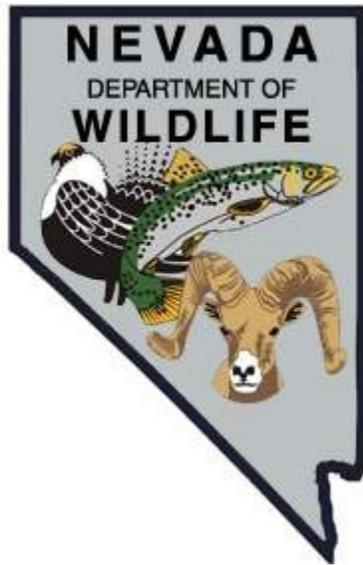


NEVADA DEPARTMENT OF WILDLIFE  
STATEWIDE SPORT FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORT

F-20-54  
2018

Cold Creek Reservoir  
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:** *Cold Creek Reservoir – Final Report*  
**Period Covered:** *January 1, 2018 through December 31, 2018*

**SUMMARY**

This is a final report for work at Cold Creek Reservoir that started in July 2009 and finished in June 2018. The goal of this study was to use largemouth bass and other piscivorous trout species (bowcutt trout) to control a population of tui chub. With a reduced number of tui chub, the rainbow trout was expected to improve in Cold Creek Reservoir. Over the last decade, the fisheries in Cold Creek Reservoir have received intensive sampling in order to monitor species interactions. Although largemouth bass has begun to increase in quality sizes, it has not provided the expected response in tui chub biomass. Inherently, the trout population has suffered, with most still exhibiting poor body conditions.

Several reasons exist as to why biological control efforts did not effectively control tui chub. One reason is that there were too few largemouth bass relative to the number of tui chub in the reservoir; essentially, largemouth bass predation could not significantly reduce the tui chub population. Additional piscivorous species such as bowcutt trout also were stocked, but very few were captured in later surveys to confirm there was survival/carryover from one year to the next. Again, their impact on tui chub abundance was likely negligible. Another influence over the course of the study was a low water level due to drought and irrigation. A smaller reservoir pool correspondingly increased water temperature and most likely showed more of an effect on rainbow trout than tui chub. Growth and feeding behavior of rainbow trout are reduced when at higher temperatures and, therefore, this inhibits their ability to control tui chub.

In order to achieve the study's main objective, largemouth bass should be augmented to increase population numbers. Other piscivorous species, such as wiper, should be investigated to determine if they would be appropriate to control tui chub. Additionally, in order to address the issue with capacity and retention of water, coordination should occur with the private water right holder to assure extra water is left in Cold Creek Reservoir at the end of the irrigation season.

**BACKGROUND**

Cold Creek Reservoir sits on the eastern slope of the Diamond Range in White Pine County. It was created in 1943 to allow the owners of Cold Creek Ranch to irrigate agricultural fields and water livestock. The reservoir is approximately 14 surfaces acres with a maximum depth of 24 feet. Historically, the reservoir has had an issue maintaining a consistent water level due to poor sealing of the dam when it was originally constructed.

A report in 1951 found rainbow trout inhabited Cold Creek Reservoir, but there is no documentation of stocking game fish earlier than the 1970s. The trout fishery was historically managed under a general limit regulation until 1981. New regulations were then adopted that allowed only five trout at a minimum of size of 12-inches and use of only artificial lures. Due to poor compliance with this change, Cold Creek Reservoir never became a true trophy trout fishery. In the 1989 Fisheries Management Plan by R. Haskins, Cold Creek Reservoir would be managed under a Cold Water Quality Fishery Management Concept with a five trout possession limit. Since the time largemouth bass has inhabited the reservoir, it has been managed under a Warm Water General Fishery Management Concept. Five black bass could legally be caught at a 10-inch minimum size limit.

Newark Valley tui chub is an endemic fish species, which has likely occupied Cold Creek Reservoir since it was constructed. Due to their presence, competition for available food resources has negatively influenced the body condition of trout for decades. As a result, the reservoir was treated with Antimycin A in 1972 to eradicate this nuisance species and rebuild the recreational trout fishery. The treatment was thought successful until two tui chub were caught during a gill net survey in 1982. By 1984, the tui chub population greatly expanded the nongame fish to game fish ratio was 2.2:1. This warranted a second chemical treatment using Nusyn-Noxfish, a piscicide with 2.5% active rotenone. The success of the treatment was again doubtful due to the availability of fresh water coming from a spring in Cold Creek. This spring was used as a domestic water supply for the ranch house and, therefore the drip station for the treatment was located just below the domestic water supply intake. When the 1989 Cold Creek Reservoir Fisheries Management Plan was written, tui chub were thought to be absent from the reservoir. A 1993 report by R. Haskins suggested that tui chub had reappeared in the reservoir, but had not made it into the stream.

