



# **2018 Rio Grande Cutthroat Trout, High-Elevation Lake Sampling Report**



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## **INTRODUCTION AND OBJECTIVE**

In Colorado, Rio Grande Cutthroat Trout (RGCT) were designated a state threatened species in 1973, however successful recovery efforts improved conditions for the species to the point that it was downlisted to a species of special concern in 1984. The species is now managed for refugia populations to conserve genetically pure “Core” populations. In addition to Core Conservation populations, 87 waters are managed to provide recreational opportunities. These recreational populations are defined by the genetic purity of the population. Recreational populations of RGCT have been determined to be at least 90% pure but less than 99% pure.

Sixty-six high elevation lakes in the San Luis Valley are managed to provide recreational angling opportunities for RGCT. The majority of these lakes are very remote and stocked biannually by airplane. The RGCT aerial stocking program began in 1994 but the remoteness of the lakes has made it very difficult to monitor success of the plants at many of these waters.

In 2018, a 2-person crew was hired to assess the RGCT aerial stocking program. The crew was tasked with surveying 15 lakes during the summer of 2018. Each survey consisted of overnight gillnet sets to sample fish populations at each lake. In this report, the sampling effort at each water is summarized and recommendations for future management are suggested.

## **WATERS SAMPLED**

The following lakes were surveyed in 2018: Archuleta Lake, Bear Lake, Blue Lake, Cliff Lake, Crystal Lake, Lower Deadman Lake, Upper Deadman Lake, West Deadman Lake, Heart Lake, Machin Lake, Big Ruby Lake, Little Ruby Lake, Rito Alto Lake, Rock Lake, and Tobacco Lake.





## DETAILED INFORMATION ABOUT EACH SURVEY



**Water:** Archuleta Lake  
**Location:** Headwaters of Archuleta Creek, approximately four miles west of Big Meadows Reservoir  
**Sampling Date:** 8/13/2018  
**Gear:** One 75 foot coldwater experimental gillnet  
**Drainage:** Rio Grande  
**Water Code:** 88408  
**UTM Zone:** 13S  
**Easting:** 334019  
**Northing:** 4156099

### HISTORY

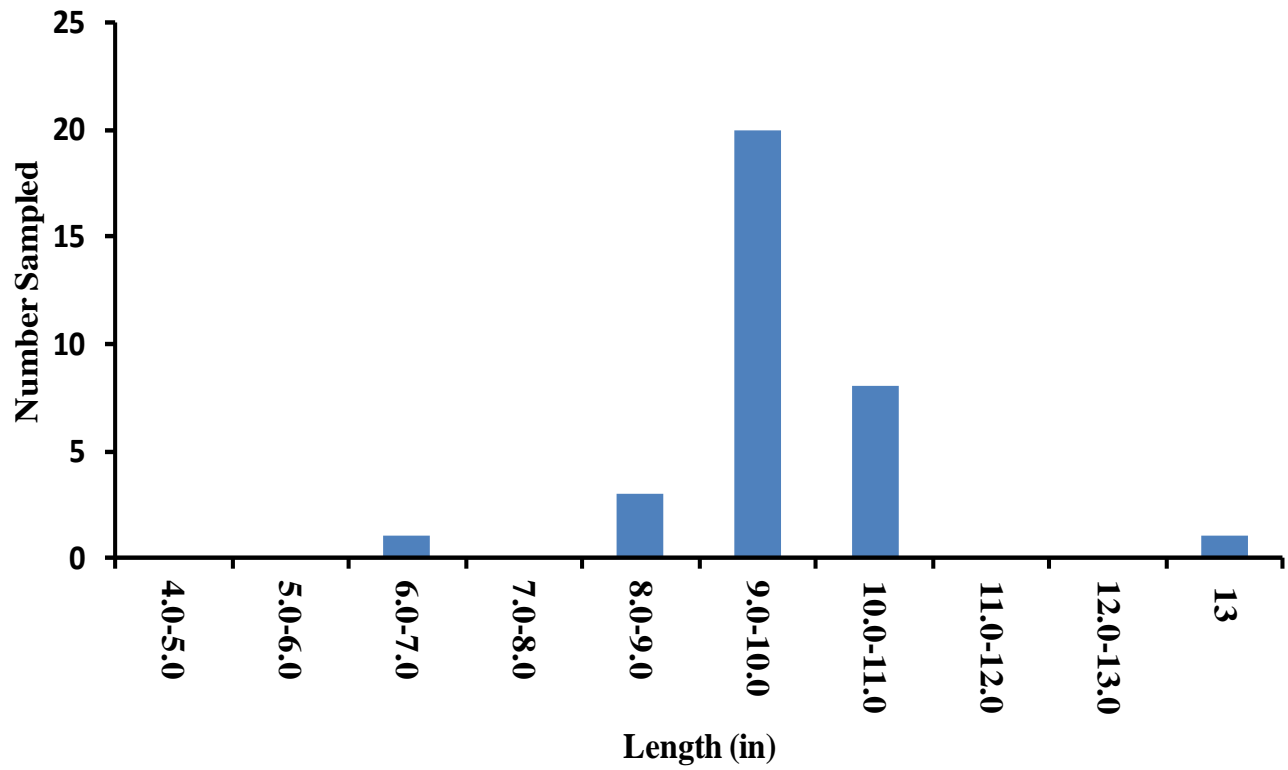
Archuleta Lake is four surface acres with an average depth of 7 feet and a maximum depth of 11 feet. The lake is located within the Weminuche Wilderness of the San Juan National Forest at an elevation of 11,720 feet. Archuleta Lake is accessible through The Forest Service's Archuleta Trail #839. The trail originates at Big Meadows Reservoir and runs approximately 7 miles to Archuleta Lake on the Continental Divide.

Stocking at Archuleta Lake consisted of Pikes Peak Native Cutthroat Trout 1973-1980, and Snake River Cutthroat Trout 1981-1995. No fish stocking occurred from 1995 to 2006. Rio Grande Cutthroat Trout have been stocked biannually from 2007-2017.

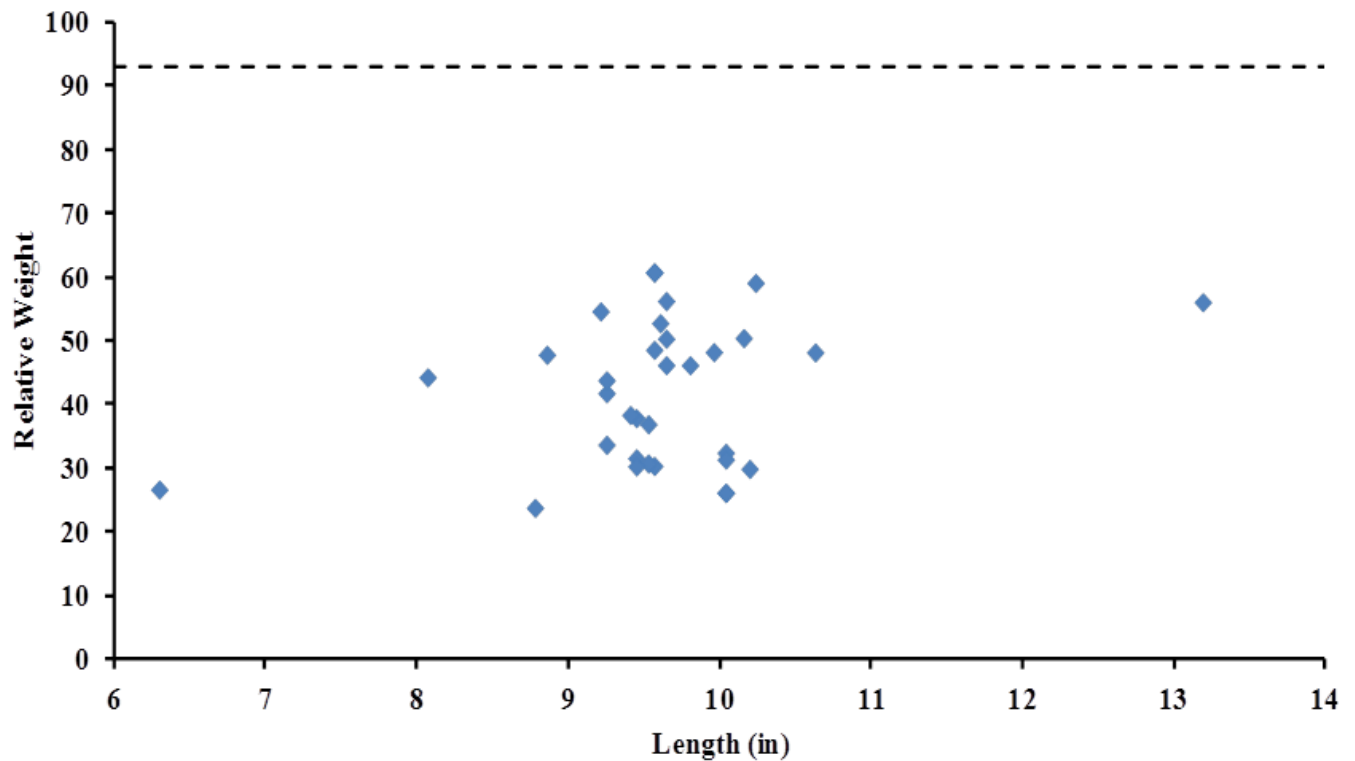
### RESULTS

Archuleta Lake is dominated by a sandy substrate with some submerged wood and rocks. Caddisflies, water boatmen, and small leaches were observed in the lake but density of prey appeared to be low.

Thirty-three Brook Trout and no Rio Grande Cutthroat Trout were sampled from Archuleta Lake. Twenty-five of the Brook Trout were sampled using one overnight gillnet set, the remaining eight fish were sampled using hook and line techniques. The overnight gillnet was set for 12 hours, giving a catch rate of 2.08 fish/hour. Brook Trout in Archuleta Lake ranged in size from 6.3 inches to 13.2 inches and had a mean length of 9.6 inches (Figure 1). The average relative weight of all fish sampled was calculated to be 41.9. A relative weight value of 93 is considered average for a fish of a given length. All of the fish sampled from Archuleta Lake fall well below the expected weight based on the fish's length (Figure 2). Of the fish sampled, approximately 60% fall within the 9-10 inch bin, and the maximum relative weight was 60.7. These data suggest the lake is overpopulated with small Brook Trout. No Rio Grande Cutthroat Trout were sampled from Archuleta Lake suggesting the competition levels with Brook Trout are too high for Rio Grande Cutthroat to become established.



**Figure 1.** Length-Frequency histogram of Brook Trout sampled from Archuleta Lake, 2018.



**Figure 2.** Relative Weights of Brook Trout sampled from Archuleta Lake, 2018.

## CONCLUSIONS

Archuleta Lake supports a self-sustaining population of Brook Trout. Rio Grande Cutthroat Trout were not sampled in the lake, despite being stocked six times since 2007, and as recently as 2017. At this time, it is recommended that Archuleta Lake be removed from the Rio Grande Cutthroat Trout aerial stocking program.

Brook Trout sampled from Archuleta Lake, 2018.



**Water:** Bear Lake  
**Location:** Rio Grande National Forest, approximately 9 miles west of La Jara Reservoir  
**Sampling Date:** 7/3/2018  
**Gear:** One 75 foot coldwater gillnet  
**Drainage:** Rio Grande  
**Water Code:** 88484  
**UTM Zone:** 13S  
**Easting:** 0365833  
**Northing:** 4126568



## **HISTORY**

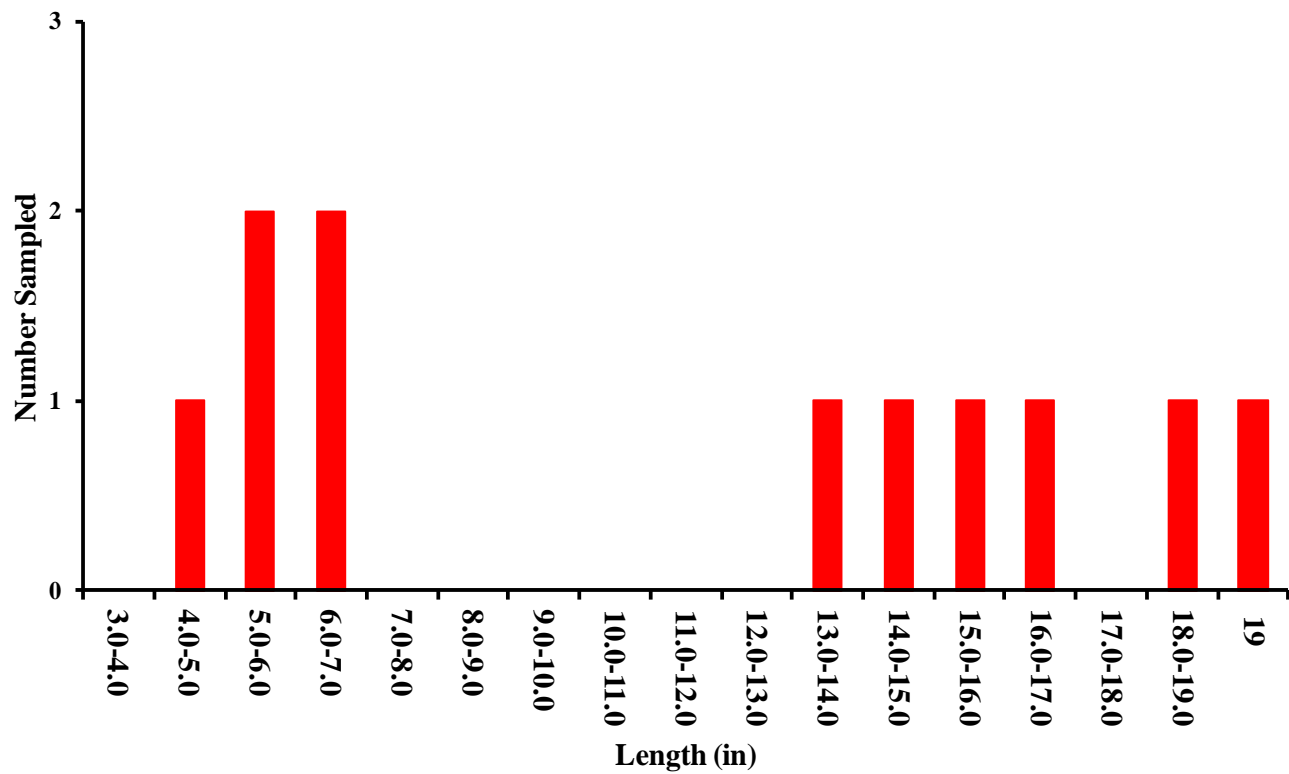
Bear Lake is 18.3 surface acres with a maximum depth of 25 feet and an average depth of 15 feet. The lake is located in the South San Jan Wilderness of the Rio Grande National Forest at an elevation of 11,520 feet. Bear Lake is accessible through the Bear Lake Forest Service Trail #721. The trail is a moderately difficult trail that runs 3.3 miles from the trailhead to the lake.

Bear Lake was stocked with Rainbow Trout from 1973-1995. The lake was first stocked with Rio Grande Cutthroat Trout in 1997 but not again until the year 2000. Starting in 2000, the lake was stocked annually with Rio Grande Cutthroat until 2003. From 2005-2017 the lake has been stocked biannually with Rio Grande Cutthroat Trout.

