



**KOOSHAREM RESERVOIR  
2021 TREND NET SURVEY**

**Report prepared by:  
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**BACKGROUND:** Koosharem Reservoir is a small, relatively shallow irrigation reservoir. There is no conservation pool in the reservoir and periodic, severe draw-downs have historically limited the survival of stocked trout. In addition, competition between trout and Utah chubs is a chronic problem and the reservoir has been chemically treated periodically to reduce chub densities, the last time in 2002. Complete removal of chubs has not been possible due to the presence of spring complexes in the valley upstream of the reservoir. Despite these limitations, trout growth has been exceptional during years when water conditions are good and chub numbers are low. Koosharem Reservoir was historically managed as a rainbow trout (RBT) fishery though, in recent years, attempts have been made to add trout species that would utilize Utah chubs as forage (Table 1), including Bear Lake cutthroat trout (BLCT), tiger trout, and splake. A small quota of tiger muskies was also added in 2020. In addition to stocking, a limited number of wild trout (brook, RBT, and RBT x BLCT hybrids) enter the reservoir from tributary streams.

Koosharem Reservoir was drained in fall 2018 while repair work was conducted on the dam and most fish, including Utah chubs, were assumed to be lost. The subsequent winter yielded a high snowpack and the reservoir filled up quickly. Extra RBT and tiger trout were stocked in 2019 and 2020 to take advantage of the good conditions (high water, low chubs). A netting survey in spring 2020 found that, while Utah chubs had been significantly reduced by draining in 2018, more trout had survived than had been expected, likely by ascending tributaries during the draining, then being flushed back in by high spring runoff. Unfortunately, favorable conditions did not last long as severe drought returned to southern Utah in 2020 and the reservoir was again drawn extremely low in the fall. Die-offs of both trout and chubs were observed.

The fishery in Koosharem Reservoir is regular monitored through trend net surveys, most recently conducted every two years. This schedule has been slightly altered in recent years due to periodic low water level and stocking adjustments. Since 2011, a new net design recommended by the American Fisheries Society (AFS) has been employed in trend net surveys at most Southern Region waters, including Koosharem Reservoir. This design was intended to reduce catch bias generated by graduated nets, which “lead” fish into the net. In most waters where they have been deployed, the AFS-style nets have caught about 50% of the trout and chubs when compared to the older style nets that were used by UDWR for many years.

**METHODS:** Three experimental gill nets (two floating and one diving) were set in Koosharem Reservoir on April 20, 2021, 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”). The south floater (SF) and west diver (WD) have been set in consistent locations for many years, while the second floater has been moved a few times to improve catch efficacy (Figure 1). Fish caught were removed from nets on the morning of April 21 and all fish were measured to the nearest mm (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]):

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

Results of the 2021 survey were compared with those from historic trend net surveys.

**RESULTS:** A number of brood RBT and 8-inch BLCT that had been stocked within the last month were caught in the nets on April 21, 2021, but were not included in the survey analysis. (This is standard practice since trend nets surveys are intended to evaluate previous years’ stocking.) Besides these fish, nets caught just six brook trout and one tiger trout, for a catch rate of 2.3 trout per net-night (Table 2), the second lowest rate observed in the last ten years (Table 3,

Fig. 2). All but one of the brook trout appeared to be from one cohort (Fig. 3) – possibly the excess fish stocked in 2017 (Table 1) – while the other was much smaller. Overall, brook trout averaged 341 mm (13.4 in) in TL, 593 g (1.3 lbs) in weight, with a mean condition ( $K_{TL}$ ) of 1.41, all impressive values for brook trout. Brook trout ranged in size up to 395 mm (15.6 in) and 794 g (1.7 lbs). The single tiger trout measured 358 mm (14.1 in) and weighed 438 g (1.0 lbs). No Utah chubs were observed during the survey.