The resurgence of tui chub coupled with the reservoir drawn downs kept the fishery from fully recovering after the 1984 treatment. In early 2000, an attempt to control tui chub using largemouth bass was decided. Later, bowcutt trout were introduced for the same purpose. Largemouth bass was stocked on three occasions (2008, 2009, and 2014), totaling 316 fish. From 2010 to 2017, about 10,860 Marlette Lake strain bowcutt trout were stocked to assist with biological control of tui chub.

## **OBJECTIVES and APPROACHES**

**Need:** Tui chub are very abundant and compete heavily with rainbow trout for the available food in Cold Creek Reservoir. With poor survival affected trout abundance, angler satisfaction and, therefore, visitation have suffered over the years. Monitoring the fish community will assess the effectiveness of largemouth bass and bowcutt trout on controlling tui chub abundance and, as a response, if rainbow trout body condition and survival/abundance improves.

**Expected Results and Benefits:** Monitoring will provide insight on the success of largemouth bass in controlling tui chub population growth. As tui chub numbers decline, it is expected that rainbow trout will respond with greater survival/abundance and better

health. Stocking allocation and rates of trout and largemouth bass may be adjusted as needed, depending on results. Increased abundance and condition of rainbow trout and largemouth bass will benefit anglers and showing an increase in angler use.

**Objective:** Monitor and assess the fisheries response to largemouth bass and bowcutt trout stocking.

**Approach:**

1. Conduct a boat electroshocking survey at night in late summer or fall to assess largemouth bass recruitment and tui chub abundance and size structure.
2. Gill net, frame net, and minnow trap overnight in the spring to assess tui chub populations.
3. Augment with largemouth bass of various sizes from nearby waters if necessary.

## PROCEDURES

From 2010 to 2014, two experimental frame nets were set in the spring of each year to monitor trout and tui chub in Cold Creek Reservoir. In 2015, the spring sampling method was modified, using 7 frame nets and approximately 30 baited minnow traps to assess trout and tui chub populations. In fall, an electroshocking barge was used to survey trout, tui chub, and largemouth bass abundances. A sub-sample of trout, tui chub, and largemouth were measured.

In order to control the nuisance population of tui chub in the reservoir, largemouth bass and bowcutt trout were used as a biological control. Largemouth bass were stocked into Cold Creek Reservoir in 2008 ( $n=26$ ), 2009 ( $n=221$ ), and again in 2014 ( $n=69$ ). Between 2010 and 2017, 10,858 Marlette Lake strain of bowcutt trout were stocked to assist in controlling tui chub.

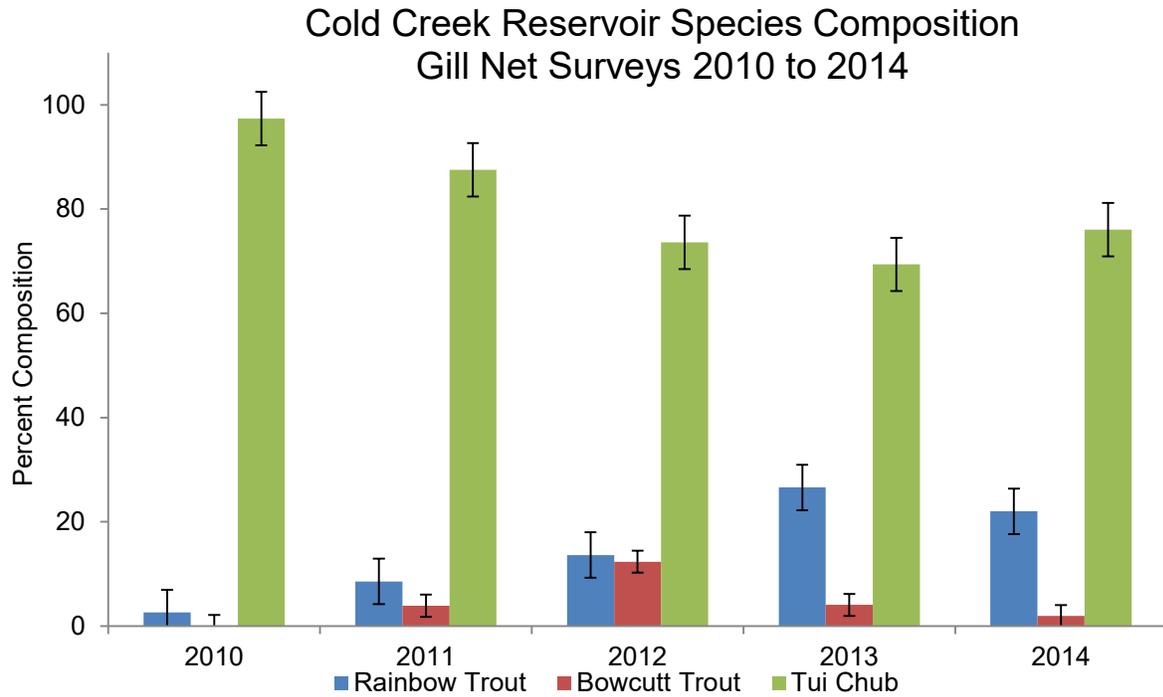
Contact angler surveys along with creel information obtained from a volunteer angler drop-box were conducted. Information collected included number of anglers, total hours fished, number of fish caught, number of fish harvested, and length measurements.