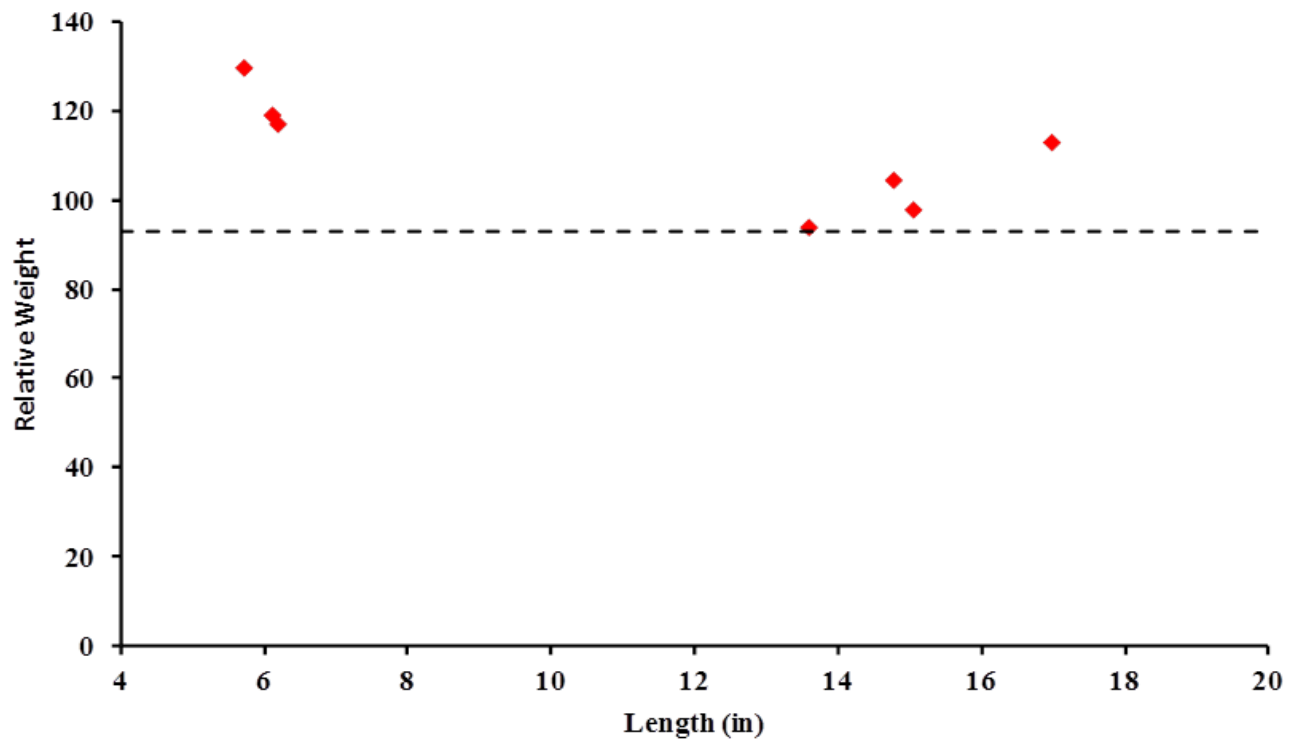
## **RESULTS**

The substrate at Bear Lake is comprised of mud, sand, and rocks. Bear Lake supports a healthy population of aquatic invertebrates including caddisflies, midges, scuds, leeches, water boatmen, and aquatic beetles.

A total of 11 Rio Grande Cutthroat Trout were sampled from Bear Lake. One 75 foot gillnet was set overnight for 14 hours, giving a catch rate of 0.79 fish/hour. The Cutthroat Trout sampled ranged in size from 4.6 inches to 19.09 inches with a mean length of 11.5 inches (Figure 3). The average relative weight of fish sampled was 110.8, and the maximum relative weight was 129.7. Relative weights were not computed for all fish sampled due to scale capacity. All of the fish sampled from Bear Lake were in very healthy condition as shown by the relative weights (Figure 4).



**Figure 3.** Length-Frequency histogram of Rio Grande Cutthroat Trout sampled from Bear Lake, 2018.



**Figure 4.** Relative Weights of Rio Grande Cutthroat Trout sampled from Bear Lake, 2018.



## CONCLUSIONS

Bear Lake is a very productive lake that produces large, healthy Rio Grande Cutthroat Trout. The high densities of aquatic invertebrates provide a prey base that allows fish to grow well in this system. The catch rate of 0.79 fish/hour for the gillnet set is one of the lowest sampled in 2018. Given the low density of fish and high density of prey, higher stocking rates could be considered. If stocking rates are increased in the future, the lake should be monitored to maintain the trophy status of fish currently in Bear Lake.

Rio Grande Cutthroat Trout sampled from Bear Lake, 2018.





**Water:** Blue Lake  
**Location:** Rio Grande National Forest, approximately 8 miles southwest of Platoro Reservoir  
**Sampling Date:** 8/6/2018  
**Gear:** One 75 foot coldwater experimental gill net  
**Drainage:** Rio Grande  
**Water Code:** 88698  
**UTM Zone:** 13S  
**Easting:** 0355508  
**Northing:** 4122794

## **HISTORY**

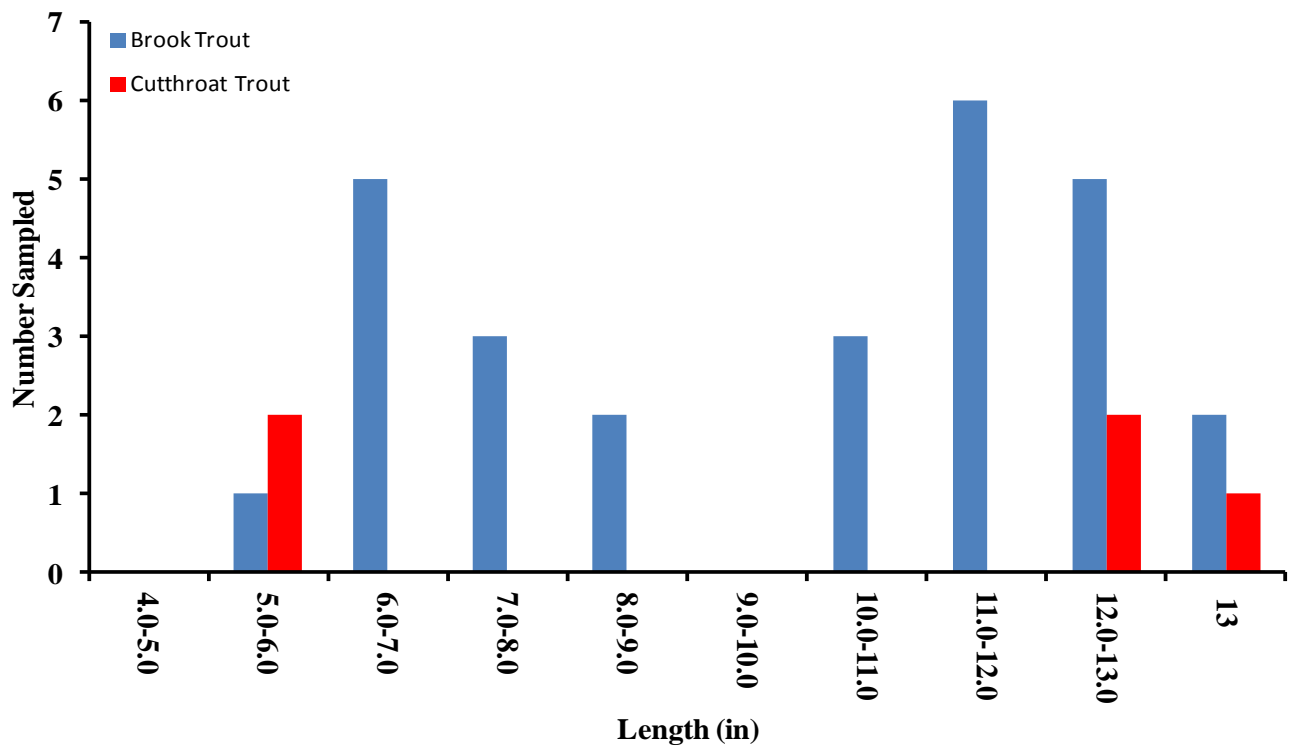
Blue Lake is 49 surface acres, with a maximum depth of 60 feet and an average depth of 26 feet. The lake is located in the South San Juan Wilderness of the The Rio Grande National Forest at an elevation of 11,463 feet. Blue Lake is accessed via Forest Service El Rito Azul Trail #718. The Distance from the trailhead to the lake is 4.6 miles. The lake can also be accessed through the Continental Divide Trail and Forest Trail #724.

Blue Lake was stocked with Pikes Peak Native Cutthroat Trout from 1973-1980. From 1981 until 1995 Snake River Cutthroat were stocked into the lake. Rio Grande Cutthroat were first stocked in 1997, and not again until 2000. From 2000-2003 Rio Grande Cutthroat were stocked annually. Beginning in 2005 the lake has been stocked biannually with Rio Grande Cutthroat Trout.

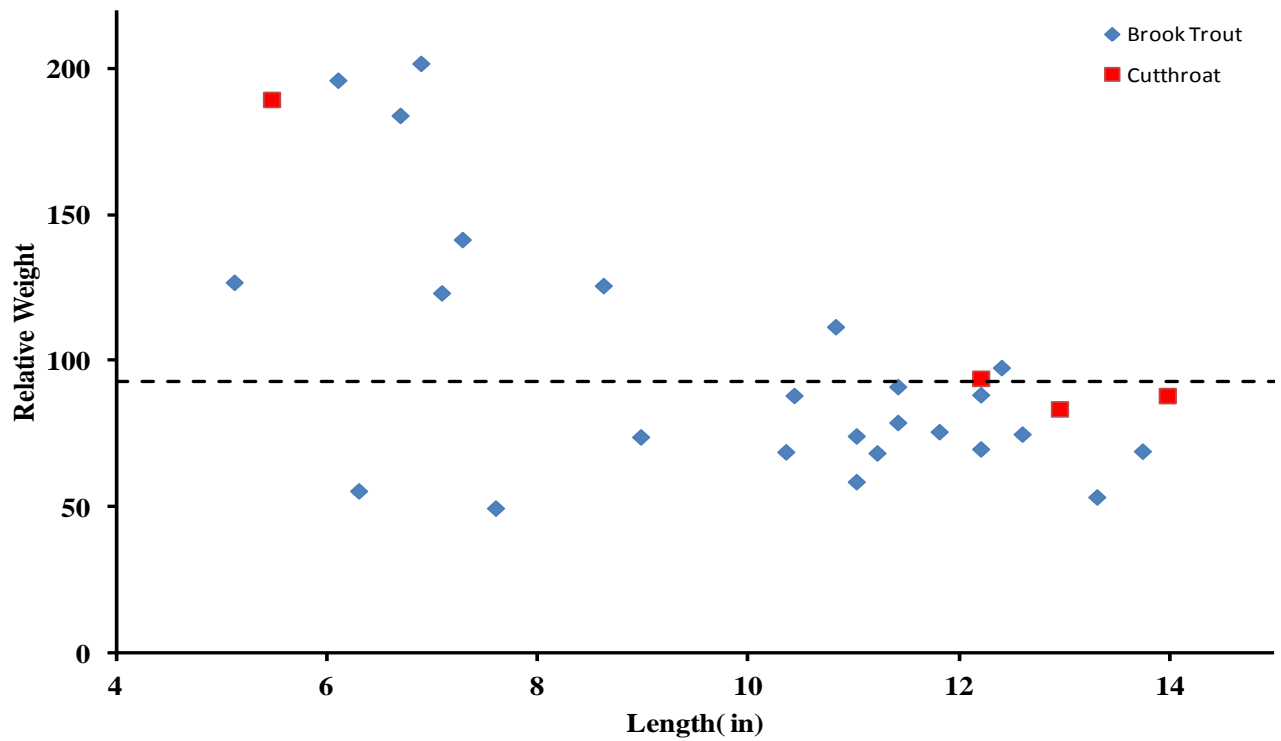
## **RESULTS**

Blue Lake has a rocky substrate and has scattered cliff banks surrounding it. Approximately 70% of the shore is considered fishable. Multiple species of aquatic invertebrates were observed in the lake including caddisflies, true flies, earthworms, leeches, snails, bivalves, mayflies, dragonflies, and water striders. The abundant amount of aquatic invertebrates in the lake provides ample prey sources for fish.

Blue Lake supports populations of both Rio Grande Cutthroat Trout and Brook Trout. Five Rio Grande Cutthroat Trout, and 27 Brook Trout were sampled from one gillnet set overnight for 13 hours. The catch rates for Rio Grande Cutthroat Trout and Brook Trout were 0.38 fish/hour, and 2.08 fish/hour respectively. Rio Grande Cutthroat Trout ranged in size from 5.3 inches to 13.9 inches, and had a average length of 10 inches (Figure 5). The mean relative weight for Rio Grande Cutthroat Trout was 113.8. Mean relative weight of Brook Trout sampled was 98 (Figure 6). Overall, Blue Lake is a productive water that supports a healthy fishery.



**Figure 5.** Length-Frequency histogram of fish sampled from Blue Lake, 2018.



**Figure 6.** Relative Weights of fish sampled from Blue Lake, 2018.

## CONCLUSIONS

Blue Lake is a very productive, deep lake that supports both Rio Grande Cutthroat Trout, and Brook Trout. Brook Trout are the dominate fish species found in the lake and comprised 84% of the catch. While Rio Grande Cutthroat Trout were not very abundant in the lake, the few that were sampled were mostly large, healthy fish. The self-sustaining Brook Trout population in Blue Lake hinders the ability of Rio Grande Cutthroat Trout to establish larger populations. At this time, Rio Grande Cutthroat Trout will continue to be stocked, but higher stocking rates should be considered.

Brook Trout sampled from Blue Lake, 2018.





**Water:** Cliff Lake

**Location:** Rio Grande National Forest, approximately 3.5 miles northeast of the town of Platoro

**Sampling Date:** 8/1/2018

**Gear:** One 75 foot coldwater experimental gillnet

**Drainage:** Rio Grande

**Water Code:** 93738

**UTM Zone:** 13S

**Easting:** 368738

**Northing:** 4138768



## HISTORY

Cliff Lake is an 8.4 surface acre lake, with an average depth of 14 feet and a maximum depth of 19 feet. The lake is located at an elevation of 11,620 feet within the Rio Grande National Forest. Cliff Lake can be accessed from Forest Road 257.1A. The road is closed to motorized travel by a gate, from which it is about a 5-mile hike to the lake.

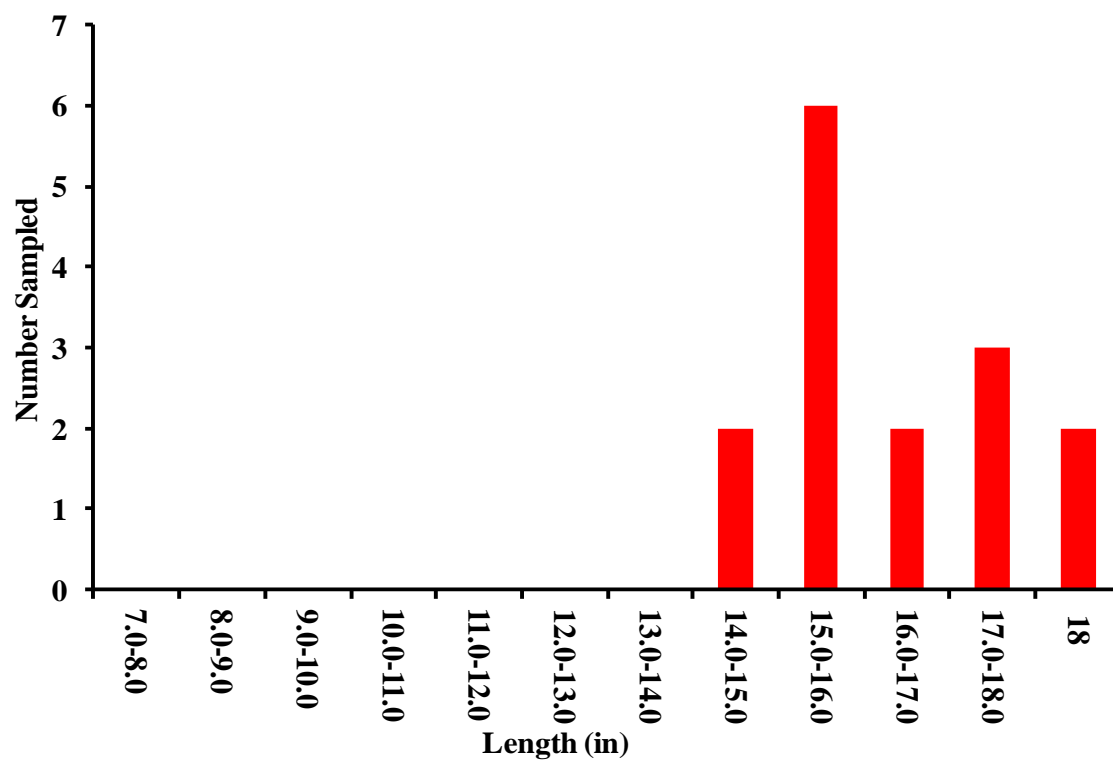
Stocking at Cliff Lake from the mid 1970s until 1993 was dominated by Brook Trout. No stocking occurred at Cliff Lake between 1994 and 2000. Since 2001, Rio Grande Cutthroat Trout have been the only species stocked in the lake. The lake is currently stocked biannually with Rio Grande Cutthroat Trout. The last stocking event occurred in 2017.

