



**OTTER CREEK RESERVOIR
2020 TREND NET SURVEY**

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BACKGROUND: Otter Creek Reservoir is one of southern Utah's most popular fishing destinations and has historically provided a high quality fishery able to sustain a large amount of harvest, as long as water levels remain high enough to maintain the fishery. For many years, the fishery has been maintained with an annual stocking quota of 200,000 sub-catchable rainbow trout (RBT) in the fall. Due to various stocking adjustments, that quota has been raised to 220,000, while an additional quota of 23,000 has been added in the spring (Table 1). An angler survey conducted at the reservoir in 2016 found that the Otter Creek RBT fishery provides a significant draw to anglers from across Utah, as well as southern Nevada (Hadley et al. 2017). The results of the survey prompted increases in stocking as well as the designation of Otter Creek Reservoir as one of Utah's Blue Ribbon Fisheries, based on the high quality of the fishery and its value to Utah anglers. In fact, Otter Creek Reservoir can be considered Utah's best RBT sport fishery.

An annual quota of 25,000 Bear Lake cutthroat trout was stocked regularly in Otter Creek Reservoir from the early 1990s through 2017 in an effort to apply predation pressure to Utah chubs. Due to poor returns, this quota was cancelled after 2017 and converted to a quota of 20,000 brown trout (Table 1). Due to the significant level of angler interest, Otter Creek Reservoir is frequently used as a receptacle for excess trout produced by hatcheries.

Competition between stocked trout and Utah chubs has historically been a chronic problem and Otter Creek Reservoir has been treated periodically with rotenone to reduce chub densities, most recently in 1999. There is no conservation pool in the reservoir but at least a small pool is normally maintained through the year by the Sevier River Water Users in order to sustain a fishery. This effort has been instrumental in preserving the sport fishery during frequent drought conditions over the last 10+ years. The Bear Lake cutthroat trout quota was originally added with the intent that they would utilize chubs as forage and add diversity to the sport fishery. By the same reasoning, smallmouth bass were introduced in 2005 and a limited population has maintained through natural recruitment since that time.

Due to limited establishment and return, Bear Lake cutthroat trout and smallmouth bass have never been able to exert an appreciable effect on the Utah chub population in Otter Creek Reservoir. Conversely, the introduction of hybrid wipers (white bass x striped bass) to Newcastle and Minersville reservoirs yielded significant reduction of rough fish density and positive responses in survival and condition among stocked trout. Based on these results, the addition of wipers to the Otter Creek Reservoir fishery commenced in 2011. Varying quotas of wiper sac fry and fingerlings have been stocked since that time (Table 2) and the requested quota has recently been set at 20,000 fingerlings (2-3 inches). Excess wipers are also stocked in Otter Creek Reservoir when available. Return of wipers to netting surveys has been limited and variable and return to anglers has been almost negligible (Hadley et al. 2017). Those wipers that have been observed, however, have exhibited exceptional growth and condition. Factors that may have contributed to the low netting returns include poor survival of sac fry, insufficient stocking numbers, and behavioral avoidance of littoral zones where nets are set. Low catch of wipers by anglers is attributed to predominant use of tackle and techniques that target trout and are not favored by wipers.

The fishery at Otter Creek Reservoir is monitored annually through trend net surveys. Since 2011, a new gill net design recommended by the American Fisheries Society (AFS) has been utilized. The random placement of differing mesh sizes is intended to avoid "leading" fish into the net and, thus, reduce bias in the net catch – as opposed to nets previously used for decades ("DWR" nets), which comprised of graduating mesh sizes. In most waters, catch rate

trends observed since 2011 indicate that the AFS nets catch about 50% fewer trout and chubs than did the DWR nets, though the reduced catches are still sufficient to provide measures of population dynamics. The trout catch rate at Otter Creek Reservoir has followed this pattern, while the chub catch rate has been about 75% that of the old net style.

METHODS: Seven experimental gill nets (four floating and three diving) were set in Otter Creek Reservoir on April 7, 2020, and were allowed to fish overnight. The floating nets and two of the diving nets measured 6 ft x 80 ft, with eight panels of randomly-arranged mesh size (1.5", 2.25", 1", 0.75", 2.5", 1.25", 2") and were set at shoreline locations that have been consistent for more than 30 years of sampling (Figure 1). The additional diving net (NPD) was of the "DWR" design, measuring 6 ft x 125 ft, with five panels of increasing mesh size (0.75", 1", 1.25", 1.5", 2"). This net was set in open water (22 feet bottom depth) in the northern portion of the reservoir (Fig. 1) with the intent of evaluating possible use of the pelagic zone by wipers. Fish caught were removed from nets on the morning of April 8 and all sport fish were measured to the nearest millimeter (total length) and weighed to the nearest gram. Trout body condition was measured by the calculation of Fulton's K_{TL} (generated from total length [TL]):

$$K_{TL} = (Weight/Length^3) \times 100,000$$

Wiper and smallmouth bass body condition was measured by relative weight (W_r), given by:

$$W_r = (W/W_s) \times 100$$

where W = the weight of an individual fish and W_s = the standard weight for a fish of similar length. W_s is computed by the equation:

$$\log_{10}(W_s) = a + b(\log_{10}TL)$$

where a and b are constants defined by species-specific length-weight relationships (Anderson and Neumann 1996). Total length was recorded for a subset of Utah chubs, while total batch weight and count was recorded for each net. Results of the 2020 survey were compared with those from historic trend net surveys.

RESULTS: Due to windy overnight conditions, three of the nets (EMLF, SEF, and WMLD) set in Otter Creek Reservoir filled with algae and did not fish properly. RBT and chubs caught in these nets were not included in calculations of catch rate, though they were used to calculate mean size and condition. A total of 92 trout was collected in the remaining four nets on April 8, for a catch rate of 23 trout per net-night (Table 3). This rate was similar to most other years since the AFS nets were first employed in 2011 (Table 4). Although AFS nets yield a lower catch than DWR nets, variability in catch rate has also been lower (Fig. 2). Trout made up 89% of the total net catch and 91% of the total biomass collected (Fig. 3).

