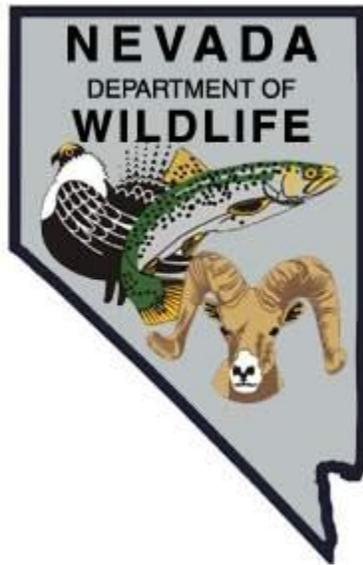


NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORTS

F-20-50
2014

REDBAND TROUT
EASTERN REGION



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

Table of Contents

<u>Contents</u>	<u>Page</u>
SUMMARY	1
OBJECTIVES and APPROACHES	2
PROCEDURES	3
FINDINGS	2
MANAGEMENT REVIEW	14
RECOMMENDATIONS	14
LITERATURE CITED	20

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

List of Figures

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Length frequency of redband trout from Canyon Creek.....	4
2	Length frequency of brook trout from Canyon Creek.....	4
3	Length frequency of redband trout from South Fork Canyon Creek	6
4	Length frequency of redband trout from Schoonover Creek	7
5	Length frequency of redband trout from Mill Creek and the E.F. Mill Creek	8
6	Length frequency of redband trout from Chicken Creek	8
7	Bruneau River flows at Rowland USGS gauge station June 23-25, 2014	10
8	Bruneau River flows at Rowland USGS gauge station 10/1 – 9/30, 2014	10
9	Stream bottom composition for the furthest upstream NDOW owned property the Bruneau River on June 23-24, 2014	12
10	Length frequency of redband trout from Badger Creek on June 16-20, 2014.....	13

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

List of Tables

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	2014 Redband Trout Survey Summaries.....	2
2	Schoonover Creek fish population survey August 14, 2014.....	6
3	Mill Creek fish population survey August 14 - 26, 2014	7
4	Chicken Creek fish population survey August 14, 2014.....	9
5	Dorsey Creek, Upper Jack Creek and Coffin Creek fish population survey August 25-26, 2014	9
6	Habitat Condition Index for the furthest upstream NDOW owned property on the Bruneau River on June 23-24, 2014	11
7	Riparian area seral stage, score and rating for the furthest upstream NDOW owned property on the Bruneau River on June 23-24.....	12

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

List of Maps

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Portion of Flat Creek where brook trout removal efforts occurred on May 29, 2014	16
2	Station location on Canyon Creek on August 27 – September 14, 2014.....	16
3	Station locations on the North Fork and South Fork of the Middle Fork Canyon Creek on September 8 - 9, 2014.....	17
4	Station locations on South Fork Canyon Creek on September 9, 2014	17
5	Station locations on Schoonover Creek on August 14, 2014	18
6	Station locations on Mill Creek, E.F. Mill Creek and S.F. Mill Creek on August 8-14, 2014	18
7	Station locations on Chicken Creek August 14, 2014	19
8	Station locations on Coffin Creek, Dorsey Creek and Upper Jack Creek on August 25-26, 2014.....	19
9	Station locations on Badger Creek on June 16-20, 2014.....	20

**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, 2014 through December 31, 2014*

SUMMARY

The Redband Trout Species Management Plan provided direction for activities completed during 2014. Below normal stream flows in the spring and summer prevailed in 2014. Attempts were made to document the spawning success of the redband trout population within Mason Creek Reservoir with limited success, but a future survey of the reservoir is warranted.

Brook trout removal efforts were ultimately thwarted on Flat Creek in the East Fork Bruneau River drainage due to high flows and low shocking efficiency. A more comprehensive survey of the drainage is needed to better understand the extent and size of the brook trout population.

A sizeable brook trout population was documented in the upper reaches of Canyon Creek in the Salmon Falls drainage. Due to the size of the population and the amount of occupied habitat, a future chemical eradication project may be warranted. The opportunity was taken to survey the remaining two forks of Canyon Creek, including S.F. Canyon Creek and E.F. Canyon Creek. A stable population of redband trout was documented in S.F. Canyon Creek.

Stable populations of redband trout were documented in Schoonover Creek, E.F. Mill Creek, and Chicken Creek. Additionally, the opportunity was taken to survey the remainder of the Jack Creek tributary streams in the S.F. Owyhee River drainage, including Coffin Creek, Mill Creek, and Upper Jack Creek. A stable population of redband trout was documented in Mill Creek.

A GAWS Level III survey of the NDOW owned "Howard" property on the Bruneau River found good to excellent habitat conditions for the redband trout and mountain whitefish populations present. A sizeable population of endemic nongame fish was also documented.

A baseline survey of the redband trout population was completed in Badger Creek in the East Fork Owyhee River drainage before exploratory drilling occurs within the drainage. It appears this population has been negatively impacted by the recent and continuous drought.

Due to time constraints, Merritt Creek, Willis Creek, and Sun Creek were not surveyed in 2014 and will be surveyed in 2015.

OBJECTIVES and APPROACHES

Objective: Native Sport Fish Management

Approaches:

- Visually inspect Mason Creek above the reservoir to discern redband trout reproduction in the spring and summer.
- Mechanically remove brook trout from Walker Creek and the BLM reach of Flat Creek.
- Survey Merritt and Willis creeks in the Sheep Creek drainage to discern redband trout status and current fish assemblage.
- Survey Canyon Creek and the BLM section of Sun Creek in the Salmon Falls drainage to discern redband trout status and current fish assemblage.
- Survey Schoonover, E.F. Mill, S.F. Mill, Chicken, and Dorsey creeks in the Jack Creek drainage to discern redband trout status and current fish assemblage.
- Perform a GAWS survey on NDOW owned Howard property on the Bruneau River.
- Survey Badger Creek (EFOR) to discern redband trout status and current fish assemblage.
- Continue to coordinate with the Rangewide Redband Trout Status Assessment.

PROCEDURES

A Smith Root LR-20B backpack electroshocker was used to collect fish during spot shocking and during surveys at established sample sites. Table 1 is a summary of 2014 redband trout surveys.

Table 1. 2014 Redband Trout Survey Summaries.

Stream	Number of sample sites	Length of Sample Sites
Bruneau River	9	100 ft.
Canyon Creek	7	100 ft.
M.F. Canyon Creek	Spot Shocking	N/A
S.F. Canyon Creek	6	100 ft.
Schoonover Creek	3	100 ft.
Mill Creek	3	100 ft.
E.F. Mill Creek	2	100 ft.
S.F. Mill Creek	1	100 ft.
Coffin Creek	2	100 ft.
Chicken Creek	5	100 ft.
Dorsey Creek	1	100 ft.
Upper Jack Creek	1	100 ft.
Badger Creek	12	100 ft.
Flat Creek	Spot Shocking	1.2 mi

All fish population sampling included a single upstream pass through the sample area. After electroshocking at sample sites, all game fish were identified and measured (mm, TL). Captured brook trout were removed from the stream and disposed of properly. Electroshocking in Canyon Creek, South Fork Canyon Creek, Middle Fork Canyon Creek, Schoonover Creek, Mill Creek, East Fork Mill Creek, South Fork Mill Creek, Coffin Creek, Chicken Creek, Dorsey Creek, Upper Jack Creek, and Badger Creek was conducted to document the status of redband trout. The electroshocking in Flat Creek was to remove competing brook trout from redband trout occupied habitat. The survey of Mason Creek was conducted to document redband trout reproduction. A GAWS level III survey on the Bruneau River was to document current conditions on the NDOW owned "Howard" property on the river.