## FINDINGS

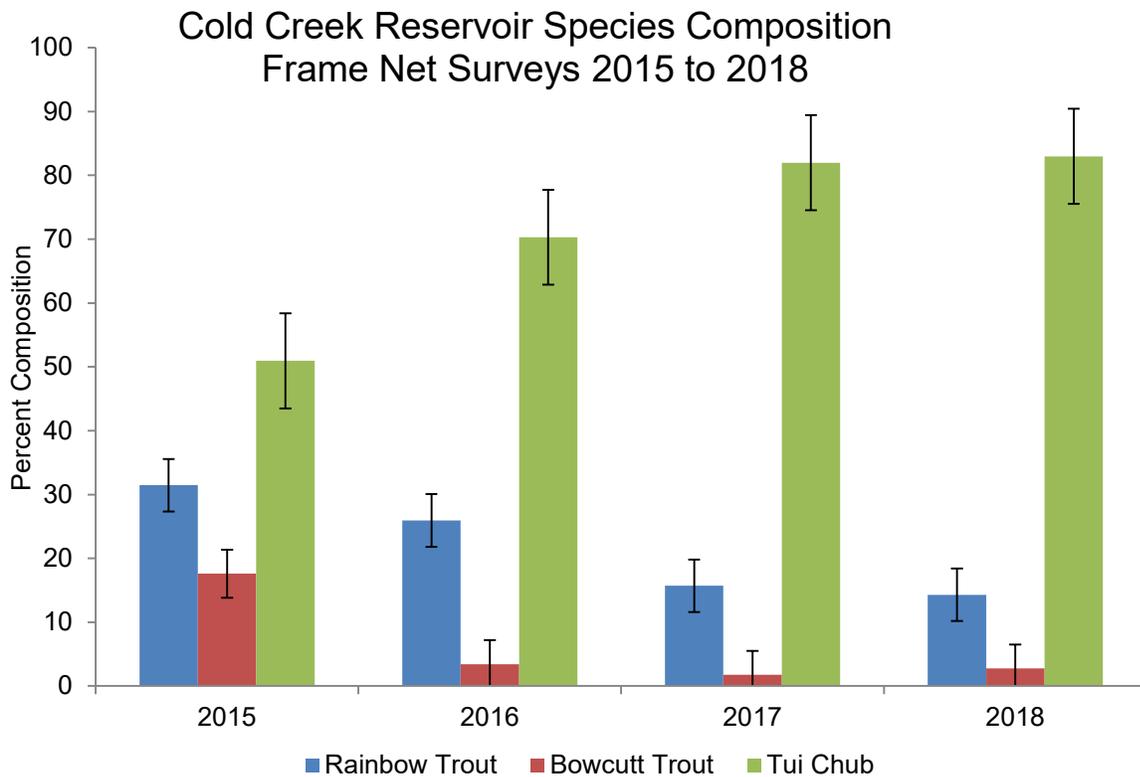
Cold Creek Reservoir was gill netted on five occasions (2010 to 2014) and four times using frame nets during the spring. Gill nets caught 1,456 fish, with a species composition dominated by tui chub (85%), followed by rainbow trout (12%) and bowcutt (3%) (Figure 1). Although sampling methods changed in 2015, tui chub remained the dominate species caught from the reservoir. From 2015 to 2018, frame nets caught 1,133 fish, 75% were tui chub, 20% were rainbow trout, and 5% were bowcutt trout (Figure 2). During 2015, minnow traps caught 1,052 YOY tui chub (YOY data was not described in composition or length figures). However, from 2016 to 2018, minnow traps

did not capture any YOY tui chub, even though they were deployed at similar locations and depths and were baited.