All but three of the trout collected were RBT (Fig. 4). Unlike in 2018 and 2019, RBT cohorts were easily distinguishable (Fig. 5). RBT stocked in fall 2019 made up 71% of the trout catch and averaged 263 mm in total length (TL), 191 g in weight, with a mean condition (K_{TL}) of 1.01. Mean length and weight were slightly lower than long-term means for RBT stocked the previous year, while condition was the lowest observed since 2005 (Table 4, Fig. 6). These fish grew an average of 0.48 mm/day since stocking, which was almost identical to the long-term mean. Older RBT (stocked prior to fall 2019) made up 26% of the trout catch and averaged 445 mm (17.5 in), 1,005 g (2.2 lbs), with a mean K_{TL} of 1.13. Length and weight were higher than long-term means, while condition was similar (Table 4). RBT ranged in size up to 528 mm (20.8 in) and 1,554 g (3.4 lbs). The rest of the trout catch was made up by two large brown trout (title

page) measuring 550-624 mm (22-25 in) and weighing 2,390-3,120 g (5.3-6.9 lbs), and one large cutthroat trout (573 mm, 23 in; 2,060 g, 4.5 lbs). One wiper and two smallmouth bass were also collected. Unlike at other waters where they have been stocked in southern Utah, wiper catch rate has been low and inconsistent at Otter Creek Reservoir and that trend continued in 2020 (Fig. 7).

Only eight Utah chubs were collected in 2020, for a catch rate of just two fish per net-night. This marked a significant decrease from the extremely high catch observed in 2019 (Fig. 8). In 2020, the chub catch spanned at least four cohorts and was dominated by smaller fish (Fig. 9).

DISCUSSION: Trend net survey results in 2018 and 2019 showed that RBT distribution was skewed from traditional patterns in Otter Creek Reservoir by the slow-growing 2016 cohort, which was influenced by poor environmental conditions in 2017 and 2018, as well as high excess stocking in 2018 (Hadley 2019). With the passage of most of this cohort out of the fishery in 2020, RBT length distribution returned to what is typically observed in spring trend net surveys, with fish stocked the previous year measuring 230-300 mm (9-12 inches), while older RBT measure 380 mm (16 in) to over 500 mm (20 inches) (Fig. 5). RBT benefited from improved water levels in 2019 and 2020, exhibiting typical survival and growth.

Utah chub catch has typically varied in response to water level fluctuations and chemical treatments in Otter Creek Reservoir, though the high catch of 2019 was directly attributed to the draining of Koosharem Reservoir in 2018 (Fig. 8). High catches in 2013 and 2019 represent outliers that have inordinately raised mean catch rate for AFS nets to much higher than would be expected. If these two years are removed, then mean chub catch rate since 2011 is just 12 fish per net-night (30% of the rate by DWR nets, 1979-2010). After the extremely high catch observed in 2019, it was surprising to see such a precipitous decline in chubs in 2020. The 2019 survey also marked the first time that multiple size classes of wipers were observed in Otter Creek Reservoir and it was hypothesized at the time that these fish would perform well with the temporary influx in forage. While wipers have significantly reduced chub density in Minersville Reservoir, wiper monitoring results in Otter Creek are less conclusive. While it is tempting to hypothesize that wipers contributed to the rapid decline in chubs from 2019 to 2020, trend net results do not provide sufficient data to corroborate that supposition. Rather, the extreme high chub density itself may have contributed to a natural, population-scale reduction. Winterkill of Utah chubs has occurred periodically in Navajo Lake, when density appears to reach a critically high extreme. It is not clear exactly when a similar die-off may have occurred in Otter Creek Reservoir, though the high snowpack of 2018-19 boosted water level throughout the following summer. Conversely, RBT survived and grew well during this same period. Regardless of when the chub population crashed, RBT likely avoided significant detriment from chub competition thanks to the improved water level and environmental conditions in 2019.

Despite increased stocking and the addition of pelagic sampling gear, netting surveys have yielded inconclusive data on wiper performance in Otter Creek Reservoir. The additional pelagic net has benefited the survey, however, because algae has often fouled shoreline nets and reduced sample size. In addition to the pelagic diving net, it is recommended that a pelagic floating net be included in the 2021 survey. While spring netting has sufficiently sampled wipers in Newcastle and Minersville reservoirs, other regions have also found success in monitoring wipers in the fall. A fall survey is recommended for Otter Creek Reservoir in 2021 to evaluate seasonal variation in wiper net catch. With the current success of wiper stocking survival unknown, another adjustment was made in 2020 as eight-inch wipers were stocked instead of the

requested two-inch fish. Only 4,500 larger fish were available in 2020, though a quota of 9,000 has been requested for 2021.

Relative biomass of Utah chubs has remained low in Otter Creek Reservoir since 2005 (Fig. 3) even during years when catch rate has been high. This time period corresponds to increased efforts by water users to maintain sufficient water levels by increasing releases from Piute Reservoir to meet water demand during drought years. These conditions have allowed RBT to maintain accelerated growth in Otter Creek Reservoir and gain a competitive advantage over Utah chubs, regardless of performance of various potential chub predators (smallmouth bass, Bear Lake cutthroat trout, brown trout, wipers). Maintenance of minimum water levels will continue to provide the greatest potential in sustaining the state's most successful RBT fishery. Such conditions may be difficult to maintain, however, during extreme drought years like 2017-2018, when reservoir capacity dropped as low as 11%. In those instances, continued efforts to establish populations of wipers and brown trout may aid in depressing increases in Utah chub density that often occur when water levels are drawn low. These species are also more apt to survive low water conditions and provide sport fish opportunity while RBT recover.

RECOMMENDATIONS:

1. Maintain current stocking quotas of rainbow and brown trout at Otter Creek Reservoir. Evaluate stocking of fewer, larger wipers. Continue stocking of excess RBT and wipers when available.
2. Conduct trend net surveys annually in the spring to monitor trout, wipers, and Utah chubs. Set one diving net and one floating net in the pelagic zone to assess use by wipers and chubs, as well as to avoid fouling by algae. Evaluate fall netting in 2021. Conduct electrofishing when possible in order to more effectively monitor smallmouth bass.
3. Analyze scales or dorsal spines from both wipers and smallmouth bass for age and growth.
4. Develop outreach efforts to promote wiper fishing.

LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. *Fisheries techniques: second edition*. American Fisheries Society, Bethesda, Maryland.
- Hadley, M. J., N. R. Braithwaite, and R. D. Hepworth. 2017. 2016 angler survey at Otter Creek Reservoir, Utah. Publication Number 17-02. Utah Department of Natural Resources, Division of Wildlife Resources, Salt Lake City. 26 pp.
- Hadley, M. J. 2019. Otter Creek Reservoir: 2019 trend net survey. Utah Department of Natural Resources, Division of Wildlife Resources, Cedar City.

Otter Creek Reservoir

Sampling Locations

F=Floating Gill Net

D=Diving Gill Net

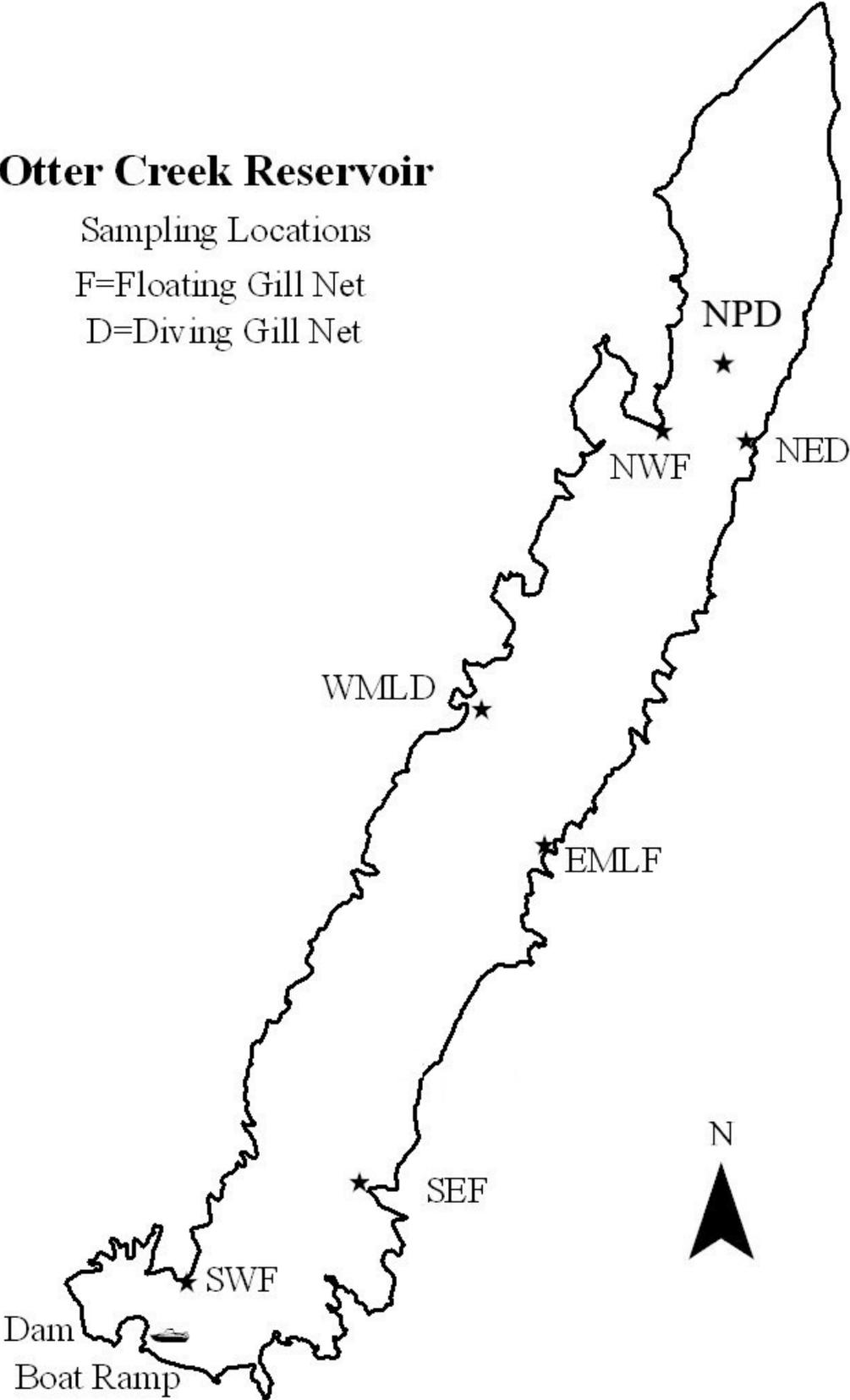


Figure 1. Locations of gill nets set at Otter Creek Reservoir during the 2020 trend net survey.

