

NEVADA DEPARTMENT OF WILDLIFE  
STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORTS

F-20-48  
2012

REDBAND TROUT  
EASTERN REGION



**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION  
ANNUAL JOB PROGRESS REPORT**

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**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION  
ANNUAL JOB PROGRESS REPORT**

**State:** *Nevada*  
**Project Title:** *Statewide Fisheries Program*  
**Job Title:** *Redband Trout*  
**Period Covered:** *January 1, 2012 through December 31, 2012*

**SUMMARY**

The Redband Trout Species Management Plan provided direction for activities completed during 2012. Below normal stream flows in the spring and summer prevailed in 2012. Electrofishing at six sites and through what was previously the brook trout occupied reach of Bear Creek yielded only redband trout. A resurvey of the entire North Fork Salmon Falls drainage streams documented good populations of redband trout except in Shell Creek. Shell Creek formally had redband trout and none were seen or electroshocked during this survey. A total of eight brook trout were removed in lower Caudal Creek and in a small reach of Flat Creek before the equipment failed. Spot-shocking in Walker Creek allowed for the removal of 939 brook trout and the capture and return of 59 redband trout. Low flows in Martin Creek resulted in poor shocking efficiency and a single redband trout was documented. Angling in a beaver pond yielded only redband trout.

Low stream flows in Mason Creek apparently prevented successful spawning despite a run of reservoir fish in 2012. A successful reintroduction of redband trout in Clear Creek was documented, with an estimate 586 fish in over 1.2 miles of stream. Fifty redband trout collected from Sun Creek were transported to upper West Fork Deer Creek and released to augment the initial 2008 redband trout introduction. In lieu of conducting the Bull Run fish population survey, a stream habitat survey was completed on a newly State acquired ranch located on the lower Bruneau River. Stream habitat conditions were "good;" however, several water diversion structures were identified as likely fish barriers. Information on redband trout activities was provided to the Rangewide Redband Trout Status Assessment Team.

**OBJECTIVES and APPROACHES**

**Objective:** Native Sport Fish Management

Approaches:

- Electrofish Bear Creek to discern brook trout presence/absence.
- Mechanically remove brook trout from Flat Creek, Walker Creek and Martin Creek.
- Electrofish previously surveyed sites throughout North Fork Salmon Falls Creek drainage to assess the presence of both redband trout and non-native trout.

- Visually inspect Mason Creek above the reservoir to discern redband trout reproduction.
- Install a thermograph in Mason Reservoir and Mason Creek above the reservoir.
- Electrofish upper Bull Run Creek through private land providing landowner permission.
- Electrofish Clear Creek to discern the establishment of the 2008 introduction of redband trout providing landowner permission.
- Transplant at least 50 redband trout from Sun Creek to West Fork Deer Creek to assist in the reestablishment of a redband trout population.
- Continue to coordinate with the Rangewide Redband Trout Status Assessment.
- Conduct a stream habitat survey of the newly acquired lower Bruneau River.

## PROCEDURES

A Dirigo® 700 backpack electroshocker was used to collect fish during spot-shocking and during surveys at established sample sites (Table 1).

**Table 1.** Redband Trout Survey Summaries.

Stream	Number of Sample Sites	Length of Sample Sites
North Fork Salmon Falls Cr.	8	100 ft
Bear Creek	3	100 ft
Shack Creek	3	Mean of 135 (100-200) ft
Walker Creek	Spot-shocking	0.9 mi.
Martin Creek	Spot-shocking	1 mi.
Mason Creek	Ocular	0.3 mi.
Clear Creek	2	Mean of 150 (100-200) ft
Flat Creek	Spot-shocking	0.1*mi.
Caudle Creek	Spot-shocking	0.6 mi.

\*Backpack electroshocker failed

All fish population sampling included a single upstream pass through the sample area. After electroshocking at sample sites, all fish were identified and measured (mm), game fish were measured to total length, and weighed (g) using Pesola® spring scales. Captured brook trout were removed from the stream. Electrofishing in the North Fork Salmon Falls Creek drainage was conducted to document the status of redband trout and occurrence of any nonnative trout. The electroshocking in Fall Creek, Caudle, Walker, and Martin Creeks was to remove competing brook trout from each redband trout population. The survey of Mason Creek was conducted to document redband trout reproduction. The survey in Clear Creek was to document the status of the 2008 reintroduction of redband trout into the stream.