**Figure 1.**

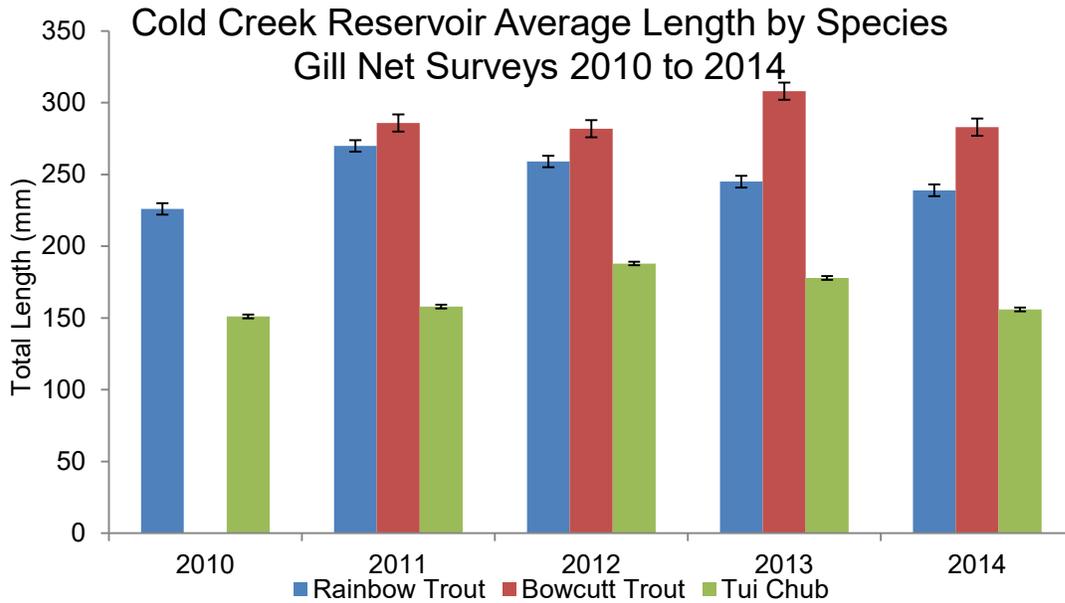


**Figure 2.**

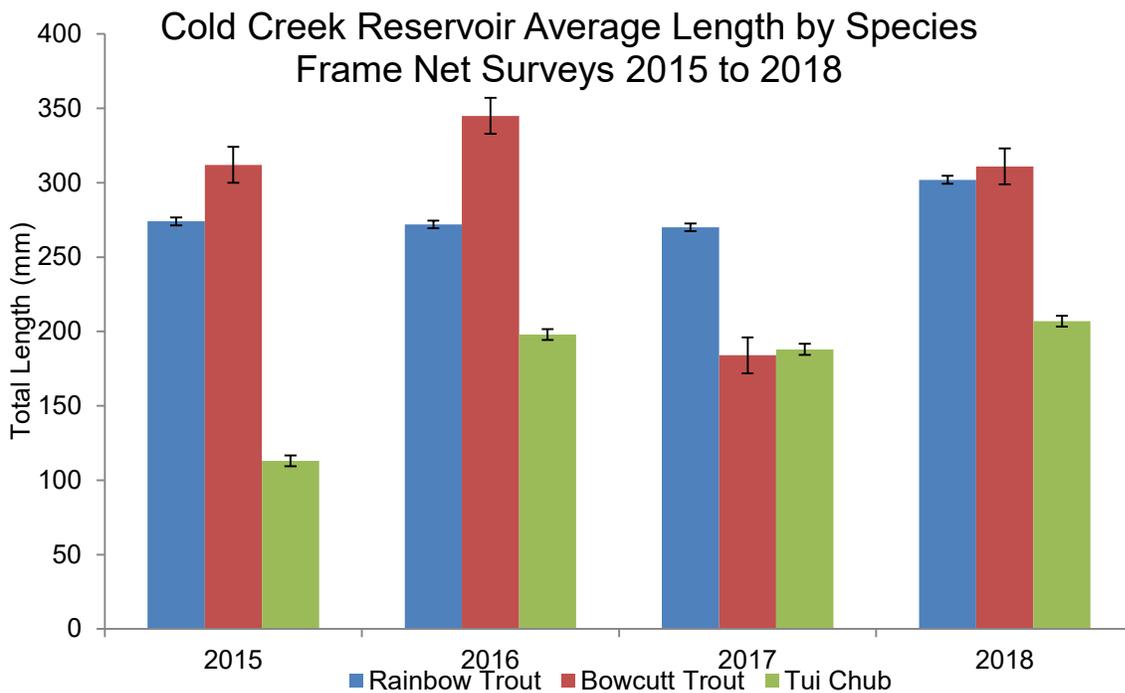


Figures 3 and 4 show average sizes for fish species captured during spring gill and frame netting surveys. Tui chub ranged from 2.9 in (76 mm) to 8.1 in (206 mm), with an average of 6.6 in (168 mm). Rainbow trout ranged from 3.9 in (98 mm) to 15.0 in (381 mm), with an average of 9.8 inches (247 mm). Bowcutt trout ranged from 8.1 in (206 mm) to 15.1 in (383 mm) and averaged 11.3 in (287 mm).