## RESULTS

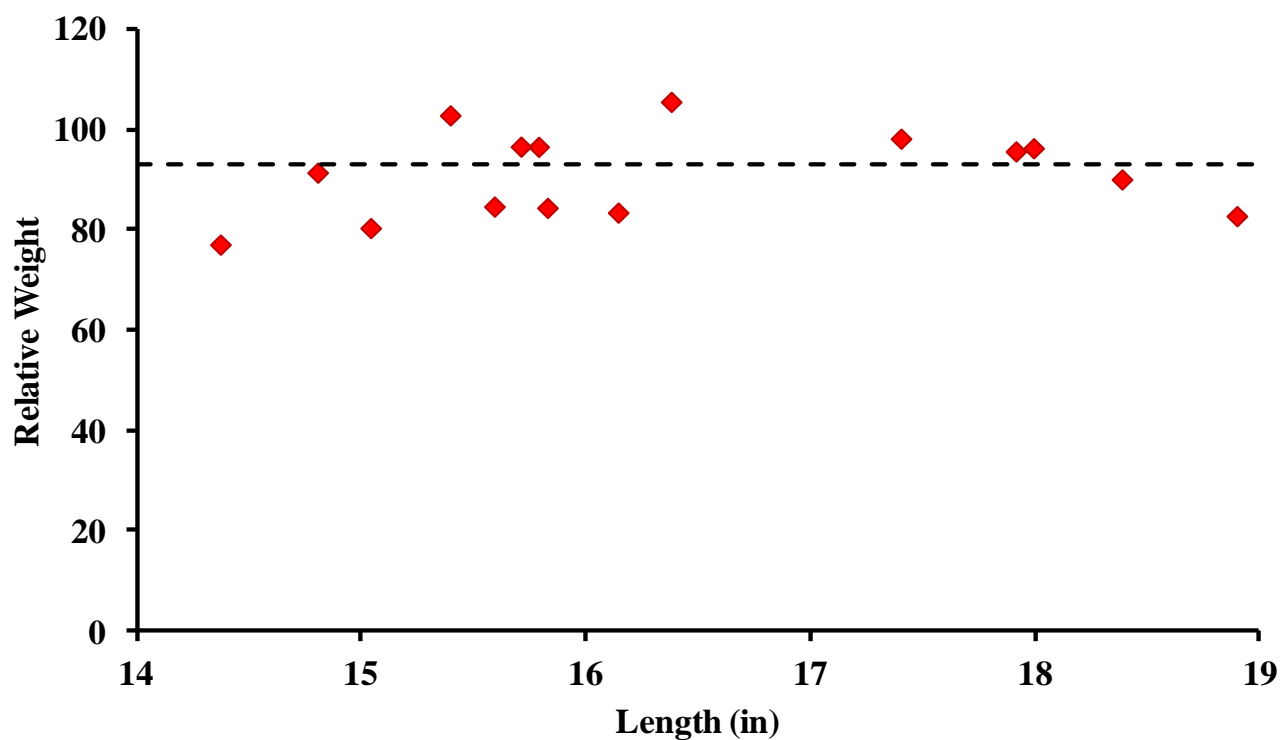
Cliff Lake has grassy shores on the south and east sides, the west and north shores of the lake are rocky with cliffs in some areas. It is estimated that approximately 50% of the shore is fishable. At the time of this survey, the lake appeared to be about 3 feet low. The substrate is comprised of sand, gravel, and rock. Small scuds and caddisflies were the observed prey items in the lake.

Fifteen cutthroat were sampled in the overnight gill net set at Cliff Lake. The gillnet at Cliff Lake was set for 15.5 hours, giving a catch rate of 0.97 fish/hour. The fish sampled at Cliff Lake ranged in size from 14.4 inches to 18.9 inches, with an average length of 16.4 inches (Figure 7). The average relative weight value was 91 for the fish sampled from the lake (Figure 8).





**Figure 7.** Length-Frequency histogram of Cutthroat Trout Sampled from Cliff Lake, 2018.



**Figure 8.** Relative Weights of Cutthroat Trout sampled from Cliff Lake, 2018.

## CONCLUSIONS

Cliff Lake supports a population of healthy Cutthroat Trout. As shown by Figure 8, the majority of fish sampled fall near or above the expected average weight depicted by the dashed line. Individual fish condition in the lake appears to be healthy suggesting an ample prey base. While the fish we did sample were in good condition, we did not sample any fish under 14 inches (Figure 7). The lack of smaller size classes may suggest low survival of fish stocked in 2017. The survival of the larger size class and not the recently stocked fish could be a result of temperature or pH shock during the last stocking event. It will be important to continue to monitor this lake to determine survival of future stocking events.

Cutthroat Trout sampled from Cliff Lake, 2018.



**Water:** Crystal Lake  
**Location:** Headwaters of Shallow Creek, approximately seven miles northwest of Creede  
**Sampling Date:** 8/7/2018  
**Gear:** One 75 foot coldwater experimental gillnet  
**Drainage:** Rio Grande  
**Water Code:** 89335  
**UTM Zone:** 13S  
**Easting:** 319948  
**Northing:** 4194873



## HISTORY

Crystal Lake is a four surface acre lake with a maximum depth of 24.4 feet. The average depth of the lake is unknown at this time. The lake is located in the Rio Grande National Forest and is accessible through Bristol Head Road accessed off Highway 149. Follow the road west from highway 149 for approximately eight miles at which point the road forks. Take the north fork of the road and follow approximately two mile to the parking lot for the lake. This road requires a four-wheel drive vehicle with high clearance, but the lake is also accessible through the Mckenzie Trail #804. The trail is accessed off Forest Roads 507 and 508 approximately three miles west of Creede on Highway 149. Mckenzie Trail is seven miles long with an elevation gain of 2600 feet.

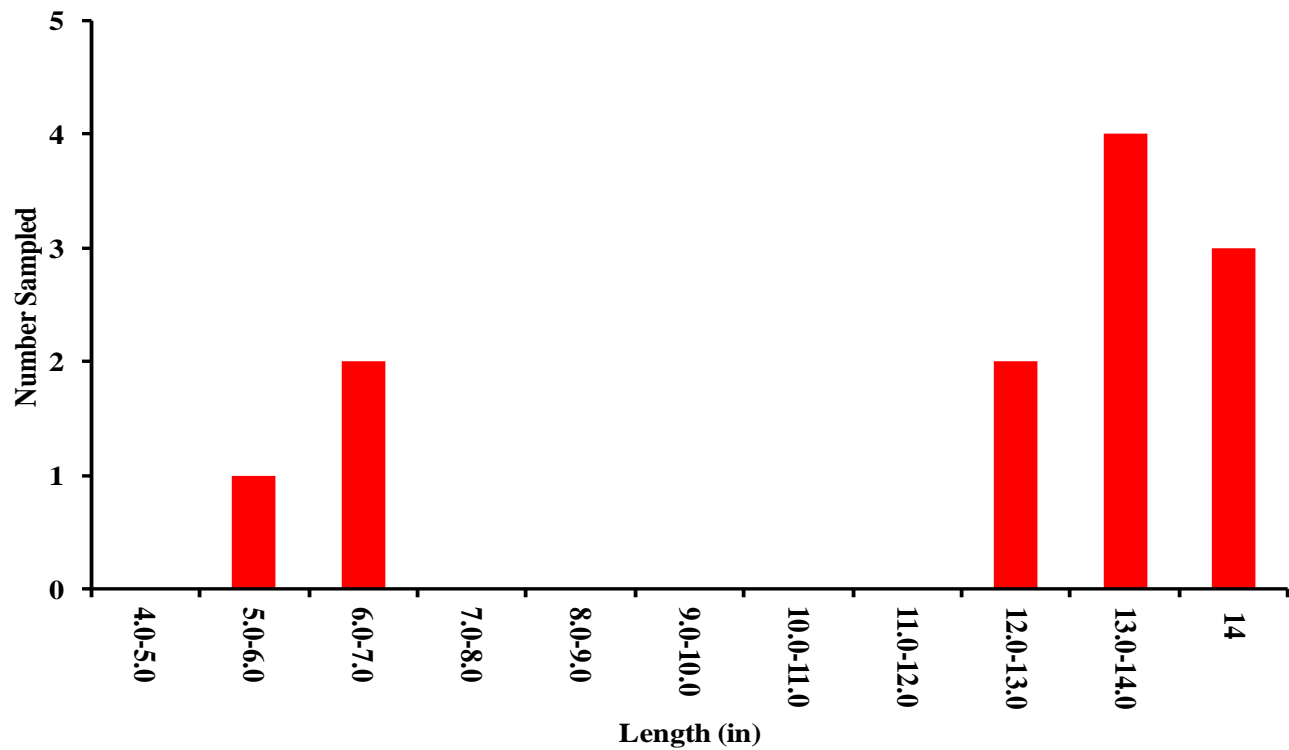
Pikes Peak Native Cutthroat Trout were stocked into Crystal Lake in the 1970s. From 1981 until 1995, Snake River Cutthroat Trout were stocked into the lake. Rio Grande Cutthroat Trout were first stocked in the lake in 1996, and have been stocked periodically since. The last stocking event occurred in 2017.

## RESULTS

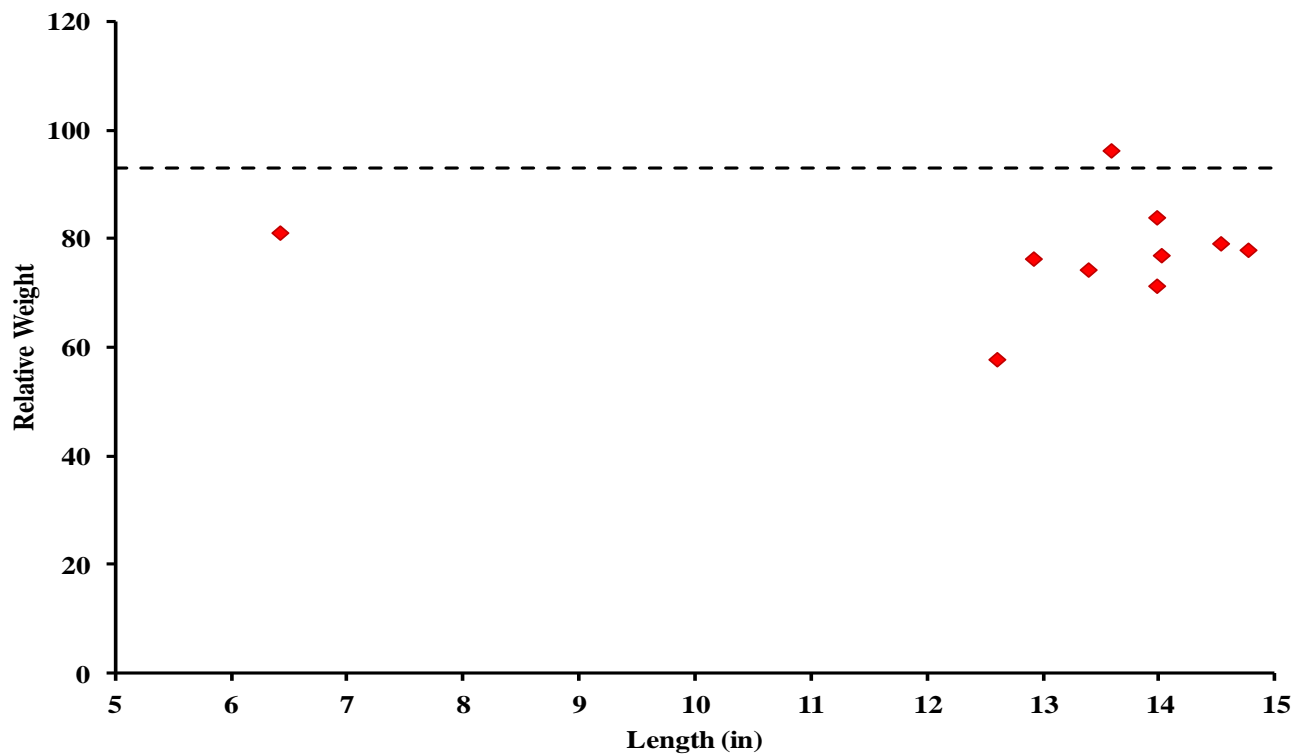
Crystal Lake has a sand/gravel dominated substrate with grassy banks. The entire shore of Crystal Lake is considered fishable. Aquatic invertebrates observed in the lake during this survey included leeches, caddisflies, small bivalves, and beetles. Earthworms were also observed in diet analysis of fish sampled.

One overnight gillnet was set for 13 hours at Crystal Lake. Twelve Rio Grande Cutthroat Trout were sampled, giving a catch rate of 0.92 fish/hour. The fish sampled ranged in size from 5.3 inches to 14.8 inches, and had an average length of 11.8 inches (Figure 9). Two distinct size classes of fish were sampled from Crystal Lake, as shown by the length-frequency histogram (Figure 9). The average relative weight of fish sampled was 77.5, and the maximum relative weight was 96.3. With the exception of one fish, all cutthroat sampled fell below the expected weight for a fish of a given length (Figure 10).





**Figure 9.** Length-Frequency histogram of Cutthroat Trout sample from Crystal Lake, 2018.



**Figure 10.** Relative Weights of Cutthroat Trout sampled from Crystal Lake, 2018.

## CONCLUSIONS

Crystal Lake supports a population of Rio Grande Cutthroat Trout. Two size classes of fish were sampled from Crystal Lake showing the ability of stocked fish to recruit to adult sizes. Although, adult fish were sampled in the lake, the condition of these fish was a under average. The catch rate of 0.92 fish/hour suggests that there are good numbers of fish in the lake. At this time, no changes in management of the lake are planned but decreasing the stocking rate in the future could be considered to increase individual fish condition.

Cutthroat Trout sampled from Crystal Lake, 2018.



**Water:** Lower Deadman Lake  
**Location:** Sangre de Cristo Wilderness, Rio Grande National Forest, approximately 9.5 miles southeast of the Town of Crestone.