**DISCUSSION:** Results of the 2021 trend net survey confirmed that the 2020 draining of Koosharem Reservoir once again resulted in significant losses of stocked fish and Utah chubs. Brook trout showed the best survival and growth, even though they were still caught at a low rate. Frequent water level fluctuation over the last ten years has made it nearly impossible to evaluate stocking of multiple chub predators and very difficult to maintain any kind of sport fishery beyond that provided seasonally by catchable-sized RBT. During those brief periods when the reservoir was somewhat stabilized, some trout species (RBT and BLCT) have shown impressive growth potential, while others (tiger, splake) still experienced little or no recruitment to the fishery. Unfortunately, drought conditions only worsened in 2021 and Koosharem Reservoir was again completely drained by late summer. RBT, BLCT, and tiger muskie quotas were stocked in early spring, while tiger trout and splake quotas were cancelled once it was clear that the reservoir would be drawn down again. The irrigation company took advantage of the low water level and kept the reservoir drained throughout the fall and winter while major construction work was being performed on the dam.

Water level fluctuation has and will continue to constrain the sport fishery potential in Koosharem Reservoir, regardless of Utah chub density. Requested stocking quotas of predators (BLCT, tiger trout, splake, tiger muskie) will continue, though actual stocking will be dependent on snowpack and water levels each year. If drought patterns and water fluctuation continue as they have during the past decade, these stocking quotas will have to be shifted to other waters where they have the greater potential to benefit fisheries and anglers. Trend net surveys should be conducted every other year, unless water levels allow for regular stocking of the predator quotas, at which point surveys can be conducted annually.

#### **RECOMMENDATIONS:**

1. Maintain requested stocking quotas of trout and tiger muskies in Koosharem Reservoir, but adjust actual stocking based on water level and drought projections. Consider moving predator quotas to other waters if current water fluctuation patterns continue.
2. Conduct trend net surveys every other year unless water levels allow for regular stocking of predator quotas. In that case conduct surveys annually until predator quotas can be fully evaluated. Sample tributary streams with electrofishing equipment to assess potential exit from the reservoir by stocked trout.

