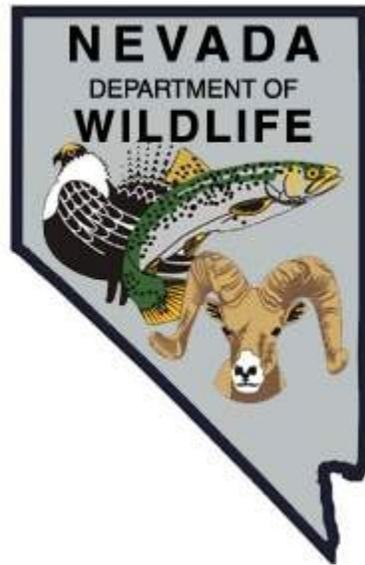


NEVADA DEPARTMENT OF WILDLIFE STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORT

F-20-54
2018

TRUCKEE RIVER WESTERN REGION



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

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

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Truckee River*
Period Covered: *January 1, 2018 through December 31, 2018*

SUMMARY

On April 1, 2018, the designated end of the snow-measuring season, the snowpack in the Truckee River Basin stood at 75% of the median for that date and the amount of precipitation for the year stood at 90% of average. While the 2017/18 winter was slightly below average based on snowpack and precipitation, the benefits from an extremely wet winter in 2016/17 was still being realized in the Truckee Meadows.

Eleven fish survey transects were sampled (tote-barge electroshocking) across four river zones (2 through 5) on the Truckee River from September 26 through 28, 2018. A total 2,152 fish were captured (357 in 2017) and consisted of 747 salmonids, 1,329 native nongame fishes, 75 nonnative warmwater game fish, and 1 undesirable species.

Anglers completed 75 volunteer creel surveys at three drop-boxes along the Truckee River. Anglers fished 191 hrs and caught 142 fish consisting of 115 rainbow trout, 9 brown trout, 13 Lahontan cutthroat trout (LCT), 4 mountain whitefish, and 1 fish reported as other. Resulting catch rates of all fish were 1.9 fish per angler and 0.7 fish per hour. Of the fish reported, only seven rainbow trout and the one "other" fish were reported as harvested, the remaining fish were reported as released. The number of anglers reporting their results in volunteer drop-boxes this year improved over the average use of 59 anglers (seven years of data).

The Mail-in Angler Questionnaire Survey for 2017 estimated use at 5,115 anglers and 25,781 angler use days. There was an estimated 87,297 fish caught for an angler success rate of 3.4 fish per day. This was substantially higher than the long-term average of 1.9 fish per day.

BACKGROUND

The Truckee River formerly supported tremendous spawning runs of cui-ui that traveled from Pyramid Lake and lacustrine/adfluvial Lahontan cutthroat trout (LCT) that inhabited Lake Tahoe and Truckee River basins. It is generally accepted there were two LCT spawning runs (winter and spring) from Pyramid Lake that would ascend the Truckee River to reach spawning habitats in the main stem and tributaries. The cui-ui was believed to have had an upstream limit near East McCarran Boulevard while LCT was believed to have moved throughout the Lake Tahoe-Truckee River-Pyramid Lake watershed.

The influx of European settlers to the Truckee River basin brought with it a number of anthropogenic changes to the system including water diversions (fish passage barriers)

for municipal and agricultural use (i.e., Derby Dam), over-harvest of fish, habitat alteration, reduced water quality and quantity, and introduction of non-native fishes. The Pyramid Lake LCT population began dwindling in the early 1900s and it eventually was extirpated around 1940. Fortunately, the cui-ui was able to persist in limited numbers due to the longevity of the species.

Historically, LCT was successfully reintroduced into Pyramid Lake by the Nevada Department of Wildlife (NDOW), with stocks coming from a number of genetic strains including Summit Lake and the Carson River Basin. Further advancements by the Pyramid Lake Paiute Tribe (PLPT) and USFWS have produced a quality fishery. Pyramid Lake is within the boundaries of the Pyramid Lake Paiute Reservation and the PLPT currently manages the lake's LCT fishery, which is maintained by hatchery stocking.

Subsequent to the collapse of the LCT fishery in the Truckee River, non-native salmonids such as rainbow trout and brown trout were introduced for sport fishing. These species soon established self-sustaining populations, which continue to persist. In an effort to meet angler demand, the fisheries were annually augmented with hatchery-reared trout.

Portions of the Truckee River managed by the Nevada Department of Wildlife have seen an array of catch regulations and tackle restrictions over the years. In an effort to minimize confusion, and with the support of angling groups in the area, the angling regulation for the entire Truckee River within the State of Nevada and upstream of the Pyramid Lake Paiute Tribe (PLPT) boundary was changed to a three game fish harvest limit in 2013. Subsequently, all tackle restrictions were lifted in 2014 and any legal method of fishing was allowed. These regulations were meant to benefit all angling methods and should have no adverse effects on the fishery. In an effort to protect a potential spawning run of Pilot Peak strain Lahontan cutthroat trout from Pyramid Lake in the lower Truckee River (below derby dam) a regulation was approved by the State of Nevada Board of Wildlife Commissioners in 2016 and went into effect in February of 2017. This new regulation reduced the limit of trout (all species) to zero (0) and limited tackle to only artificial single barbless hooks from the PLPT boundary upstream to 1,000 feet below derby dam. This occurs annually from February 1 to May 31. The regulation did not appear to significantly impact the fishery or angling during 2017.

NDOW and the PLPT signed a five-year Memorandum of Agreement (MOA) in 2002, which coordinates efforts for restoring LCT in the Truckee River. Upon the expiration of this agreement, a meeting occurred in late 2014 to reenact the agreement and to include the USFWS. The main objectives were to: 1) Work toward the reestablishment of a natural LCT spawning run from Pyramid Lake to the Truckee River, and 2) Maintain LCT in the Truckee River for recreational fishing. Due to improved habitat conditions for salmonid spawning and rearing, there was optimism that some degree of restoration could be possible. In addition, through the efforts of the Fish Passage Team, several barriers will be evaluated for fish passage in hopes that modifications allow trout to disperse naturally throughout the system.

In April of 2013, the NDOW was informed by the Nevada Division of Environmental Protection (NDEP) that a substrate sample collected in August of 2012 from the Truckee River confirmed a single New Zealand mud snail (*Potamopyrgus antipodarum*, NZMS). It was collected near East McCarran Bridge in Sparks, representing the first established occurrence in the Truckee River/Lake Tahoe Basin. Subsequent NZMS surveys defined its distribution from Mayberry Park downstream to the Mustang exit off I-80.

The entire Great Basin, specifically the Lake Tahoe Basin, experienced drought that began in 2012 and concluded in 2016. Four consecutive years of having an annual snowpack of less than 60% of normal created entire stretches in the Truckee River void of flow for extended periods. This resulted in numerous fish kills, which negatively affected the fishery as a whole. Then, the winter of 2015/16 brought much needed relief to the region with an average snowpack (i.e., 100% of normal) that enabled flows in the Truckee River to return to normal. The winter of 2016/17 produced a record-breaking snowpack of over 200% that led to flooding in winter and brought higher than average flows for most of the year. The river undoubtedly benefitted from sustained flows causing scouring and cleaning of the gravels in a system that was in need of flushing. The effects of this drought yielded very low fish densities throughout Nevada's length of river, but fish population health shortly returned to an all-time high. Having average or above average winter snowpack allows great improvement of Truckee River habitats and fisheries.

OBJECTIVES

- Monitor water quantity (discharge) through USGS Stream Flow data.
- Monitor fish populations by conducting tote-barge electroshocking surveys at 11 traditional transects during three days in the fall.
- Collect fin samples from rainbow trout and LCT for genetic analysis by the University of Nevada Genetics Lab.
- Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts, return of angler drop-box surveys, and mail-in angler questionnaire data.
- Maintain the angler information center and angler drop-boxes.
- Conduct two days of presence/absence surveys for NZMS at suitable locations upstream and downstream of the area they are presently known to occupy.

