PIUTE RESERVOIR
2019 TREND NET SURVEY

Report prepared by:
Mike Hadley
Regional Sport Fish Biologist

BACKGROUND: The sport fishery in Piute Reservoir has been limited historically by periodic water fluctuation and dense populations of Utah suckers and Utah chubs. While stocked trout have at times performed well in the reservoir, poor survival and growth have been much more typical over the long-term. Good water conditions and low densities of suckers and chubs led to historically high trout survival and growth during the late 2000s. This performance decreased, however, with subsequent increases in rough fish abundance. Drought conditions and water level fluctuation caused the trout fishery to completely fail in the years following 2010. While water users avoid completely draining Piute Reservoir, so as to avoid shunting large amounts of sediment downstream, the minimum pool left does not provide sufficient conditions for successful survival of a trout fishery and may not support any kind of sport fishery. Just during the past decade, the reservoir was mostly drained at least four times (2014, 2015, 2016, 2018). Coinciding with the poor water conditions of the 2010s, Utah suckers came to dominate the Piute Reservoir fish community, comprising up to 99% of fish biomass. This dominance persisted despite repeated reduction to the minimum reservoir level over several years and a rotenone treatment in 2014.

The last ten years have exemplified the major challenges to maintaining a sport fishery in Piute Reservoir, especially through the stocking of trout that has been traditionally attempted. Conditions are unlikely to change in the future because Sevier River Water Users have made a concerted effort over the last 15 years to maintain water minimum water levels to sustain the trout fishery in Otter Creek Reservoir, located upstream. This effort is fully supported by Utah Division of Wildlife Resources because Otter Creek Reservoir has consistently shown the ability to maintain a high quality fishery as long as extreme water fluctuation is avoided during most years. Piute Reservoir has not shown the same ability due to the presence of Utah suckers and, likely, other environmental conditions like temperature and turbidity. These factors, combined with reduced holding capacity at Utah's fish hatcheries, led to the cancellation of regular trout stocking in Piute Reservoir after 2017 (Table 1). Attempts to establish a population of wipers that could prey on suckers and chubs have also been hampered by variable water levels, leading to periodic cancellation of that stocking (Table 2). An annual quota of 50,000 fingerling channel catfish was added in 2019 because regional staff felt that this was the only species currently available for introduction that may be able to persist in Piute Reservoir under current circumstances.

The fishery at Piute Reservoir has historically been monitored annually through trend net surveys, though the monitoring schedule was shifted to every other year beginning in 2015. Since 2011, a new net design recommended by the American Fisheries Society (AFS) has been utilized in sampling at Piute Reservoir. The random placement of differing mesh sizes is intended to avoid "leading" fish into the net and, thus, reduce bias in the net catch. 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. At Piute Reservoir, the AFS net catch rate is about 33% that of the DWR style nets, though this time period (2011-2019) also corresponds to a known reduction in trout survival due to water fluctuation and rough fish competition. By contrast, AFS net catch rate for Utah chubs and Utah suckers has been about double that of the old style nets, though this increase likely has more to do with increased abundance than differences in catchability.

METHODS: Six experimental gill nets (four floating and two diving) were set in Piute Reservoir on April 2, 2019, and were allowed to fish overnight. 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"). Net locations have been consistent for more than 20 years of sampling (Figure 1). Fish caught were removed from nets on the morning of April 3 and all sport fish were measured to the nearest mm (total length) and weighed to the nearest gram. Body condition was measured by the calculation of Fulton's K_{TL} (generated from total length [TL]):

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

Non game fish caught in each net were counted and a sub sample of lengths and weights was recorded. Total weight of non game fish was calculated from the total count and mean weight.

RESULTS: The two floating nets set at the south end of Piute Reservoir fouled with algae on April 3, 2019, and did not fish properly. The remaining four nets caught 98 Utah suckers, which made 95% of the total catch (Table 3) and 97% of the total biomass sampled (Fig. 2). The sucker catch was dominated by large adults ranging from 429 mm to 515 mm (Fig. 3). Combined catch of Utah suckers and Utah chubs has been higher with AFS nets than was observed historically with DWR nets (Table 4), however, this disparity was caused by very high catches of chubs observed from 2011 to 2013 (Fig. 4). Utah chubs have been relatively absent from the catch since Utah suckers came to dominate the catch and biomass in 2014 and none were observed in 2019.

