

**LAKE TANEYCOMO  
2021  
ANNUAL LAKE REPORT**



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## EXECUTIVE SUMMARY

Lake Taneycomo was formed by the construction of Powersite Dam (Ozark Beach Dam) in 1913 and is Missouri's oldest hydroelectric reservoir. It is owned and operated by Empire District of Liberty Utilities (EDLU). The lake is riverine in nature, 22 miles in length, and encompasses 2,080 surface acres. Prior to 1958, Lake Taneycomo supported one of Missouri's best warm-water fisheries. This changed in 1958 when Table Rock Dam, located in the headwater of Lake Taneycomo, began discharging cold hypolimnetic water into Lake Taneycomo. The discharge of cold water changed Lake Taneycomo into a cold-water environment, providing good conditions for trout. Rainbow Trout were first stocked into Lake Taneycomo in 1958 and Brown trout were first stocked in 1980. Since that time more than 30 million Rainbow and Brown Trout have been stocked. Lake Taneycomo is Missouri's largest and most popular trout fishery, but it also contains an excellent warmwater fishery in the lower sections of the lake. It annually receives in excess of 100,000 fishing trips and anglers catch an estimated 400,000 trout annually. The Missouri Department of Conservation (MDC) coordinates fisheries management activities following the 2010 Lake Taneycomo Management Plan.

### **Fish Population Sampling**

The Lake Taneycomo trout electrofishing survey was conducted on two separate nights on August 12 and August 26, 2021 in the upper 3.5 miles of the lake. Only zones 1 and 2 were completed on August 12 and the sample was cancelled early due to weather. Zones 1-4B were all completed on August 26. With the cooperation of the U.S. Army Corps of Engineers and Southwestern Power Administration, hydropower releases were terminated at 1900 hours and sampling began around 2130 hours. A crew of five MDC personnel consisting of two netters, one driver, one person assisting with measuring and weighing fish and one person measuring and weighing fish and recording data using a voice recorder assisted with the sample. Electrofishing gloves were used to immobilize the trout while measuring and weighing them. This enabled the crew to continue sampling throughout the night and reduced both the number of staff needed for the sample as well as time needed to conduct the sample. A total of 596 Rainbow Trout and 54 Brown Trout were collected in 3.0 hours of cumulative electrofishing time from both samples.

### **Rainbow Trout**

Rainbow Trout were captured at a rate of 197 fish per hour in all zones combined, which is comparable to the past three years following the decreased stocking rates that began in 2018 ([Table 1, Figures 1-2](#)). Size structure has increased significantly over the past few of years as well, with PSD<sub>13</sub> values measuring 81 percent and PSD<sub>16</sub> values measuring 40 percent ([Appendix A](#)). These metrics remain among the highest PSD values on record. Body condition of Rainbow Trout was excellent with relative weights (Wr) averaging 109 for all sizes ([Table 2, Figure 3](#)). The catch per unit effort (CPUE) of Rainbow Trout was 220 fish per hour in the special regulation zone above Fall Creek ([Table 3, Figure 4](#)). In this same area, the PSD<sub>13</sub> was 87 percent and the PSD<sub>16</sub> was 36 percent, which was nearly identical to 2020 and still among the highest values on record.

Electrofishing catch rates increased significantly with the implementation of the special regulation zone in 1997. In this zone anglers are required to release all Rainbow Trout between 12 and 20 inches. Catch rates from 1997 through 2017 showed an increasing trend in the number of Rainbow Trout present in the lake, especially in this zone ([Figure 1](#)). Rainbow Trout were stocked at rate of 700,000 per year until 2018, yet angler creel surveys indicated that only about 20 percent of these fish were harvested each year. In 2018, only 528,215 Rainbow Trout were stocked which resulted in lower electrofishing catch rates and a substantial increase in PSD and Wr values. A total of 563,682 Rainbow Trout were stocked in 2019, which helped to stabilize the reduced catch rates and resulted in additional increases in PSD values and the overall size structure of the Rainbow Trout population ([Table 1](#), [Figure 5](#)). Based on the improvements in the quality of Rainbow Trout with the reduced stocking rate, support from anglers to reduce the stocking rate, and the stabilization of CPUE values, the new stocking rate of 560,000 Rainbow Trout was requested for 2021. However, due to hatchery mortality at Neosho National Fish Hatchery, only 497,356 Rainbow Trout were stocked in Lake Taneycomo in 2021 ([Table 4](#)). To recompense for these losses, the stocking request was increased to 600,000 Rainbow Trout for 2022.

Rainbow Trout were collected at a rate of 103 fish per hour below Fall Creek. This is similar to previous years when the full stocking rate of 700,000 Rainbow Trout was in place, indicating continued good numbers of fish available for anglers to harvest ([Table 5](#), [Figure 4](#)). The PSD<sub>13</sub> and PSD<sub>16</sub> values remained above average at 53 percent and 24 percent, respectively. Rainbow Trout are stocked into Lake Taneycomo at 11 inches, yet high numbers of fish in the 4-6-inch range were collected in the electrofishing sample in 2020 and 2021, indicating that some natural reproduction of Rainbow Trout is occurring ([Figure 4](#)). The largest Rainbow Trout collected in the 2021 sample measured 24.6 inches and weighed 6.8 pounds.

### **Brown Trout**

The CPUE of Brown Trout was only 18 fish per hour, which is still among the lowest values on record ([Table 6](#), [Figures 6-7](#)). The size structure of Brown Trout remains excellent with PSD<sub>13</sub> and PSD<sub>16</sub> values measuring 85 percent and 64 percent, respectively. The PSD<sub>20</sub> value of Brown Trout was 25 percent, which is the highest value on record. Body condition of Brown Trout was also the highest it has ever been with average relative weight of 138 for all sizes ([Table 7](#), [Figure 3](#)). Although overall numbers of Brown Trout in the lake remain low, trophy size fish are still available despite the loss of a substantial portion of the population from the high water in 2017 and 2020.