**Sampling Date:** 6/19/2018

**Gear:** One 75 foot coldwater experimental gillnet

**Drainage:** Rio Grande

**Water Code:** 89397

**UTM Zone:** 13S

**Easting:** 451149

**Northing:** 4196510



## HISTORY

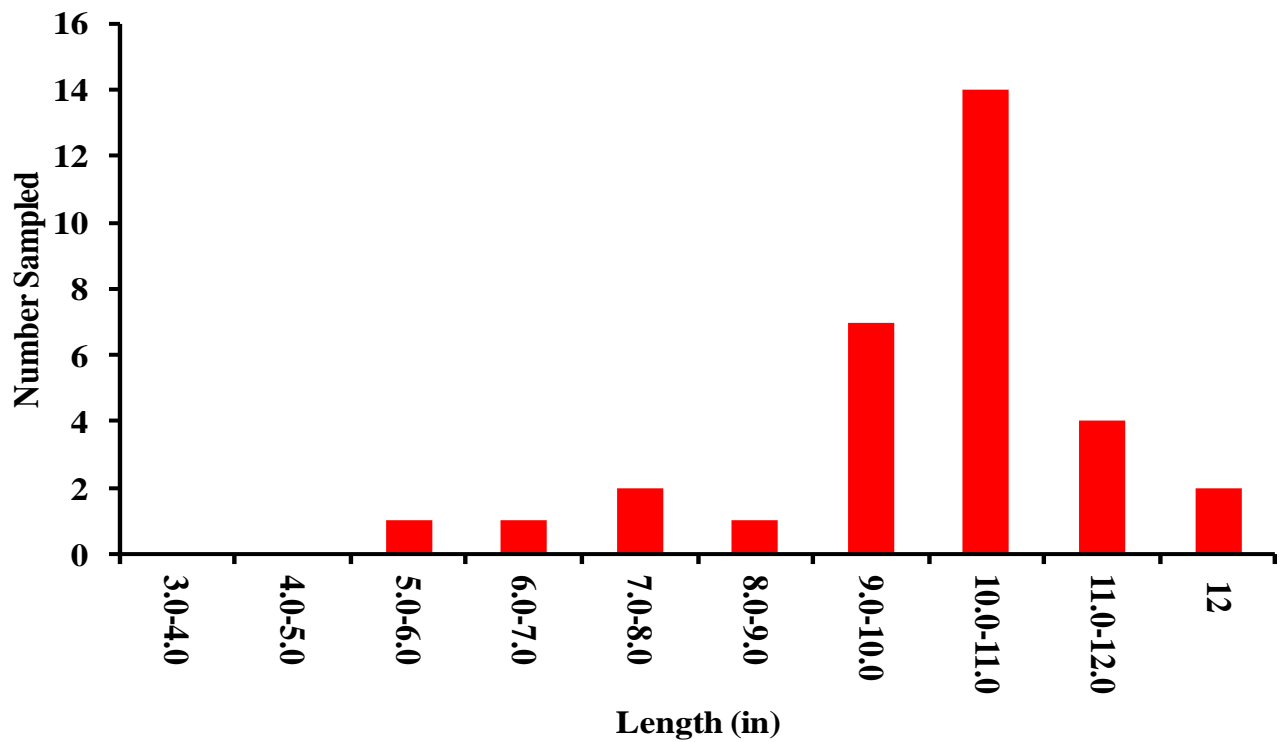
Lower Deadman Lake is a 2.5 surface acre lake with an average depth of 5 feet, and a maximum depth of 9.8 feet. The lake is located on Deadman Creek in the Sangre de Cristo Wilderness at an elevation of 11,662 feet. Lower Deadman Lake is accessed through the Liberty Road Trail, south of the Town of Crestone. From the Liberty Road Gate hike the primitive road for approximately two miles to the junction with the Deadman Creek Trail. Follow the Deaman Creek Trail east for approximately six miles to Lower Deadman Lake. The trail is considered difficult and hard to follow in some places.

Pikes Peak Native Cutthroat were stocked into the lake from 1974 until 1983. Snake River Cutthroat were stocked in the lake form 1985-1993. Rio Grande Cutthroat Trout stocking began in 1995. The lake is currently stocked biannually with the last stocking event taking place in 2018.

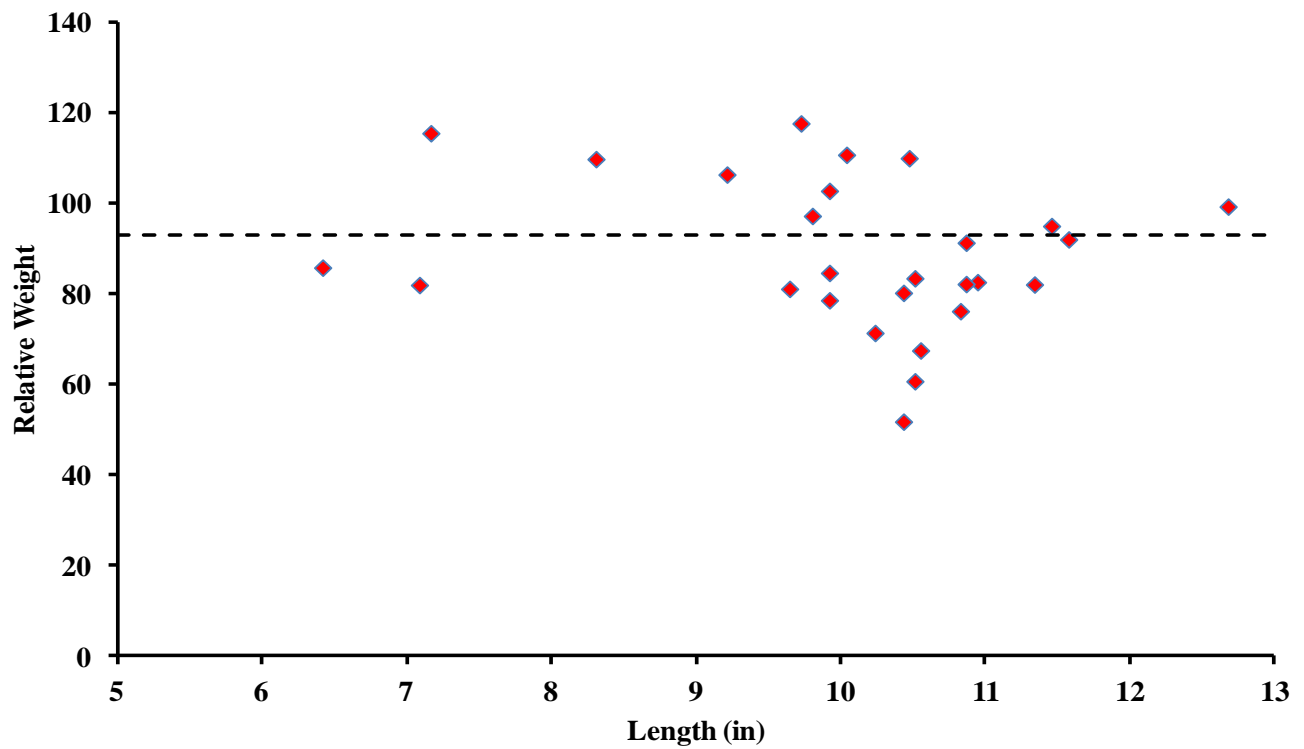
## RESULTS

Lower Deadman Lake is dominated by a sandy substrate, and has a rocky shore of which 70% is easily fishable. Aquatic invertebrates observed in the lake were caddisflies, scuds, midges, earthworms, and water boatmen.

Thirty-Two Cutthroat Trout were sampled from a 14 hour overnight gillnet set. The catch rate for fish sampled in Lower Deadman Lake was 2.29 fish/hour. The Cutthroat Trout sampled from Lower Deadman Lake ranged in size from 5.9 inches to 12.9 inches and had an average length of 10 inches (Figure 11). Although fish sampled ranged in size from 5.9 to 12.9 inches, most individuals measured between 9 and 11 inches, no other distinct size classes were apparent. The average relative weight of fish was 89 and the maximum relative weight was 117 (Figure 12).



**Figure 11.** Length-Frequency histogram of Cutthroat Trout sampled from Lower Deadman Lake, 2018.



**Figure 12.** Relative Weights of Cutthroat Trout sampled from Lower Deadman Lake, 2018.



## CONCLUSIONS

Lower Deadman Lake continues to support a large population of Cutthroat Trout. The cutthroat trout sampled had varying spotting patterns which could suggest that the Rio Grande Cutthroat that have been stocked have been naturally crossing with the previous species of cutthroat that were stocked in the lake. This backcrossing with previous species and the large number of fish in the lake suggest that successful natural reproduction occurs in Lower Deadman Lake. The average relative weight of fish sampled was below the average expected weight of fish sampled. The below average body condition is likely due to the large population of fish creating competition for prey resources in the lake. In order to improve fish condition, lower stocking rates or a temporary break from stocking is recommended. If stocking is discontinued at this point, the lake should be sampled again in 5-7 years to determine changes in the fish population.

Cutthroat Trout sampled from Lower Deadman Lake, 2018.



**Water:** Upper Deadman Lake  
**Location:** Sangre de Cristo Wilderness, Rio Grande National Forest, approximately 10 miles southeast of the Town of Crestone.

**Sampling Date:** 6/20/2019

**Gear:** One 75 foot coldwater experimental gillnet

**Drainage:** Rio Grande

**Water Code:** 89400

**UTM Zone:** 13S

**Easting:** 451401

**Northing:** 4196085



## HISTORY

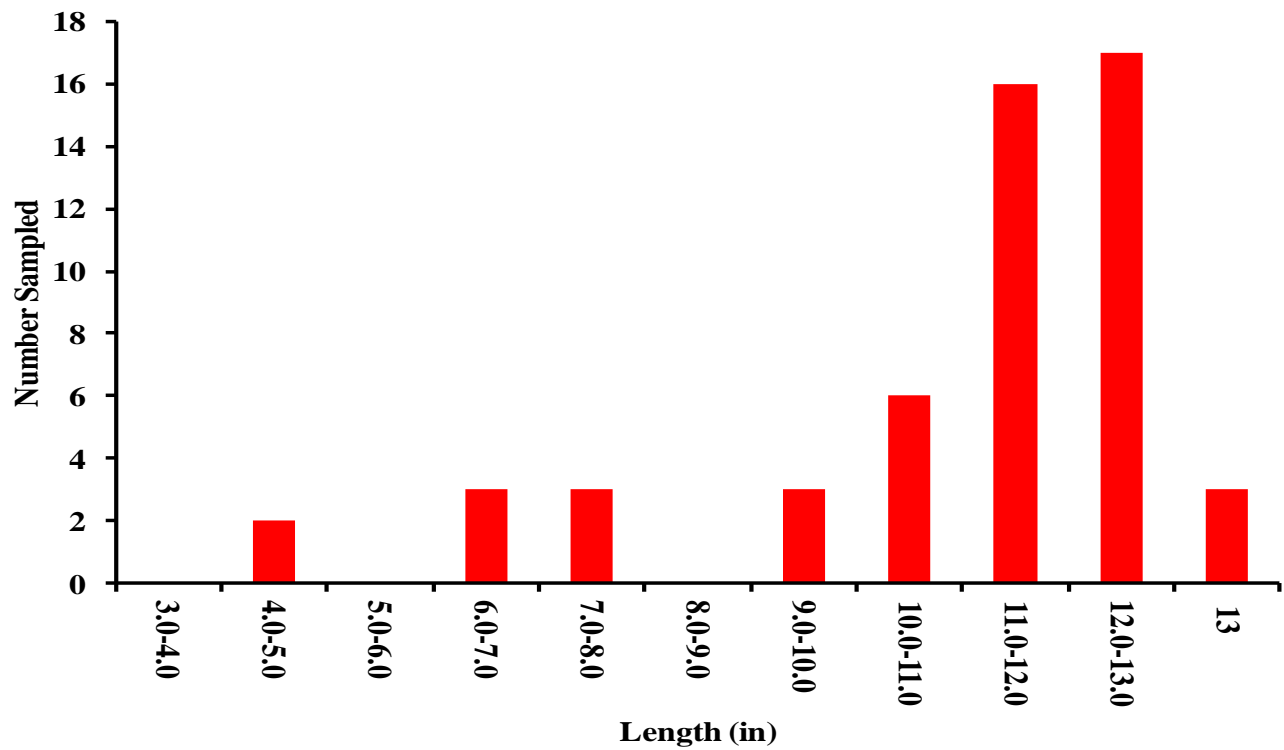
Upper Deadman Lake is a 13.8 surface acre lake, with an average depth of 11 feet and a maximum depth of 29.8 feet. The lake is located in the Sangre de Cristo Wilderness of the Rio Grande National Forest at an elevation of 11,703 feet. Upper Deadman Lake is accessed through the Liberty Road Trail, south of the Town of Crestone. From the Liberty Road Gate hike the primitive road for approximately two miles to the junction with the Deadman Creek Trail. Follow the Deaman Creek Trail east for approximately 6.5 miles to Upper Deadman Lake. The trail is considered difficult and hard to follow in some places.

Pikes Peak Native Cutthroat were stocked into the lake from 1974 until 1983. Snake River Cutthroat were stocked in the lake form 1985-1993. Rio Grande Cutthroat Trout stocking began in 1995. The lake is currently stocked biannually with the last stocking event taking place in 2018.

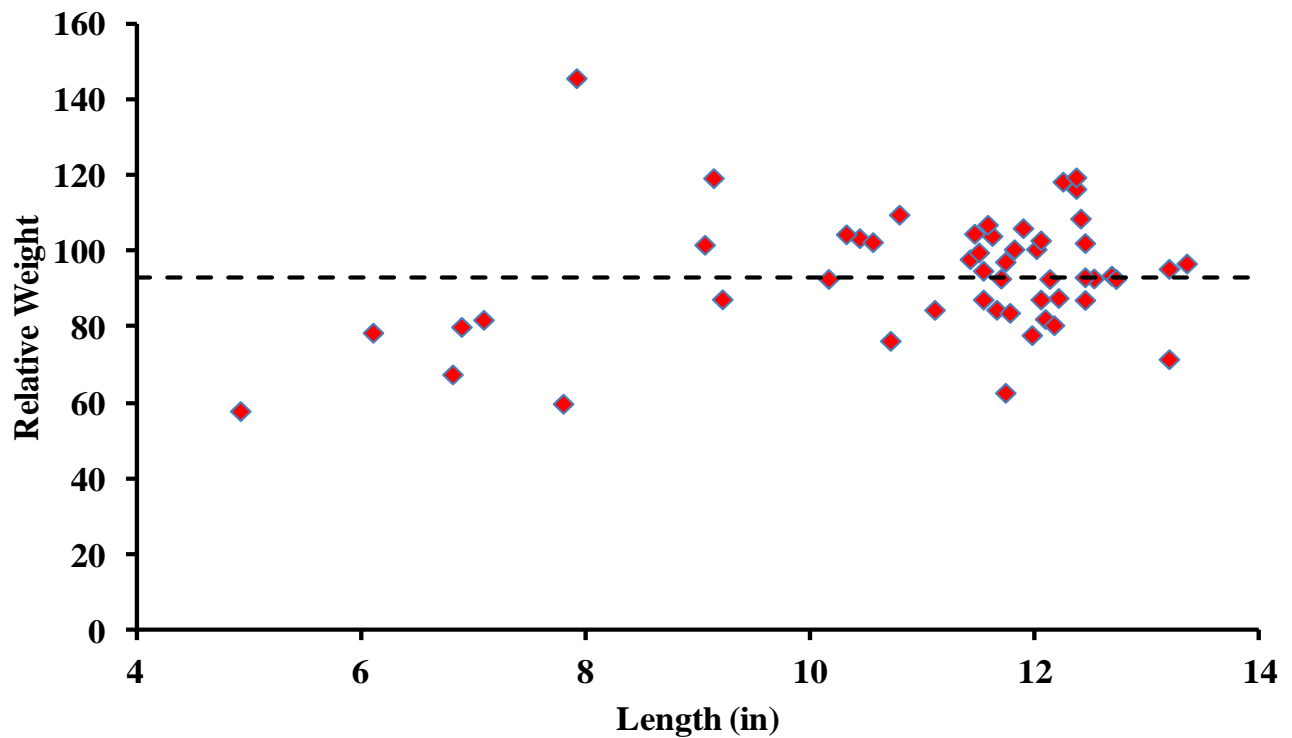
## RESULTS

Upper Deadman Lake is dominated by a rocky substrate with some area of sandy substrate. The shoreline is a mix of rocky areas and grassy areas, 50% of the shoreline is considered easily fishable. Aquatic invertebrates observed at the lake include midges, scuds, earthworms, water boatmen, and abundant caddisflies.