**Figure 3.**



**Figure 4.**



Some observed changes in average length could be explained by the size selectivity of sampling gear (i.e., mesh size). Although mesh sizes were consistent from the fence to the basket of a frame net, this likely allowed smaller trout and tui chub to pass through undetected. Contrastingly, the variable-sized mesh panels on the experimental gill net most likely captured smaller trout and tui chub. The data gathered from springtime sampling suggests there was poor carryover of rainbow and bowcutt trout throughout the course of the study.

Trout showed natural reproduction, but documentation of older, wild trout was not common. For example, combining all sampling throughout the course of the study, only one wild rainbow trout longer than 13.7 in was caught. That individual was 27.9 in long and was caught during a fall electroshocking.

Fall electroshocking surveys were the primary method for monitoring largemouth bass at Cold Creek Reservoir. During nine sampling events from 2009 through 2017, 1,452 largemouth bass were captured. Tui chub continued to show dominance, but to a lesser degree when compared to springtime surveys (Figure 5). Over the course of electroshocking surveys, tui chub comprised 39% of the total catch, rainbow trout 29%, bowcutt trout 5%, and largemouth bass 28%.

**Figure 5.**

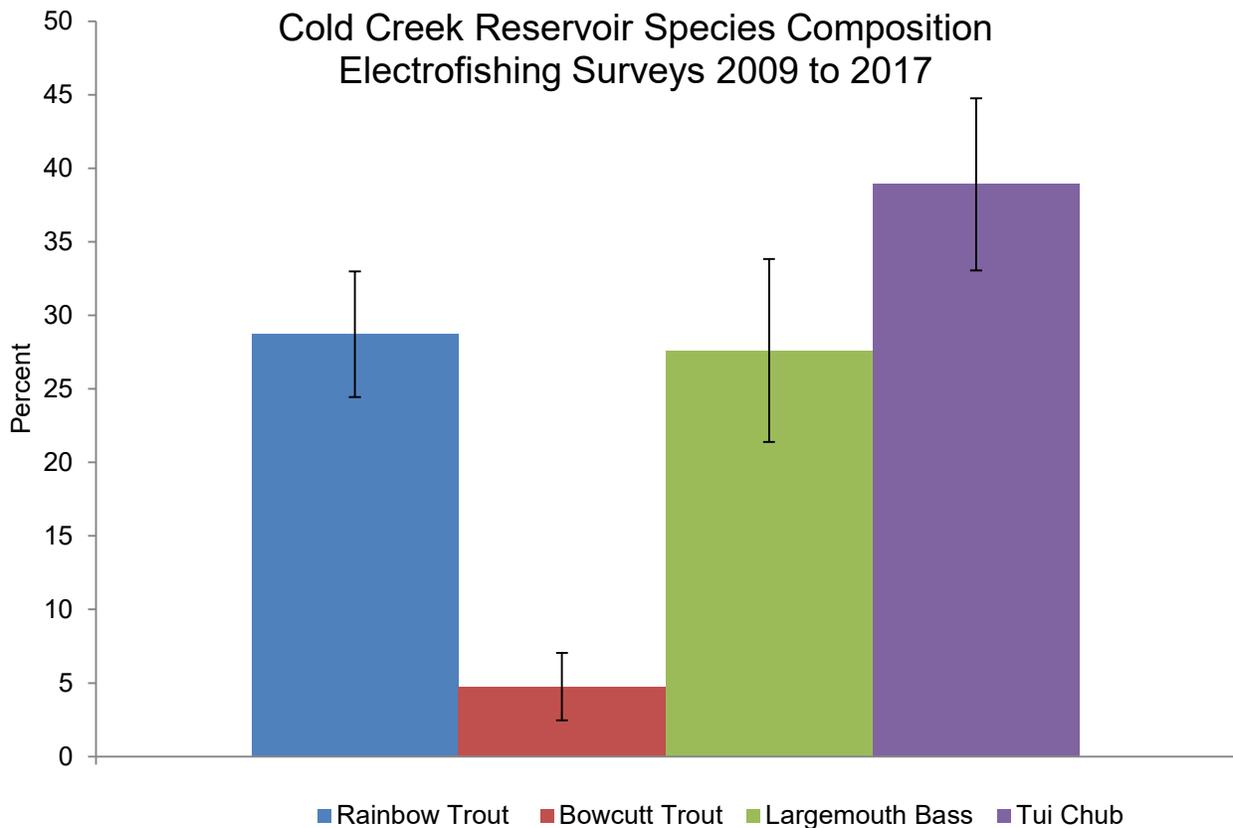


Figure 6 shows a subtle shift in largemouth bass dominance beginning in 2015. During this same period, tui chub steadily declined within the fishery, even with an increase in electroshocking effort. Since 2017 was the last electroshocking survey for this study, it is unclear if this trend will continue.