PROCEDURES

Monitor water quantity (discharge) through USGS Stream Flow data. Natural Resource Conservation Service (NRCS) and US Geological Service (USGS) data were used to assess water quantity in the Truckee River throughout the year. Annual snowpack data was derived from NRCS SNOTEL sites in the Truckee River Basin, while river discharge was obtained from USGS gages located at Reno and Derby Dam.

Monitor fish populations by conducting tote-barge electroshocking surveys at 11 traditional transects during three days in the fall. A Smith Root 5.0 GPP tote barge electroshocker was used for a single pass fish survey at 11 traditional transects

along the Truckee River on September 26, 27, and 28, 2018. For the first time in over five years, a complete survey of all transects could be carried out. All fish were identified from which a subset of each species were measured to fork length, weighed, and released back to the river unharmed.

Collect fin samples from rainbow trout and LCT for genetic analysis during electroshocking surveys for genetic analysis by the University of Nevada Genetics Lab. Sixty-seven fin clips were collected for genetic analysis during the 2018 electroshocking survey. They are currently being held until the University of Nevada is able to process them.

Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts, return of angler drop-box surveys, and mail-in angler questionnaire data. During the course of other duties, fishing information was collected from available anglers on site. Fish caught, hours fished, tackle used, and environmental conditions were recorded.

Three volunteer angler drop-boxes on the Truckee River were periodically monitored and restocked. At the end of the calendar year, data was collected, reviewed, and summarized.

Angler use and success was also assessed through the Mail-in Angler Questionnaire Survey. Angler questionnaire data was summarized from a survey that was mailed to 30,000 license purchasers from the previous calendar year (2017).

Maintain the angler information center and angler drop-boxes. The angler information center and drop-boxes were visually inspected and restocked on a regular basis.

Conduct two days of presence/absence surveys for New Zealand mud snails at suitable locations upstream and downstream of the area they are known to occupy. A modified zigzag technique was used to survey seven transects on the Truckee River for identifying presence/absence of NZMS on July 22 and July 23. Surveys were used to monitor changes in distribution from previous surveys.

Two to three surveyors were utilized per transect, which was similar to previous surveys. At each transect, a midpoint was delineated, and a length of 100 ft was measured and marked upstream and downstream. Beginning at the midpoint, one surveyor completed a “zig” by first walking perpendicular to the bank to a point halfway across the river. At the completion of every other step, two to three rocks or substrate material were picked up from the river bottom and thoroughly examined for the presence of snails. A corresponding “zag” was accomplished by walking at a 45-degree angle back to the same bank, checking the substrate at every other step.

Zigs and zags were completed by one surveyor moving upstream and another surveyor moving downstream to each corresponding 100 ft marker. At most transects,

this equated to four zigzags upstream and four zigzags downstream. In some cases, the halfway point of the river could not be safely reached during the zig due to depth or high flow. In these instances, a returning zag was initiated from the furthest, safest location that could be reached. In addition, some transects did not allow for a complete 100 ft transect upstream or downstream from the initial midpoint. In such cases, the longest attainable distance was completed. In addition to the two surveyors conducting the zigzags, a third surveyor focused on areas that appeared to be of appropriate snail habitat, this person was deemed the “rover.” Areas were chosen based on previous knowledge of quality snail habitat gained during the 2013 survey. All gastropods found were collected into plastic vials with ethyl alcohol until the transect was completed. Notes were taken at each transect depicting the actual location and cataloguing what was sampled.

FINDINGS

Visually monitor water quantity (discharge) through USGS Stream Flow data.

On April 1, 2018, the designated end of the snow-measuring season, the Truckee River Basin snowpack stood at 75% of the median for that date and the overall precipitation for the year stood at 90% of average. While this winter was slightly below average in snowpack and precipitation, the benefits from the extremely wet winter of 2016/17 were still being realized in the Truckee Meadows. The USGS gage in Reno recorded fluctuating flow rates throughout the year, with a large spike during spring runoff and rain events (Figure 1). For the remainder of the year it was maintained near the 93-year average. Lake Tahoe rose above its natural rim in early 2017 and maintained above that level. Discharge in the Truckee River near Wadsworth (Figure 2) remained slightly above or near the 46-year average for the entire year. This gage is located well below all municipal outtakes and hydropower diversions; therefore, most of the diverted water returned to the river passes freely to Pyramid Lake outside of tribal diversions.

Figure 1. USGS Gage - Truckee River at Reno Discharge Summary, 2018.

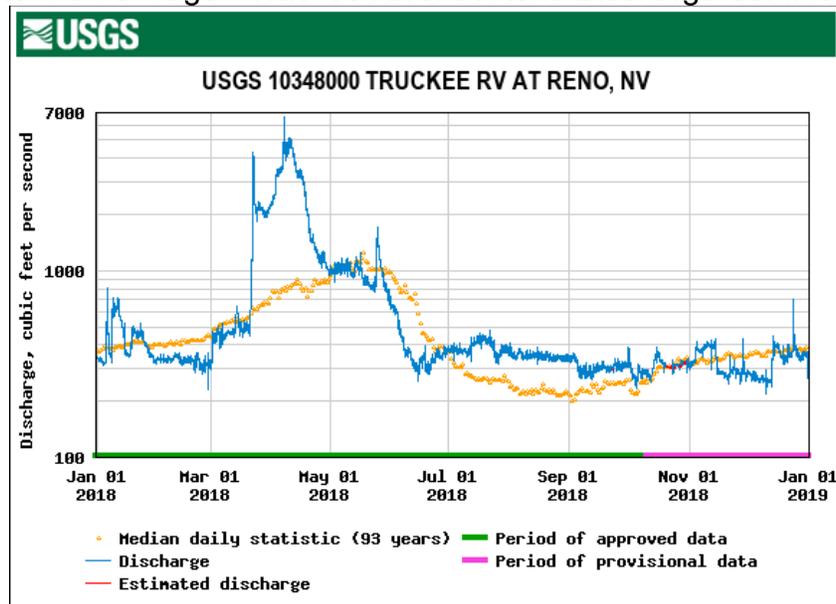
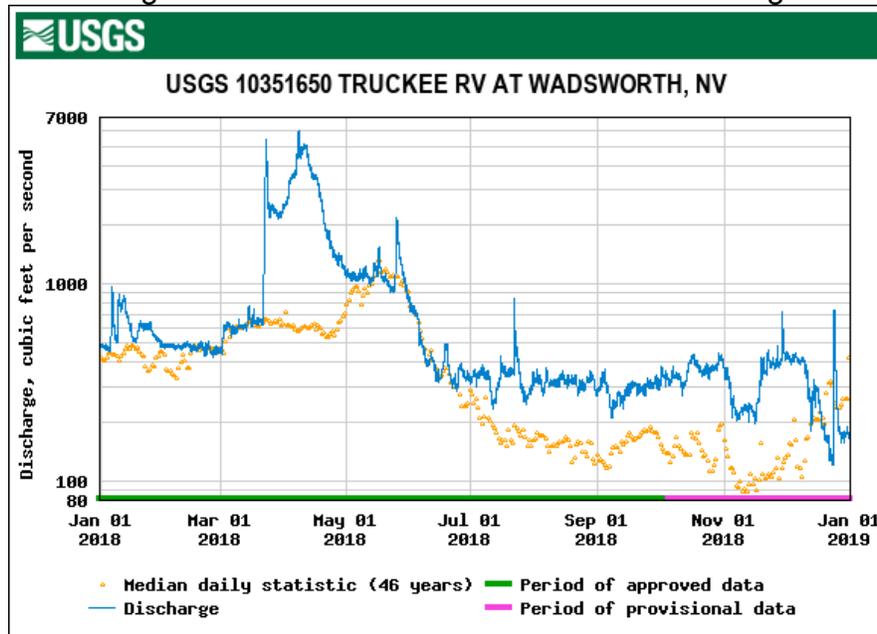
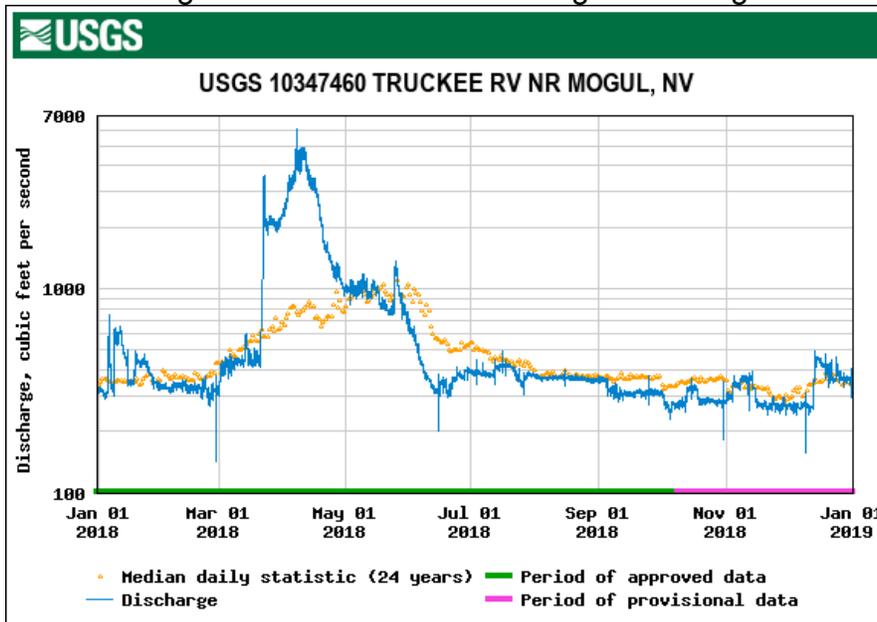