Sample site locations in the North Fork Salmon Falls Creek drainage corresponded to the 1980 Stream Survey electrofished sample sites. Stream habitat and survey variables noted at each sample site included the following: relative water clarity, relative stream stage and flow characteristic, relative electrofishing efficiency, and relative amount of stream cover for fish. Both air and water temperatures (°F) and

time of day were recorded at each site. Additionally, stream width and depths at the start, middle, and end of each electrofished area was measured. Depths were taken at  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  the width of each transect. Stream bottom was characterized as percent composition throughout each electrofished site. Dominant aquatic organisms were noted. Quality pools were noted and referenced as to type (GAWS Class 1, 2, or 3) at each sample site. Captured trout were measured to the closest millimeter and weighed (g) using Pesola® Spring Scales. A USFS, Gaws Level III, stream habitat survey was used to characterize the newly acquired ranch along the lower Bruneau River.

Onset Brand HOBOTM Water Temp Pro v2 thermographs were installed on April 24, 2012. The Mason Reservoir thermograph was attached to a steel pipe with a zip tie and slide down to a depth of 44 in before slipping the pipe through a crack in the dock to secure it. The Mason Creek thermograph was placed in a riffle area and attached to a limb with a zip tie located about 250 ft upstream of the reservoir. Rubble-sized rocks were placed over the thermograph. Both thermographs were delayed to start at midnight on April 25, 2012.

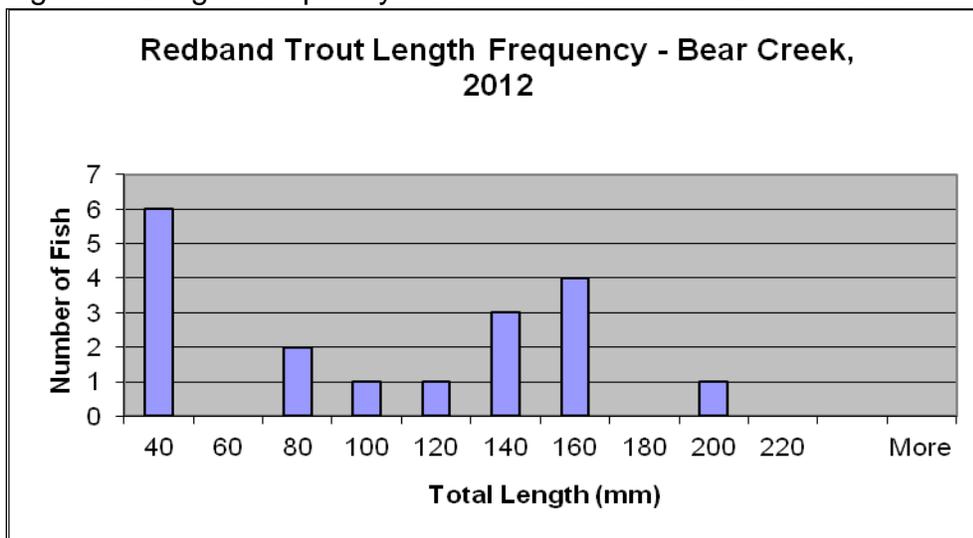
Just as was conducted in 2007, backpack electrofishing was used to capture redband trout from Sun Creek. Collected trout were placed in a 5 gal bucket and carried to the 300 gal aerated fish tank and held until a sufficient number of redband trout were captured. The fish were then hauled to upper West Fork Deer Creek, placed in 5 gallon buckets, and distributed in a 0.25 mile reach of the creek.

## FINDINGS

### Bear Creek Brook Trout Removal

Sample sites included SS-1, SS-2, SS-3, SS-3.5, SS-3.75 and SS-4. No trout were noted at either SS-3 or SS-3.75. Eighteen captured redband trout probably comprised four different age groups (Figure 1).