**Figure 6.**

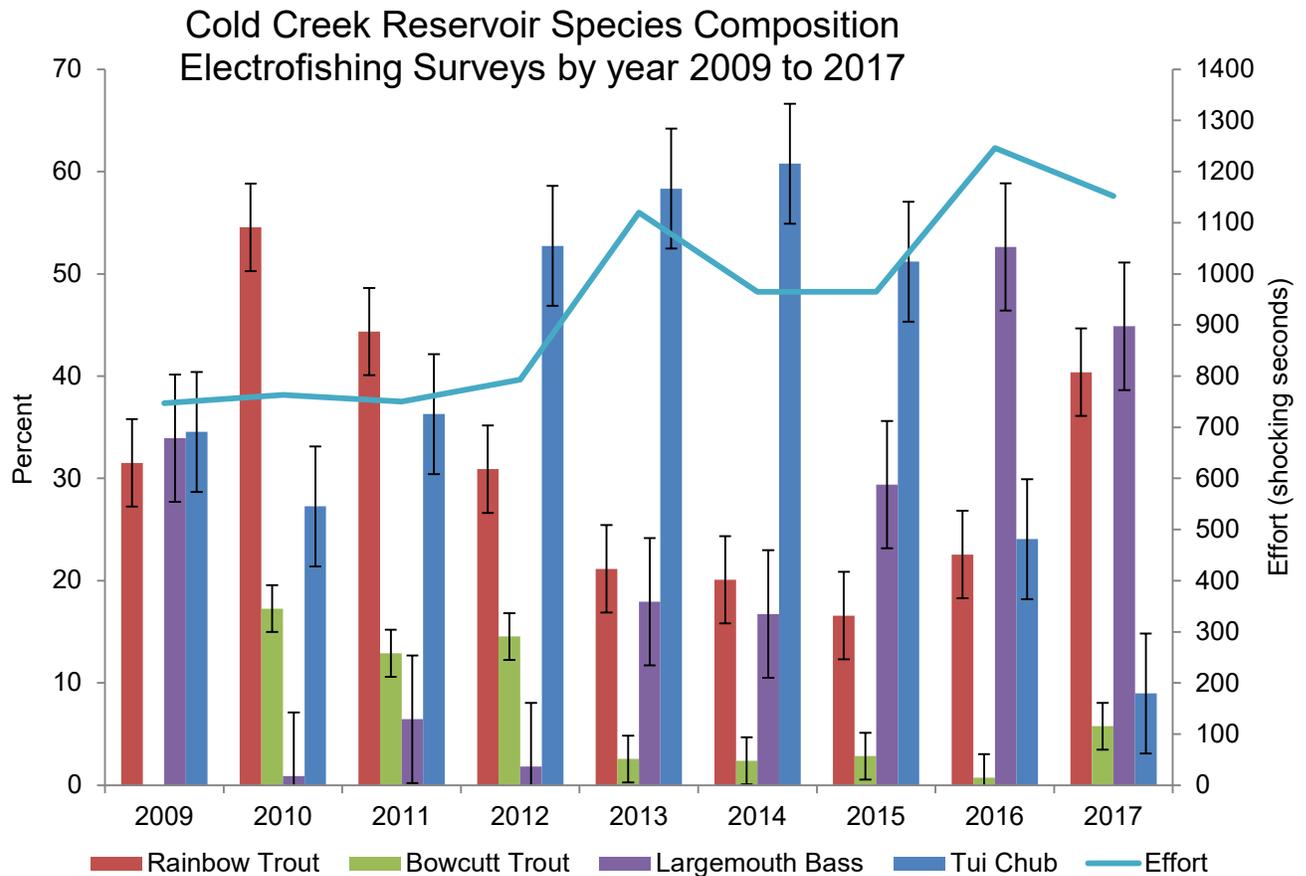
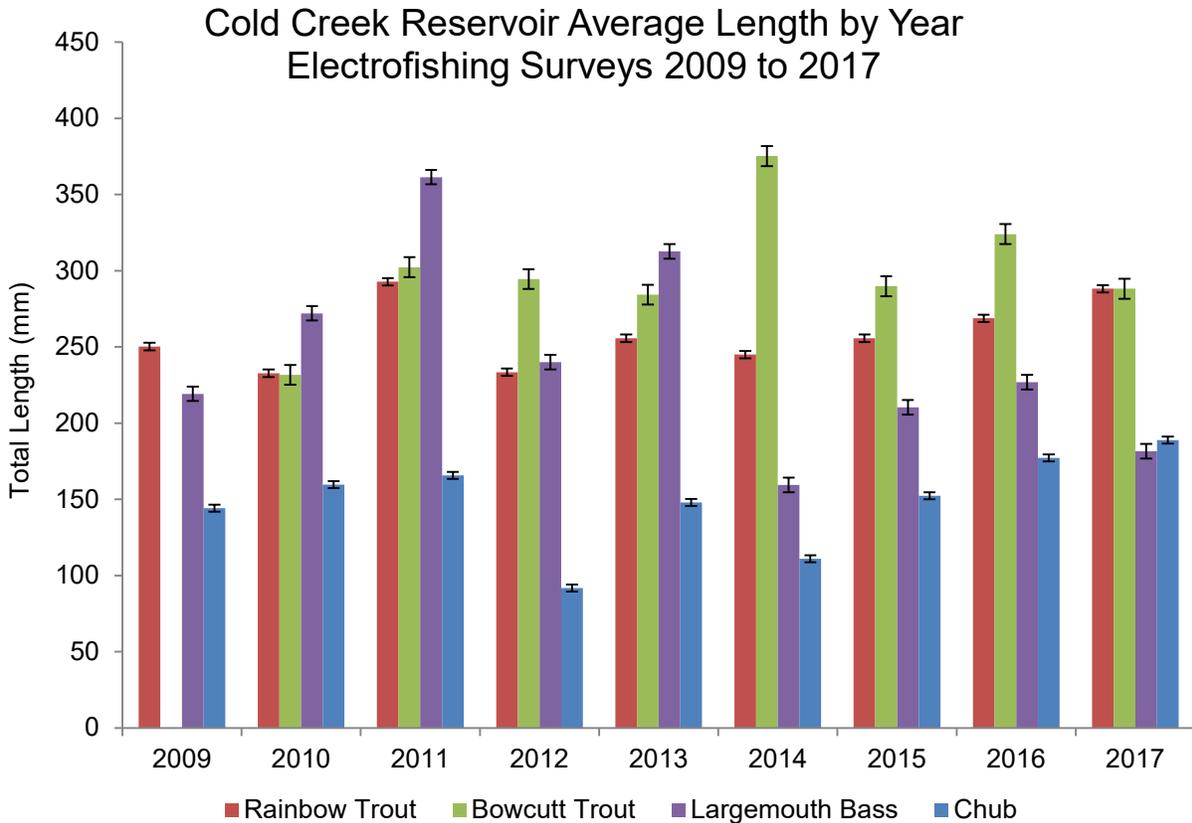