Figure 2. USGS Gage – Truckee River near Wadsworth Discharge Summary, 2018.



Flows recorded Mogul gage mirrored other gages during spring runoff, but then fell below the 24-year average. Flows remained slightly below the long-term average for the remainder of the year. This gage is situated downstream of Washoe Highlands diversion dam that diverts water for municipal use. Due to this diversion, lower flows are realized downstream to the confluence of Hunter Creek. It is difficult to assess true flows below the Washoe Highlands diversion since the next gage occurs at Mogul. For the second consecutive year, a small drop in river flow occurred near October 1. This drop could be negatively affecting brown trout spawning success during this time of year.

Figure 3. USGS Gage – Truckee River near Mogul Discharge Summary, 2018.



Monitor fish populations by conducting tote-barge electroshocking surveys at 11 traditional transects during three days in the fall. All 11 fish population survey transects were completed across four river zones (2 through 5) on the Truckee River from September 26 to 28. A total 2,152 fish were captured (total 357 in 2017) and consisted of 747 salmonids, 1,329 native non-game species, 75 non-native warm-water gamefish, and 1 undesirable species (fathead minnow). Salmonids were comprised of non-native sport fish (rainbow and brown trout) as well as native mountain whitefish and four Lahontan cutthroat trout that were stocked earlier in the year (total stocked was 36,584). Native non-game species consisted of Paiute sculpin, Lahontan redbreast, speckled dace, mountain sucker, and Tahoe sucker. Warmwater gamefish consisted of largemouth bass, pumpkinseed, green sunfish, Sacramento perch, and brown bullhead. The presence of an undesirable species was the result of unintentional and/or illegal introductions.

Excluding undesirable species, a gamefish to nongame fish ratio of 1.0:1.6 was found in 2018. This ratio represents a species assemblage that has abundant forage fish. It is likely attributed to the Truckee River continuing its rebound from drought conditions experienced from 2013 to 2015. Smaller, nongame species have been able to show recruitment quicker and become more abundant than game fish species. In the Truckee River, a community dominated by nongame species typically leads to healthier and larger gamefish.

Two locations were sampled at Zone 2, Painted Rock riffle and Derby Dam riffle and pool. The survey caught eight salmonids (rainbow and brown trout) for an estimated density of 22.5 fish/mi, an increase from the 5.8 fish per/mi in 2017. Other species sampled in this zone consisted of Lahontan redbreast, sucker sp., largemouth bass, pumpkinseed, and green sunfish. The habitat was characterized as slower moving current, deeper channels, and typically warmer temperatures.

Table 1. Zone 2 Salmonid Data, 2018.

		Brown	Rainbow	LCT	Whitefish
No. Caught		5	3	0	0
Avg. Size	mm	289	329	0	0
	in	11.4	12.9	0	0
Size Range	mm	110.0	265.0	0	0
	in	4.3	10.4	0	0
	mm	450.0	381.0	0	0
	in	17.7	15.0	0	0
# Wild		5	3	0	0
Percent Wild		100.0%	100.0%	0	0
Fish / Mile (By Species)		14.1	8.4	0.0	0.0
Total Trout (Incl. Pools)		8			
Total Trout (Excl. Pools)		8			
Total Salmonids (Incl. Pools)		8			
Total Salmonids (Excl. Pools)		8			
Trout Fish / Mile (River)		22.5			
Salmonid Fish / Mile (River)		22.5			

Zone 3 consisted of a single transect at McCarren Ranch. This transect was first added in 2012, and provides a unique look at the fisheries response to a number of instream and riparian habitat restorations. A total of 228 non-game fish and 32 salmonids were captured. Non-game fish were represented by Lahontan redbside, sucker sp., and speckled dace. Salmonids comprised 27 brown trout, 2 rainbow trout, and 3 mountain whitefish resulting for an estimated density of 224.1 fish/mi (Table 2). This was an increase from the 75.8 fish/mi estimated in 2017. All rainbow trout were identified as wild (i.e., naturally propagated in the river). During the 2017 survey at McCarren Ranch, no juvenile salmonids were captured and led to concerns that fish would not recover after the drought. Those concerns were remedied in 2018 with 70.4% of the sampled brown trout comprised of juveniles.

Table 2. Zone 3 Salmonid Data, 2018.

		Brown	Rainbow	LCT	Whitefish
No. Caught		27	2	0	3
Avg. Size	mm	181	375	0	131
	in	7.1	14.8	0	5.2
Size Range	mm	108	345	0	121
	in	4.3	13.6	0	4.8
	mm	410.0	405.0	0	142.0
	in	16.1	15.9	0	5.6
# Wild		27	2	0	3
Percent Wild		100.0%	100.0%	0	100.0%
Fish / Mile		189.1	14.0	0.0	21.0
Total Trout		29			
Total Salmonids		32			
Trout Fish / Mile		203.1			
Salmonid Fish / Mile		224.1			

Zone 4 sampling was completed at Rock Park (two transects) and Wingfield Park. This section of the Truckee River was the most densely populated area of the river in 2018. A total of 255 salmonids were captured and consisted of 169 brown trout, 33 rainbow trout, 49 mountain whitefish, and 4 Lahontan cutthroat trout (Table 3) resulting in a density of 607.8 fish/mi (78.4 fish/mi in 2017). Nongame species consisted of sucker sp., speckled dace, Lahontan redbside, pumpkinseed, Sacramento perch, brown bullhead, and green sunfish. A single fathead minnow was also sampled in this zone. Approximately 87% of brown trout and 30% of rainbow trout captured were considered Class I or younger fish (<150 mm). High levels of recruitment are a positive sign that river conditions have been conducive for year round spawning and rearing of juvenile salmonids.