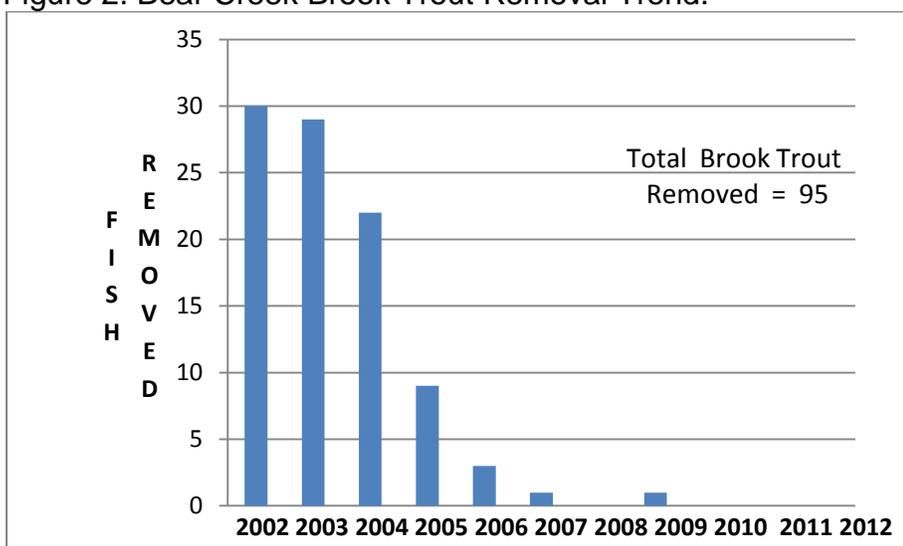
Figure 1. Length Frequency of Redband Trout from Bear Creek.



Redband trout mean density over two miles of occupied stream in 2012 was 139.6 fish/mi., which was the lowest density ever recorded in Bear Creek. The collection of trout at SS-1 just above the domestic water pond marks the first time trout have been found there. The upstream distribution of redband trout has ascended about 2,000 ft since 2008. The upper limit of redband trout extended to 7,600 ft in elevation. The low density of redband trout could be attributed to high runoff flows present in the spring of 2011, which may have washed trout downstream.

The brook trout removal the last few years appears to have exterminated the population (Figure 2). No brook trout were found in 2012 just as was the case in 2008 and 2010. A single brook trout was removed in both 2007 and 2009.

Figure 2. Bear Creek Brook Trout Removal Trend.



Stream temperatures encountered in Bear Creek ranged from a morning low of 41°F at 0917 hrs to 49°F at 1641 hrs. Bear Creek was running at medium flow stage, clear, and fast. Mean stream width averaged 8.2 ft (2.5 m). Quality pool habitat was noted at all sample sites. Boulder and rubble were the dominate substrate types throughout the surveyed reach of Bear Creek. Stream cover was judged as moderate at all sample sites and several areas had fallen trees spanning the channel. Mayflies, caddisflies, planaria, and stoneflies were noted at most sites.

### North Fork Salmon River Drainage Fish Population Survey

#### North Fork Salmon Falls Creek

The N. Fork Salmon Falls Creek was surveyed from 7/16/13 to 7/18/13 and SS-14 was dry and unsurveyable. Redband trout were the only trout captured or seen and shocking efficiency was deemed “good.” There was a mean of 250.8 redband trout per mile over 16.5 mi of surveyed stream (excludes the lower one mile of unsurveyed stream), giving an expanded estimate of 4,138 redband trout for the stream. The percent of trout >6 in and <6 in was 47.45% and 52.55%, respectively. Redband trout

ranged from 1.3 to 8.7 in (34 to 221 mm) and there were at least four different age classes represented.