Figure 7 shows the average length of all species captured during electroshocking. Total length of tui chub ranged from 1.6 in (41 mm) to 9.5 in (241 mm) and averaged 5.9 in (149 mm). Rainbow trout ranged from 3.6 in (92 mm) to 27.9 in (710 mm) and averaged 10.2 in (259 mm). Bowcutt trout ranged from 2.7 in (68 mm) to 18.1 in (470 mm) with averaged 11.5 in. Finally, largemouth bass ranged from 2.1 in (54 mm) to 18.1 in (460 mm) and averaged 8.3 in (210 mm). From 2014 to 2017, there was a steady increase in average size of tui chub, potentially from predation on the younger age classes during the summer.

The majority (87%,  $n=123$ ) of largemouth bass captured were in either good or excellent body condition (Table 1). While trout were not weighed, the overwhelming majority appeared to be in poor to fair body condition. Most exhibited long bodies with no substantial girth.

**Figure 7.**



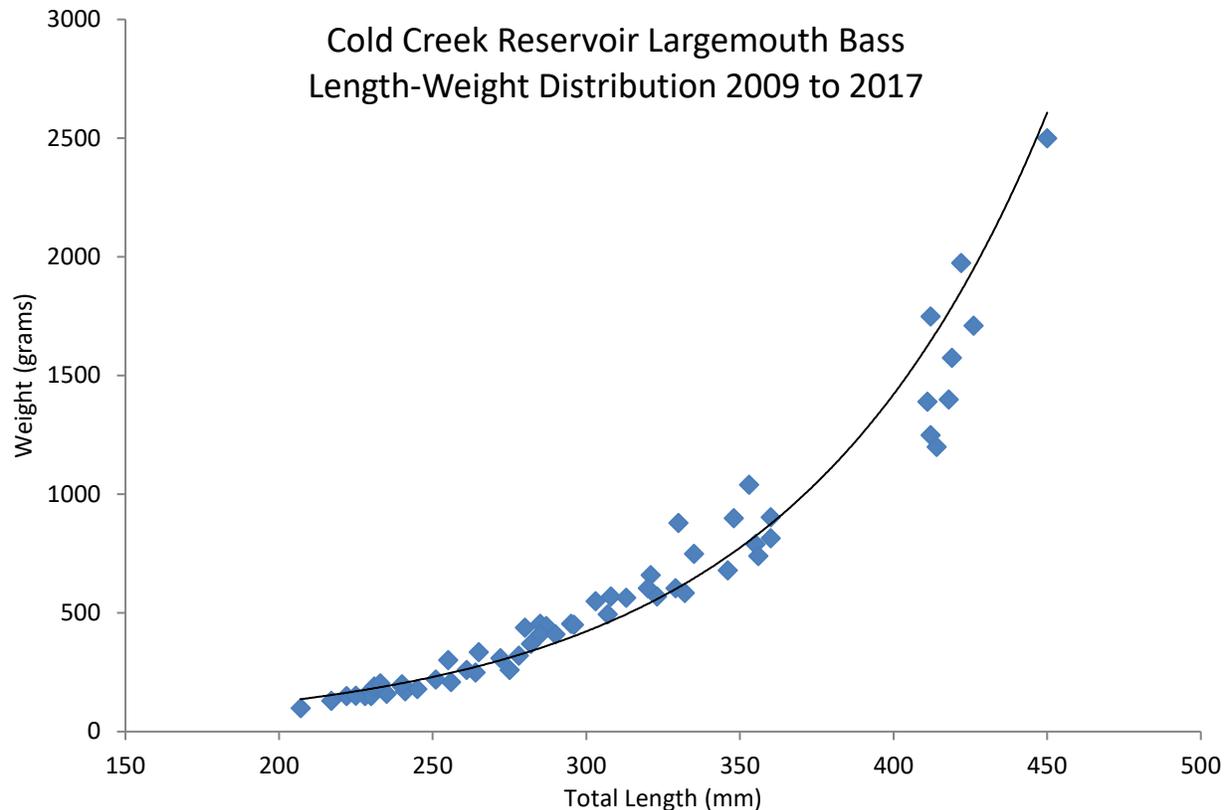
**Table 1.**

Condition Rating	Number of Largemouth Bass	Percent
Excellent	88	72
Good	19	15
Fair	15	12
Poor	1	1

Figure 8 portrays the length-weight distribution of largemouth bass data collected during electroshocking surveys from 2009 to 2017. Although the majority were sub-adults (<10 in), they still likely provided some level of biological control towards young tui chub.

The largest largemouth bass contacted was 17.7 in (450 mm) and 5.6 lbs (2,500 g) and came from 2013. This bass was highly piscivorous and consumed YOY and adult tui chub, however, that age class and size of largemouth bass was rare. The 10-in minimize size harvest limit on largemouth bass at Cold Creek Reservoir may not ensure enough bass reach their potential and ultimately become more piscivorous. The average length for all bass captured was 8.3 in (210 mm).

**Figure 8.**



Coupled with the shift noted in species composition, there was an increase in the average length of tui chub based on fall electroshocking data. The average length of tui chub increased from 4.3 in (110 mm) in 2014 to 7.1 in (188 mm) in 2017. During springtime surveys, the average length appeared to remain stable over the course of the study, even with the change in sampling methodology. It is surprising to find that the change in species composition and average length exhibited in the fall survey were not duplicated in the spring survey.