Fifty-three Cutthroat Trout were sampled from a 14 hour overnight gillnet set. The catch rate for fish sampled from Upper Deadman Lake was 3.79 fish/hour. The Cutthroat Trout sampled ranged in size from 4.4 inches to 13.3 inches with an average length of 10.9 inches. There appears to be three size classes in the lake with the majority of the fish caught falling between 11 and 13 inches (Figure 13). The average relative weight of fish sampled was 92.8 and the maximum relative weight was 119.5 (Figure 14).



**Figure 13.** Length-Frequency histogram of Cutthroat Trout sampled from Upper Deadman Lake, 2018.



**Figure 14.** Relative Weights of Cutthroat Trout sampled from Upper Deadman Lake, 2018.

## CONCLUSIONS

Upper Deadman Lake continues to support a large population of Cutthroat Trout. Similar to Lower Deadman Lake, the fish sampled from Upper Deadman Lake also varying spotting patterns. The variance in spotting patterns and the high number of fish sampled suggest successful reproduction in the lake. The average relative weight for fish sampled from Upper Deadman Lake was 92.8 showing the fish to be in good condition on average. However, many fish fall below the average, especially given the apparent high productivity of the lake. At this point, the suggestion is to stop stocking the lake to grow larger, trophy size fish. The natural reproduction in the lake will allow the population to persist and by discontinuing stocking, competition for prey resources will be decreased. The decrease in competition will allow fish to grow to their full potential in the lake. The lake should be monitored to confirm the change in the fishery in 5-7 years.

Cutthroat sampled from Upper Deadman Lake, 2018.





**Water:** West Deadman Lake  
**Location:** Sangre de Cristo Wilderness, Rio Grande National Forest, approximately 10 miles southeast of the Town of Crestone.

**Sampling Date:** 8/7/2018

**Gear:** One 75 foot coldwater experimental gillnet

**Drainage:** Rio Grande

**Water Code:** 89412

**UTM Zone:** 13S

**Easting:** 450228

**Northing:** 4196021



## HISTORY

West Deadman Lake is a three surface acre lake located in the Sangre de Cristo Wilderness of the Rio Grande National Forest at an elevation of 11,765 feet. The lake has an average depth of 9 feet and a maximum depth of 12 feet. This lake is also accessed from the Liberty Road Gate and the Deadman Creek Trail. When hiking the Deadman Creek Trail follow the drainage to the west of the main Deadman Lakes drainage to reach West Deadman Lake.

Pikes Peak Native Cutthroat were stocked into the lake from 1974 until 1983. Snake River Cutthroat were stocked in the lake from 1985-1993. Rio Grande Cutthroat Trout stocking began in 1995 and was discontinued in 2014.

## RESULTS

West Deadman Lake is dominated by a rocky substrate. The banks of the lake consist of rocky cliffs and grassy areas. Aquatic invertebrates observed at the lake include midges, water boatmen, scuds, and caddisflies.

No fish were sampled in one 12.5-hour overnight gill net set.

## CONCLUSIONS

West Deadman Lake does not support Cutthroat Trout and will not be stocked in the future.

**Water:** Heart Lake  
**Location:** Rio Grande National Forest, approximately 8 miles west of Brown Lakes State Wildlife Area.  
**Sampling Date:** 6/11/2018  
**Gear:** Two 75 foot coldwater experimental gill nets  
**Drainage:** Rio Grande  
**Water Code:** 90415  
**UTM Zone:** 13S  
**Easting:** 293790  
**Northing:** 4188928



## HISTORY

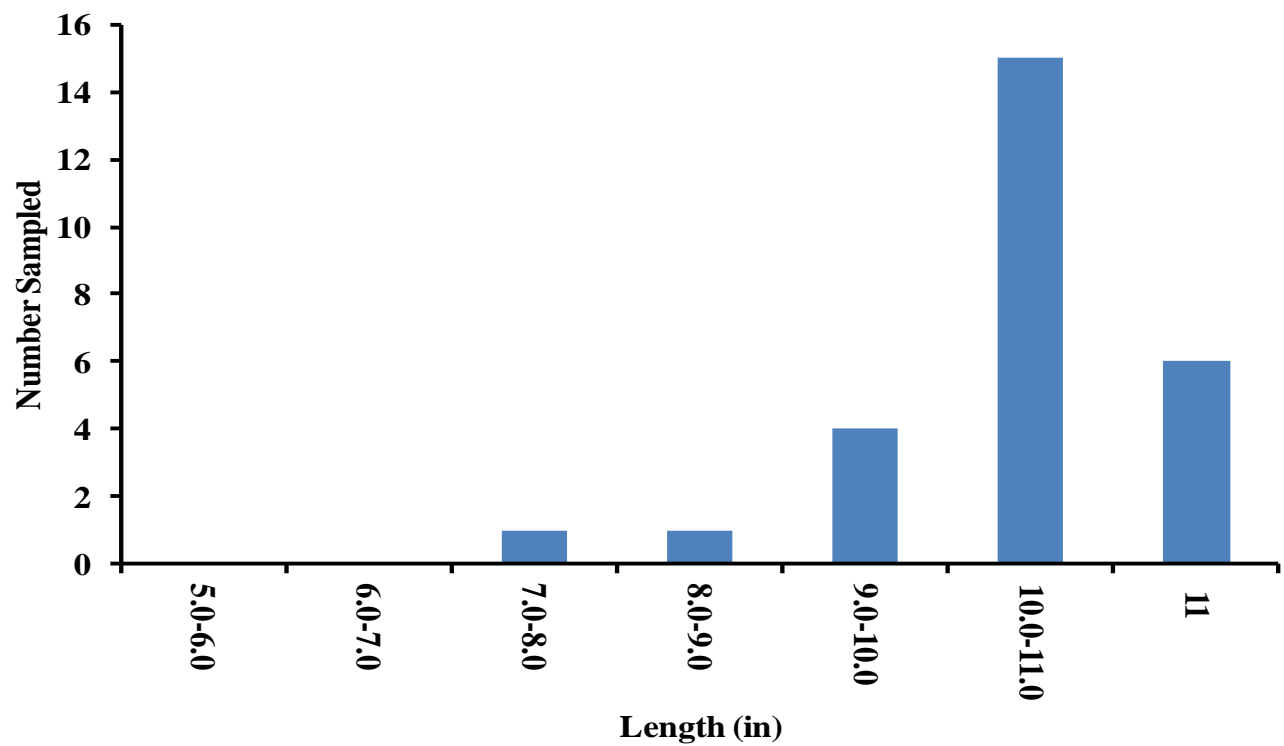
Heart Lake is a 16.8 surface acre lake located at an elevation of 10,550 feet. The lake has an average depth of five feet and a maximum depth of seven feet. Heart Lake is located near the town of Creede, Colorado. The lake is accessible from Forest Service trail #821, Lost Trail Creek Trail. Follow Trail #821 for approximately 3.5 miles to the junction with Heart Lake Trail, then continue for approximately two miles to the lake.

Rio Grande Cutthroat Trout were stocked nine times between 2000 and 2017.

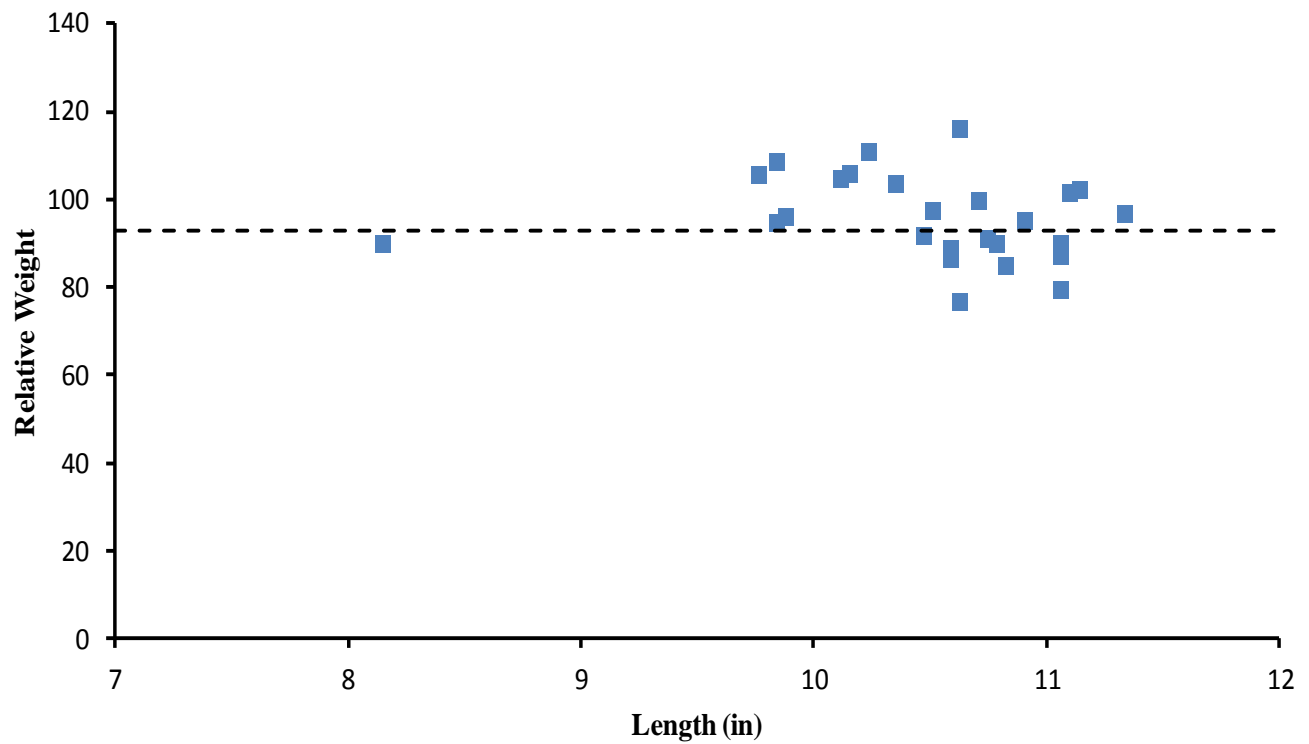
## RESULTS

Heart Lake is dominated by a silt substrate and gravel shoreline, and 100% of the shore is fishable. Aquatic invertebrates observed include scuds and abundant midges.

Twenty-seven Brook Trout were sampled in two, two-hour gillnet sets. No cutthroat trout were sampled at Heart Lake during this survey. The Brook Trout sampled ranged in size from 7.4 inches to 11.3 inches and had an average length of 10.4 inches (Figure 15). The majority of fish sampled measured between 10-11 inches as shown by the length-frequency histogram (Figure 15). The average relative weight of the Brook Trout sampled from Heart Lake was 96 and the maximum relative weight was 116 (Figure 16).



**Figure 15.** Length-Frequency histogram of Brook Trout sampled from Heart Lake, 2018.



**Figure 16.** Relative Weights of Brook Trout sampled from Heart Lake, 2018.

## CONCLUSIONS

Heart Lake supports a healthy, naturally reproducing population of Brook Trout. No Cutthroat Trout were sampled from Heart Lake in 2018. The absence of Cutthroat Trout in the survey suggests that the Brook Trout population has outcompeted all prior Cutthroat stocking efforts. At this time all stocking of Rio Grande Cutthroat Trout will be discontinued, and Heart Lake will be managed for a wild Brook Trout population.

Brook Trout, sampled from Heart Lake, 2018.





**Water:** Machin Lake  
**Location:** Near the headwaters of Saguache Creek, approximately 8.5 miles southwest of Saguache Park  
**Sampling Date:** 7/24/2018  
**Gear:** Two 75-foot Coldwater experimental gillnets  
**Drainage:** Rio Grande  
**Water Code:** 91114  
**UTM Zone:** 13S  
**Easting:** 337416  
**Northing:** 4199489



## HISTORY

Machin Lake is an 11.5-acre lake with an average depth of 30 feet, and a maximum depth of 42 feet. During this survey, the lake was approximately 10 feet below full pool. The lake is located near the headwaters of the Middle Fork of Saguache Creek at an elevation of 12,560 feet. Machin Lake is accessible through the Machin Basin Trail #784, which is 9.2 miles long. Machin Basin Trail can be accessed through many different trails including Middle Fork Trail #783, Middle Fork Cutoff Trail #888, Benito Creek Trail #867, Twin Peaks Trail #782, Halfmoon Creek Trail #782, and La Garita Stock Driveway #787. The trails are open to horses, but navigation can be difficult in some areas due to down timber.

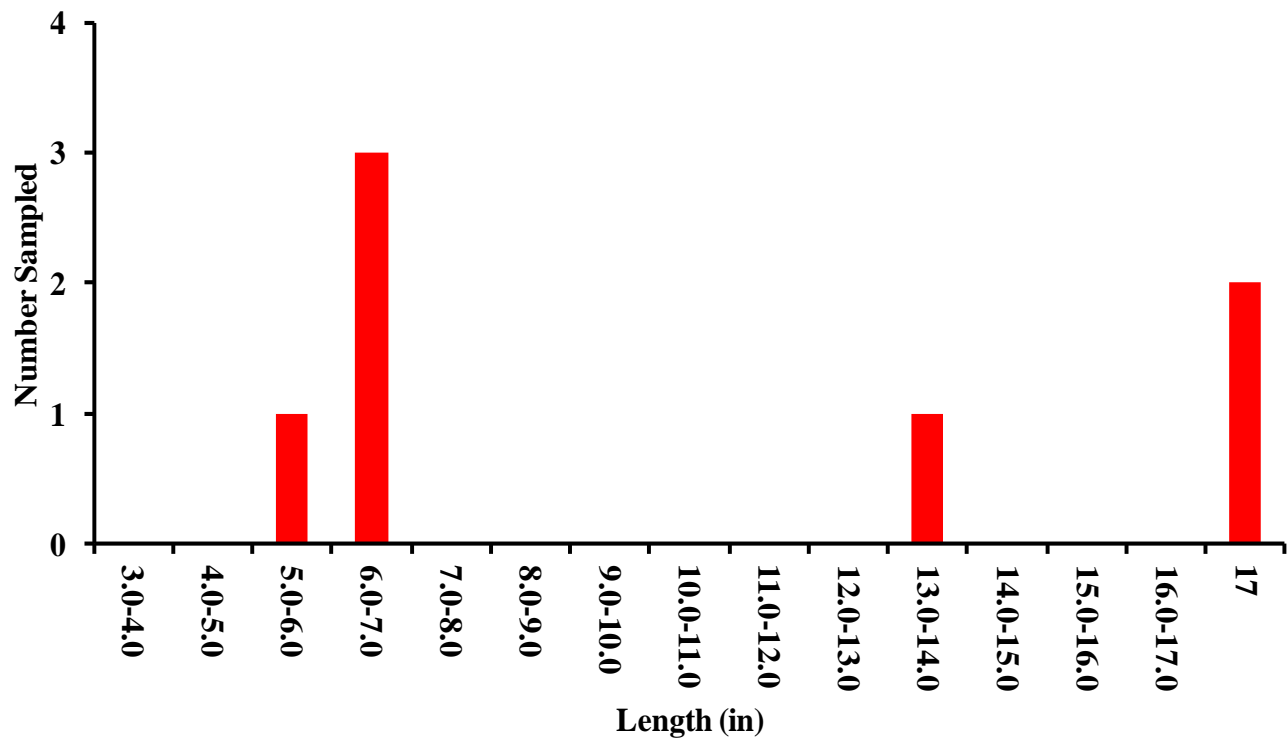
Pikes Peak Native Cutthroat were stocked in Machin Lake six times from 1974 to 1980. Beginning in 1981, stocking changed to Snake River Cutthroat until 1993. Rio Grande Cutthroat Trout were first stocked into the lake in 1996, and are now stocked on a biannual basis, with the last stocking event taking place in August of 2017.