FINDINGS

Mason Reservoir Inlet Stream Inspection

A single redband trout approximately 12 inches in length was found directly upstream of the reservoir on April 21, 2014. No redband trout redds were found during the survey. On May 22, 2014, the lower portion of Mason Creek was intermittently dry and no trout or redds were documented. Due to time constraints, the upper portion of Mason Creek was not walked in May. Several actively feeding redband trout were noted within the reservoir during the surveys.

Flat Creek Brook Trout Removal

A total 64 brook trout were removed from Flat Creek and 83 redband trout were captured and released. Map 1 illustrates the portion of Flat Creek where removal efforts occurred. The removal efforts were ultimately cut short due to high water flows and high turbidity creating very poor shocking efficiency.

The status of brook trout in the Flat Creek drainage is currently unknown. A drainage wide survey is needed to document the extent of brook trout invasion and to address the feasibility of conducting future removal efforts.

Merritt and Willis Creeks Population Survey

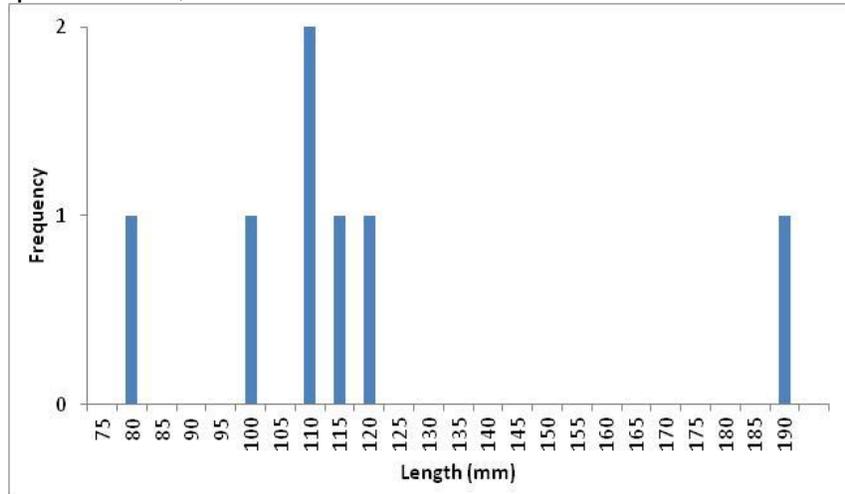
Due to time constraints, Merritt and Willis creeks were not surveyed in 2014 and will be surveyed in 2015.

Canyon Creek Population Survey

Seven redband trout were sampled on the USFS portion of Canyon Creek for a relative abundance of 197 trout per mile. Redband trout were present at the lower four stations (Canyon 1-4) and absent from the upper three (Canyon 5-7) (Map 2). Figure 1 illustrates the length frequency distribution of the population sampled. Roughly, three

age classes were represented with the two younger cohorts making up the largest portion of the population.

Figure 1. Length frequency of redband trout from Canyon Creek August 27 – September 14, 2014.



Forty brook trout were sampled during the survey and were present at every station, with the exception of Canyon 7 where no fish were present. Brook trout constituted 85% of the trout sampled within the USFS portion of Canyon Creek. The highest percentages of brook trout were found at Canyon 4-5 and the relative abundance of brook trout throughout the sample area was 886.7 trout per mile.

Figure 2. Length frequency of brook trout from Canyon Creek August 27 – September 14, 2014.

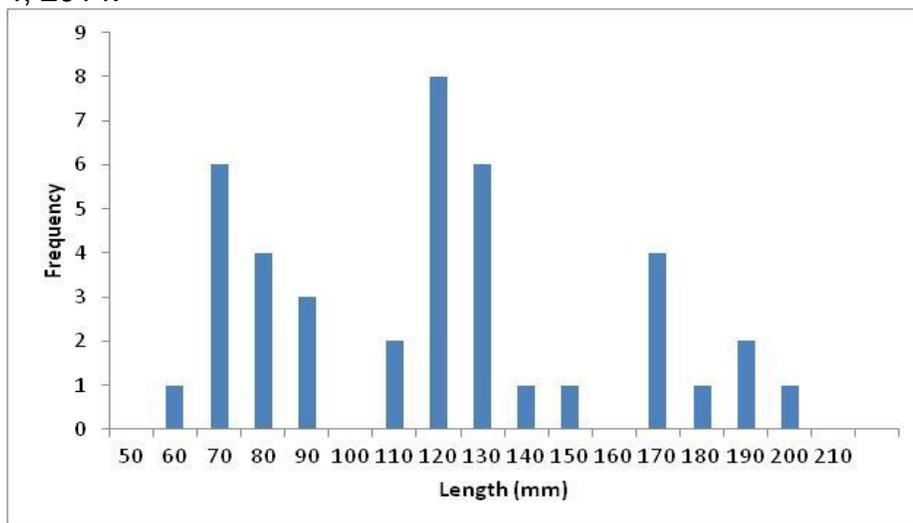


Figure 2 illustrates the length frequency distribution of the brook trout population sampled. Approximately three age classes of brook trout were contacted during the survey, indicating that a naturally reproducing population is present. These findings are very similar to what was found during the previous 1996 survey. Given the high

abundance of brook trout and their continued expansion, it is evident they are outcompeting the native redband trout in the drainage. Introduced fish species that establish self-sustaining populations threaten the long-term persistence of native fishes (Moyle 1986, Allan and Flecker 1993, Rahel 2000).

Future surveys need to be conducted in the remainder of the drainage to determine the extent of brook trout invasion and address the feasibility of beginning a brook trout mechanical removal project or conducting a chemical treatment on the stream. Given the long stream length occupied by brook trout, an electroshocking removal project would be costly and ultimately unsuccessful. Meyer et al. (2006) stated that a lack of a meaningful decline and unchanged total mortality for older brook trout during removal projects suggest that a compensatory response occurs in the brook trout population via reduced natural mortality, which offset the removal of large numbers of brook trout. They continue to conclude that future projects elsewhere over large stream lengths would be costly, quixotic enterprises (Meyer et al. 2006).