# Koosharem Reservoir

Sampling Locations

F=Floating Gill Net

D=Diving Gill Net

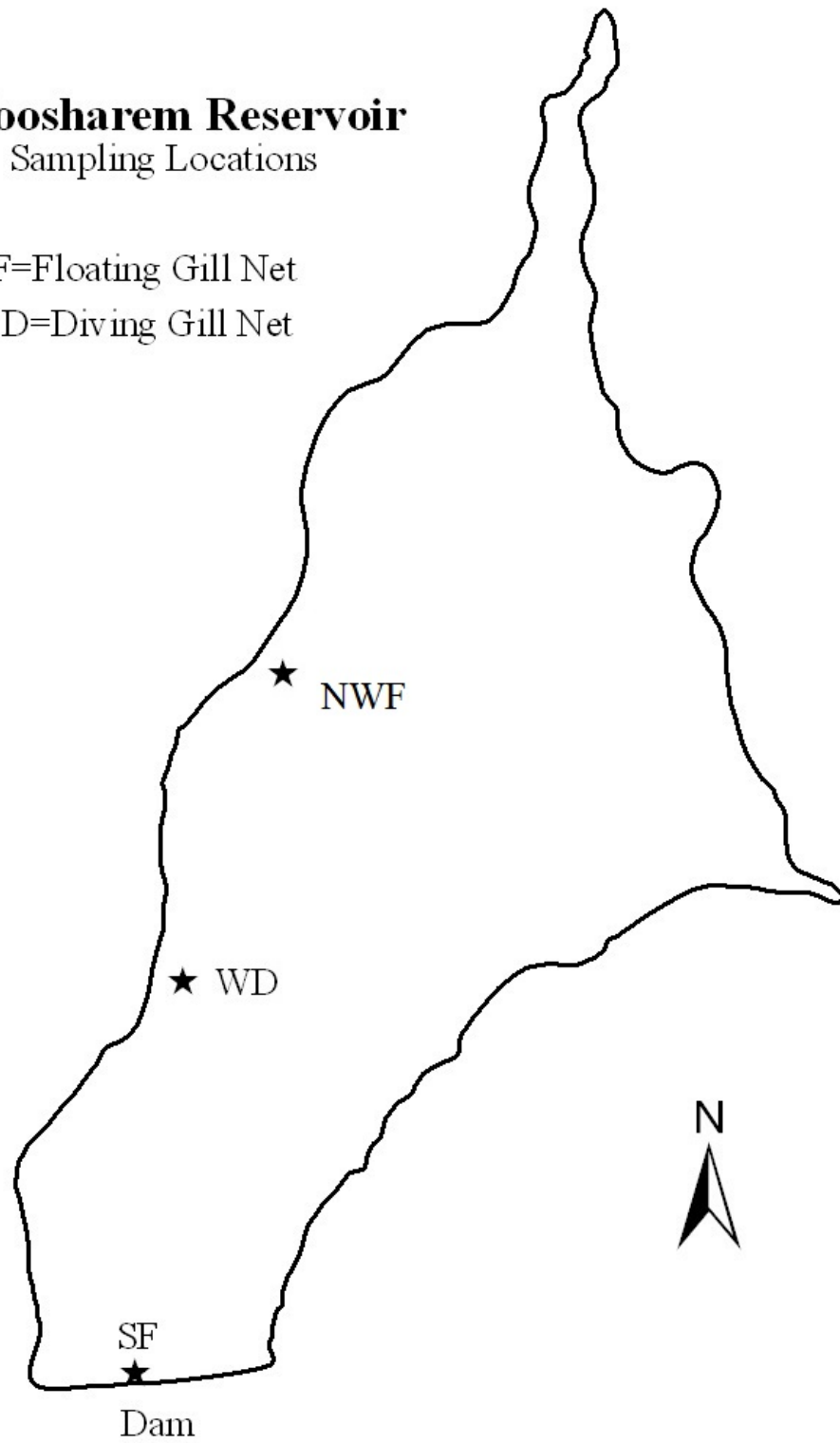


Figure 1. Locations of gill nets set at Koosharem Reservoir during the 2021 trend net survey.