A total of 13,862 triploid Brown Trout were marked with an adipose fin clip and stocked into Lake Taneycomo from 2013-2015. Only two triploid Brown Trout were collected during the 2021 sample, but they comprised the largest fish in the sample at 31 inches and 15.6 pounds and 31.6 inches and 18.8 pounds. The triploid Brown Trout stockings have resulted in numerous trophy sized fish caught in recent years. Both state record Brown Trout caught in 2019 were triploids and many of the Brown Trout over 20 inches that have been caught by anglers over the past few years have been adipose fin clipped. Due to the success of this program, an additional 5,000 triploid Brown Trout will be requested to be stocked each year in conjunction with the

10,000 diploid Brown Trout. A total of 1,432 triploid Brown Trout were stocked in Lake Taneycomo in November 2021.

Historically, Brown Trout numbers have declined during and immediately following the years that Lake Taneycomo experiences extended periods of high flow from Table Rock Dam. Lake Taneycomo experienced high flow events that contributed to declines in the Brown Trout population in the lake in 2008, 2011, 2017, and 2020 ([Figure 5](#)). The reason for this decline is believed to be due to Brown Trout emigration out of Lake Taneycomo over Powersite Dam or far up tributary streams when steady increased flows are present. The Sheep Creek strain of diploid Brown Trout that are currently stocked into Lake Taneycomo are known to be highly migratory, however the Crawford strain of triploid Brown Trout that have been stocked into the lake have proven to remain in the lake better during these high flow events. Both Crawford strain diploid and triploid Brown Trout are planned to be stocked each year beginning in 2022 to evaluate retention and growth of this strain.

The Brown Trout population has historically been able to recover with help of additional Brown Trout stockings following these high flow events. A total of 10,017 Brown Trout were stocked into Lake Taneycomo in October 2017 as a surplus stocking and an additional 10,038 Brown Trout were stocked in the summer of 2018 to help the population recover from the 2017 event. An additional 15,018 Brown Trout were stocked in January 2019. These stockings led to improvements in Brown Trout catch rates in 2018 and 2019, but catch rates decreased again in 2020 ([Figure 5](#)). A total of 20,345 Brown Trout were stocked in 2021, which should greatly help the population to recover.

Additional Brown Trout length and weight data has been collected from fish ascending the fish ladder at Shepherd of the Hills Fish Hatchery since the fall of 2015. A total of 54 Brown Trout ascended the fish ladder in October 2021. When combined with the 54 Brown Trout that were captured during the August electrofishing sample, this data provides a more accurate depiction of the Brown Trout population in Lake Taneycomo ([Figure 8](#)). The size structure of Brown Trout that ascended the fish ladder was comparable to the sizes of Brown Trout captured during electrofishing, verifying that the sizes collected using both methods are indicative of the true size structure of the population in the lake. Continuing to collect this data in the future should provide quality supplemental data to the electrofishing samples and greatly help inform future management decisions regarding the Brown Trout population in Lake Taneycomo.

In response to some angler concerns about treble hooks causing injury to trout in the lake, staff recorded injuries that were present in Rainbow and Brown Trout during the August 2021 electrofishing survey. Injuries were classified into three groups: new minor injury, old minor injury, and major injury. Of the 644 trout that were observed, seven percent had a new minor injury, six percent had an old minor injury, and 12 percent had a major injury ([Table 8](#)). Relative weights of the injured fish were not significantly lower than uninjured fish. In addition, several of the major injuries observed were not caused by treble hooks and included single hook lures stuck on the fish, line wrapped around the fish, and flies swallowed by and/or being expelled from the fish. The results of this study combined with existing literature indicates that treble hooks are not causing significantly more injuries than single barbed hooks.

## **General Lake Activities**

The vacuum breaker vents, which help to improve dissolved oxygen in Lake Taneycomo, were opened at Table Rock Dam on July 2 and closed on December 8. The recommended maximum generation rate (RMGR) was reduced to 54% nameplate at its lowest on October 20.

Submersed aquatic vegetation was problematic throughout the lake again in 2021. Staff from MDC assisted EDLU staff with aquatic herbicide treatments at Empire Park where Eurasian Milfoil was problematic throughout the cove and around the fishing dock. Multiple treatments using Weedar 64® were conducted throughout the summer using a boat mounted sprayer to inject the liquid herbicide into the water. The results of these treatments were very successful and should help to provide future recommendations for treating the vegetation in other areas of the lake.

## **Management Recommendations**

- 1) Conduct electrofishing surveys in spring 2022 to collect bass and sunfish population information for regulation and monitoring purposes.
- 2) Conduct electrofishing surveys in fall 2022 to collect trout population information for regulation and monitoring purposes.
- 3) Stock 600,000 Rainbow Trout and 15,000 Brown Trout in 2022. Coordinate with hatchery and Science Branch staff to evaluate Crawford strain Brown Trout stockings.
- 4) Cooperate in ongoing efforts to monitor and enhance water quality and flow regimes by serving as the MDC representative on the White River Dissolved Oxygen Committee.
- 5) Continue efforts through education of boaters and anglers to prevent the spread of zebra mussels, *Didymo geminata*, and other aquatic nuisance species (ANS) from and to Lake Taneycomo. Maintain *Didymo* wash stations and ANS signage at Lake Taneycomo.
- 6) Review and comment on permit applications for boat dock construction and dredge and fill activities.
- 7) Provide advice and logistical support to EDLU and other stakeholders related to nuisance aquatic vegetation problems on Lake Taneycomo.
- 8) Cooperate with H2Ozarks and participate in discussions and efforts to complete the Lake Taneycomo Watershed Management Plan.