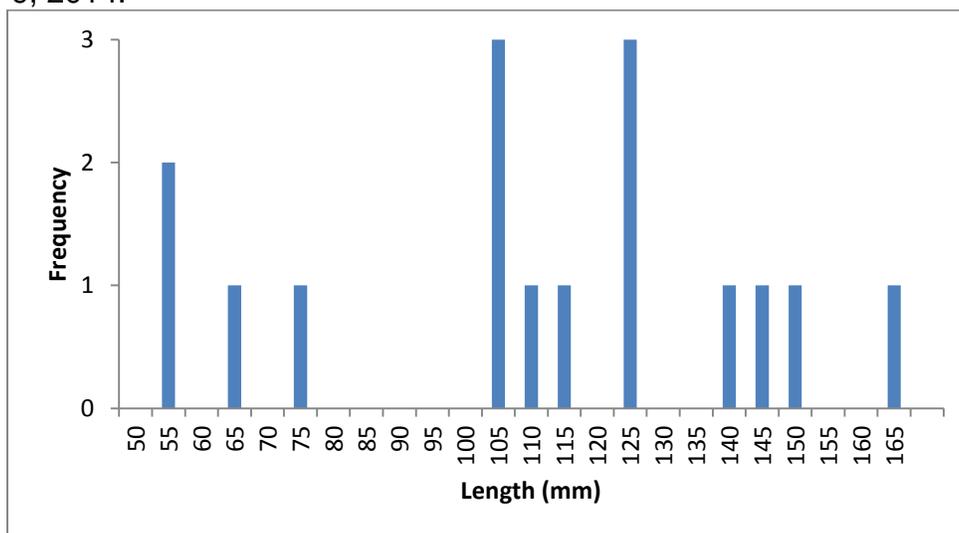
It was noted that the riparian area appeared to be in excellent shape with the exception of Canyon 2 (Map 2) where extensive past cattle use and a diminished riparian area were present. Paiute sculpin were present throughout the drainage and fin clips were collected per request from the Rocky Mountain Research Station in Montana.

No trout were contacted at any of the five stations sampled on the south fork and the north fork of the Middle Fork Canyon Creek. The furthest downstream station (Map 3) was dry at the time of the survey and was not sampled. Both forks of the Middle Fork Canyon Creek were heavily impounded by a succession of beaver dams, and sampling was extremely problematic. Attempts were made to sample the margins of the beaver ponds at the previously established stations sites. No trout were visible within the beaver ponds. Additionally, small patches of running water between the stations were also sampled. No fish species were contacted. It was noted that the riparian area appeared to be in excellent shape on both of the two forks surveyed.

A total of 37 redband trout were sampled on the South Fork Canyon Creek, 19 (51%) of which were classified as young-of-year and were not included in the analysis. Excluding young-of-year, the relative abundance of redband trout in South Fork Canyon Creek was 237.5 fish per mile. Redband trout were present at every station, with the exception of SFCAN 5 (Map 4). SFCAN 5 was located on a small tributary with minimal flow that possibly goes dry during certain time periods. Including young-of-year, approximately four age classes of redband trout were sampled. Figure 3 illustrates the length frequency distribution of the population sampled, excluding the young-of-year.

A stable population of redband trout is currently present in South Fork Canyon Creek as evident by the multiple age classes and the large young-of-year cohort found during the survey. Additionally, it was noted that the riparian area was in excellent condition, with very little evidence of past livestock grazing. Paiute sculpin were only present at SFCAN 1 and fin clips were collected per request from the Rocky Mountain Research Station in Montana.

Figure 3. Length frequency of redband trout from South Fork Canyon Creek September 9, 2014.



Sun Creek Population Survey

Due to time constraints Sun Creek was not surveyed in 2014 and will be surveyed in 2015.

Schoonover Creek Population Survey

Nineteen redband trout were contacted in Schoonover Creek, of which one was classified as a young-of-year and was not included in the population estimate. The age one and older redband trout ranged in length from 2.4 inches (62 mm) to 5.7 inches (145 mm) and had a relative density of 443.0 fish per mile (Table 2). Figure 4 shows the length frequency distribution of the redband trout from Schoonover Creek. Approximately two to three age classes of redband trout were represented within the sample. Map 5 shows the station locations.

Table 2: Schoonover Creek fish population survey August 14, 2014.

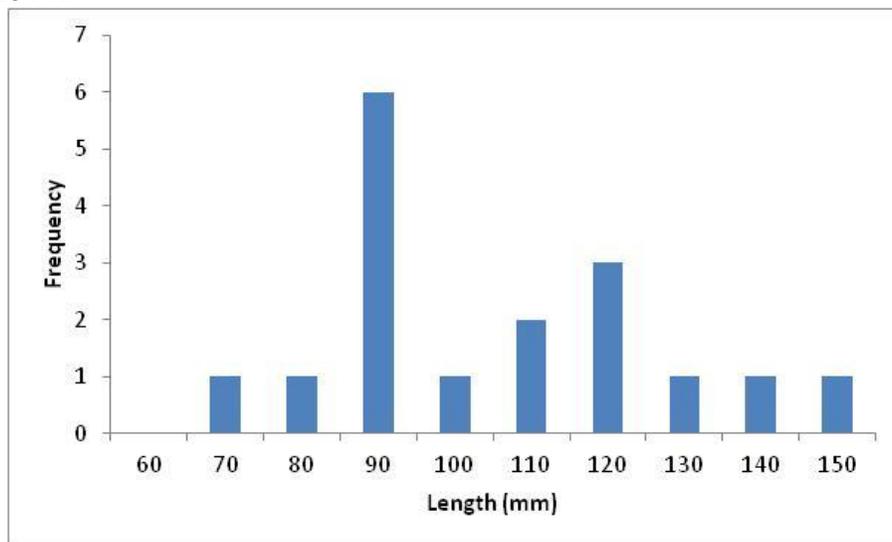
Station	Date	#RB	# RB Miss	UTM E	UTM N	H2O Temp
Schoonover 1	8/14/2014	10	3	578067	4595832	52
Schoonover 2	8/14/2014	3	2	578879	4595588	51
Schoonover 3	8/14/2014	6	0	580116	4595155	46

Mill Creek Population Survey

Sixteen redband trout were contacted in Mill Creek and ranged in length from 2.5 inches (63 mm) to 8.3 inches (210 mm). Redband were only present at the lower stations; Mill 1, Mill 2, and E.F. Mill 1 (Map 6; Table 3). The remaining stations had a very high gradient and appeared to be above the occupied trout habitat. The relative

abundance for Mill Creek was 131.9 fish per mile, with several age classes (about three) being represented. Figure 5 shows the length frequency of the redband trout from Mill Creek and the E.F. Mill Creek.

Figure 4. Length frequency of redband trout from Schoonover Creek on August 14, 2014.



Redband trout were the only fish species sampled in Mill Creek. The previously documented brook trout were not contacted during the survey and it is unknown if they have been extirpated from the system. Future follow up will be needed to ensure that a small population does not exist somewhere in the system. The relative abundance of redband trout within Mill Creek appears to be much lower than the previous 1978 survey. This could be contributed to a number of factors including survey protocol, timing of the survey, and inclusion of young-of-year fish into data analysis, and is not a cause for concern. Additionally, the 2014 survey was performed during a period of extensive drought that likely negatively impacted the redband trout population. Table 3 illustrates the date, time, and the UTM of each station. Additionally, it shows the number of redband trout, the number of redband trout missed and the water temperature at each station.

Table 3: Mill Creek fish population survey August 14 - 26, 2014.