Temperatures at each surveyed site ranged from 55°F at SS-16 at 1103 hrs to 75°F at SS-2 at 1218 hrs. No trout were captured or seen at SS-2. A stream discharge of 5.25 cfs was calculated at SS-6 located above any private water withdrawals. At SS-4 was below a water diversion and the discharge was only 1.84 cfs. Stream width at sites having water ranged from 7.2 ft (2.18 m) at SS-18 to 18.0 ft (5.5 m) at S-2 and averaged 11.2 ft (3.4 m). Water stage and flow was considered “low” and “slow” throughout. Stream cover was judged “light” at the two lowest stations on private land and “moderate” at the two sites above; “heavy” due to the willow canopy occurred in the narrows at SS-10; and “light-moderate” existed at the three uppermost sites. One quality sized pool occurred at all but the lowest elevation site. The pool:riffle ratio averaged 75:25 or 50% of optimum. Dominant stream invertebrates found at most sites included both rock and vegetation cased caddisflies, mayflies, stoneflies, and snails. Less common aquatic invertebrates included crayfish, a flat worm, and Western ridged mussels.

### Bear Creek

Bear Creek was surveyed, except at SS-1 where beaver ponds prevented electrofishing. Shocking efficiency was deemed “good” at the rest of the sites. There were 1,302 redband trout per mile for a population estimate of 5,468 fish. Composition of >6 in and <6 in fish was 4.5% and 95.5%, respectively. Captured redband trout ranged in length from 1.8 to 7.2 in (45 to 182 mm) and averaged 4.1 in. (103 mm). At least four age classes of redband trout were represented and there were no other species of fish collected in Bear Creek.

Stream stage was judged to be “low to medium” and the flow was described as both “fast” in the riffles and “slow” in the pools. Stream cover was “moderate” throughout. The stream channel was down-cut from 2 to 4 ft, except where beaver dams had raised water levels. Stream width averaged less than 6.6 ft (2 m). Stream discharge at SS-4 was measured at 1.62 cfs and stream temperatures ranged from 53°F at SS-4 at 0817 hrs to 75°F at SS-8 at 1608 hrs. The rubble dominated stream channel had planarians, stoneflies, mayflies, and caddisflies throughout.

### Shack Creek

Shack Creek is a tributary of Bear Creek and had a similar redband trout population, with an average of 1424.3 redband trout per mile for a total estimated population of 4,985. Shocking efficiency was deemed “good” and an average of 90.2% of those redband trout seen were caught. Length of the 104 captured redband trout ranged from 2.0 to 7.5 in (50 to 191 mm), and averaged 4.1 in (104 mm). Trout composition >6 in and <6 in was 12.8% and 87.2%, respectively. There was an average of 227.2 sculpin per mile within an estimated 2.5 mi of lower Shack Creek.

Speckled dace and longnose dace averaged 422.4 per mile and 290.4 per mile, respectively over the lower one mile of Shack Creek.

Similar to Bear Creek, the flow stage was judged to be “low to medium” and the flow was “fast” over riffles and “slow” through pools. Stream discharge, as measured at SS-6, was only 0.58 cfs. Stream width was generally less than 6.6 ft (2 m). Gravel and sand/silt dominated the bottom at SS-2, while rubble and gravel along with some sand and boulders dominated at the two upstream sites. Stream cover was “light” to “moderate-heavy” along its 3.5 mile length in Nevada. No quality sized pools were noted through the sampled areas. Stream temperature ranged from 51°F in the morning to 66°F in late afternoon. Stream invertebrates included planarians, stoneflies, mayflies, and both stone cased and vegetation cased caddisflies.

### Shell Creek

Only SS-2 in Shell Creek had sufficient water to electrofish and no fish were seen or captured within 200 ft of electrofishing. The stream stage and flow were “low” and “slow,” respectively. The stream course was meandering through sagebrush and was less than 3.3 ft (1.0 m) wide. No overhead shade was evident and steam cover was “light.” Stream discharge was 0.23 cfs and no quality sized pools were present. There were patches of aquatic buttercup growth and the stream was muddied when disturbed. Gravel and silt dominated the streambottom. Stream invertebrates included water striders, stone cased caddisflies, snails, and mayflies. The apparent absence of stoneflies could indicate an intermittently dry stream.