Table 1. Electrofishing capture rates and size structure indices of stock size Rainbow Trout ( $\geq 11$  inches) in August electrofishing samples, 1996-2021. [back to text](#)

<b>Year</b>	<b>Fish/Hour</b>	<b>PSD-13</b>	<b>PSD-16</b>	<b>PSD-20</b>
1996	23	10	0	0
1997	101	30	2	<1
1998	117	46	5	0
1999	203	53	9	<1
2000	185	24	3	0
2001	175	31	5	<1
2002	274	59	12	<1
2003	219	52	13	0
2004	277	43	9	0
2005	276	57	11	0
2006	175	52	6	<1
2007	259	55	4	0
2008	157	66	7	0
2009	313	57	9	0
2010	245	70	18	0
2011	302	60	16	1
2012	248	56	9	<1
2013	233	52	6	<1
2014	202	57	9	0
2015	265	63	13	<1
2016	243	62	24	<1
2017	307	48	12	<1
2018	183	56	8	<1
2019	176	80	17	<1
2020	190	87	40	<1
2021	197	82	40	3

Table 2. Relative weights of Rainbow Trout from Lake Taneycomo, 1993-2021. [back to text](#)

Year	Relative Weight by Length Class (Inches)			
	All Sizes	<13.0	≥13.0	≥16.0
1993	111	110	112	118
1994	95	95	97	-
1995	111	109	117	124
1996	106	107	100	-
1997	102	101	102	102
1998	107	107	107	109
1999	104	104	103	104
2000	95	96	90	81
2001	112	110	114	113
2002	112	109	114	116
2003	101	101	100	99
2004	99	99	99	98
2005	96	100	94	92
2006	85	86	84	86
2007	96	97	95	94
2008	88	88	88	85
2009	88	91	87	84
2010	98	96	100	101
2011	88	88	89	92
2012	92	94	89	85
2013	97	99	96	93
2014	98	101	96	96
2015	102	106	99	97
2016	97	98	96	97
2017	86	85	87	88
2018	109	123	94	97
2019	101	103	100	103
2020	95	98	94	93
2021	109	114	106	106

Table 3. Electrofishing capture rates and size structure indices of stock size Rainbow Trout ( $\geq 11$  inches) in August electrofishing samples, taken above Fall Creek in the regulation area, 1996-2021. [back to text](#)

<b>Year</b>	<b>Number/Hour</b>	<b>PSD-13</b>	<b>PSD-16</b>
1996	27	9	0
1997	121	31	2
1998	147	47	5
1999	238	54	9
2000	202	25	3
2001	205	34	5
2002	334	62	13
2003	260	55	14
2004	331	44	10
2005	315	59	12
2006	226	53	6
2007	302	56	4
2008	187	67	7
2009*	449	62	11
2010	275	72	19
2011	338	60	16
2012	278	58	9
2013	271	53	6
2014	225	60	9
2015	314	66	14
2016	296	63	25
2017	355	49	12
2018	215	57	7
2019	207	82	18
2020	221	89	41
2021	220	83	41

\*For Zones 1 and 2 only



Table 4. Monthly trout stocking rates in Lake Taneycomo in 2021. [back to text](#)

<u>Month</u>	<u>Rainbow Trout</u>	<u>Brown Trout</u>
January	38,754	
February	31,528	11,531
March	29,645	305
April	70,063	
May	14,416	
June	46,380	3,498
July	61,009	3,579
August	61,701	
September	69,535	
October	32,745	
November	15,294	1,432
December	26,286	
<b>TOTAL</b>	497,356	20,345

Table 5. Electrofishing capture rates and size structure indices of stock size Rainbow Trout ( $\geq 11$  inches) in August electrofishing samples, taken below Fall Creek, 1996-2021. [back to text](#)

<b>Year</b>	<b>Number/Hour</b>	<b>PSD-13</b>	<b>PSD-16</b>
1996	10	0	0
1997	38	11	0
1998	18	14	0
1999	50	19	4
2000	78	5	2
2001	64	3	1
2002	86	31	3
2003	65	17	2
2004	64	29	4
2005	125	17	2
2006	38	46	8
2007	55	32	0
2008	45	53	7
2009	122	28	0
2010	120	43	6
2011	97	44	15
2012	112	24	2
2013	94	44	9
2014	94	17	0
2015	91	33	9
2016	55	26	4
2017	116	31	7
2018	62	35	9
2019	67	51	4
2020	83	60	24
2021	103	53	24

Table 6. Electrofishing capture rates and size structure indices of stock size Brown Trout ( $\geq 11$  inches) in August electrofishing samples, 1982-2021. [back to text](#)

<b>Year</b>	<b>Number/Hour</b>	<b>PSD-13</b>	<b>PSD-16</b>	<b>PSD-20</b>
1982	132	10	4	1
1983	225	38	10	<1
1984	160	33	8	1
1985	188	14	6	<1
1986	273	24	2	<1
1987	134	60	14	0
1988	66	57	29	2
1989	73	37	17	2
1990	204	40	13	2
1991	62	44	16	1
1992	71	45	11	3
1993	133	57	15	3
1994	113	38	15	3
1995	145	58	20	2
1996	102	32	13	2
1997	175	42	13	2
1998	93	51	17	2
1999	124	37	10	2
2000	100	59	15	3
2001	120	36	8	1
2002	125	52	14	1
2003	84	59	16	3
2004	80	67	23	3
2005	77	91	45	2
2006	101	76	33	4
2007	90	82	39	5
2008	41	66	30	5
2009	33	87	35	6
2010	29	98	67	12
2011	23	45	37	20
2012	107	51	7	2
2013	61	76	35	3
2014	36	79	44	12
2015	70	60	23	4
2016	64	89	36	5
2017	27	96	52	18
2018	26	54	35	17
2019	27	95	35	11
2020	12	93	65	20
2021	18	85	64	25