Station	Date	# RB	# RB Miss	UTM E	UTM N	H2O Temp
Mill 1	8/14/2014	7	0	581827	4598456	53
Mill 2	8/14/2014	4	0	582163	4597663	53
Mill 3	8/14/2014	0	0	582385	4596690	50
E.F. Mill 1	8/25/2014	5	4	582685	4598363	49
E.F. Mill 2	8/26/2014	0	0	583618	4598711	46
S.F. Mill 1	8/26/2014	0	0	583284	4598006	46

Chicken Creek

Sixteen redband trout were contacted in Chicken Creek, eight of which were classified as young-of-year and were not included in the population estimate. The age class one and older redband trout ranged in length from 2.2 inches (55 mm) to 5.0 inches (128 mm), and had a relative density of 139.0 fish per mile. Figure 6 shows the length frequency of the redband trout from Chicken Creek. Approximately three age classes of redband trout were represented within the sample.

Figure 5. Length frequency of redband trout from Mill Creek and the E.F. Mill Creek on August 14 and 25, 2014.

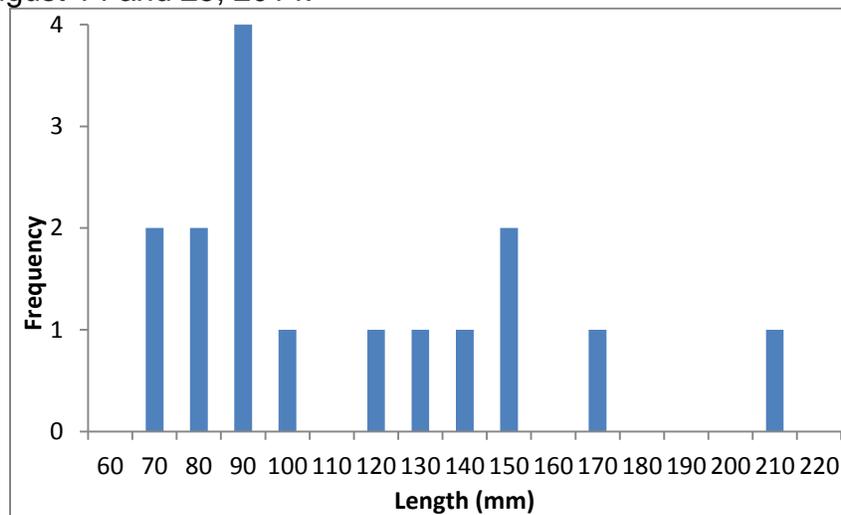


Figure 6. Length frequency of redband trout from Chicken Creek on August 14 2014.

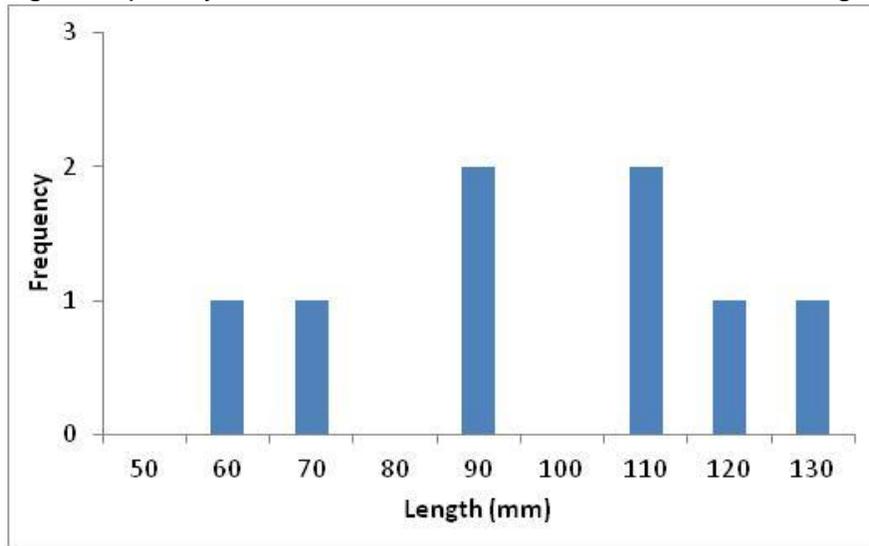


Table 4 illustrates the date, time, and the UTM of each station. Additionally, it shows the number of redband trout, the number of redband trout young of year, the number of redband trout missed, and the water temperature at each station. The high

proportion of young-of-year redband trout present within Chicken Creek suggests that it is an important spawning and juvenile rearing tributary to Jack Creek. No other fish species were contacted during the survey. Map 7 shows the station locations.

Table 4. Chicken Creek fish population survey August 14, 2014.

Station	Date	#RB	#RB YOY	# RB Miss	UTM E	UTM N	H2O Temp
Chicken 1	8/14/2014	4	6	0	580610	4598698	53
Chicken 2	8/14/2014	2	2	0	581352	4597832	53
Chicken 3	8/14/2014	1	0	0	581926	4596883	54
Chicken 4	8/14/2014	1	0	0	582014	4595783	52
Chicken 5	8/14/2014	0	0	0	582263	4594611	52

Coffin Creek, Upper Jack Creek, and Dorsey Creek Population Surveys

A single young-of-year redband trout was sampled in Dorsey Creek and no redband trout were contacted in Upper Jack Creek or Coffin Creek. The 1978 findings suggest that these small tributaries have the potential to support redband trout populations, but the current prolonged drought has negatively impacted these populations. Additionally, the 1978 survey occurred in October in which higher flows were likely present. With the higher flows, redband trout could have potentially moved out of the main stem of Jack Creek and moved into the smaller tributaries. Map 8 and Table 5 shows the station locations.

Table 5. Dorsey Creek, Upper Jack Creek, and Coffin Creek fish population survey August 25-26, 2014.

Station	Date	UTM E	UTM N	H2O Temp
Dorsey 1	8/26/2014	582345	4600082	50
Upper Jack 1	8/25/2014	582030	4601098	Dry
Coffin 1	8/25/2014	578979	4596573	Dry
Coffin 2	8/25/2014	579778	4596117	52

Bruneau River GAWS Level III Survey

At the time of the survey (June 23-24), water flows were well below average at roughly 20 cfs. A United States Geological Service (USGS) gauging station is located 3.4 miles downstream of BRU 17. Given the proximity of the gauging station to the survey location, no flow measurements were taken during the survey. Figure 7 illustrates the flow measured by the USGS gauge in cubic feet per second (cfs) on June 23-24, 2014.

The Bruneau River and Northern Elko County experienced well below average precipitation during the water year that extended from October 1, 2013 to September 30, 2014. The flow in the Bruneau River from October 1, 2013 to September 30, 2014 is illustrated in Figure 8, with the yellow triangles showing the average flow over 52

years. When combining the low flows and the significant runoff events that occurred in August 2014, it is likely that the fish assemblage present within Bruneau River was negatively impacted in 2014.

Figure 7. Bruneau River flows at Rowland USGS gauge station June 23-25, 2014.