Zone 5 sampling transects were completed at Patagonia, River Bend Dam, Crystal Peak Park, and Verdi Power Dam. Game fish caught totaled 452 salmonids and nongame fish included Paiute sculpin, speckled dace, sucker sp., and redbside. Salmonids were comprised of brown trout, rainbow trout, and mountain whitefish resulting in an estimated density of 170.4 fish/mi (86.5 fish/mi in 2017) (Table 4). Fish collected and processed from large pools at the foot of River Bend Dam and Verdi Power Dam

were included in length assessments, but not factored into density estimates. Class 1 brown trout (<150 mm) made up approximately 41.7% of the salmonids captured and represented a healthy amount of recruitment in a stretch of river that has limited spawning habitat. From 106 rainbow trout caught, 96.2% were identified as wild and approximately 23.5% were Class I or younger (<150 mm). The wild component of the Truckee River fishery appears to be strong and makes up the vast majority of gamefish.

Table 3. Zone 4 Salmonid Data, 2018.

		Brown	Rainbow	LCT	Whitefish
No. Caught		169	33	4	49
Avg. Size	mm	138	251	238	201
	in	5.4	9.9	9.4	7.9
Size Range	mm	85.0	73.0	204.0	88.0
	in	3.3	2.9	8.0	3.5
	mm	328.0	488.0	262.0	360.0
	in	12.9	19.2	10.3	14.2
# Wild		169	33	0	49
Percent Wild		100.0%	100.0%	0%	100.0%
Fish / Mile (By Species)		402.8	78.7	9.5	116.8
Total Trout		206			
Total Salmonids		255			
Trout Fish / Mile		491.0			
Salmonid Fish / Mile		607.8			

Table 4. Zone 5 Salmonid Data, 2018.

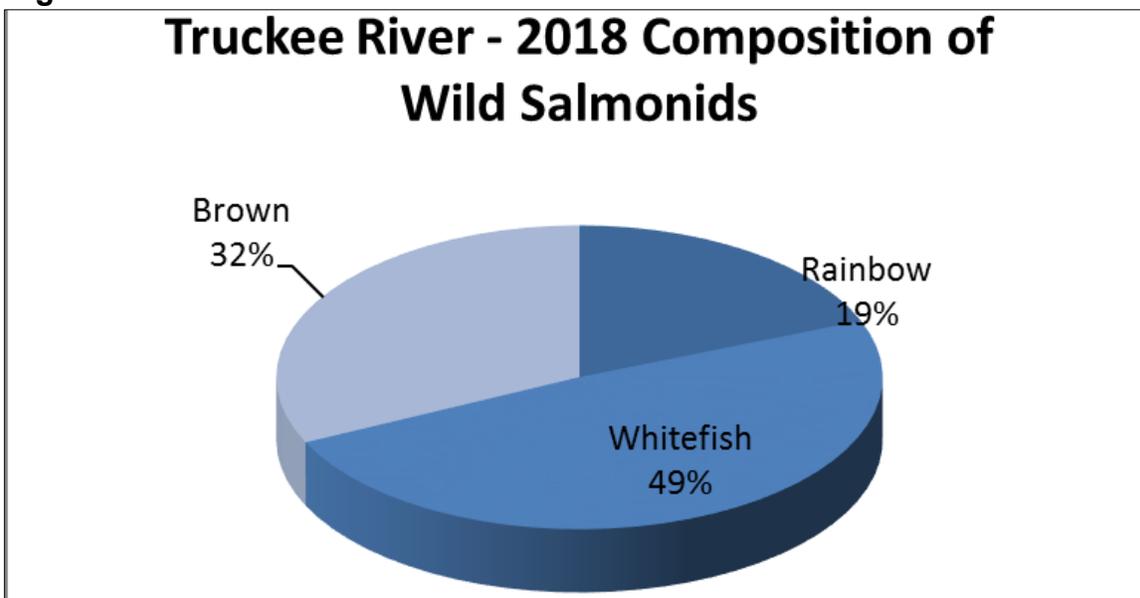
		Brown	Rainbow	LCT	Whitefish
No. Caught		36	106	0	310
Avg. Size	mm	252	260	0	158
	in	9.9	10.2	0	6.2
Size Range	mm	94	74	0	107
	in	3.7	2.9	0.0	4.2
	mm	650	499	0	347
	in	25.6	19.6	0.0	13.7
# Wild		36	102	0	310
Percent Wild		100.0%	96.2%	0	100.0%
Fish / Mile (By Species)		26.9	96.1	0.0	35.9
Total Trout (Incl. Pools)		142			
Total Trout (Excl. Pools)		105			
Total Salmonids (Incl. Pools)		452			
Total Salmonids (Excl. Pools)		133			
Trout Fish / Mile (River)		134.5			
Salmonid Fish / Mile (River)		170.4			

The estimated density of salmonids across all sampled areas of the Truckee River averaged 256.2 fish/mi. This was the highest recorded density since the 2013 survey. The highest salmonid estimate was in Zone 4 and the lowest in Zone 2. This was expected due to the habitat types in each zone. Quicker recruitment and recolonization is expected in areas having the highest habitat complexity (i.e., Zone 4), while areas like Zone 2 take more time to repopulate because flows are slower and deeper and the water

temperature is warmer. Over 36,000 LCT were stocked in 2018, however, only four were captured during population surveys. For the entire river, wild salmonids were comprised of 19% rainbow trout, 32% brown trout, and 49% mountain whitefish (Figure 4). These ratios differed from 2016 and 2017 when rainbow trout dominated the survey. This suggests the river has better flows and habitat conditions into the fall creating a better spawning environment for mountain whitefish and brown trout. This is further supported by 77.2% of the brown trout sampled during 2018 were class 1 fish (less than 150 mm).

Fish densities and overall population sizes increased substantially from those observed in 2017. This may partly be a function of more manageable survey conditions in 2018 but continued average to above average winter precipitation is undoubtedly benefitting the Truckee River fishery as it recovers from drought.

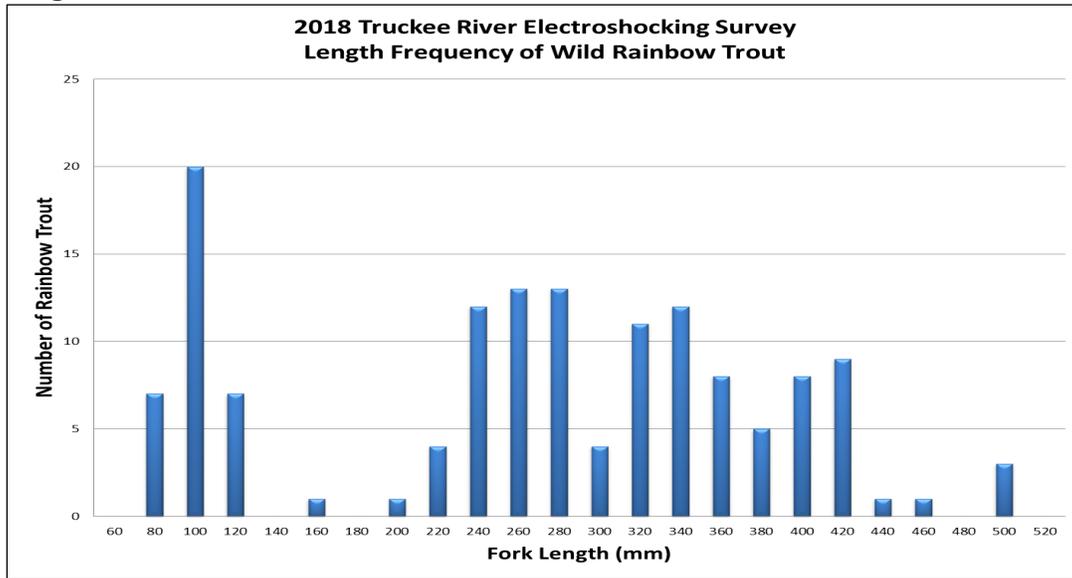
Figure 4.