## RESULTS

The substrate of Machin Lake appears to be dominated by large gravel and rocks. Aquatic invertebrates observed in the lake include scuds, small bivalves, and caddisflies. Approximately 60% of the shoreline is considered easily fishable.

Two 75-foot coldwater experimental gillnets were set overnight at Machin Lake in 2018. One net was set for 12 hours and the other was set for 13 hours, for a total fishing time of 25 hours. Between both nets, only seven Cutthroat Trout were sampled. Fish sampled ranged in size from 5.5 inches to 18.5 inches with an average length of 10.5 inches (Figure 17). Although the average length of fish sampled was 10.5 inches, most of the fish sampled were between 5 and 7 inches. A couple of larger fish were sampled but no size classes were well defined in the lake. Accurate weights were only obtained on three fish, but the relative weights were near average for all three individuals. No relative weight graph is included due to small amount of data.





**Figure 17.** Length-Frequency histogram of Cutthroat Trout sampled from Machin Lake, 2018.

## CONCLUSIONS

Although the density of fish in Machin Lake appears low, the lake continues to support Cutthroat Trout. One hypothesis for the low population density could be low survival of stocked fish, however stocking rates have changed significantly over the years as well. The change in stocking rates is more likely the reason for the small population at this time. Since 2009, Machin Lake has been stocked at low stocking rates ranging from 13 to 45 fish/acre. Prior to 2009, the lake was stocked at much higher rates (130-150 fish/acre). Increasing stocking rates for the lake could result in a larger population of Cutthroat Trout at Machin Lake. At this time, stocking rates will be increased. Machin Lake should be monitored in 5-7 years to determine population changes that result from increased stocking rates. Stocked fish should be monitored after stocking events to ensure survival in the lake.

Rio Grande Cutthroat Trout sampled from Machin Lake, 2018.



**Water:** Big Ruby Lake  
**Location:** Rio Grande National Forest, approximately 15.5 miles southwest of Creede  
**Sampling Date:** 6/25/2018  
**Gear:** One 75-foot coldwater experimental gillnet  
**Drainage:** Rio Grande  
**Water Code:** 92089  
**UTM Zone:** 13S  
**Easting:** 311189  
**Northing:** 4174991



## HISTORY

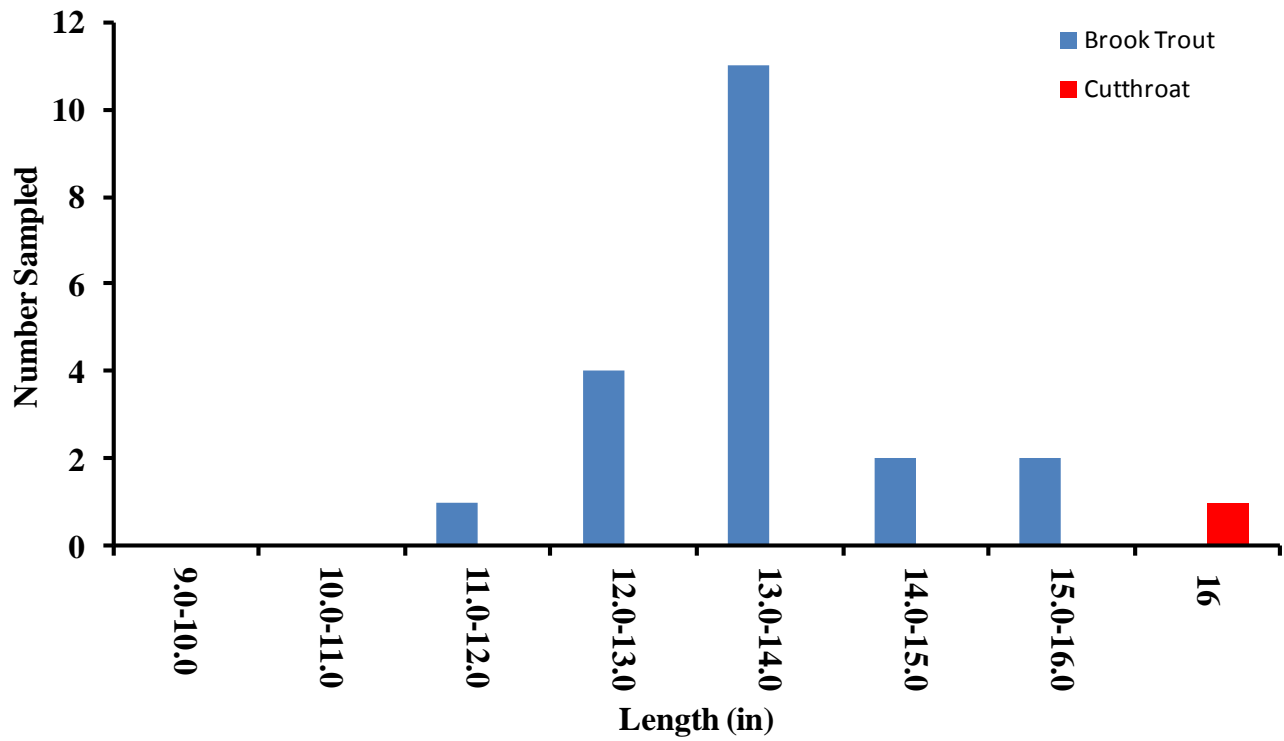
Big Ruby Lake is 29.6 surface acres with an average depth of 26 feet, and a maximum depth of 50 feet. The lake is located in the Rio Grande National Forest near the town of Creede at an elevation of 11,290 feet. Big Ruby Lake is accessible through the Rio Grande National Forest, Fern Creek Trail #815. The trail is heavily used and open to foot, horse, and OHV traffic. OHV travel is restricted to the first 4 miles of the trail, after which the trail continues for about a mile to Big Ruby Lake.

Big Ruby Lake was stocked with Rainbow Trout periodically from 1973 until 1995. Rio Grande Cutthroat Trout were stocked in the lake 12 times between 1996 and 2017.

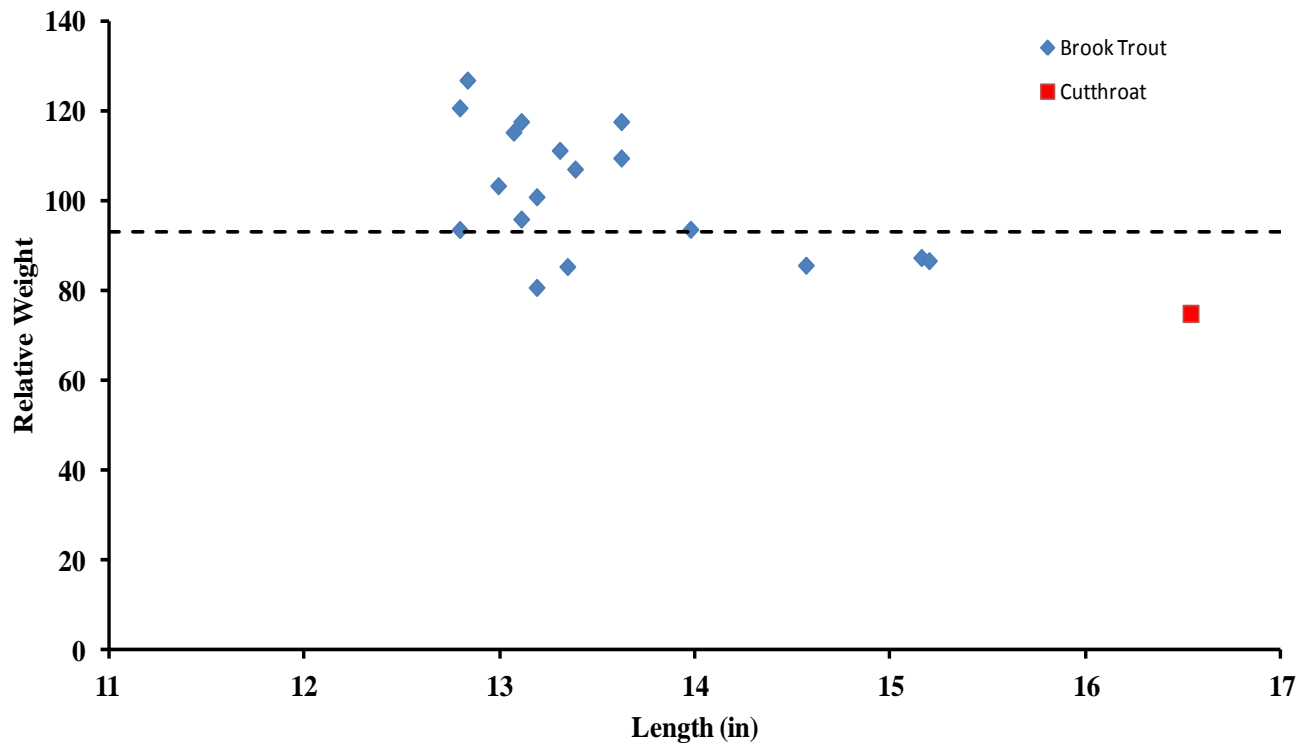
## RESULTS

Big Ruby Lake is dominated by a gravel substrate, and gravel and grass banks. The shoreline of the lake is very accessible with 90% of the shore considered easily fishable. Aquatic invertebrates were very abundant in the lake and included midges, scuds, leeches, and caddisflies.

Twenty Brook Trout and one Cutthroat Trout were sampled from one 14.25-hour overnight gill net set. The catch rates for Brook Trout and Cutthroat Trout were 1.4 fish/hour and 0.07 fish/hour respectively. The Cutthroat Trout sampled had a total length of 16.5 inches and a relative weight of 75. The Brook Trout sampled ranged in size from 11.6 inches to 15.2 inches, and had an average length of 13.5 inches (Figure 18). The average relative weight of Brook Trout sampled was 102 and the maximum relative weight was 127 (Figure 19).



**Figure 18.** Length-Frequency histogram of fish sampled from Big Ruby Lake, 2018.



**Figure 19.** Relative Weights of fish sampled from Big Ruby Lake, 2018.



## CONCLUSIONS

Big Ruby Lake does not support a large population of Cutthroat Trout and it appears that only a few individuals survive in the lake. The Cutthroat Trout that are stocked in the lake are likely outcompeted by the Brook Trout population. While Brook Trout in the lake are abundant, no well-defined size classes are apparent in the sample (Figure 18). The smallest fish sampled in the lake was over 11 inches, but the number of fish caught suggests a robust population. It is likely that no smaller fish were sampled because of habitat preferences. It is possible that smaller fish are utilizing habitat areas with more cover, and with one gillnet we did not adequately survey these areas. However, the abundant adult population of Brook Trout suggests good recruitment and survival of the species in the lake. The apparent large Brook Trout population and poor survival of Rio Grande Cutthroat Trout in the lake are good reasons to discontinue stocking efforts. Rio Grande Cutthroat Trout stocking should occur in waters with higher survival rates to provide better opportunity for anglers. At this time, Big Ruby Lake will be removed from the stocking schedule. It is recommended to survey the lake again in the coming years to verify occurrence of small Brook Trout and to observe any changes that may occur.

Rio Grande Cutthroat Trout sampled from Big Ruby Lake, 2018.



Brook Trout sampled from Big Ruby Lake, 2018.



**Water:** Little Ruby Lake  
**Location:** Rio Grande National Forest, approximately 14.5 miles southwest of Creede  
**Sampling Date:** 6/25/2018  
**Gear:** One 75-foot coldwater experimental gillnet  
**Drainage:** Rio Grande  
**Water Code:** 92091  
**UTM Zone:** 13S  
**Easting:** 311313  
**Northing:** 4176294



## HISTORY

Little Ruby Lake is 17.8 surface acres with an average depth of 8 feet and a maximum depth of 19 feet. The lake is located in the Rio Grande National Forest near the town of Creede at an elevation of 11,250 feet. Little Ruby Lake is accessible through the Rio Grande National Forest, Fern Creek Trail #815. The trail is heavily used and open to foot, horse, and OHV traffic. The trail is approximately 3.7 miles to Little Ruby Lake from the trailhead.

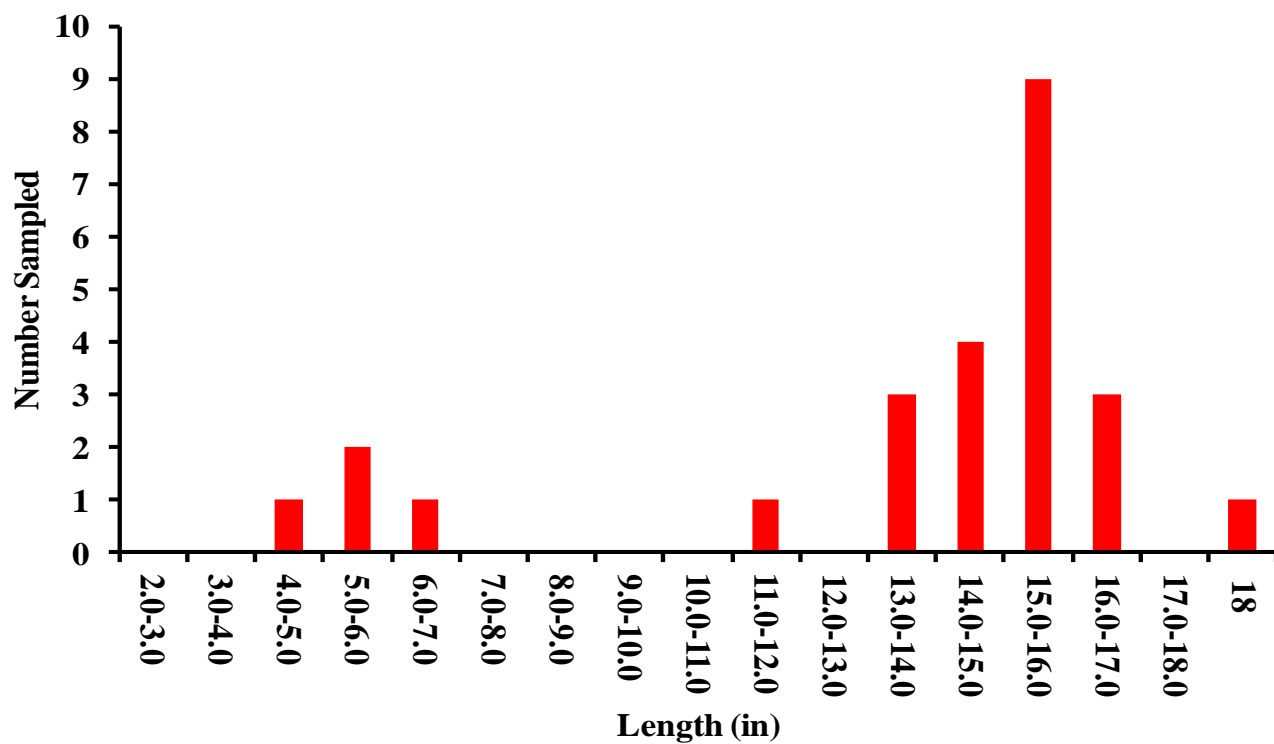
Brook Trout were stocked in Little Ruby Lake in 1973. From 1974 to 1995, the lake was stocked with Rainbow Trout 16 times. Rio Grande Cutthroat Trout have been stocked in Little Ruby Lake 12 times since 1996 and are currently stocked on a biannual basis. The last stocking event occurred in August of 2017.