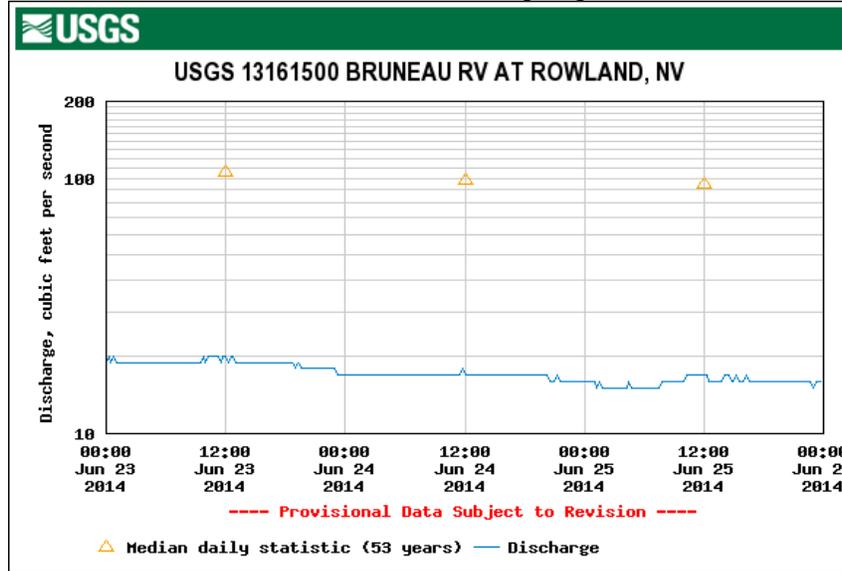
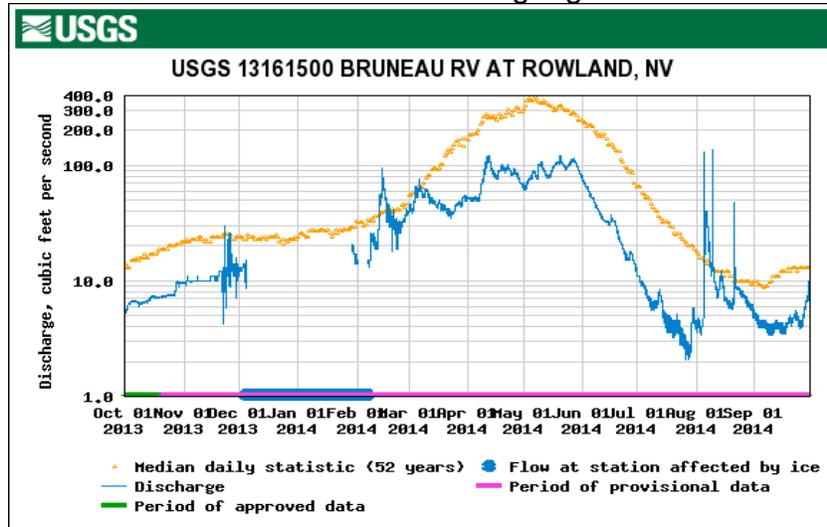


Figure 8. Bruneau River flows at Rowland USGS gauge station 10/1 – 9/30, 2014.



The average HCI rating for the stations surveyed on the Bruneau River was 64.7 (fair condition). All stations were found to have aquatic habitat conditions rated as fair. These condition ratings are based on the USFS ratings of 0-39 (poor), 40-69 (fair), 70-89 (good), and 90-100 (excellent). Table 6 shows the summary of the habitat survey.

Percent pool measure (PM, Table 6) and the percent pool structure, or quality pools (PS), were found to be major limiting factors. Pool measure is a rating of the

pool/riffle ratio for a stream or stream reach. It is assumed that a 1:1 ratio of pool to riffle is most productive. Measurable pools were only sampled at a single station, with a percent pool measure of 91.9% at BRU 23. Quality pools were also only sampled at BRU 23, with a rating of 100%. Quality pools are defined as pools with widths that are greater or equal to the average stream depth, greater or equal to one foot in depth, and have adequate cover. It was noted that several high quality pools were located at BRU 23, primarily caused by the high amount of channel sinuosity located at the station. Throughout the rest of the stations sampled, the low amount of quality pools can be partially attributed to the low flows present during the survey and the less sinuous nature of the stream channel at the stations.

Table 6. Habitat Condition Index for the furthest upstream NDOW owned property on the Bruneau River on June 23-24, 2014

Station	PM	PS	SB	BC	BSS	BVS	HCI
17	0.0	0.0	96.7	100.0	95.8	95.8	64.7
18	0.0	0.0	101.7	91.7	95.8	100.0	64.9
19	0.0	0.0	91.7	100.0	87.5	95.8	62.5
20	0.0	0.0	93.3	100.0	91.7	91.7	62.8
21	0.0	0.0	95.0	87.5	91.7	87.5	60.3
22	0.0	0.0	90.0	91.7	91.7	95.8	61.5
23	91.9	100.0	96.7	33.3	79.2	79.2	80.0
24	0.0	0.0	76.7	100.0	95.8	100.0	62.1
25	0.0	0.0	83.3	100.0	100.0	100.0	63.9
Average	10.2	11.1	91.7	89.4	92.1	94.0	64.7

Bank cover (BC) rated 89.4% (good), with 83% covered with shrubs, 7% covered with grass, and the remaining 10% was rated as exposed. An optimum rating would be a plant community of 100% shrubs with an understory of sod.

Bank vegetation stability (BVS) was measured to be 94.0% (excellent) and bank soil stabilization (BSS) was measure to be 92.1% (excellent). Overall, both the vegetation and soil on the Bruneau River were found to be very stable.

Stream bottom embeddedness was very light to nonexistent at all of the stations. Stream bottom embeddedness is the measurement of substrate that is covered in fine sediments (sand/silt). The only stations with identifiable stream bottom embeddedness were BRU 17 at 6.7% embeddedness and BRU 25 at 13.3% embeddedness. Figure 9 illustrates the substrate composition present at the survey sites.

Riparian habitat conditions for the surveyed portion of the Bruneau River ranged from good to excellent at all stations. Table 7 illustrates the seral stage, score, and rating for all station sampled. Overall, canopy density was very low at 3%, this low canopy density can be attributed to the lack of mature trees within the river corridor providing shading over the relatively wide stream channel.

Thirty-three meter electroshocking surveys were conducted at all nine stations. Due to the size of the stream and no block nets being utilized, shocking efficiency was

deemed extremely low. A total of six redband trout were captured during the survey and due to the small sample size and survey methodology, an accurate population estimate could not be made. This survey was performed to serve mainly as an aquatic and riparian habitat survey, but the opportunity to shock was taken in order to document species composition within the survey area. Speckled dace *Rhinichthys osculus*, redband shiner *Richardsonius balteatus* were well represented at every station sampled. Mountain sucker *Catostomus platyrhynchus* and bridgelip sucker *C. platyrhynchus* were present at low abundances. Additionally, mountain whitefish *Prosopium williamsoni* were present at the three furthest upstream stations sampled.