A length frequency analysis of the wild rainbow trout ($n=140$) reveals at least five age classes currently inhabiting the Truckee River (Figure 5). A breakpoint at 5.9 in (150 mm) distinguished Class I and younger fish, while breakpoints at 11.8 in (300 mm), 15.0 in (380 mm), and 17.3 in (440 mm) separated older age classes. Class I or younger fish comprised 24.3% of the wild fish, an increase from the 8.2% found in 2017. This is further indication that the river provided beneficial habitat from the average to above average winters over the last three years.

Brown trout similarly showed five age classes (Figure 6), with a length break at 7.1 in (180 mm) used to distinguish Class I and younger individuals. Similar to the rainbow trout, it appears that juvenile brown trout dominated the population. All brown trout captured were considered wild since they have not been stocked since 2005. Of the 237 wild brown trout analyzed, 77.2% were deemed as Class I fish and serve as a positive indicator the species is recovering from past drought.

Figure 5.



Mountain whitefish abundance has drastically improved since 2016 and 2017. In 2016 they made up just 2% of the salmonid composition, while in 2018 they made up 49%. This is likely a factor of better habitat conditions (higher flow and lower temperature) in fall. Their numbers may be slightly skewed due to a large number sampled at the Verdi Pool transect where they congregated for spawning. When removing this transect from calculations, whitefish comprised 18% of salmonids. Mountain whitefish in 2018 showed three distinct size classes suggesting the population was substantially depleted during the drought (Figure 7).

Figure 6.

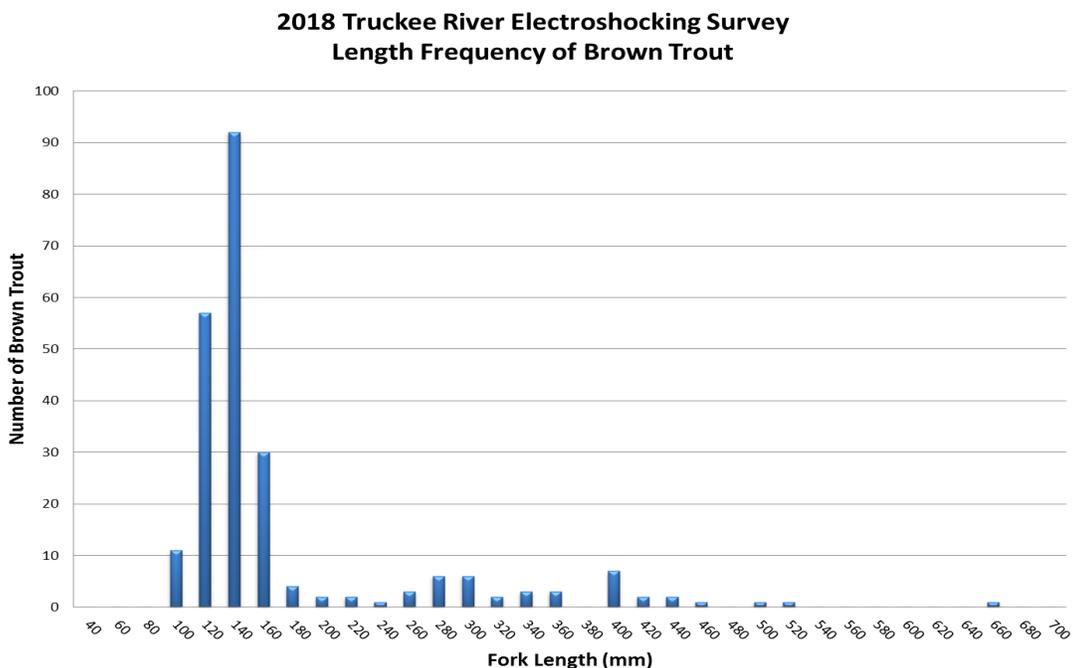


Figure 7.

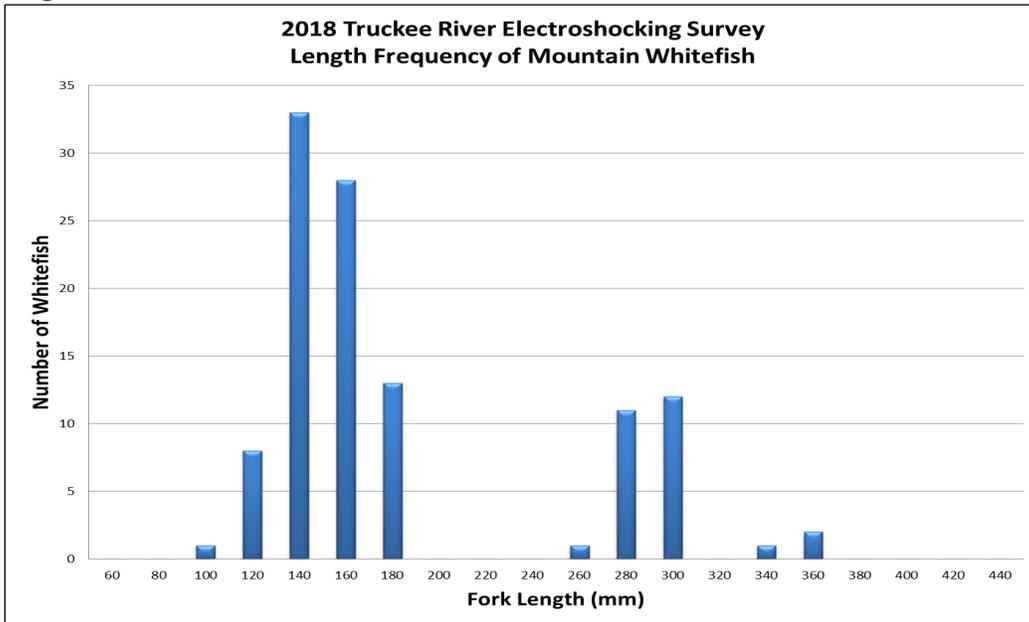
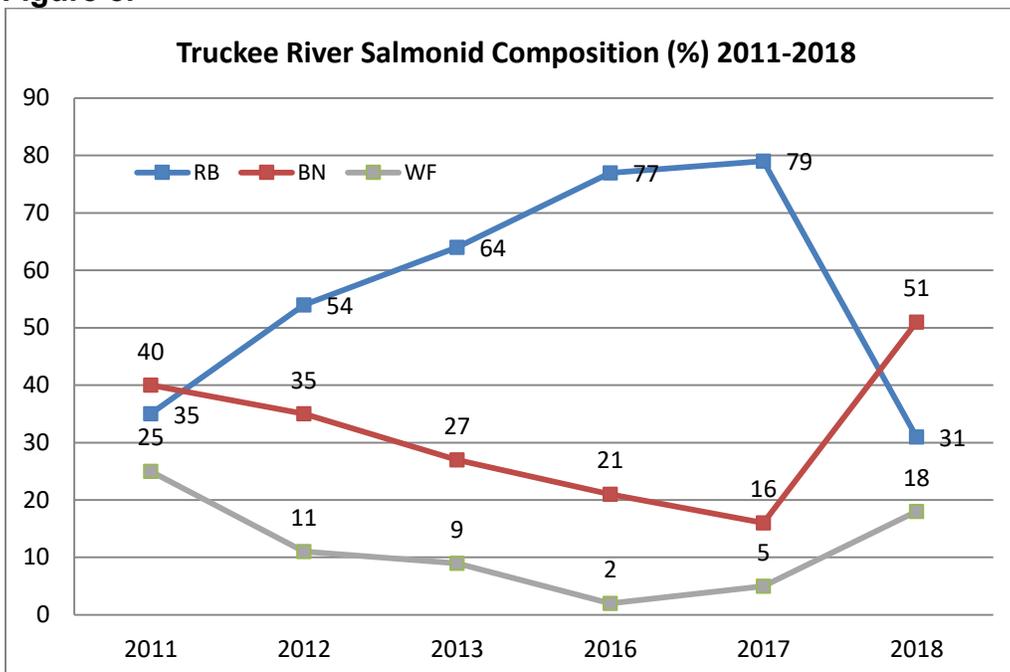


Figure 8.