## RESULTS

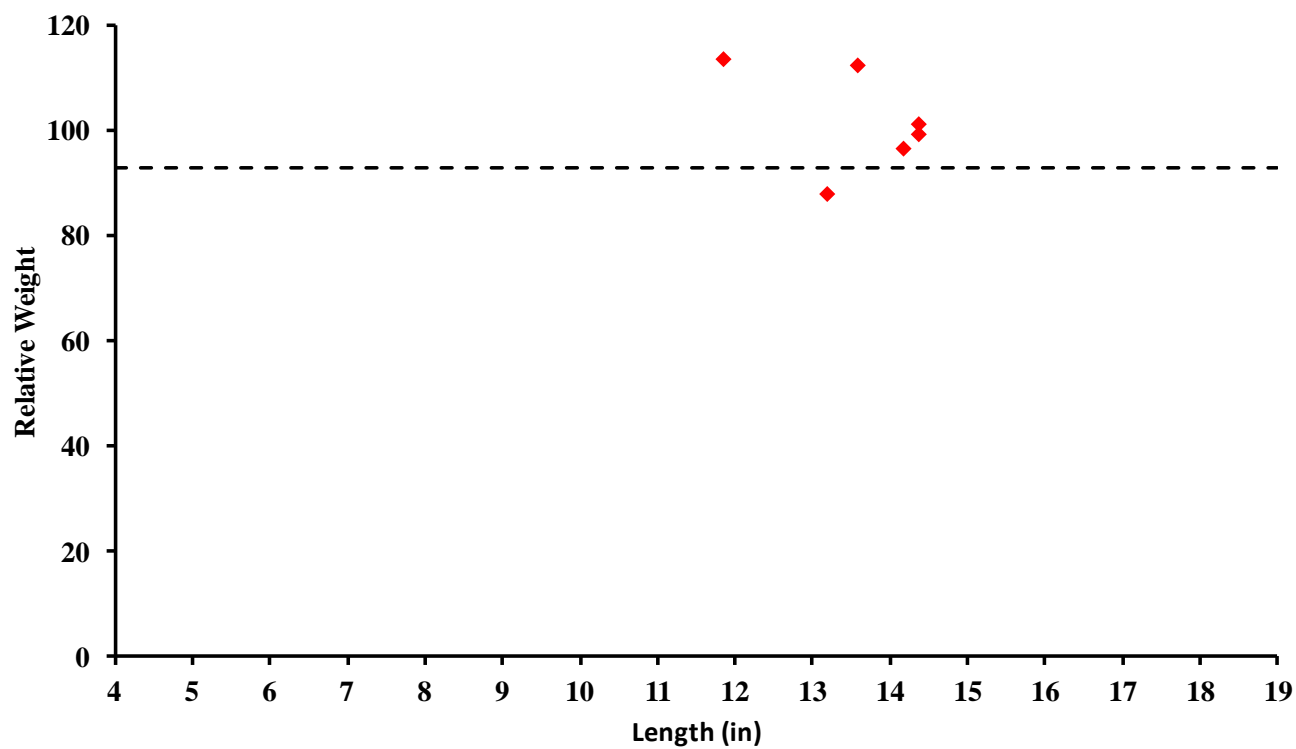
Little Ruby Lake is dominated by sand and gravel with some grassy areas on the northwest shore. The shoreline is very accessible with 95% of shore considered easily fishable. There appears to be an abundant prey base in the lake with multiple aquatic invertebrates observed including damselflies, leeches, caddisflies, water beetles, and scuds.

Twenty-five Rio Grande Cutthroat Trout were sampled from one 15.5-hour overnight gillnet set, giving a catch rate of 1.6 fish/hour. The fish sampled from Little Ruby Lake ranged in size from 4.5 inches to 18.5 inches. The length-frequency graph of fish sampled shows multiple size classes in the population (Figure 20). Only six fish were weighed from this sampled due to equipment issues, however the average relative weight for those fish was 102 and the maximum relative weight was 114 (Figure 21).





**Figure 20.** Length Frequency histogram of Cutthroat Trout sampled from Little Ruby Lake, 2018.



**Figure 21.** Relative Weights of 6 Cutthroat Trout sampled from Little Ruby Lake, 2018.

## CONCLUSIONS

Little Ruby Lake supports a healthy population of Rio Grande Cutthroat Trout. The lake is relatively shallow and has had issues with winterkills in the past. In 2006, the last time the lake was sampled only four large Rio Grande Cutthroat Trout were sampled. It is extremely important to continue stocking the lake because of the potential for winterkill. The abundant amount of prey available in the lake allows fish to grow to large sizes and provides the opportunity to catch cutthroat up to 18 inches long. The Rio Grande Cutthroat Trout population in Little Ruby Lake is very healthy and will be maintained through stocking in the future.

Rio Grande Cutthroat Trout sampled from Little Ruby Lake, 2018



**Water:** Rito Alto Lake

**Location:** Sangre de Cristo Wilderness of the Rio Grande National Forest, approximately 6.5 miles north-northeast of the town of Crestone

**Sampling Date:** 7/09/2018

**Gear:** One 75-foot coldwater experimental gillnet

**Drainage:** Rio Grande

**Water Code:** 91986

**UTM Zone:** 13S

**Easting:** 440634

**Northing:** 4215852



## HISTORY

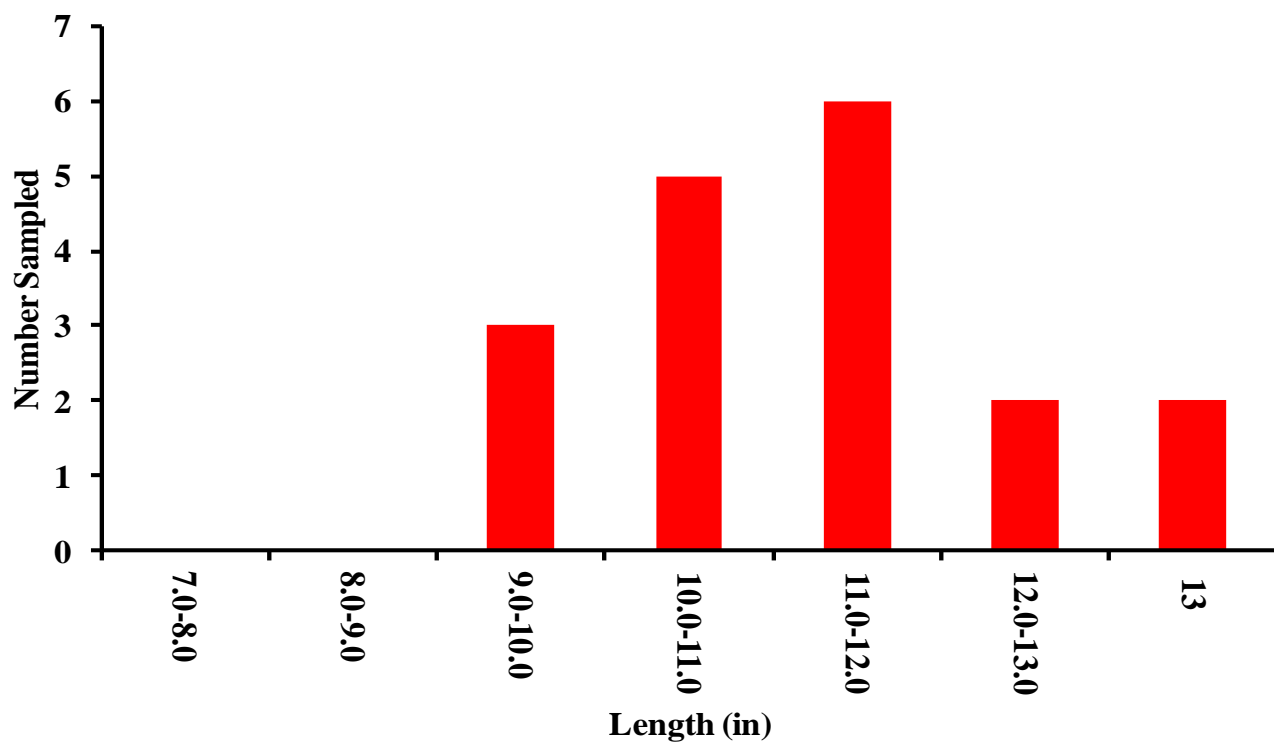
Rito Alto Lake is four surface acres with an average depth of 8 feet and a maximum depth of 14.5 feet. The lake is located in the Sangre de Cristo Wilderness of the Rio Grande National Forest, approximately 6.5 miles north by northeast of the town of Crestone. Rito Alto Lake is located at an elevation of 11,240 feet, and can be accessed from the Rito Alto Trail #745. The distance from the trailhead to the lake is approximately 7.6 miles. The trail is easy to follow, with a steady incline. After hiking for about six miles the trail splits with the left fork leading to Cotton Lake and the right fork leading to Rito Alto Lake.

Pikes Peak Native Cutthroat Trout were stocked nine times in Rito Alto Lake from 1974 to 1985. Snake River Cutthroat Trout were also stocked in 1985 as well as in 1987, 1989, and 1993. Since 1995, only Rio Grande Cutthroat Trout have been stocked in the lake, and are currently stocked on a biannual schedule. The last stocking event occurred in August of 2018.

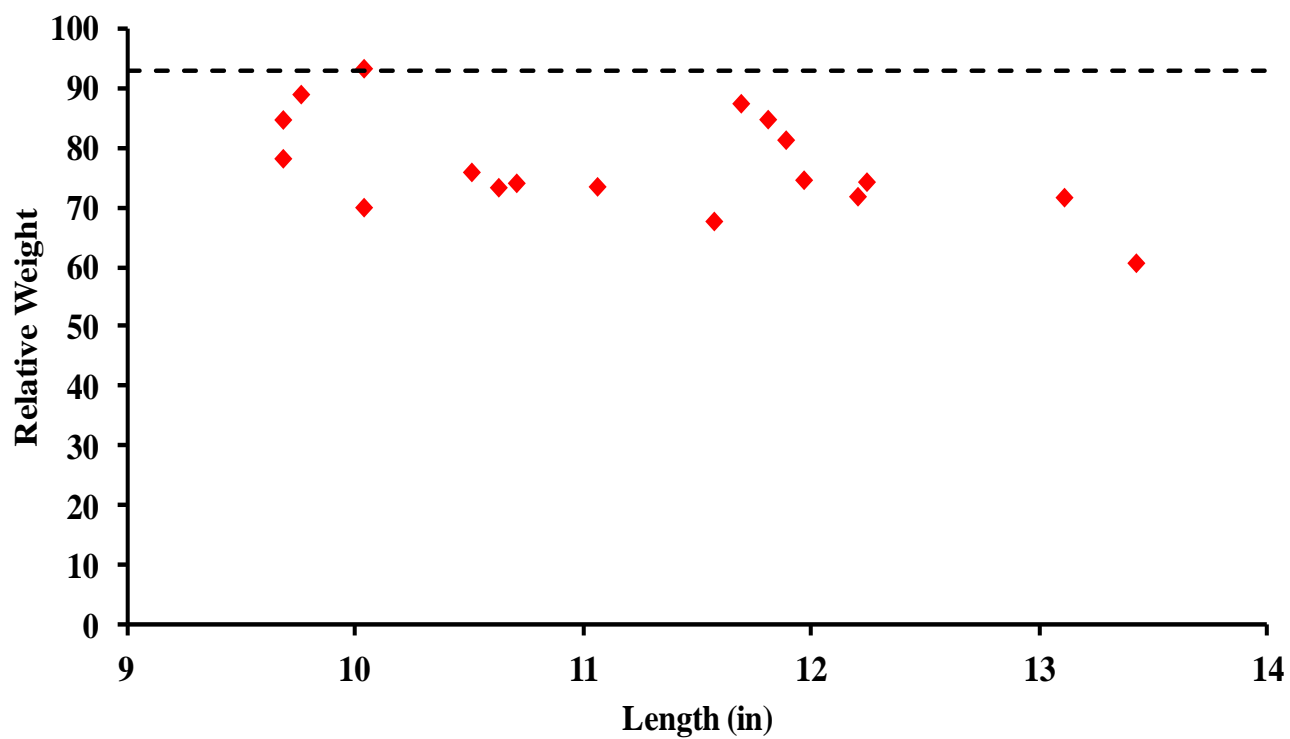
## RESULTS

Rito Alto Lake is dominated by a sandy substrate with rocky banks. There are some marshy areas of the bank but 95% of the bank is easily fishable. The lake supports a variety of aquatic invertebrates including leeches, scuds, caddisflies, and midges. At the time of this survey, small 3-5mm leeches were the most abundant invertebrate in the lake.

Eighteen Cutthroat Trout were sampled from one 12 hour, overnight gillnet set, giving a catch rate of 1.5 fish/hour. The fish sampled ranged in size from 9.7 inches to 13.4 inches and had an average length of 11.2 inches (Figure 22). The lake was stocked a month after the sampling date which explains why no smaller size classes were sampled during this survey. The average relative weight of fish sampled from Rito Hondo was 77, and the maximum relative weight was 93 (Figure 23). All of the fish sampled, with the exception of one individual weighed less than their expected weight.



**Figure 22.** Length-Frequency histogram of Cutthroat Trout sampled from Rito Alto Lake, 2018.



**Figure 23.** Relative Weights of Cutthroat Trout sampled from Rito Alto Lake, 2018.

## CONCLUSIONS

Rito Alto Lake supports a good population of Cutthroat Trout. The catch rate of 1.5 fish/hour shows that there is a relatively large population of fish in the lake. The relative weights of fish were on the low side, which also suggests an abundance of fish in the lake. The fish in this lake are surviving well; however, there is high completion for resources in this lake and the fish are slightly underweight. The recommendation for Rito Alto Lake is to decrease the stocking rate slightly to decrease completion in the lake. The decrease in stocking will lower the number of fish in the lake, but the quality of individual fish will improve. The lake should be surveyed again in 5-7 years to determine the effects of the changes in stocking to the population of RGCT in Rito Alto Lake.

Cutthroat Trout sampled from Rito Alto Lake, 2018.





**Water:** Rock Lake  
**Location:** Rio Grande National Forest, approximately 3 miles southeast of Platoro  
**Sampling Date:** 8/14/2018  
**Gear:** One 75 foot coldwater experimental gill net  
**Drainage:** Rio Grande  
**Water Code:** 92039  
**UTM Zone:** 13S  
**Easting:** 374064  
**Northing:** 4107949



### History

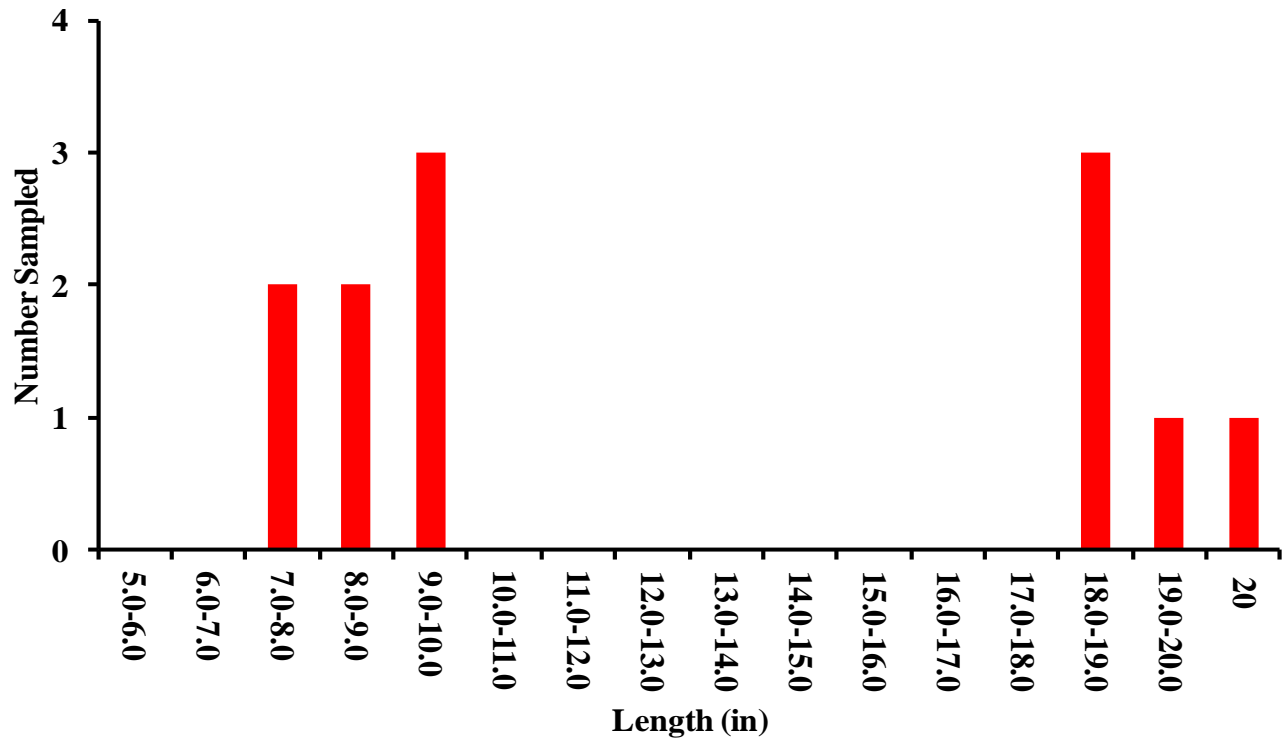
Rock Lake is 5.72 surface acres with a maximum depth of 21.2 feet. The lake is located in the Rio Grande National Forest, about 3 miles southeast of the town of Platoro near the Elk Creek Campgrounds. Rock Lake is set at an elevation of 9,860 feet and is accessible from Duck Lake Trail #732. Duck Lake trail #732 is a moderate hike, though finding the path to Rock Lake can be difficult. Once in the South San Juan Wilderness, the lake is approximately 0.5 miles ahead.