Table 7. Relative weights of Brown Trout from Lake Taneycomo, 1993-2021. [back to text](#)

Year	Relative Weight by Length Class (Inches)			
	All Sizes	<13.0	≥13.0	≥16.0
1993	94	93	94	96
1994	100	104	95	90
1995	100	102	99	99
1996	95	96	94	89
1997	96	98	96	96
1998	92	95	91	90
1999	92	97	87	79
2000	91	93	89	83
2001	95	97	93	89
2002	96	104	92	91
2003	95	97	94	89
2004	92	94	92	89
2005	113	107	113	123
2006	105	99	107	110
2007	105	102	105	107
2008	104	102	105	105
2009	109	91	110	106
2010	131	100	132	137
2011	107	103	128	133
2012	103	99	107	110
2013	114	103	116	119
2014	115	103	119	124
2015	111	107	115	122
2016	115	108	116	118
2017	114	93	115	117
2018	111	109	113	118
2019	116	107	117	120
2020	115	103	117	119
2021	138	125	140	142

Table 8. Rainbow and Brown Trout injury rates observed during 2021 electrofishing sampling. [back to text](#)

<u>Injury</u>	<u>Relative weight</u>	<u>Rainbow Trout</u>	
		<u>Number</u>	<u>Percent</u>
New minor injury	108	42	7.1%
Old minor injury	111	35	5.9%
Major injury	100	30	5.1%
Uninjured	109	483	81.9%
Total		590	

<u>Injury</u>	<u>Relative weight</u>	<u>Brown Trout</u>	
		<u>Number</u>	<u>Percent</u>
New minor injury	134	5	9.3%
Old minor injury	105	1	1.9%
Uninjured	139	48	88.9%
Total		54	

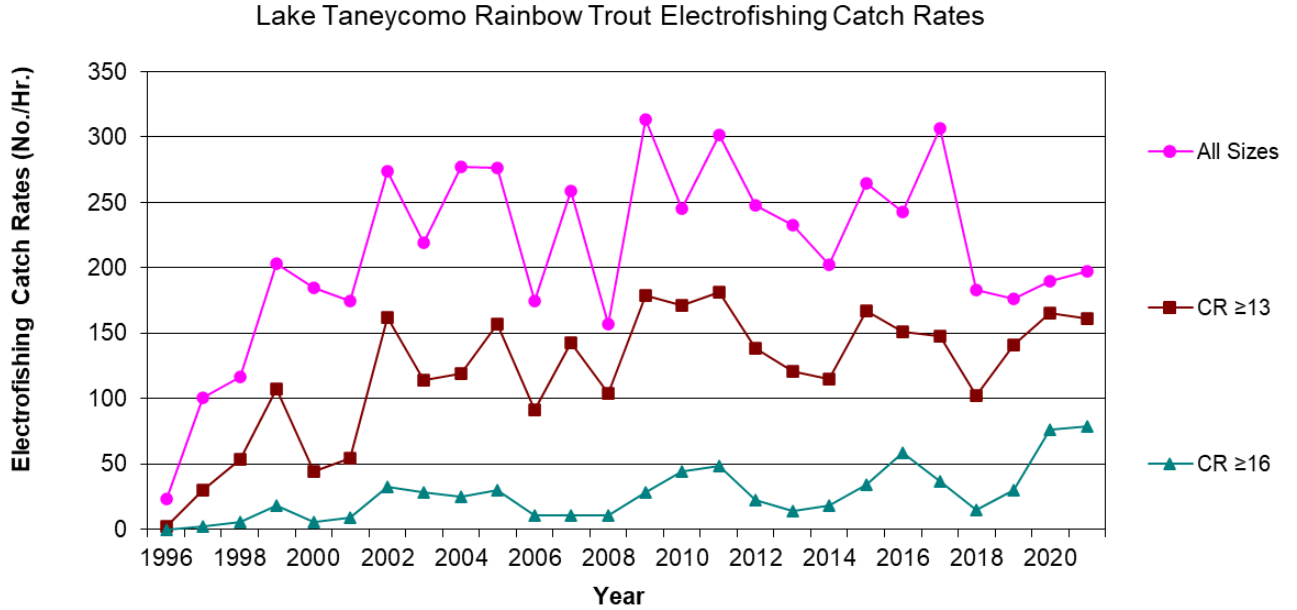
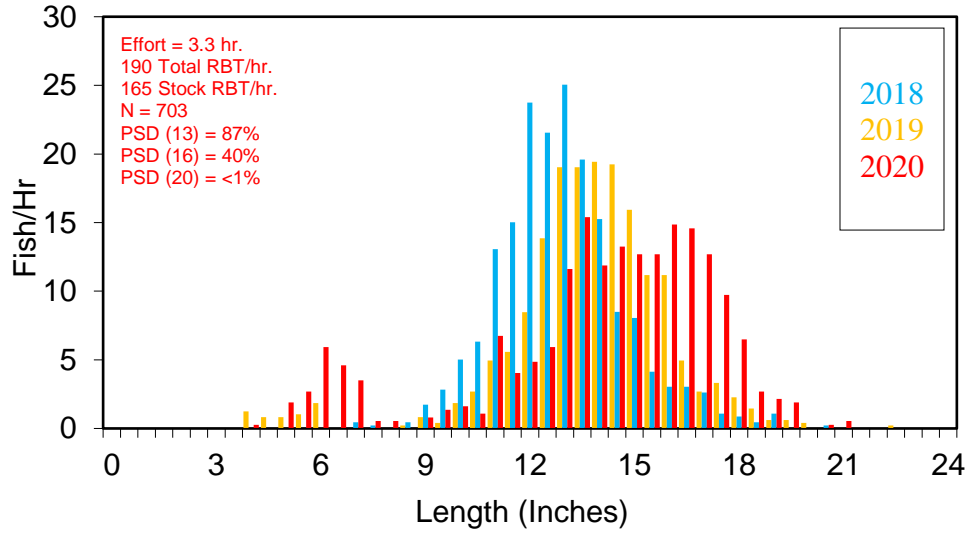


Figure 1. Electrofishing capture rates of Rainbow Trout sampled in all zones 1996-2021.