Figure 9. Stream bottom composition for the furthest upstream NDOW owned property the Bruneau River on June 23-24, 2014

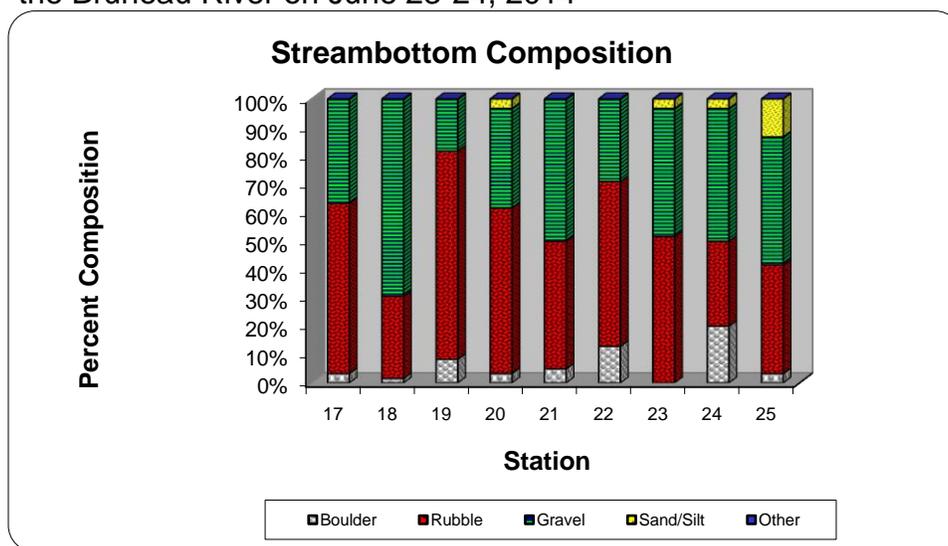


Table 7. Riparian area seral stage, score and rating for the furthest upstream NDOW owned property on the Bruneau River on June 23-24, 2014

Station	Seral Stage	Score	Rating
17	Shrub PNC	23	Good
18	Shrub PNC	26	Good
19	Shrub PNC	25	Good
30	Shrub PNC	28	Excellent
21	Shrub PNC	27	Excellent
22	Shrub PNC	27	Excellent
23	Shrub PNC	23	Good
24	Shrub PNC	26	Good
25	Shrub PNC	28	Excellent

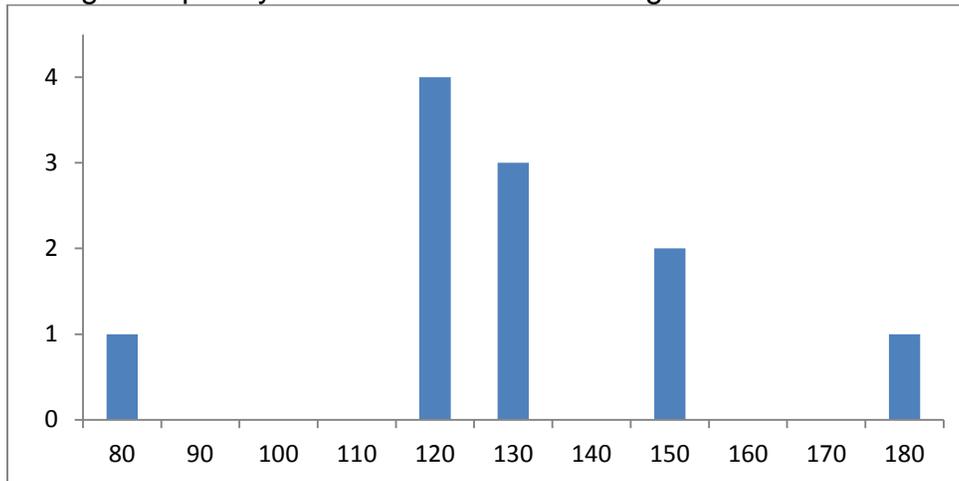
Overall, the redband trout habitat within the Bruneau River is in excellent shape. The system has a healthy stable riparian present that is stabilizing the banks and preventing excessive erosion and deposition. The presence of mature trees providing shading of the stream channel would be beneficial. The lack of suitable pool habitat can be partly attributed to the extremely low flows present. Additionally, pool habitat is extremely hard to quantify, with only three transects at each station, the low pool habitat rating is a common attribute of many Nevada streams.

Badger Creek Population Survey

A total of eleven redband trout were sampled during the 2014 survey, a significant decline from the 1986 survey. When the survey was performed, Northern Nevada was in the midst of a significant drought event. Several years of below average moisture appears to have been detrimental to the redband trout population within Badger Creek. It was noted that approximately four miles of lower Badger Creek appeared to have gone dry in the summer of 2013.

The eleven redband trout that were sampled were located in the upstream reaches of Badger Creek where water temperatures and flow were most conducive (Map 9). The relative density of redband trout within the fish bearing reach (Badger 10 – 12) was calculated at 152 fish/mile, excluding young-of-year). Figure 10 illustrates the length frequency of the redband trout sampled. Approximately three age classes of redband trout were sampled, evidence of continued reproduction within the system.

Figure 10. Length frequency of redband trout from Badger Creek on June 16-20, 2014.



Redband trout were the only fish species sampled during the survey. A single Columbia spotted frog was contacted in a beaver pond complex at the uppermost station (Badger 12). Columbia spotted frogs were previously known to occur within the drainage. Extensive beaver complexes were noted to be present within the fish bearing reach of Badger Creek, with high concentrations in close proximity to Badger 9 and Badger 12.

It was noted during the survey that the riparian condition appeared to be in good shape, with minor amounts of ungulate damage present. No habitat measurements were taken during the survey.

MANAGEMENT REVIEW

Northern Nevada experienced below normal stream flows in 2014. Stable populations of redband trout were documented in Schoonover Creek, E.F. Mill Creek, and the Bruneau River.

Mason Creek Reservoir should be surveyed in the future to document the number of age classes and the relative age of the redband trout present, a single adult redband and no redds were documented during spawning surveys. The presence of younger age redband trout would confirm that successful spawning is occurring. Depending on the survey methods utilized, a population estimate of redband trout in the reservoir could be made.

The opportunity was taken to survey the remainder of the Jack Creek tributaries in the South Fork Owyhee drainage. A stable redband trout population was found in Mill Creek. No redband trout were contacted in Coffin and Upper Jack creeks, these tributaries can possibly be utilized as spawning streams.

A very sizeable population of brook trout was documented in the upper reaches of Canyon Creek, but surveys on the remainder of the drainage need to be performed to address the feasibility of conducting a chemical eradication project. The opportunity was taken to survey the remaining two forks of Canyon Creek, both of which are redband trout streams. A stable population of redband trout was found in S.F. Canyon Creek. M.F. Canyon Creek was heavily impounded by beaver dams and no redband trout were contacted.

Brook trout removal efforts on Flat Creek were ultimately cancelled. A more extensive survey is needed to better understand the extent and size of the brook trout population before any more removal efforts are conducted.

The current ongoing drought appears to have negatively impacted the redband trout populations in Badger Creek. Redband trout were documented only within the headwater reaches. When conditions improve and more suitable habitat is available, this population is expected to expand. Additionally, the Badger Creek survey will be utilized as a baseline to address concerns of the exploratory drilling that is set to occur within the drainage.

Planned surveys were not completed in Merritt Creek, Willis Creek, and Sun Creek. Brook trout removal efforts were not performed in Walker Creek and a more extensive survey is needed before additional removal efforts are warranted.