Pikes Peak Native Cutthroat Trout were stocked seven times from 1973 to 1980. Snake River Native Cutthroat Trout were also stocked eight times from 1981 to 1993. Since 1997, only Rio Grande Native Cutthroat Trout have been stocked Rock Lake. The lake is currently stocked biannually, with the latest stocking event being recorded in August of 2017.

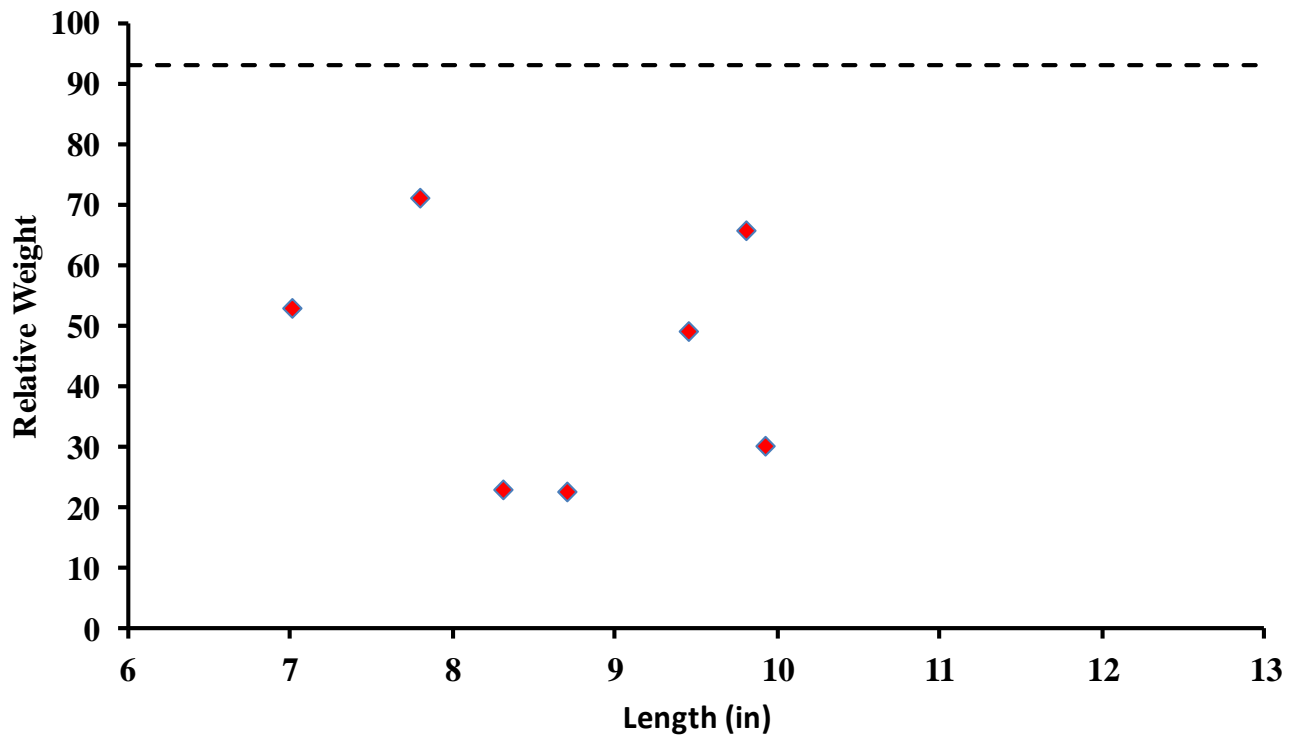
### Results

Rock Lake has a mixed substrate, containing rocks, gravel and sand. There are rocky banks, but most of the shore is dominated by marshes and grassy areas, making 70% of the bank easily fishable. The lake contains aquatic grasses and seaweed, and has some areas with dense patches of algae. The lake also supports a variety of aquatic invertebrates, providing a large prey base, including large leeches, scuds, mayflies, water striders, water boatmen, and dragonflies.

Twelve Cutthroat Trout, as well as 36 Fathead Minnow, were sampled from one 13.5 hour, overnight gillnet set, giving a catch rate of about 0.89 fish/hour. The Cutthroat Trout sampled ranged in size from 7 in to 20.5 inches (Figure 24). The average relative weight of the Cutthroat Trout sampled from Rock Lake was 45, while the maximum relative weight was 71.2 (Figure 25). All of the Cutthroat Trout sampled were well below the expected weight.



**Figure 24.** Length-Frequency histogram of Cutthroat Trout sampled from Rock Lake, 2018.



**Figure 25.** Relative weights of Cutthroat Trout sampled from Rock Lake, 2018.

**Conclusion**

Rock Lake does not seem to be able to support a large Cutthroat Trout population. The catch rate of 0.89 fish/hour shows that there is a relatively small population of Cutthroat Trout present in the lake. The relative weights of the fish were very low, possibly due to the abundance of Fathead Minnow present in the lake. The length-frequency of the fish sampled shows that the lake can support large Cutthroat Trout over a long period of time, though the relative weights of those fish suggest that there is high resource competition. Though Rock Lake has a large prey base, as well as supporting relatively large Cutthroat Trout, the relative weights of the fish sampled suggest that competition for resources is too high to support a healthy Cutthroat Trout population. The recommendation for Rock Lake is to discontinue stocking, due to the limited prey resources in the lake. The lake should be monitored in 3-4 years to determine if it is able to support a healthy population at that time.

**Water:** Tobacco Lake  
**Location:** Rio Grande National Forest, approximately 4.3 miles south-southwest of Platoro  
**Sampling Date:** 7/2/2018  
**Gear:** One 75 foot coldwater experimental gill net  
**Drainage:** Rio Grande  
**Water Code:** 92611  
**UTM Zone:** 13S  
**Easting:** 361601  
**Northing:** 4129083



### History

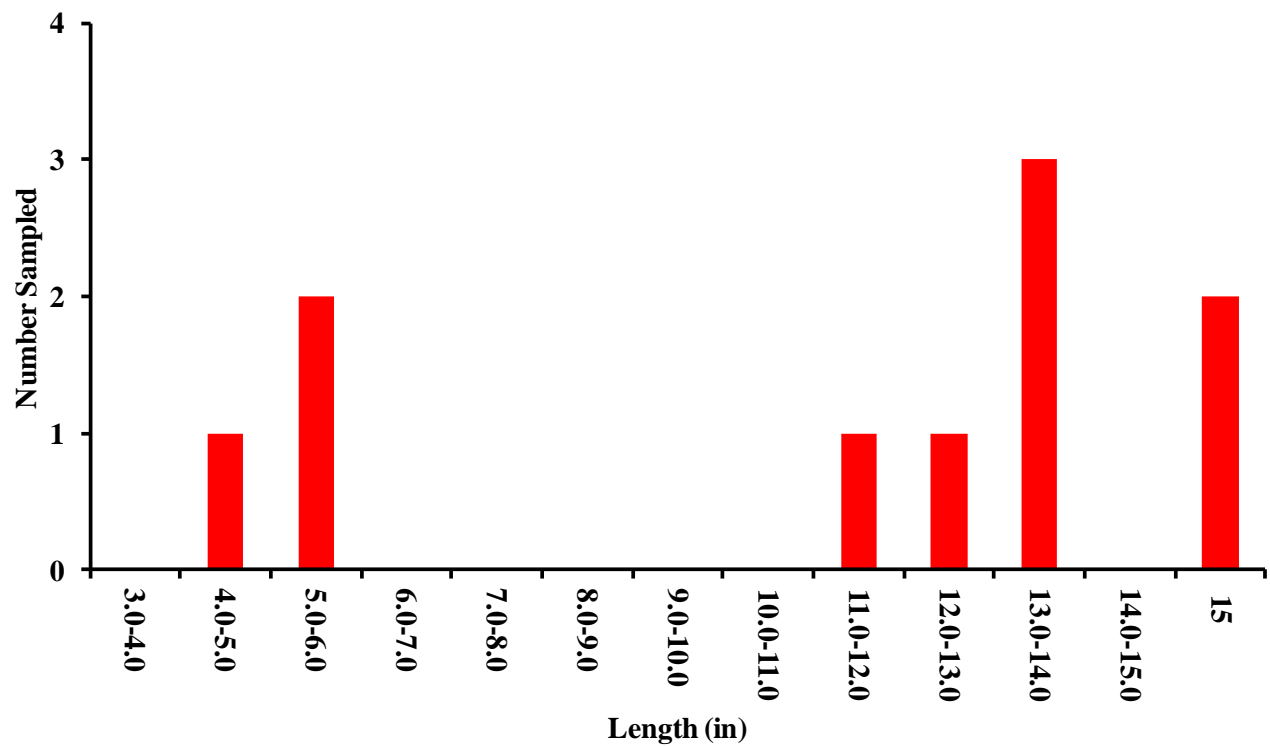
Tobacco Lake is a 12.8 surface acre lake with an average depth of 8 feet and a maximum depth of 19.3 feet. The lake is located in the San Juan Wilderness Area of the Rio Grande National Forest about 4.3 miles southwest of Platoro. Tobacco Lake is located at an elevation of 12,280 feet and is easily accessed using Tobacco Lake Trail #719 off of Forest Road 105. The distance from the trailhead to the lake is approximately 2 miles. The trail is easy to follow and has a slight incline.

Pikes Peak Native Cutthroat Trout were stocked 5 times from 1974 to 1980. Snake River Native Cutthroat Trout were also stocked 9 times from 1981 to 1995. Rio Grande Native Cutthroat Trout started to be stocked in 1997 and have been stocked 10 times since 2000. Tobacco Lake is currently stocked biannually, with the last recorded stocking event recorded in 2017.

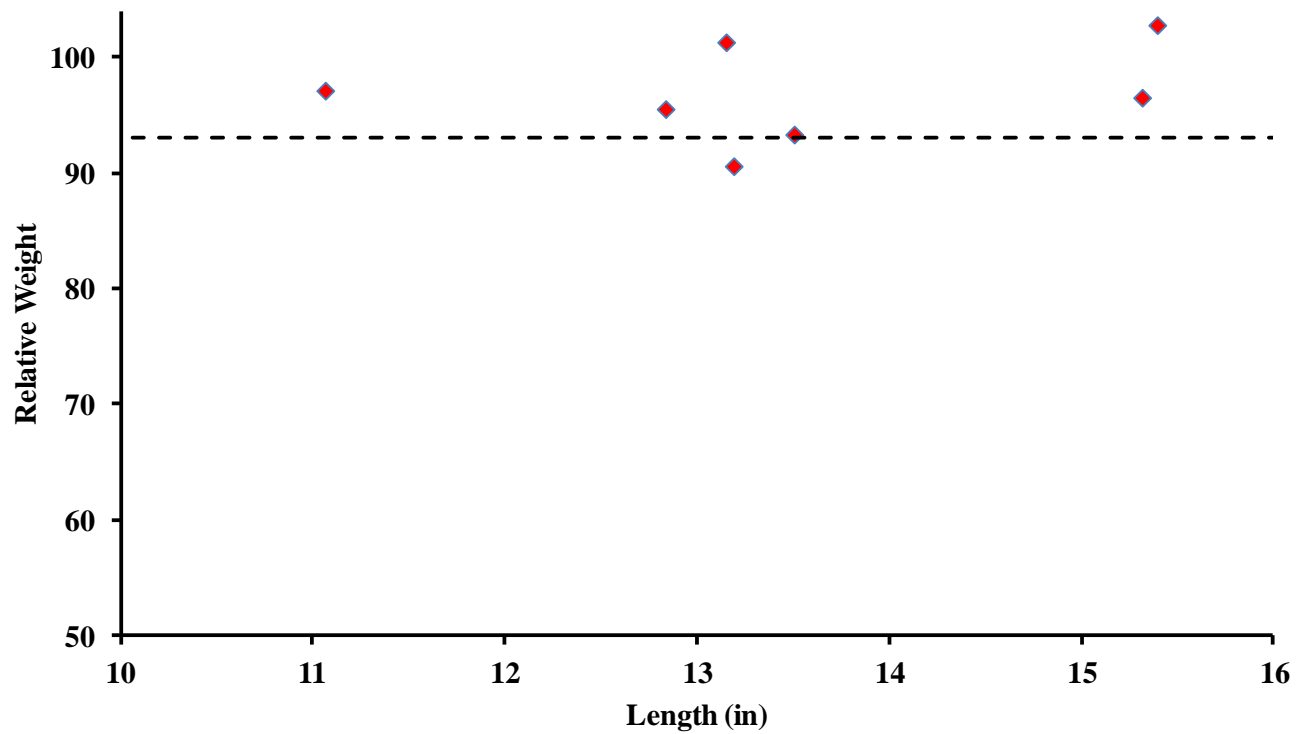
### Results

Tobacco Lake is dominated by a rocky substrate with marshy areas along the southwestern shore. The shoreline is very accessible with 90% of the banks easily fishable. At the time of this survey, there was an abundance of midges seen throughout the lake, as well as caddisflies, and mayflies.

Ten Cutthroat Trout were sampled from one 14 hour, overnight gillnet set, giving a catch rate of 0.74 fish/hour. The Cutthroat Trout that were sampled ranged in size from 4.2 inches to 15.4 inches (Figure 26). The length-frequency data collected shows 2 different age classes, including juvenile and adult Cutthroat Trout. The average relative weight of the fish sampled were 96.8, with a maximum relative weight of 102.8 (Figure 27). All of the Cutthroat Trout sampled were at, or above the expected weight.



**Figure 26.** Length-Frequencies of Cutthroat Trout sampled in Tobacco Lake, 2018.



**Figure 27.** Relative Weights of Cutthroat Trout sampled at Tobacco Lake, 2018.



**Conclusion**

Tobacco Lake supports a healthy population of Cutthroat Trout. The catch rate of 0.74 fish/hour suggests that there is a relatively small population of Cutthroat Trout. The relative weight data suggests that the fish have an abundance of food and little competition. The Cutthroat Trout in Tobacco Lake are surviving and growing well, though the relative weight data suggests that an increase in stocking could be implemented to increase catch rates. The recommendation for Tobacco Lake would be to continue stocking as scheduled. If catch rate continues to decline, an increase in the number of Cutthroat Trout should be administered.

Cutthroat Trout sampled from Tobacco Lake, 2018