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RAINBOW TROUT LENGTH FREQUENCY  
LAKE TANEYCOMO



RAINBOW TROUT LENGTH FREQUENCY  
LAKE TANEYCOMO - 2021

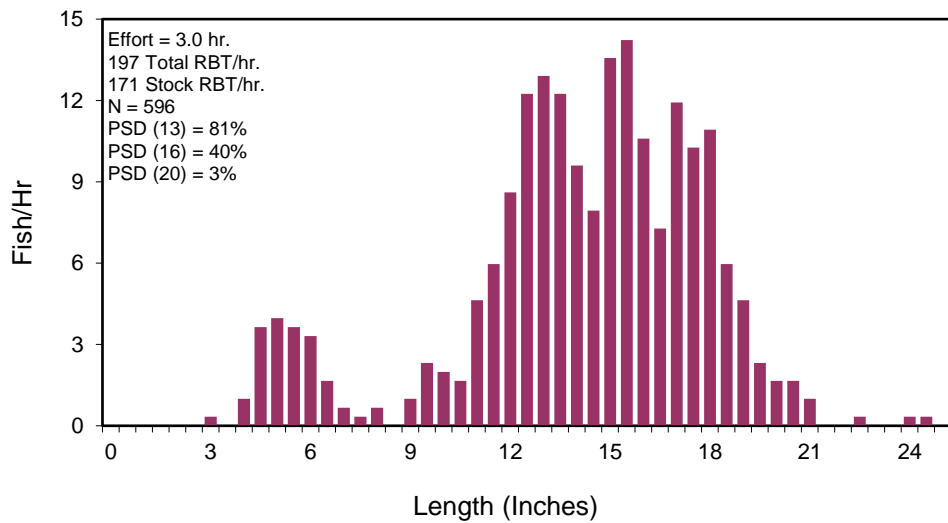


Figure 2. Length frequencies for Rainbow Trout sampled in all zones 2018-2021. [back to text](#)

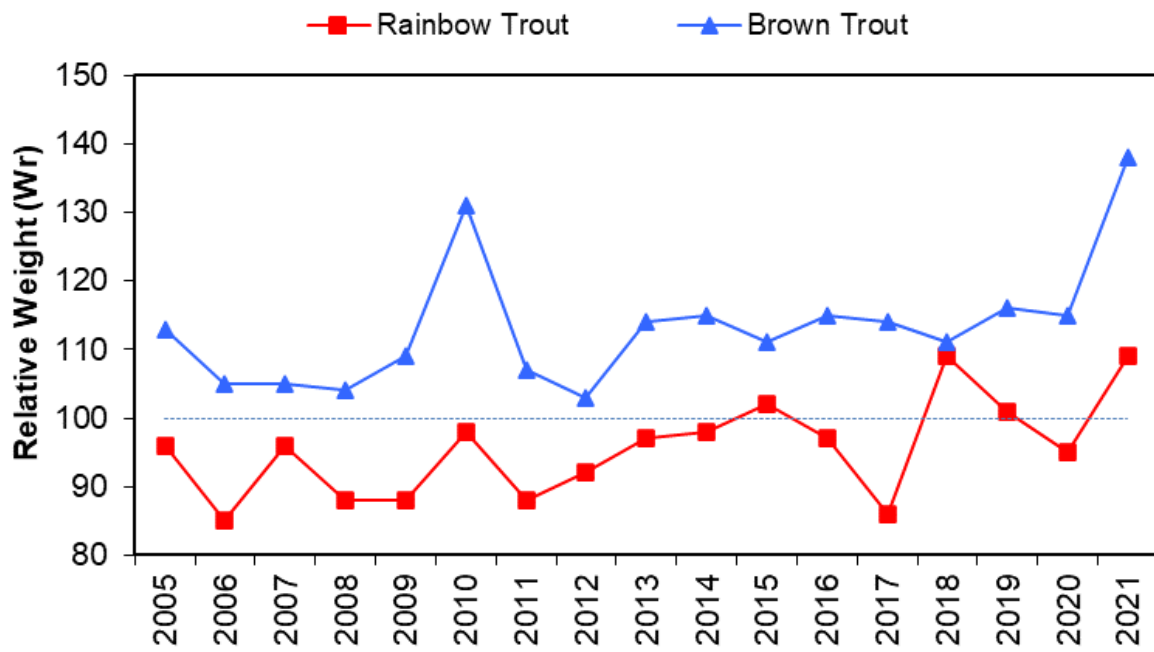
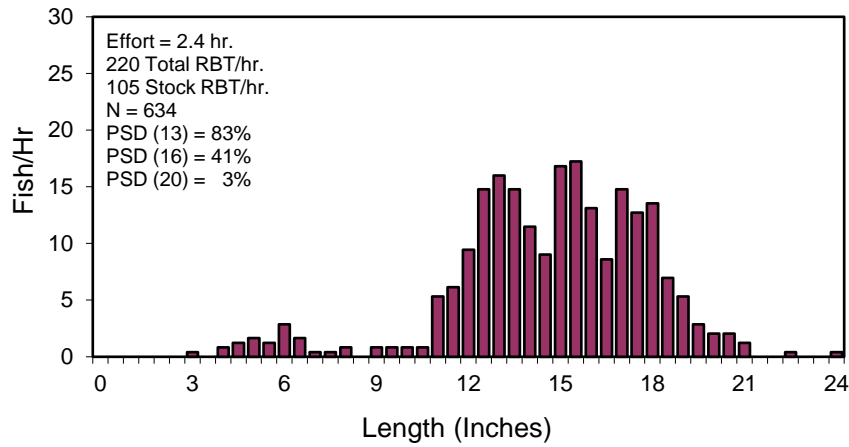