Wild salmonids over 200 mm were also weighed to calculate body condition (i.e., K-factor) (Table 5). The average K-factor for brown trout ($n=28$) was 1.24 and deemed fair. Rainbow trout ($n=62$) and mountain whitefish ($n=17$) showed average K-factors of 1.26 and 1.31, respectively, and were within fair to good body health. While condition ratings fell within a “fair” classification for wild fluvial populations, fish were considered healthy and many individuals visually appeared to be incredibly healthy. Condition ratings were slightly higher than those recorded in 2017.

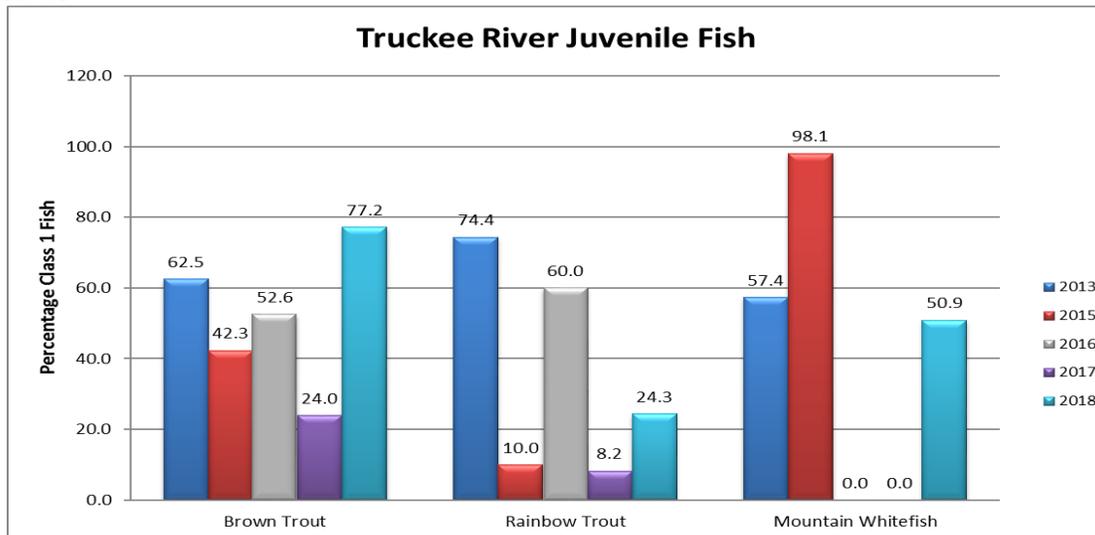
Table 5.

TRUCKEE RIVER POPULATION SAMPLING Salmonid Body Conditions Factors 2018						
	Avg. Length		Range		Avg. K-Factor	Range
	mm	inches	mm	inches		
Brown Trout (28)	354	13.9	210 - 650	8.3 - 25.6	1.24	0.86 - 2.68
Rainbow Trout (62)	318	12.5	206 - 499	8.1 - 19.6	1.26	0.86 - 1.57
Mountain Whitefish (17)	288	11.3	268 - 360	10.6 - 14.2	1.31	0.98 - 1.58

* () indicates the number of fish measured

In 2018, the occurrence of juvenile fish (<150 mm) for each species seemed to improve over 2017 (Figure 9). This rebound can be attributed partially to the inclusion of the Wingfield Park transect and above average habitat conditions throughout the river. Wingfield Park could not be sampled in 2017.

Figure 9.



Collect fin samples from rainbow trout and LCT for genetic analysis during electroshocking surveys for genetic analysis by the University of Nevada Genetics Lab. Fins from 67 fish in 2018 were taken for genetic analysis. These were sent to Dr. Mary Peacock’s Lab at University of Nevada, Reno.

Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts, return of angler drop-box surveys, and mail-in angler questionnaire data. During the 2018 field season, three days of angler surveys were conducted (Table 6). Rainbow trout were the most frequently caught fish with catch rates of 0.1 fish/hr in Zone 2 and 0.5 fish/hr in Zone 5. Brown trout were only reported in Zone 2 and showed a catch rate of 0.1 fish/hr. Of all the fish caught, only one rainbow trout was harvested. Fishing with fly tackle was the most common angling method, while using bait was the second most common method and using lures was the third. Anecdotal accounts of Lahontan cutthroat trout being caught throughout the summer, specifically at stocking locations, were reported.

Table 6.

Truckee River 2018 Angler Survey							
Zone 2							
Species	Anglers	Hours	# Caught	Length (in)	% Hatchery	# Harvested	Fish/Hour
BN	2	9	1	17	0	0	0.11
RB	2	9	1	17	0	0	0.11
Zone 5							
Species	Anglers	Hours	# Caught	Length (in)	% Hatchery	# Harvested	Fish/Hour
RB	5	15.9	8	13.1	0	1	0.5

In 2018, 75 volunteer angler surveys were received from three drop-boxes located streamside along the Truckee River. Anglers fished for 191 hrs and caught 142 fish consisting of 115 rainbow trout, 9 brown trout, 13 Lahontan cutthroat trout, 4 mountain whitefish, and one reported as other (Figures 10 and 11). Resulting catch rates for all fish caught were 1.9 fish/angler and 0.7 fish/hr. Only seven rainbow trout and the “other” fish were reported as harvested, the remaining fish were released. The number of reporting anglers ($n=75$) in 2018 was higher than of the seven-year average of 59. The ratio of fish species caught was very similar to that reported prior to the drought, with angler catching primarily rainbow trout. The number of brown trout caught was lower than the seven-year average of about 20 and was likely a function of fewer catchable-sized fish due to poor spawning recruitment during the drought.

An examination of fish lengths from drop-box data (Figure 12) showed rainbow trout occurred in all size categories, with the most representation in the 10.0 to 11.9 in size bracket. Brown trout were most frequently caught in the 16.0 to 17.9 in size bracket. Lahontan cutthroat trout were all less than 11.9 in.

Figure 10.