RECOMMENDATIONS

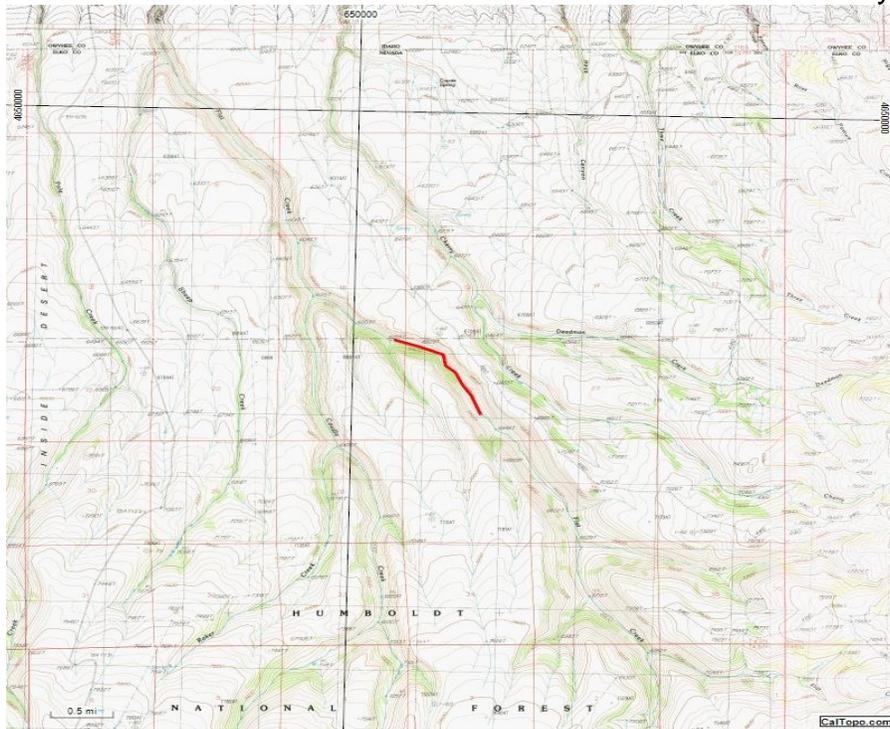
- Survey both Flat and Caudal creeks to document the extent of brook trout invasion in the drainage.

- Continue to monitor the redband trout and mountain whitefish populations within the Bruneau River.
- The current riparian management on the Bruneau River had greatly benefitted the river and the fish assemblage present and should not be altered.
- Mason Creek Reservoir should be surveyed in 2015 to document the number of age classes and the relative density of the redband trout present. The presence of younger aged redband trout would confirm that successful spawning is occurring. Depending on the survey methods utilized, a population estimate of redband trout in the reservoir could be made.
- Continue to monitor the redband trout population present in South Fork Canyon Creek
- Future sampling to determine the presence/absence of brook trout within the Jack Creek drainage should occur. This can be accomplished with future surveys and brook trout eDNA analysis.
- Continue to monitor the redband trout population within Badger Creek.
- Perform a GAWS Level III survey on Badger Creek in future years to assess habitat conditions within the drainage.
- Continue systematically surveying redband trout bearing streams that have not been surveyed in recent years.
- Survey Merritt and Willis creeks in 2015 to document the status of the redband population and current fish assemblage.
- Survey Walker Creek before brook trout removal efforts are conducted.

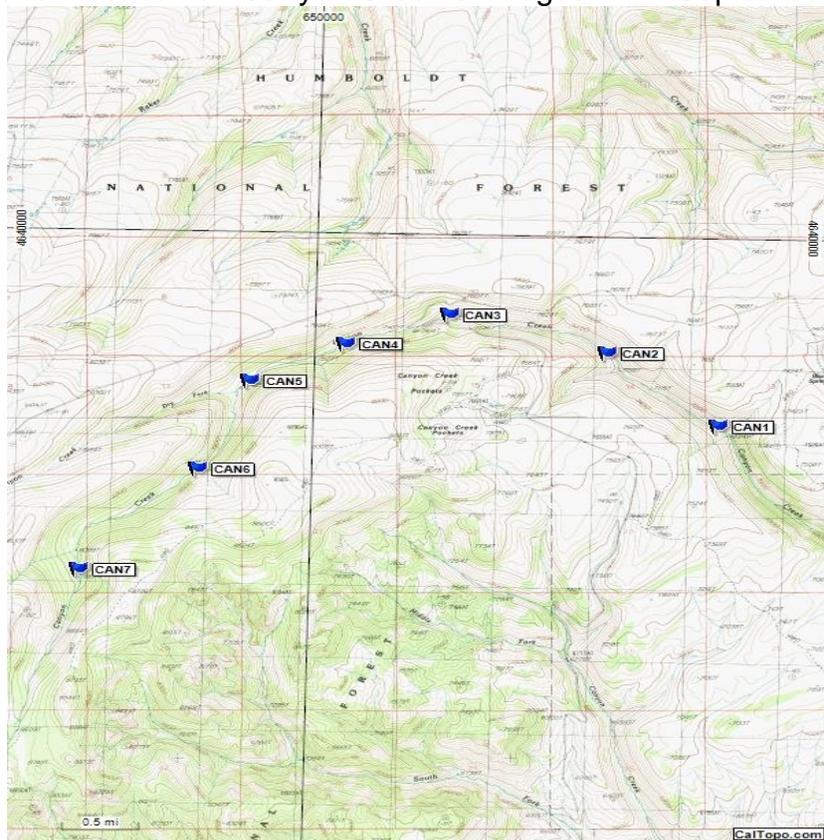
Prepared by: Kevin Netcher
Biologist II, Eastern Region

Date: February 17, 2015

Map 1: Portion of Flat Creek where brook trout removal occurred on May 29, 2014.



Map 2: Station location on Canyon Creek on August 27 – September 14, 2014.



Map 3: Station locations on the north fork and south fork of the Middle Fork Canyon Creek on September 8 - 9, 2014.



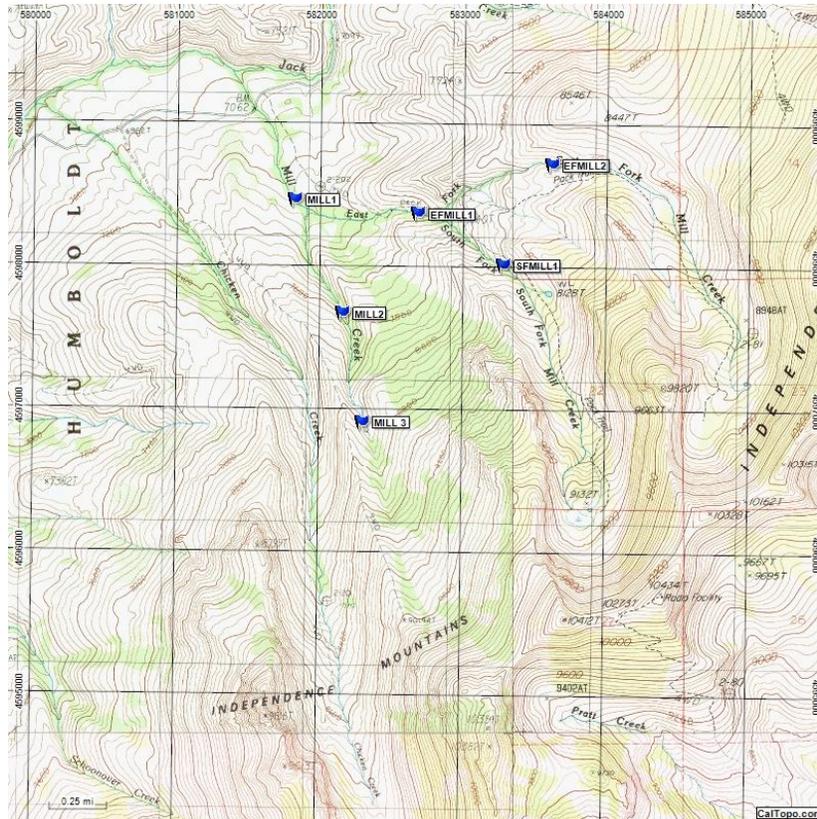
Map 4: Station locations on South Fork Canyon Creek on September 9, 2014.