Figure 3. Average relative weights of Rainbow Trout and Brown Trout sampled in all zones 2005-2021. [back to text](#)

RAINBOW TROUT LENGTH FREQUENCY  
SPECIAL MANAGEMENT ZONE  
LAKE TANEYCOMO - 2021



RAINBOW TROUT LENGTH FREQUENCY  
BELOW SPECIAL MANAGEMENT ZONE  
LAKE TANEYCOMO - 2021

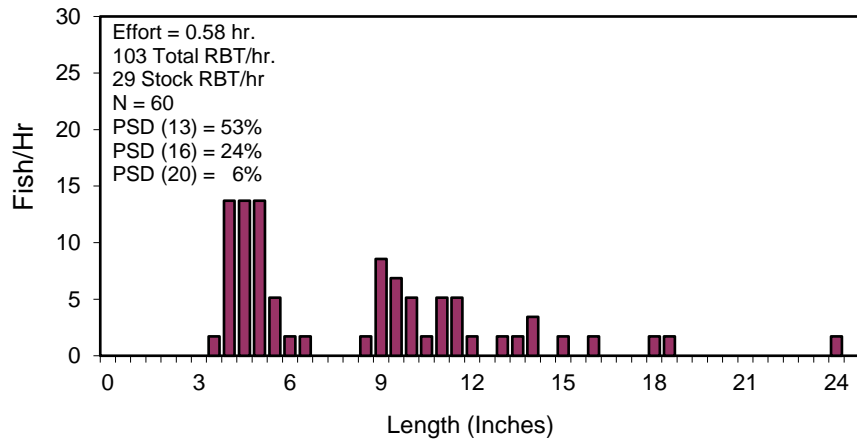


Figure 4. Length frequencies for Rainbow Trout sampled above and below Fall Creek 2021. [back to text](#)



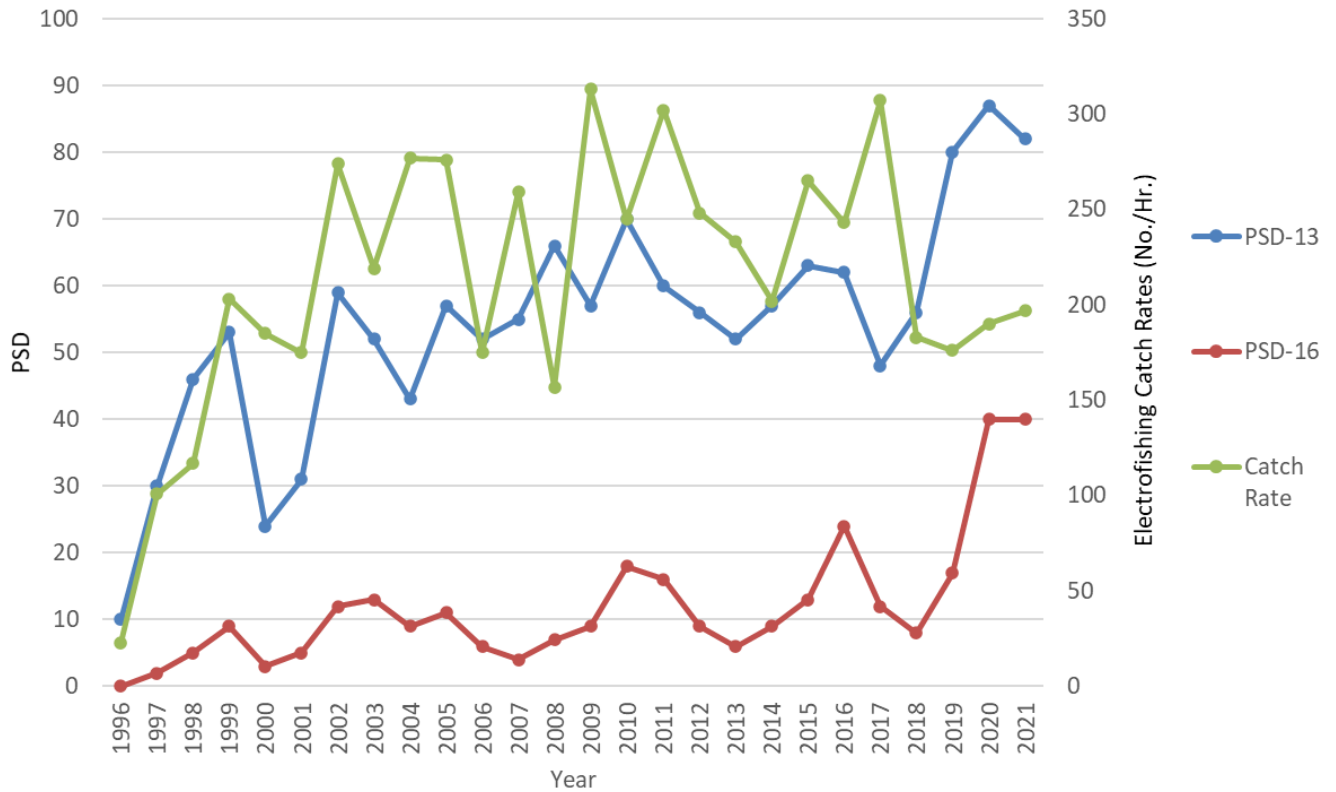


Figure 5. Electrofishing catch rates and size structure indicies for Rainbow Trout sampled in all zones 1996-2021. PSD-X = Percentage of Rainbow Trout  $\geq 11$  inches that are also over X inches. [back to text](#)