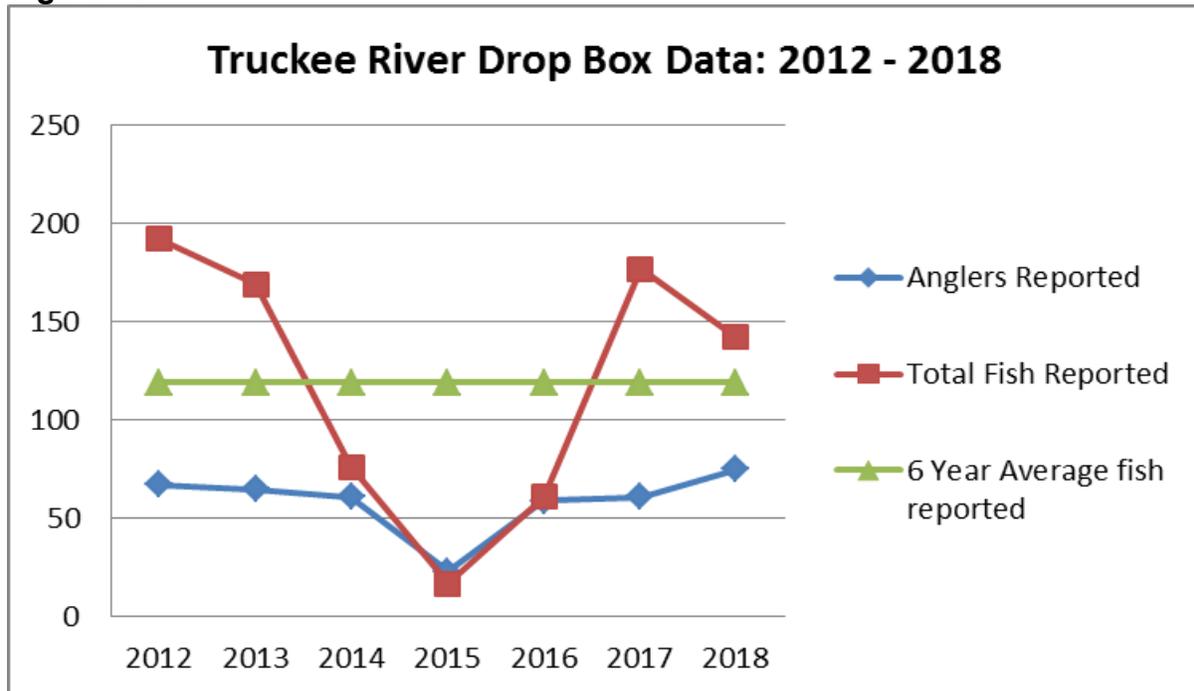


Figure 11.

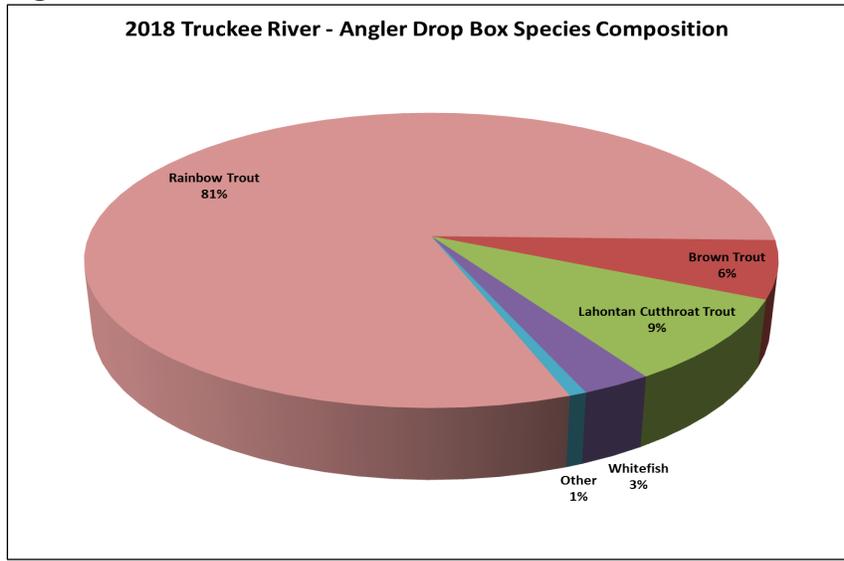
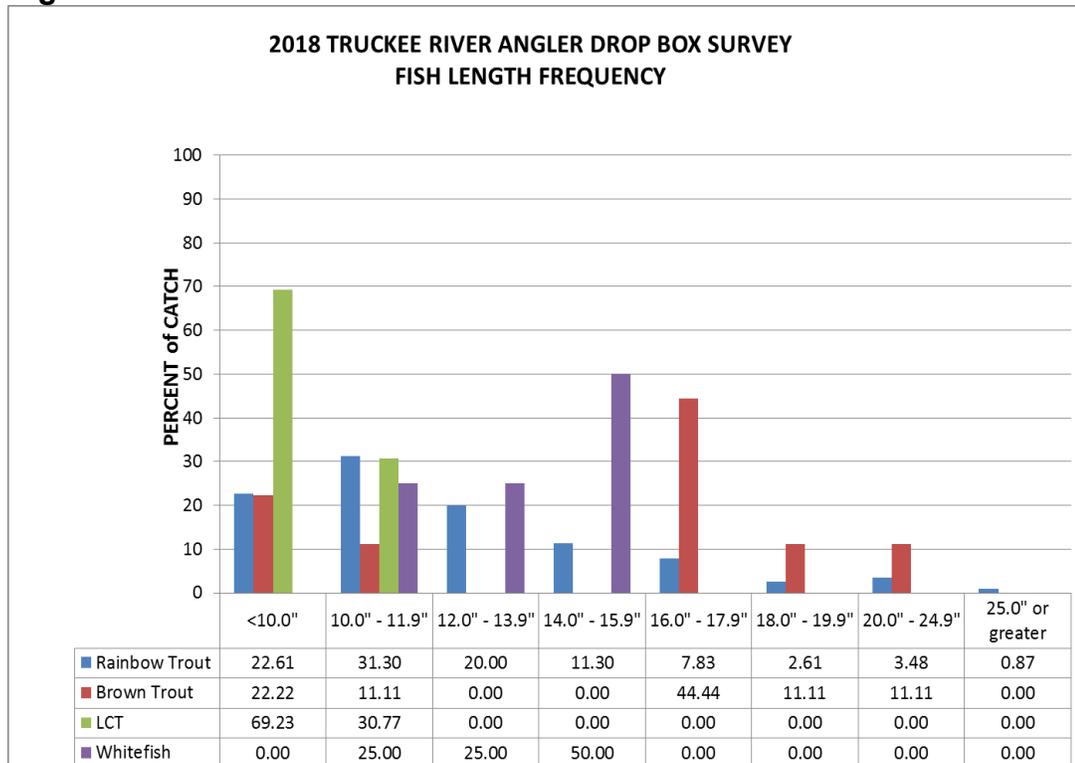


Figure 12.



Angler satisfaction for fishing the Truckee River was rated on a scale from -2 to +2, with -2 being unsatisfied and +2 representing satisfaction. Average ratings varied in all categories, but were generally positive for a third year of improvement. An average angler rating of +0.8 occurred for total fishing experience, +0.5 for size of fish, and +0.4 for number of fish. These ratings were higher than the seven-year averages.

The Mail-in Angler Questionnaire Survey for 2017 estimated 5,115 anglers fished for 25,781 days. There was an estimated 87,297 fish caught for a success rate of 3.4 fish/day. This estimate was substantially higher than the long-term average of 1.9 fish/day and is surprising due to the river being difficult to fish because of extremely high flows for a large portion of 2017. These numbers may be somewhat inflated due to a few anglers having exceptional days and making a report. However, it is expected angler use and success will continue to rise as long as there is average to above average snowpack and runoff.

From late May through June, the Truckee River received 4,940 triploid rainbow trout and 36,584 Pilot-Peak strain LCT (Table 7). During a typical year, stocking efforts begin mid- to late-March and continue until water temperatures are no longer conducive to stocking trout (generally in late June). Flow rates in the Truckee River in 2018 were much higher than average during spring, which created a narrower window for stocking in May. Due to complications with the Lahontan National Fish Hatchery Complex (U.S. Fish and Wildlife Service), the Truckee River fell short of its allotted 70,000 fish for 2018. The long-term stocking data is presented in Appendix A.

Table 7. Truckee River Stocking Summary, 2018.