Only five rainbow trout were collected at Piute Reservoir on April 3, 2019, for a catch rate of 1.25 trout per net-night (Table 3). This was the second lowest catch rate observed since 2004 (Table 4, Fig. 5) – only the 2017 catch rate was lower. All rainbow trout observed were stocked as excess brood in May 2018 (Table 1) and had grown, on average, less than one inch (25 mm) in length during 11 months in the reservoir.

Smallmouth bass, wipers, and channel catfish were absent from the trend net catch.

DISCUSSION: The 2019 trend net survey confirmed that a dense population of adult Utah suckers continues to dominate the fish biomass in Piute Reservoir. Rainbow trout, wipers, and channel catfish stocked during the last five years have either not survived well or exited downstream during frequent water level reduction. It is hoped that catfish stocked during good water conditions in 2019 will compete well with suckers and establish in the reservoir. Trend net surveys will be completed on an annual schedule while this new quota is evaluated. Cool and warm water predators (wipers, tiger muskie, saugeye) likely present the best chance to establish a sport fishery in Piute Reservoir in the future, though committing to stocking sterile fish on a regular basis may not be justified in the face of expected water level reduction. Any potential stocking of these species should focus on years of average or high snowpack in the hopes that fingerling fish will experience improved survival and growth. Introduction of fertile fish may also be considered, though any of those species could have problematic consequences downstream and may still not successfully establish, as evidenced by the lack of smallmouth bass present in the reservoir in recent years.

RECOMMENDATIONS:
1. Stock an annual quota of 50,000 fingerling (3-inch) channel catfish in Piute Reservoir.
2. Conduct trend net surveys annually to evaluate channel catfish stocking.
3. Explore opportunities for stocking or introducing warm and cool water fish species.
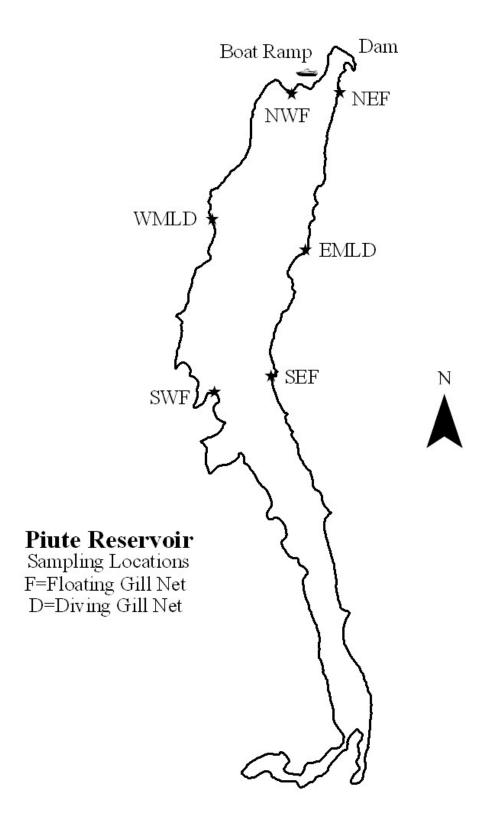
Figure 1. Locations of gillnets set at Piute Reservoir during the 2019 trend net survey.

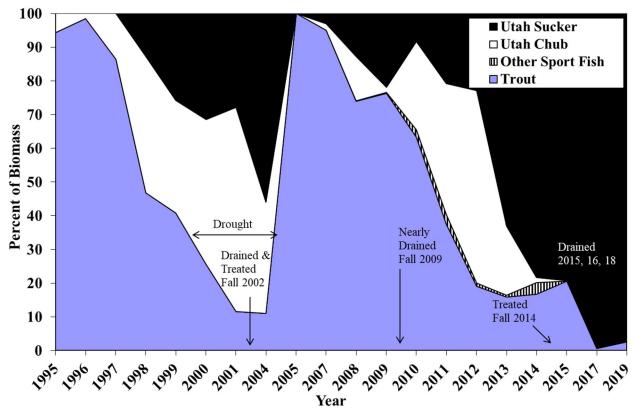Figure 2. Relative biomass of fish species collected during trend net surveys at Piute Reservoir, 1995-2019.
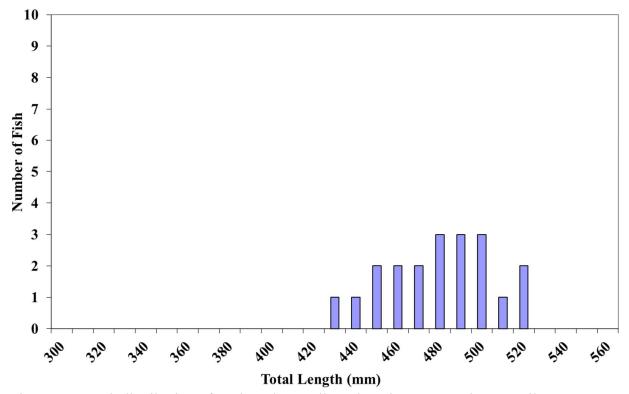