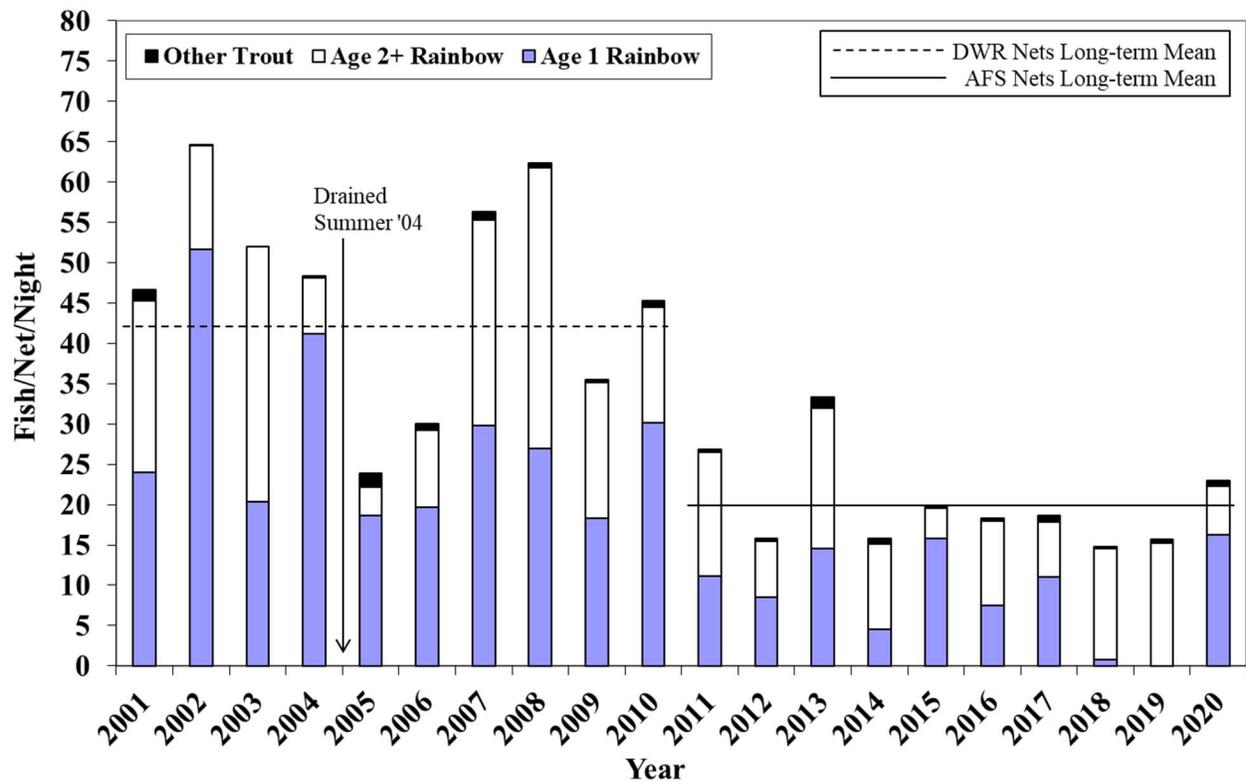


Figure 2. Trout catch rate during trend net surveys at Otter Creek Reservoir, 2001-2020.

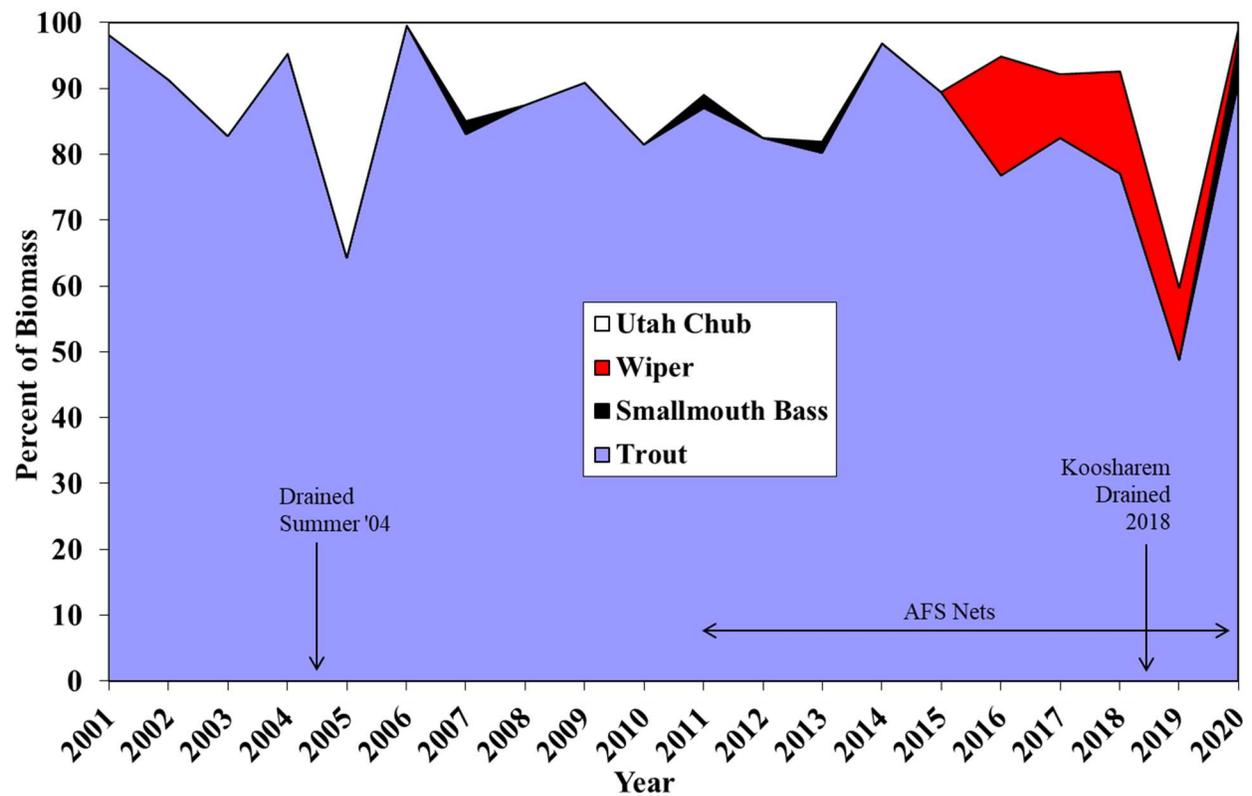


Figure 3. Relative biomass of fish species collected during trend net surveys at Otter Creek Reservoir, 2001-2020.



Figure 4. Rainbow trout collected at Otter Creek Reservoir on April 8, 2020.