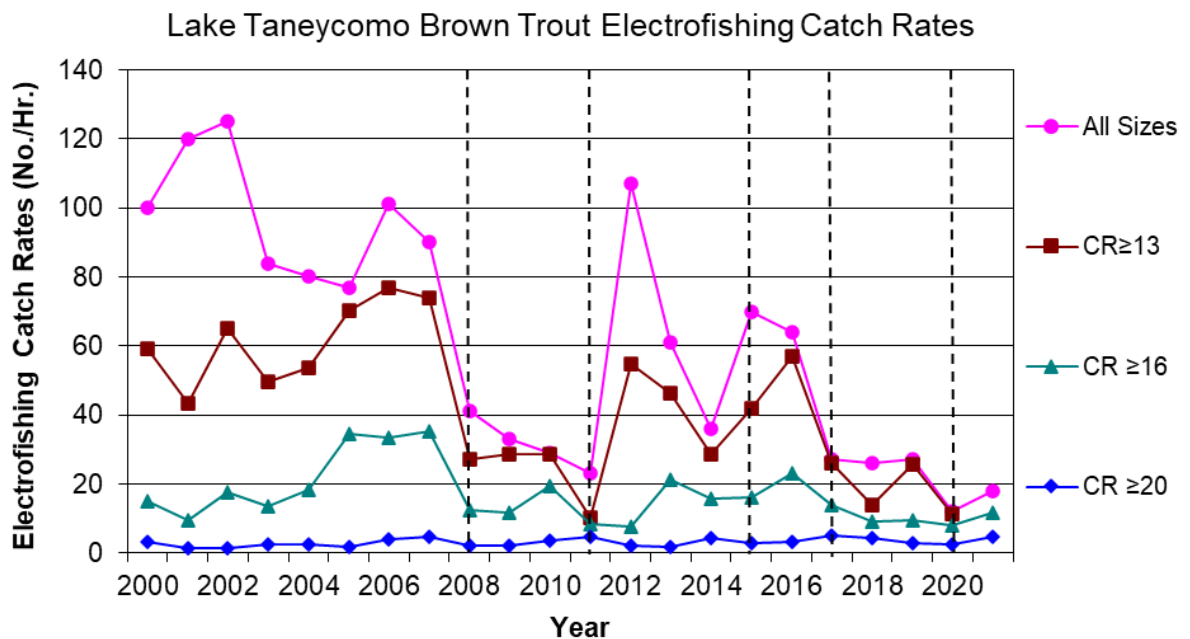
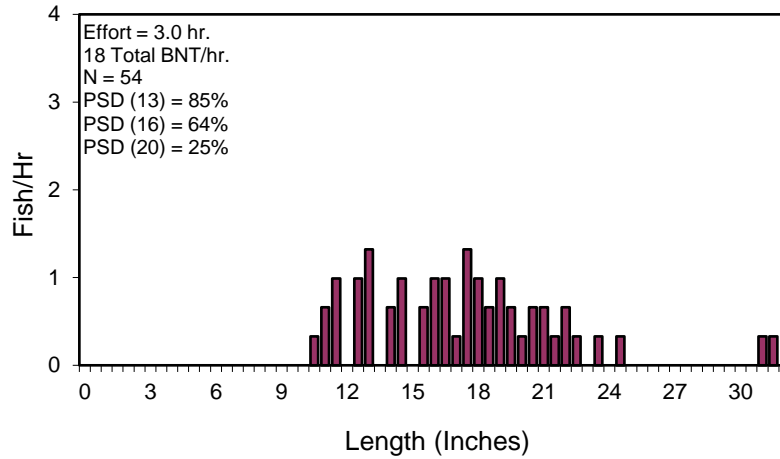
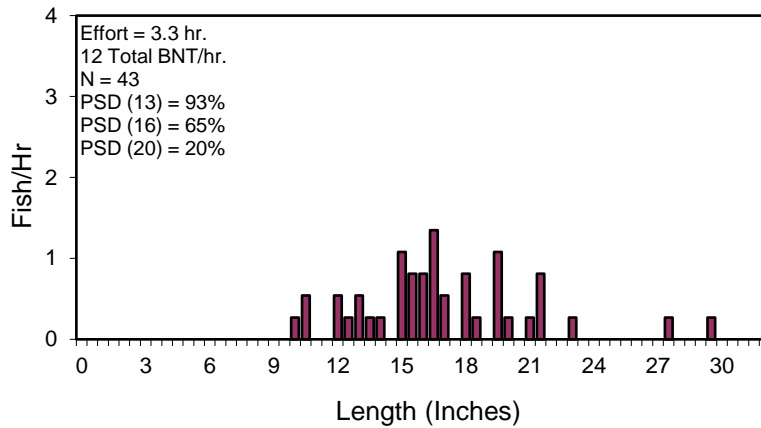


Figure 6. Electrofishing catch rates of Brown Trout sampled in all zones 2000-2021. Dashed lines indicate years with high flows through Table Rock Dam. [back to text](#)