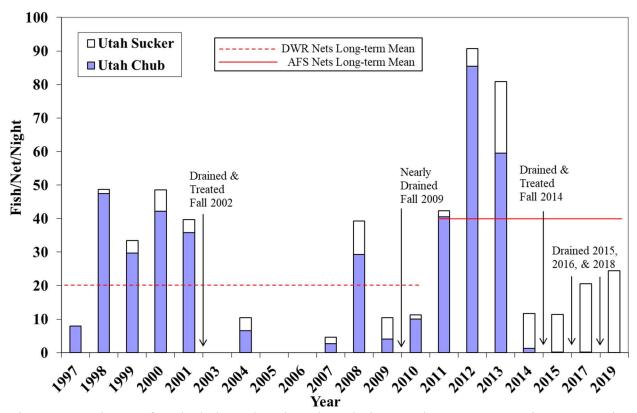Figure 3. Length distribution of Utah suckers collected at Piute Reservoir on April 3, 2019.

Figure 4. Catch rate of Utah chubs and Utah suckers during trend net surveys at Piute Reservoir, 1997-2019.
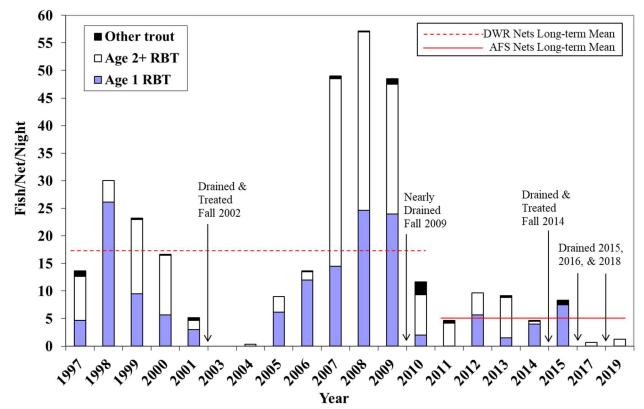

Figure 5. Trout catch rate during trend net surveys at Piute Reservoir, 1997-2019.

Table 1. Record of trout stocking in Piute Reservoir for the five years prior to the 2019 trend net survey. Bold text identifies the regularly scheduled annual quota.

Year	Rainbow Trout Number	Size (in)	Timing	Cutthroat Trout Number	Size (in)	Brown Trout Number	Size (in)	Total Excess Rainbow	Other
2014	**110,644**	**8.4**	Fall	33,185[a]	4.9	2,636[b]	14.0		35,821
2015	39,010	6.5	Spring			518[b]	13.2	95,580	518
	42,500	3.1	Spring						
	14,070	7.3	Spring						
	101,297	**7.6**	**Fall**						
2016	0								
2017	50,004	7.0	Spring					50,004	
	81,288	**7.2**	**Fall**						
2018	672[b]	14.7	Spring			381[b]	17.2	925	381
	253[b]	6.8	Spring						
2019 Quota	---	---	---	---	---	---	---	---	---

[a] – Bear Lake cutthroat trout.
[b] – Excess brood.

Table 2. Record of warm water fish stocking in Piute Reservoir for the five years prior to the 2019 trend net survey.

Year	Wiper Number	Size (in)	Channel Catfish Number	Size (in)
2014	4,018	3.0		
2015	0			
2016	23,214	1.5	187,556	0.5
2017	7,548	2.1		
	1,870	3.4		
2018	0			
2019 Quota	*20,000*	*3.0*	*50,000*	*3.0*

Table 3. Summary of the results from the 2019 trend net survey at Piute Reservoir.