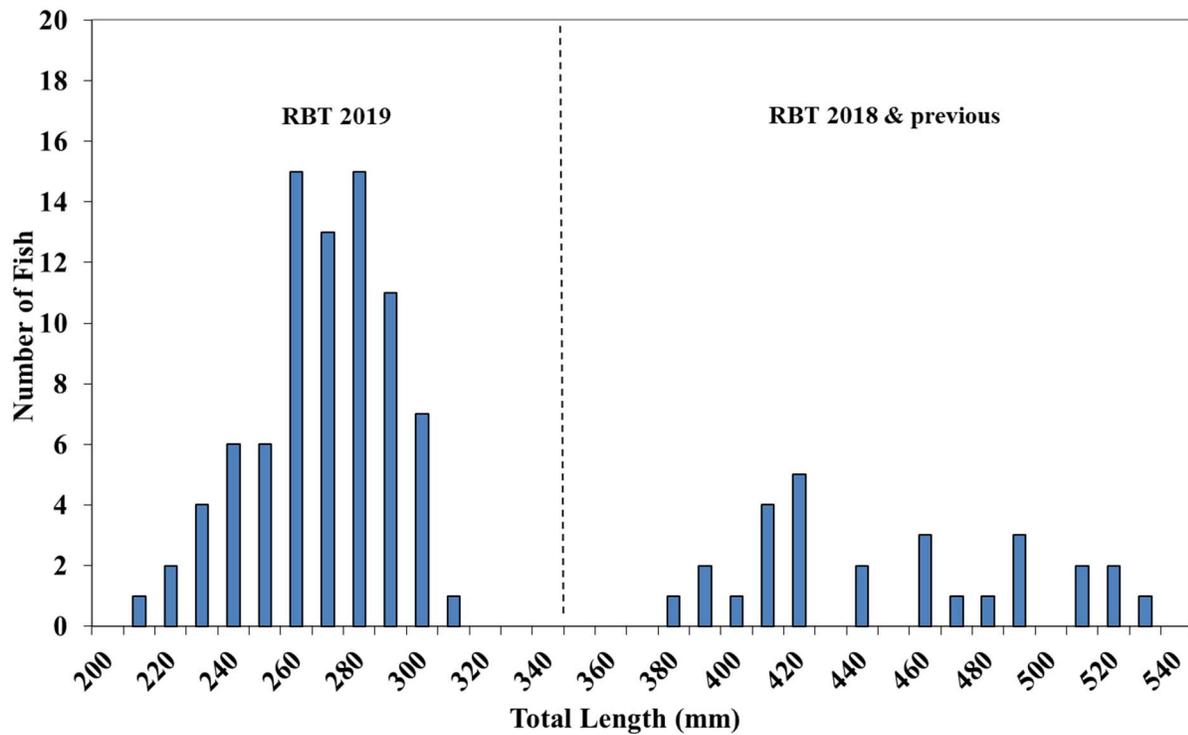


Figure 5. Length distribution of rainbow trout collected at Otter Creek Reservoir on April 8, 2020.

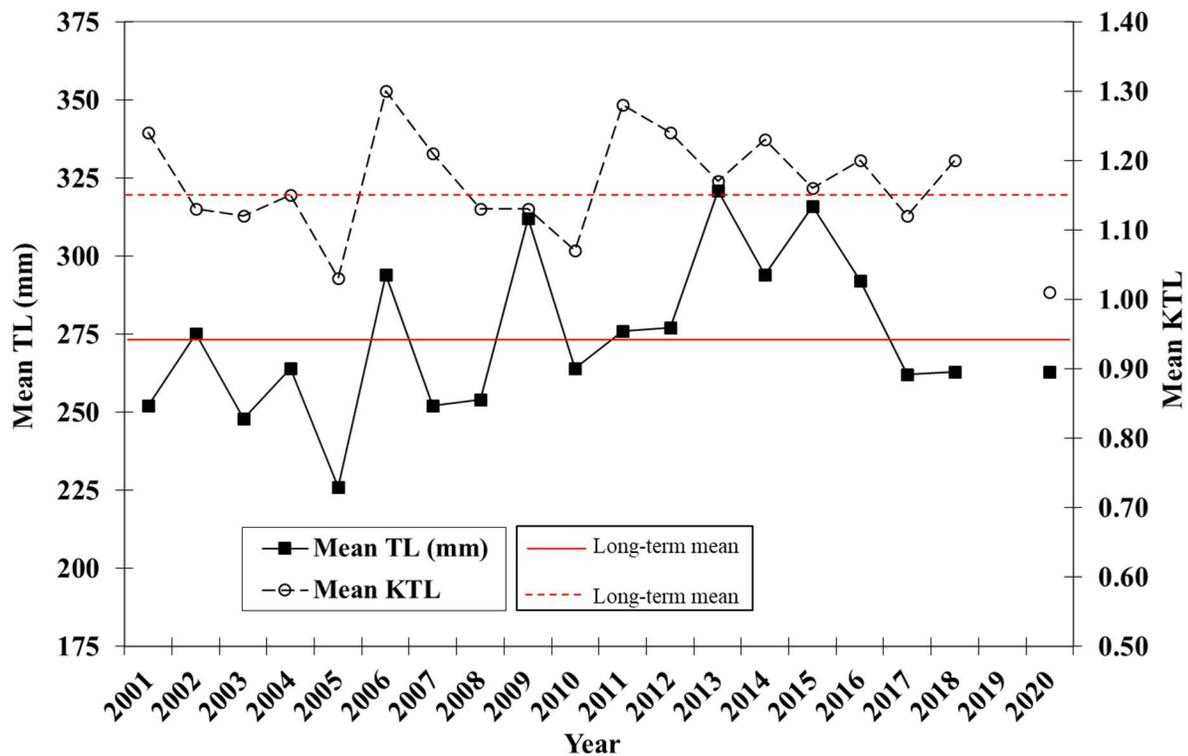


Figure 6. Mean total length (mm) and condition (K_{TL}) of rainbow trout stocked the previous year and collected during trend nets surveys at Otter Creek Reservoir, 2001-2020.