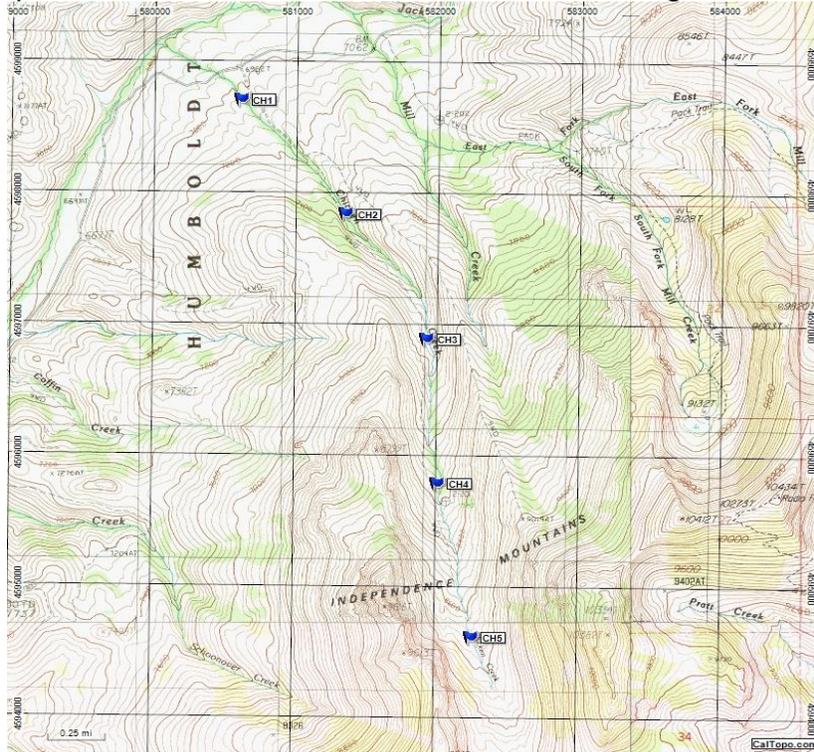
Map 5: Station locations on Schoonover Creek August 14, 2014



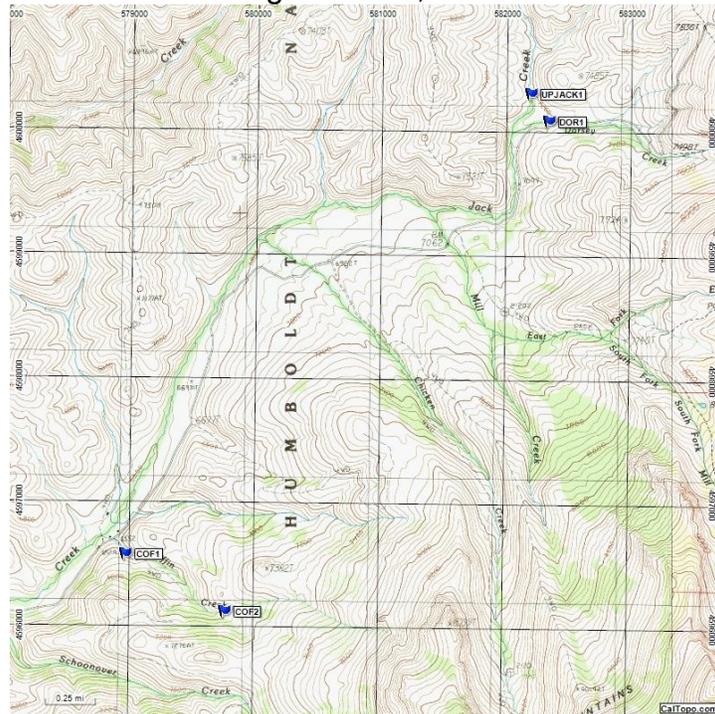
Map 6: Station locations on Mill Creek and E.F. and S.F Mill creeks on Aug 8-14, 2014.



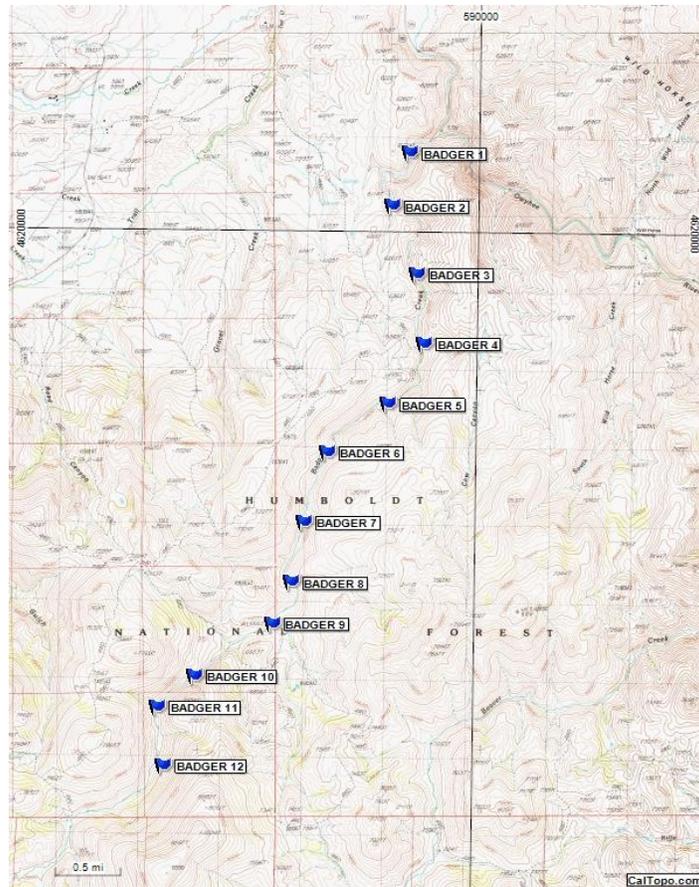
Map 7: Station locations on Chicken Creek on August 14, 2014



Map 8: Station locations on Coffin Creek, Dorsey Creek and Upper Jack Creek on August 25-26, 2014



Map 9: Station locations on Badger Creek on June 16-20, 2014



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