LAKE TANEYCOMO BROWN TROUT LENGTH FREQUENCY  
ELECTROFISHING - 2021



LAKE TANEYCOMO BROWN TROUT LENGTH FREQUENCY  
ELECTROFISHING - 2020



LAKE TANEYCOMO BROWN TROUT LENGTH FREQUENCY  
ELECTROFISHING - 2019

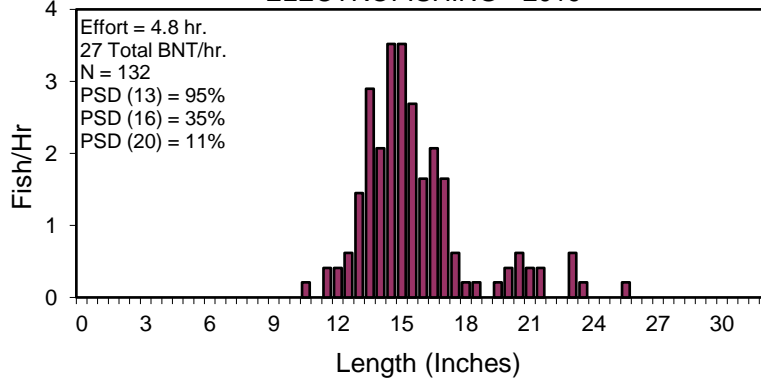


Figure 7. Length frequencies for Brown Trout sampled in all zones 2019-2021. [back to text](#)

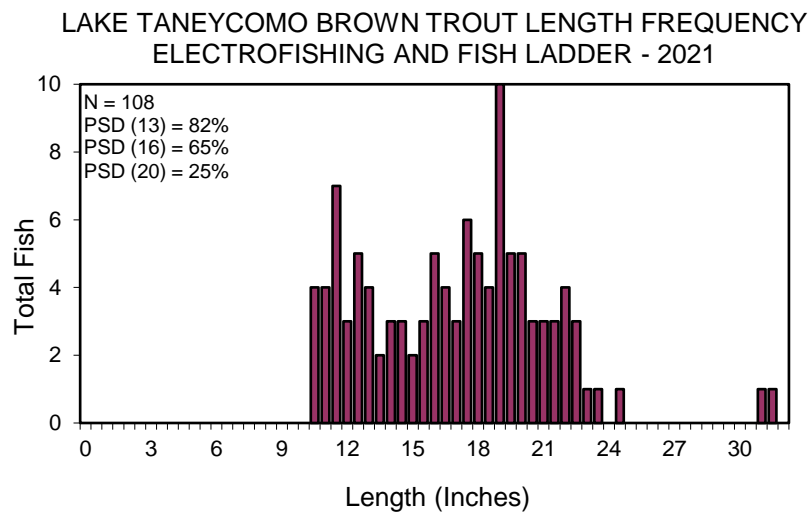
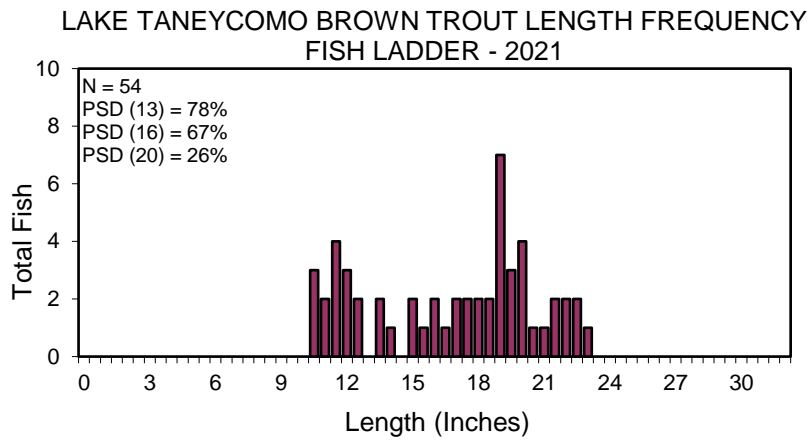
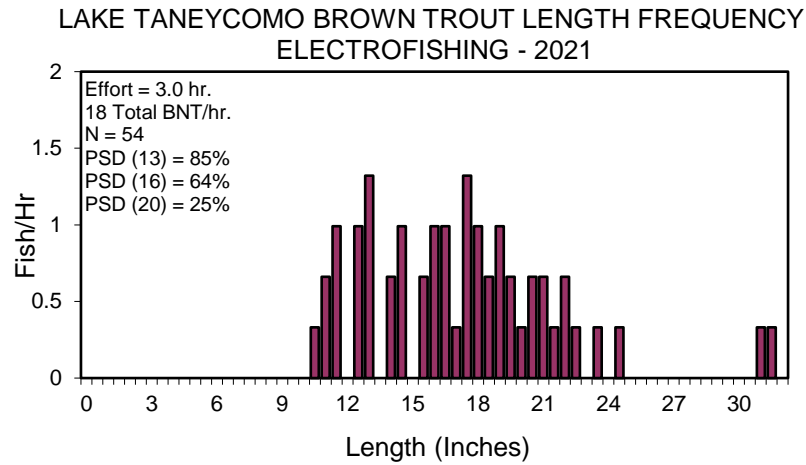


Figure 8. Length frequencies for Brown Trout from the electrofishing samples, fish ladder, and combined in 2021. [back to text](#)

Appendix A. Fish population parameters. [back to text](#)

Rainbow Trout

PSD13: The percentage of Rainbow Trout  $\geq 11$ " that are also  $\geq 13$ ".

PSD16: The percentage of Rainbow Trout  $\geq 11$ " that are also  $\geq 16$ ".

PSD20: The percentage of Rainbow Trout  $\geq 11$ " that are also  $\geq 20$ ".

Brown Trout

PSD13: The percentage of Brown Trout  $\geq 11$ " that are also  $\geq 13$ ".

PSD16: The percentage of Brown Trout  $\geq 11$ " that are also  $\geq 16$ ".

PSD20: The percentage of Brown Trout  $\geq 11$ " that are also  $\geq 20$ ".