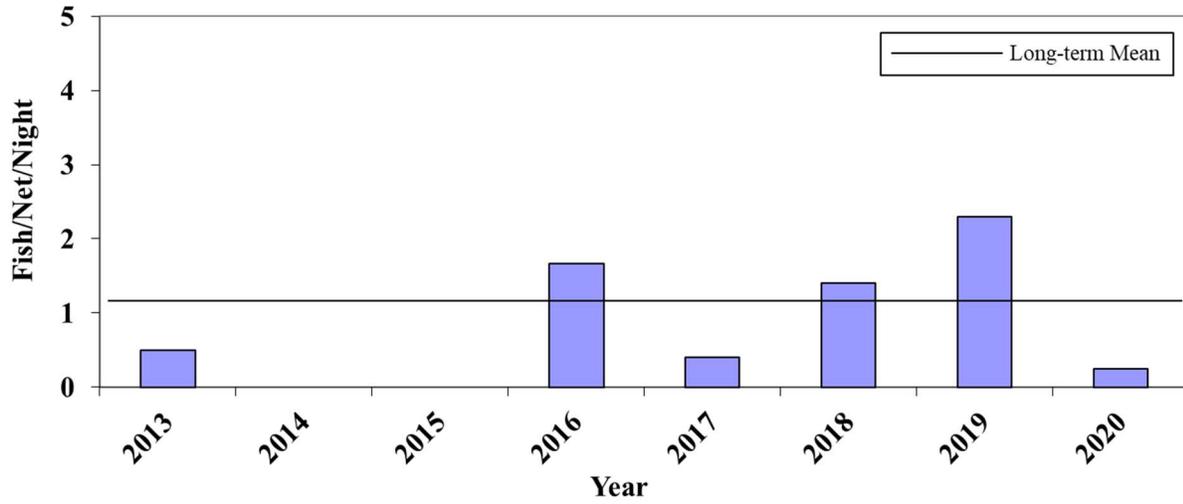


Figure 7. Wiper catch rate during trend net surveys at Otter Creek Reservoir, 2013-2020.

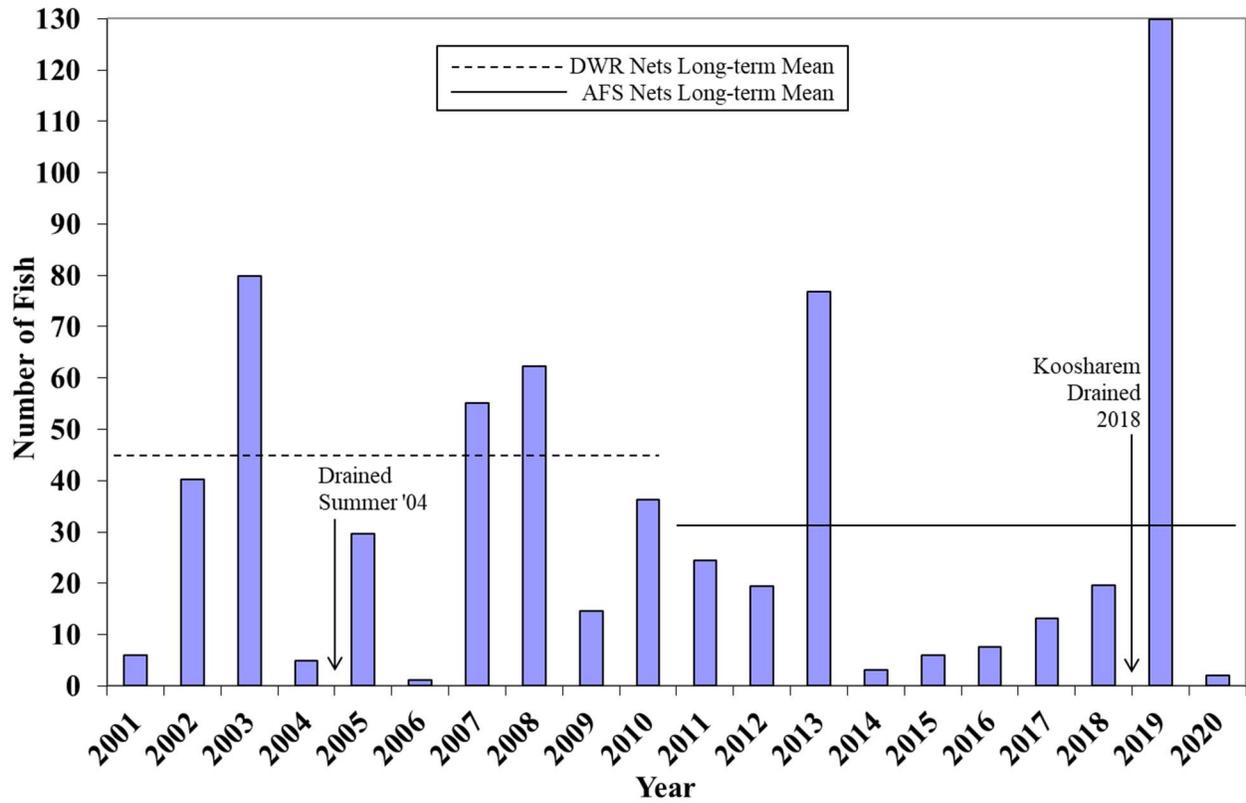


Figure 8. Utah chub catch rate during trend net surveys at Otter Creek Reservoir, 2001-2020.