### Flat Creek Brook Trout Removal

Eight brook trout were removed from a 0.6 mi reach of Caudle Creek beginning about 0.5 mi above the Raker Creek confluence. Beginning about 0.4 mi above the Caudle Creek confluence on Flat Creek, two brook trout were removed after 20 min of electroshocking before the electroshocker quit working.

The brook trout found in Caudle Creek were upstream about 1.5 mi from where they were first discovered in 2008 on the U.S. Forest Service reach of stream. The short reach electrofished in Flat Creek was where brook trout were found in 2008 below the U.S. Forest Service boundary.

### Walker Creek Brook Trout Removal

During the brook trout removal project in Walker Creek, there were 939 brook trout removed from 0.9 miles of stream and 59 redband trout were netted and returned to the stream. Only redband trout were captured from about 0.2 mile downstream of the culvert beneath the road crossing.

## Martin Creek Brook Trout Removal

Only redband trout were caught from one fishable beaver pond in Martin Creek. Limited electroshocking within the shallow stream yielded only redband trout.

## Mason Reservoir Inlet Stream Inspection for Redband Trout

The estimated discharge in Mason Creek was < 0.5 cfs and there were defined pools at this flow stage. No YOY redband trout were seen in the inlet area of the reservoir or throughout the visible 0.5 mile length of inlet stream. A total of 50 yearling redband trout (last year's spawn) were counted along with several older aged redband trout. A few reservoir sized redband trout were observed in a big pool that are likely to remain there until such a time that stream flow increases sufficiently to allow them to return to the reservoir. The main headspring forming Mason Creek was 70°F at 1226 hr. Air and water temperature of the first small pool below the headspring forks were 81°F and 68°F, respectively. Downstream, about 0.5 mi and located at the thermograph site, the stream was 69°F at 1249 hrs.

## Mason Reservoir and Inlet Stream Thermal Records

The temperature was 55°F on 04/24 when the thermograph was placed in Mason Creek. The thermograph may have become partially exposed on September 14. Summer mean (6/20 to 9/21) temperature was 58.0°F. No significant deviance of temperature was believed to have occurred from the short time the thermograph may have been partially exposed. The summer maximum temperature was 73.3°F as recorded on 8/9. The warmest month was July, where the mean temperature was 60.3°F, not much warmer than the mean of 59.5°F in August. The 6-day mean maximum temperature was 61.2°F on 7/21 - 7/27, and the 7-day mean maximum temperature was 61.3°F on 8/7 - 8/13. The warmest minimum daily temperature was 63.1°F on 7/13. The stream temperature was 52°F at 1130 hrs on 10/16. Considering the temperatures incurred in 2012, the stream thermal record would indicate suitable conditions for redband trout survival.

The openness of Mason Reservoir no doubt allows for more thermal heating than the stream course, which is moderately shaded. The summer mean (6/20 - 9/21) temperature was 63.5°F, over 5°F warmer than in Mason Creek. The maximum recorded temperature was 72.2°F on 7/11. The maximum daily, 3 day mean maximum, and 7 day mean maximum temperatures were 68.7°F on 7/22; 68.4°F on 7/10 - 7/12; and 68.0°F on 7/9 - 7/15, respectively. The warmest minimum daily temperature was 67.3°F on 7/13. The maximum temperatures recorded in 2012 exceeded the temperatures taken at depth on 8/18/08; however, thermal conditions are still suitable for redband trout growth and survival.

### Clear Creek Redband Trout Introduction Follow-up

At Clear Creek, 13 redband trout were captured at S-1 in over 200 ft of stream, while 12 trout were captured in just 100 ft of surveyed stream at S-2. Shocking efficiency was deemed good at both locations. There were means of 66 catchable and 422.4 sub-catchable redband trout per mile in an estimated 1.2 mi of habitable reach. Redband trout ranged and averaged 2.1 to 7.0 in (54 to 177 mm) and 4.3 in (109 mm), respectively. Nine YOY redband trout averaged 2.5 in (63 mm) and four catchable redband trout averaged 6.4 in (163 mm) in length. Seven yearling trout averaged 4.6 in (116 mm). There were at least three age classes of redband trout in the sample collected, which would indicate that spawning probably first occurred in spring of 2009 and every year since. An estimated 586 redband trout resided within the 1.2 estimated habitable reach of stream. There was also an average of 132 speckled dace per mile and an expanded estimate of 158 total dace.