### **Management Review**

Without showing findings that correspond during fall and spring, there cannot be a definitive conclusion to the study. The ultimate goal of the study was to improve the trout fishery, which has not happened. Although largemouth bass body condition and general population structure appeared to show successful results, the trout fishery did not respond in a positive manner. This is likely attributed to the sheer number of tui chub relative to the number of trout and largemouth bass in the reservoir.

Competition for food resources and space can be credited to the trout having such poor body condition. Inadequate abiotic conditions such as water temperature and reservoir capacity are just as likely a reason for rainbow trout doing poorly as the biotic factors (e.g., tui chub abundance). Throughout the course of the study, Cold Creek Reservoir reached capacity at least twice (2016 and 2017), unfortunately due to the leakiness that is known to exist with the bed of the reservoir, by late July the water level

was down to approximately 40% of capacity. Continuous low water conditions due to drought and irrigation demands exacerbated the effects of competition among fishes, likely adding to the poor quality of trout in Cold Creek Reservoir.

For the future, spring frame net surveys and fall electroshocking surveys will be conducted to identify population trends, and largemouth bass and trout augmentations should be made according to the findings. A more piscivorous species will be investigated for use in aiding in the control of tui chub. Not only would this create additional angler opportunity, but also it may be what is needed to reduce tui chub numbers for improving the trout fishery at Cold Creek Reservoir.

### **Recommendations**

- Document fish population indices from electroshocking, frame netting, and creel surveys.
- Augment the largemouth bass population in Cold Creek Reservoir.
- Explore different species as forms of biological control (e.g. wipers) on tui chub.
- Continue conversations with Kinross on the potential of fixing seeps/holes located in bed of the reservoir

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**Date:** March 2019