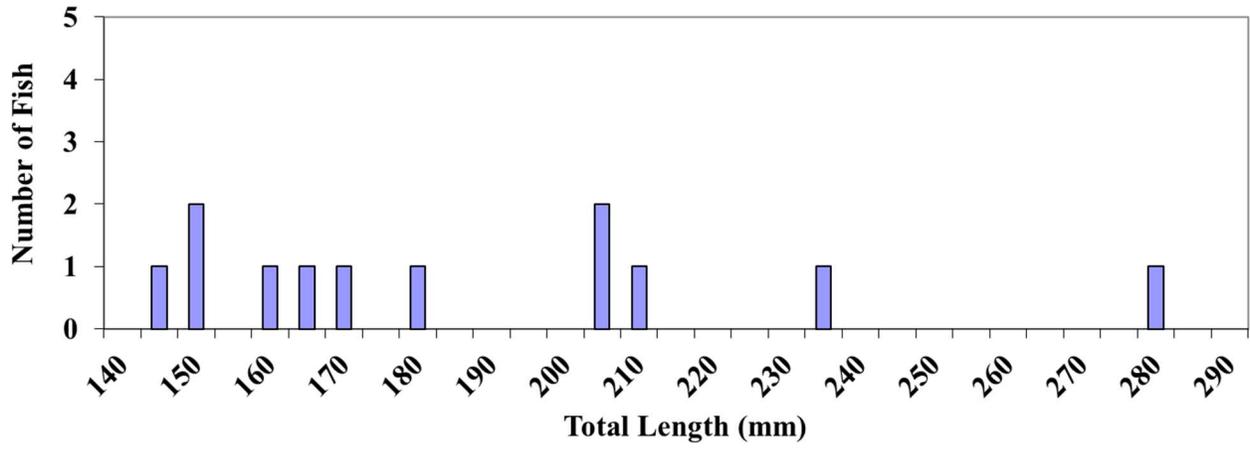


Figure 9. Length distribution of Utah chubs collected at Otter Creek Reservoir on April 8, 2020.

Table 1. Record of trout stocking in Otter Creek Reservoir for the five years prior to the 2020 trend net survey.

Year	Rainbow Trout			Cutthroat Trout		Brown Trout		Total Excess					
	Number	Size (in)	Timing	Number	Size (in)	Number	Size (in)	Rainbow	Cutthroat	Brown	Tiger		
2015	216,955 ^a	7.9	Fall	23,930 ^b	7.3	5,612 ^a	3.7	106,490	117,523	---	---		
	44,715	6.9	Spring										
	36,125	3.1	Spring										
	25,650	3.0	Fall										
2016	211,625 ^a	7.4	Fall	25,977 ^b	7.9	5,083 ^a	4.1	162,731	178,765	---	---		
	62,726	2.1	Spring	80,907 ^d	4.3								
	100,005	7.8	Summer	97,858 ^c	1.7-2.4								
2017	891	15-21	Spring	25,090 ^b	7.6	5,288 ^a	3.3	891	---	5,668	---		
	59,709 ^a	7.5	Summer										
	9,100 ^a	9.6	Summer									133	15.3
	30,659 ^a	6.1	Fall									5,535	4.6
	19,795 ^a	7.4	Fall										
	21,221 ^a	10.0	Fall										
2018	8,157	10.8	Spring	---	---	4,998 ^a	3.8	196,623	---	46,678	---		
	24,878 ^a	6.6	Spring			28,200	2.1						
	137,779	3-4	Summer			13,778	4.3						
	50,667	7.0	Fall			5,000	6.0						
	198,275 ^a	6.8	Fall										
2019	15,035	9.0	Spring	31,021 ^d	2.8	20,808 ^a	3.1	15,035	31,021	---	23,040		
	19,415 ^a	7.2	Spring										
	204,417 ^a	7.4	Fall										
2020	23,000	7.0	Spring	---	---	20,000	3.0	---	---	---	---		
Quota	220,000	7.0	Fall	---	---	---	---	---	---	---	---		

^a – Requested quota.

^b – Requested Bear Lake cutthroat trout quota.

^c – Excess Bonneville cutthroat trout from Manning Meadow brood production.

^d – Excess Bear Lake cutthroat trout.

Table 2. Record of wiper stocking in Otter Creek Reservoir for the five years prior to the 2020 trend net survey.

Year	Number Stocked	Size (in)	Fish/acre
2015	29,835	1.7-2.1	12
2016	23,469	1.5	9
2017	26,999	2.1	11
2018	6,970	1.5	2.8
2019	21,549	1.1-2.2	18
	22,906	3.8	
<i>2020</i> <i>Quota</i>	<i>20,000</i>	<i>2.0</i>	<i>8</i>

Table 3. Summary of the results from the 2020 trend net survey at Otter Creek Reservoir.

Water:	Otter Creek Reservoir						Catalog #:	VI 403								
Date Set:	4/7/2020		Time:	14:00		Weather:	Calm, mild, wind overnight									
Date Pulled:	4/8/2020		Time:	10:00		Water Temp:	46F									
# Nets:	AFS - 4 Floaters, 2 Divers						Collectors:	M. Hadley, S. Beckstrom, B. Griffin, J. Swensen, M. Jensen								
	DWR - 1 Diver															
Summary for Sport Fish																
Species	N	Total	fish per net/night	Total Length (mm)			Weight (g)			Condition (Ktl)			% total catch	% total biomass	% total trout	% trout biomass
		Weight (kg)		Mean	SE	Range	Mean	SE	Range	Mean	SE	Range				
Rainbow Trout	89	35.45	22.25	310	8.15	204-528	400	36.7	69-1554	1.04	0.01	0.78-1.36	86.41	74.80	96.74	82.40
Brown Trout	2	5.51	0.50	587	37.0	550-624	2755	365	2390-3120	1.36	0.08	1.28-1.44	1.94	11.63	2.17	12.81
Cutthroat Trout	1	2.06	0.25	---	---	573	---	---	2060	---	---	1.09	0.97	4.35	1.09	4.79
RBT 2019	65	12.04	16.25	263	2.42	204-301	191	6.05	69-305	1.01	0.01	0.78-1.24	63.11	24.40	70.65	27.98
RBT 2018 & prev	24	23.42	6.00	445	8.62	380-528	1005	48.6	663-1554	1.13	0.02	0.88-1.36	23.30	49.40	26.09	54.43
Trout	92	43.02	23.00	317	8.98	204-624	457	48.8	69-3120	1.05	0.01	0.78-1.44	89.32	90.77	---	---
Summary for Warmwater Sportfish																
Species	N	Total	fish per net/night	Total Length (mm)			Weight (g)			Relative wt. (Wr)			% total catch	% total biomass		
		Weight (kg)		Mean	SE	Range	Mean	SE	Range	Mean	SE	Range				
Wiper	1	0.50	0.25	---	---	426	---	---	988	---	---	88	0.97	2.08		
Smallmouth Bass	2	2.88	0.50	426	8.00	418-434	1441	160	1281-1600	118	6.02	112-124	1.94	6.08		
Summary for Non-Sport Fish																
Species	N	Total	fish per net/night	% total catch	% total biomass	TL (mm)										
		Weight (kg)				Range										
Utah Chub	8	0.99	2.00	7.77	1.06	141-277										
Comment:	SEF and WMLD lots of algae, EMLF some algae															
	SEF, WMLD, EMLF not counted for catch rate (except BRN and SMB)															
	NPD set at 22' depth, just N of Senior Citizen Point															

Table 4. Trend net survey results at Otter Creek Reservoir, 1974-2010.