The stream was clear at a low flow stage, with pools and riffles present. Each surveyed area had a moderate amount of stream cover and one quality-sized pool. At 1311 hrs the air and water temperature were 89°F and 64°F, respectively. Both temperatures were cooler before 1200 hrs at S-1.

### West Fork Deer Creek Redband Trout Augmentation

A total of 50 redband trout were collected from Sun Creek and hauled and then transplanted into upper West Fork Deer Creek.

### Bull Run Creek Fish Population Survey

Planned fish population surveys in Bull Run Creek were not completed due to the lack of man power available. Time that would have been expended on this project was used to conduct habitat surveys on a new private land State purchase on the lower Bruneau River.

### Lower Bruneau River Habitat Survey

The overall Percent of Optimum rating for the stream reach in the lower Bruneau River was 65%. Pool measure rating was 13% of optimum and was the lowest of the rated parameters. Conversely, Pool Structure was the highest rated habitat parameter owing to the fact that mostly quality pools were intercepted by the cross stream transects. Both streambank and bank vegetative stability ratings were each 77.5% of optimum, indicating good overall bank stability. Canopy density was 46.1% owing to heavy bank vegetation. The stream bottom rated 71.3% of optimum due to the abundance of rubble (43.8%) and gravel (27.5%). Boulders and sand/silt comprised a similar amount of the stream bottom.

The stream margin – bank interface was mostly (63.3%) a gentle slope of <45°, which may have been due to lower stream flows in 2012. Only 6.7% of the interfaces

were undercut or steep banks (46 – 89%) and accounted for 30% of the interfaces. The stream gradient measured 2% at sites 1 and 3, and 1% elsewhere. The dominate shrub riparian community was rated in “good” condition throughout the six sampled areas. Riparian vegetation filled the valley bottom except at SS-6, closest to the ranch. Canada thistle and white top, both noxious weeds, were found in the meadow at SS-5.

The stream channel was a Rosgen’s C3 channel type except for SS-1 with a B3 channel type. The stream channel stability ratings were all “good”. Stream discharge at the upper end of the reach (SS-6) measured 8.7 cfs, while the USGS gage upstream of Meadow Creek recorded a discharge of 4.5 cfs on August 8, 2012.

## **MANAGEMENT REVIEW**

Northern Nevada experienced below normal stream flows in 2012 such that very low stream flows existed in mid June in Shell Creek and could have resulted in loss of a small redband trout population first documented in 1980. Low flows in Mason Creek above the reservoir apparently negated successful spawning of adfluvial redband trout. Low flows in Martin Creek in early July prevented effective electrofishing.

## **RECOMMENDATIONS**

- The mechanical removal of brook trout from Bear Creek should be considered a success and no further removal effort is warranted.
- Future population surveys should seek to document the upstream delineation of redband trout in Bear Creek.
- A similar brook trout removal effort in Walker Creek should occur in 2013.
- No additional brook trout removal in Martin Creek is warranted.
- A sample of fin-clips from presumptive redband trout collected in Martin Creek should be genetically analyzed for purity.
- Brook trout removal should continue in Caudle Creek and in Flat Creek above and below the confluence of Caudle Creek.
- The adfluvial redband trout run from Mason Reservoir into Mason Creek and any spawning success should continue to be monitored.
- Repeated thermal profiles could be sought in the future to compare with the 2012 findings.
- Clear Creek should be surveyed again in a few years and both the upstream and downstream distribution of trout should be determined.

- The West Fork Deer Creek redband trout population should be re-assessed by 2015.
- Bull Run Creek above the reservoir should be surveyed to assess fish species composition in 2013 given permission from the new landowner.
- The noxious weeds should be sprayed to rid the meadows of them along the Lower Bruneau River.
- There are two water diversion structures in the Lower Bruneau River that should be evaluated for removal.
- Snorkeling in the Lower Bruneau River should be conducted to document fish species presence and relative numbers.

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