Species	Number	Average Size	Date
Lahontan Cutthroat	4,717	8.7	5/10/2018
	4,000	6.4	5/15/2018
	3,431	8.3	5/23/2018
	3,063	9.0	6/1/2018
	4,500	7.8	6/7/2018
	2,132	8.0	6/14/2018
	4,562	8.3	6/21/2018
	6,714	8.6	6/26/2018
	3,465	7.9	6/28/2018
Total Cutthroat	36,584		
Rainbow	4,940	10.0	5/18/2018
2018 Total	41,524		

To promote native fish and provide another species in the Truckee River for anglers to fish, NDOW and USFWS began stocking Pilot Peak strain LCT in 2016. This effort has continued annually depending upon the availability of catchable sized LCT from the USFWS hatchery. In 2018, the Truckee River received 36,584 catchable-sized LCT while 4,940 catchable rainbow trout were also stocked. When comparing return rates of LCT and triploid rainbow trout, it appeared the catch rate and survival (longevity) of rainbow trout surpassed LCT for the second consecutive year (Table 8). Despite fewer rainbow trout being stocked, an equal amount of rainbow trout and LCT were captured during fall the electroshocking survey. Based on these returns, put-and-take rainbow trout supported the sport fishery in the Truckee River.

Maintain the angler information center and angler drop-boxes. Angler drop-boxes were maintained and restocked on a regular basis during the course of other duties along the river.

Table 8. Stocking Returns in 2018.

Electrofishing			
	Stocked	Captured	Return
LCT	36,584	4	0.011%
Rainbow	4,940	4	0.081%

Conduct 2 days of presence/absence surveys for New Zealand mud snails (NZMS) at suitable locations upstream and downstream of the area they are known to occupy. The seven NZMS transects completed during 2017 were again completed in 2018. For the first time since surveys began, NZMS were sampled at the most downstream transect (Waltham Way). A single NZMS was found at the Waltham Way transect, resulting in adding survey sites downstream to determine the lowest area of the river occupied by NZMS. Transects were added at the USA Parkway exit off of Interstate 80 and another at Derby Dam. One mud snail was additionally found at the USA Parkway transect. In all, four snails were sampled, two Physidae (bladder snails) and two NZMS (Table 9).

Table 9. 2018 New Zealand Mud Snail Survey Results

Date	Waypoint	Location	Bank (N/S)	Temp (°F)	# Total Snails	# NZMS	# Physa
7/18/2018	18MS 14	Crystal Peak Park	S	67	0	0	0
7/18/2018	18MS 13	Dog Valley Bridge	S	59	0	0	0
7/18/2018	18MS 12	River Bend	S	66	0	0	0
7/19/2018	18MS 022	McCarran Ranch	N	70.5	0	0	0
7/19/2018	18MS 23	Waltham Bridge	S	73	1	1	0
7/18/2018	18MS10	Mayberry Park	N	64	0	0	0
7/18/2018	18MS001	Rock Park	S	67.5	0	0	0
7/23/2018	18MS24	USA Parkway	S	70.7	3	1	2
7/23/2018	18MS25	Derby Dam	N	72.4	0	0	0

For the third consecutive year, the number of snails found in the Truckee River was extremely low (one in 2017, four in 2018). This was most likely due to above average winters leading and flushing flows during spring runoff and heavy winter precipitation events. That is, the surge in discharge scours the substrates and makes it difficult for snails to attach. There is also the possibility that extremely low flow in late summer (no flow in some reaches during 2015) may have led to substantial mortality due to exposure. It is expected that NZMS will continue to expand their range downstream.

MANAGEMENT REVIEW

For the third consecutive year, the Lake Tahoe/Truckee River Basin saw an average to above average winter, resulting in optimum flows throughout the river for the majority of the year. The river is now three years removed from a historic drought that left entire reaches barren of fish due to dewatering and desiccation. The 2018 electrofishing survey revealed the wild trout fishery has rebounded and populations are moving towards pre-drought abundances. Young-of-the-year salmonids (rainbow trout, brown trout, and mountain whitefish) were abundant, suggesting healthy river conditions occurred throughout the year for successful spawning of all species. A gamefish to non-

game fish ratio of 1.0:1.6 suggests a healthy species composition and abundant forage for sport fish.

Stocking levels in 2018 were the lowest since the drought (2012 to 2015) because of complications acquiring LCT from the USFWS. Low levels of stocking LCT possibly benefit the wild trout fishery, but it limits the put-and-take aspect that many anglers in the Truckee Meadows anticipate. There needs to be a way to address this continuous shortfall. Future management of the Truckee River should continue to place the heaviest emphasis on wild salmonids since they have proven to be extremely resilient and capable of reestablishing when suitable environmental conditions prevail. Stocking hatchery trout should continue in a limited capacity that provides more opportunity for anglers and not for repopulating the river. It should be done with discretion when environmental conditions are less than desirable in an effort to avoid negative impacts to the wild fishery.

Angler success rates documented through angler contacts, drop-box questionnaires, and mail-in surveys were all higher than long-term averages and were nearing the levels found in 2012 (pre-drought conditions). The fishery currently meets the guidelines prescribed in a coldwater General Fishery Management Concept.

The angling public continues to wait in anticipation of lake-run LCT (i.e., from Pyramid Lake) moving into the lower reaches of the Truckee River during the spring for spawning. Evidence suggests that a small number of LCT have made it as far as Derby Dam during the past few years despite continued difficulties with passage over other downstream diversion structures. By remedying these passage issues, it is believed that a fishable run of LCT will exist in the lower Truckee River during the spring to provide an exciting and new angling opportunity.

Flow rates in the Truckee River have been maintained at healthy levels over the past three years, but certain stretches of the river continue to be dewatered during certain times for unknown reasons. That is, the stretch from the Highland Diversion Dam downstream to Mogul saw a drastic drawdown during October of 2018, which coincided with spawning and staging of mountain whitefish and brown trout. Drawdowns create negative impacts to the wild trout fishery and they should be addressed.

RECOMMENDATIONS

- Monitor water quantity (discharge) through USGS Stream Flow data.
- Monitor fish populations by conducting tote-barge electroshocking surveys at 11 transects during three days in the fall.
- Collect fin samples from rainbow trout and LCT during electroshocking surveys for genetic analysis by the University of Nevada Genetics Lab.
- Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts, return on angler drop-box surveys, and mail-in angler questionnaire data.
- Maintain the angler information center and angler drop-boxes.
- Conduct two days of presence/absence surveys for New Zealand mud snails at suitable locations upstream and downstream of the area they are known to occupy.

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Table 3. Truckee River Stocking History 2009 – 2017

Year	Species	Number	Size Range (in.)
2009	Rainbow	39,999	8.5 – 10.8
	Lahontan Cutthroat	40,465	8.4 – 12.1
2009 Total		80,464	
2010	Rainbow	33,501	2.8 – 10.6
	Lahontan Cutthroat	55,115	6.4 – 9.5
2010 Total		88,616	
2011	Rainbow	24,586	9.7 – 10.8
	Lahontan Cutthroat	15,736	2.0 – 9.5
2011 Total		40,322	
2012	Rainbow	71,130	2.1 – 10.2
2012 Total		71,130	
2013	Rainbow	76,845	9.1 -- 10.8
2013 Total		76,845	
2014	Rainbow	41,029	2.1 – 10.2
2014 Total		41,029	
2015	Rainbow	29,069	9.3 - 9.8
2015 Total		29,069	
2016	Rainbow	30,185	9.7 – 10.8
	Lahontan Cutthroat	61,142	2.0 – 9.5
2016 Total		91,327	
2017	Rainbow	10,620	9.2 - 9.3
	Lahontan Cutthroat	48,577	3.2 - 9.5
2017 Total		59,197	
Total Rainbow		356,964	
Total Lahontan Cutthroat		221,035	