Date	Nets Set		Total Trout	Trout per net-night	Rainbow trout stocked 2 yrs. or more			Rainbow trout stocked previous year			Growth (mm/day)	Wiper per Net-Night	Wiper all ages			Total Nongame per net-night	Comments
	Flo	Div			Mean TL (mm)	Mean W (g)	Ktl	Mean TL (mm)	Mean W (g)	Ktl			Mean TL (mm)	Mean W (g)	Wr		
8-May-74	0	1	124	124											0	TREATED 1971	
1-May-75	1	1	107	54											4.5		
21-Apr-76	1	1	35	18											6.5		
29-Apr-77	1	1	25	13											24	TREATED 1977	
10-Apr-79	1	2	80	27											0		
6-May-80	2	1	69	23											0		
24-Apr-81	2	1	46	15											1.33		
22-Apr-82	2	1	23	8											5		
12-May-83	6	1	175	25											65		
5-Apr-84	6	0	312	52	392	722	1.20	303	351						47		
10-Apr-85	6	0	299	50	424	966	1.26	245	183	1.20	0.48				93		
10-Apr-86	6	0	370	62	496	1300	1.06	322	463	1.30	0.69				115		
23-Apr-87	5	0	395	79	448	1010	1.13	302	348	1.22	0.77				244		
21-Apr-88	3	0	303	101	448	993	1.10	284	275	1.20	0.60				70		
19-Apr-89	4	0	57	14	471	1148	1.08	257	213	1.22	0.47				188	TREATED 1989	
12-Apr-90	4	0	32	8				272	221	1.07	0.61				0		
15-Apr-91	3	0	116	39	409	878	1.22	244	163	1.10	0.35				1.33		
16-Apr-92	4	0	50	13	423	880	1.15	260	221	1.25	0.60				0.5		
15-Apr-93	6	0	336	56	397	802	1.26	275	250	1.18					12		
18-Apr-94	6	0	211	35	468	1343	1.30	298	359	1.30	0.65				65		
3-Apr-95	5	0	319	64	410	725	1.04	241	140	0.98	0.34				195		
26-Mar-96	6	0	321	54	390	654	1.09	272	241	1.18	0.56				6.7		
3-Mar-97	6	0	345	58	347	380	0.89	207	86	0.95	0.23				31	Earlier netting	
26-Mar-98	4	0	51	13	406	766	1.13	271	184	0.90	0.52				45	4 nets instead of 6	
23-Mar-00	4	0	35	9				259	188	1.02	0.43				0	TREATED 1999	
27-Mar-01	6	0	280	47	408	848	1.24	252	202	1.24	0.46				6		
2-Apr-02	6	0	388	65	417	890	1.21	275	239	1.13	0.57				40		
8-Apr-03	6	0	312	52	388	652	1.12	248	175	1.12	0.34				80		
6-Apr-04	6	0	290	48	416	816	1.12	264	215	1.15	0.43				4.8	Drained Fall 04	
6-Apr-05	6	0	143	24				226	121	1.03	0.30				30		
13-Apr-06	6	0	180	30	390	775	1.26	294	337	1.30					1.2		
4-Apr-07	5	1	338	56	415	832	1.19	252	200	1.21	0.50				55		
11-Apr-08	5	1	374	62	386	609	1.08	254	190	1.13	0.47				62		
8-Apr-09	4	2	213	36	416	855	1.18	312	346	1.13	0.73				15		
7-Apr-10	4	2	272	45	449	977	1.07	264	204	1.07	0.47				36		

Table 4 (contd.). Trend net survey results at Otter Creek Reservoir, 2011-2020.

Date	Nets Set		Total Trout	Trout per net-night	Rainbow trout stocked 2 yrs. or more			Rainbow trout stocked previous year				Wiper per Net-Night	Wiper all ages			Total Nongame per net-night	Comments
	Flo	Div			Mean TL (mm)	Mean W (g)	Mean Ktl	Mean TL (mm)	Mean W (g)	Mean Ktl	Growth (mm/day)		Mean TL (mm)	Mean W (g)	Mean Wr		
5-Apr-11	4	2	161	27	423	935	1.22	276	286	1.28	0.55					25	start AFS nets
10-Apr-12	3	3	95	16	426	925	1.19	277	269	1.24	0.51					20	
11-Apr-13	4	2	200	33	416	823	1.13	321	391	1.17	0.62	0.50	190	91	73	77	
8-Apr-14	4	2	95	16	452	1077	1.15	294	325	1.23	0.48					3	
31-Mar-15	2	2	79	20	450	1131	1.21	316	371	1.16	0.61					6	
5-Apr-16	4	2	110	18	448	1058	1.17	292	308	1.20	0.53	1.67	483	1954	116	8	
5-Apr-17	4	2	93	19	463	1158	1.16	262	210	1.12	0.39	0.40	559	3208	120	13	
27-Mar-18	3	2	74	15	391	740	1.18	263	221	1.20	0.59	1.40	463	1573	105	20	
2-Apr-19	4	3	110	16	432	888	1.07					2.30	423	1376	105	130	Koosharem drained 2018
8-Apr-20	2	2	92	23	445	1005	1.13	263	191	1.01	0.48	0.25				2	
Long-term mean				37	405	792	1.12	274	256	1.15	0.47	1.09	424	1519	103	41	
AFS nets (since 2011)				20									AFS nets (since 2011)			30	
DWR nets (pre-2011)				42									DWR nets (pre-2011)			44	
												AFS nets (since 2011) w/out 2013, 2019			12		