Water: Piute Reservoir						**Catalog #:** VI 404									
Date Set: 4/2/2019		**Time:**	14:00			**Weather:** light rain, breezy									
Date Pulled: 4/3/2019		**Time:**	9:00			**Water Temp:** 47 F									
# Nets: 2 Floaters, 2 Divers						**Collectors:** M. Hadley, J. Gleave									

Summary for Sport Fish

Species	N	Total Weight (kg)	fish per net/night	Total Length (mm)			Weight (g)			Condition (KTL)			% total catch	% total trout	% total biomass	% trout biomass
				Mean	SE	Range	Mean	SE	Range	Mean	SE	Range				
Rainbow Trout	5	3.23	1.25	395	8.71	369-424	647	42.4	567-808	1.04	0.03	0.98-1.13	4.85	100.00	2.51	100.00

Summary for Non-Sport Fish

Species	N	Total Weight (kg)	fish per net/night	% total catch	% total biomass	Total Length (mm) Range
Utah Sucker	98	125	24.50	95.15	97.49	429-515

Comments: SEF and SWF fouled with algae

Table 4. Trend net survey results at Piute Reservoir, 1981-2019.

Date	Flo	Div	Total Trout	Trout per net-night	Rainbow trout stocked 2 yrs. or more Mean TL (mm)	Mean W (g)	Mean KTL	Rainbow trout stocked previous year Mean TL (mm)	Mean W (g)	Mean KTL	Growth (mm/day)	Total Nongame per net-night	Comments
24-Apr-81	2	1	10	3								19	
22-Apr-82	2	0	14	7								6	
11-Mar-83	5	0	17	3								120	Treated Fall 1985
17-Apr-87	3	1	75	19				343	550	1.31	0.58	0.75	Algae in nets
26-Apr-88	4	0	56	14	495	1450	1.19	261	236	1.34	0.65	0.25	
18-Apr-89	3	1	80	20	425			290				11	
18-Apr-90	3	1	73	18	424	951	1.22	281	292	1.26		72	Drained & treated 8/90
17-Apr-91	3	0	7	2	454	952	0.97	256	135	0.81	0.47	1.3	Wind problems; treated '91
14-Apr-93	6	0	50	8				296	331	1.25		0	Algae in nets
30-Mar-94	6	0	173	29	478	857	1.13	268	270	1.36	0.45	3.2	Yearling data from fall st.
16-Mar-95	6	0	103	17	407	696	1.03	222	123	1.11	0.31	19	Earlier netting date
3-Mar-96	6	0	92	15	353	498	1.12	235	147	1.1	0.41	0.5	" " "
17-Mar-97	6	0	82	14	377	563	0.91	227	107	0.91	0.19	8.2	" " "
23-Mar-98	6	0	180	30	322	313	0.89	238	128	0.94	0.26	49	" " "
29-Mar-99	4	0	93	23	331	361	0.99	238	141	1.02	0.30	34	" " "
27-Mar-00	6	0	99	17	338	372	0.95	266	198	1.04	0.45	49	" " "
28-Mar-01	6	0	31	5	372	476	0.88	194	133	0.94	0.50	40	
1-Apr-03	6	0	0	0								0	Treated Fall 2002
5-Apr-04	6	0	2	0.33	327	377	1.15					9	drained previous summer
6-Apr-05	6	0	54	9	359	547	1.17	284	256	1.09	0.48	0	very low previous summer
11-Apr-06	6	0	82	14	462	1186	1.20	282	320	1.39	0.64	0	
3-Apr-07	5	1	294	49	412	899	1.33	244	187	1.26	0.50	4.7	
8-Apr-08	4	2	343	57	403	754	1.13	250	191	1.17	0.48	39	
7-Apr-09	4	2	291	49	410	675	0.95	268	188	0.96	0.40	11	nearly drained fall 09
8-Apr-10	4	2	70	12	343	356	0.84	264	196	1.06	0.50	11	
6-Apr-11	4	2	28	5	378	551	0.93					42	start using AFS nets
11-Apr-12	4	2	58	10	407	780	1.14	250	196	1.17	0.51	91	
12-Apr-13	4	2	55	9	385	680	1.18	306	350	1.23	0.55	81	
9-Apr-14	4	2	28	5	464	1128	1.10	300	329	1.21	0.52	12	
1-Apr-15	4	2	50	8				306	329	1.11	0.61	11	drained, treated fall 2014
6-Apr-17	4	2	4	1	306	247	0.83					21	drained 2015, 2016
3-Apr-19	2	2	5	1	395	647	1.04					25	drained 2018
Long-term mean				15	393	669	1.06	264	223	1.12	0.39	25	
AFS Nets (since 2011)				6								40	
DWR nets (pre-2011)				17								20	