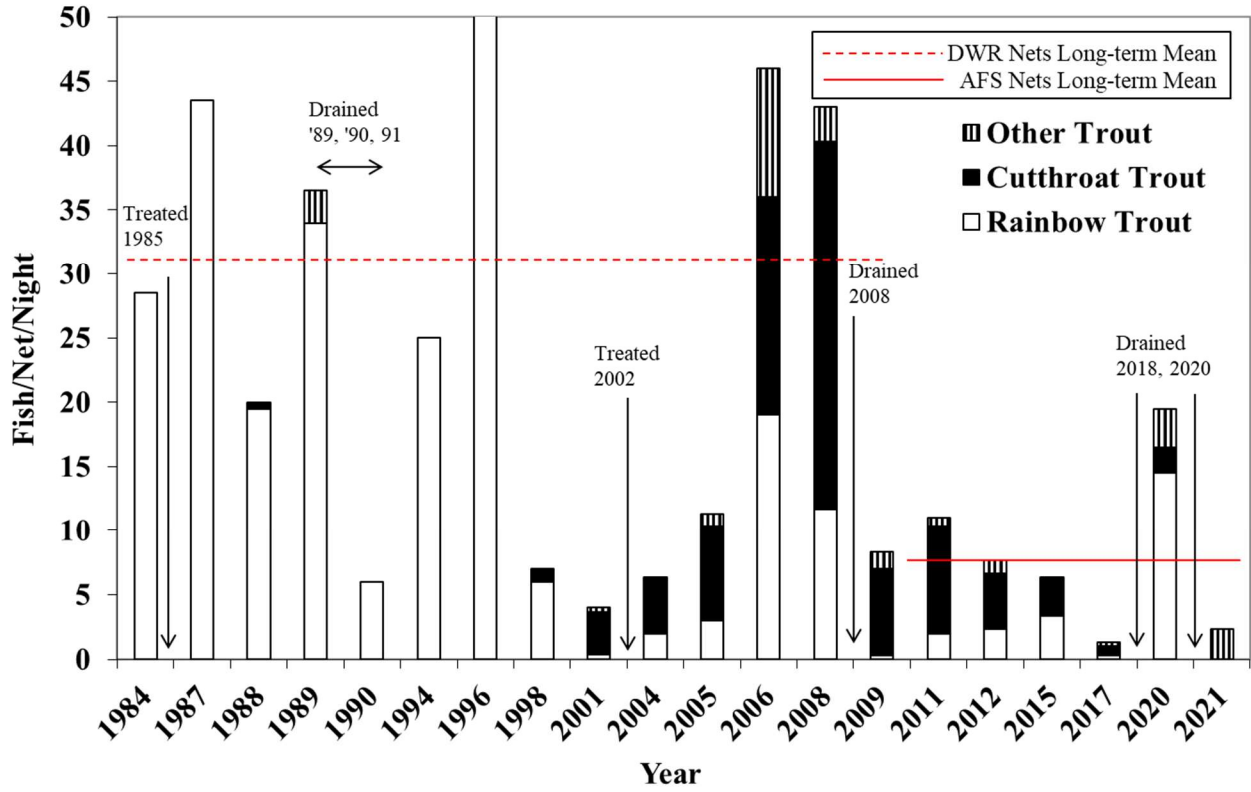


Figure 2. Trout catch rate during trend net surveys at Koosharem Reservoir 1984-2021.

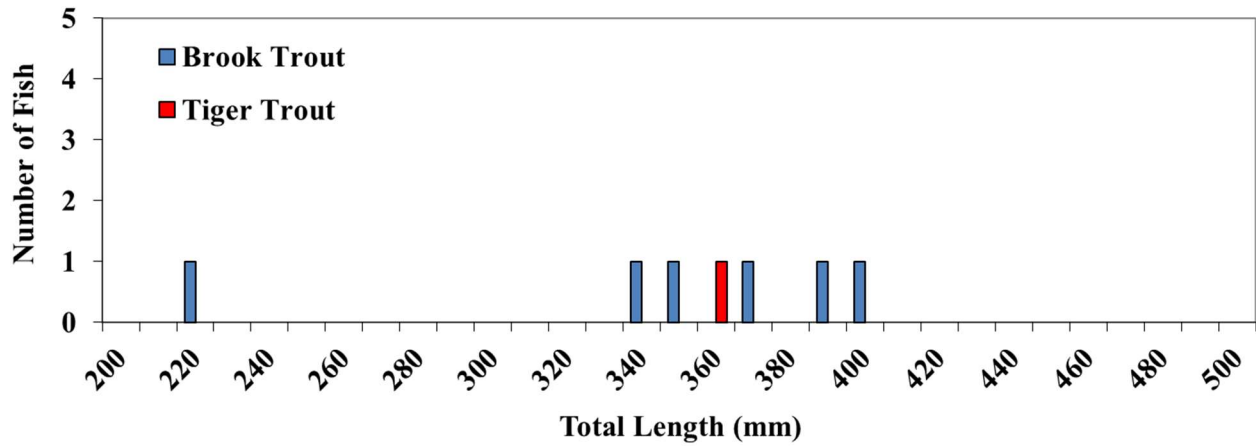


Figure 3. Length distribution of trout collected at Koosharem Reservoir on April 21, 2021.

Table 1. Record of sport fish stocking in Koosharem Reservoir for the five years prior to the 2021 trend net survey. Bold text denotes requested quotas.

<u>Year</u>	<u>Rainbow Trout</u>		<u>Cutthroat Trout</u>		<u>Tiger Trout</u>		<u>Splake Trout</u>		<u>Brook Trout</u>		<u>Tiger Muskie</u>	
	<u>Number</u>	<u>Size (in)</u>	<u>Number</u>	<u>Size (in)</u>	<u>Number</u>	<u>Size (in)</u>	<u>Number</u>	<u>Size (in)</u>	<u>Number</u>	<u>Size (in)</u>	<u>Number</u>	<u>Size (in)</u>
2016	<b>6,007</b>	8.8	<b>8,580</b>	8.3	<b>2,025</b>	7.1	<b>2,026</b>	3.6				
2017	<b>6,011</b>	8-9	<b>8,010</b> 16,000	8.2 4.5	<b>1,994</b>	6.0	<b>2,012</b>	3.4	2,114	2.5		
2018	<b>5,997</b>	10.0	<b>8,059</b>	8.1	24,000	2.1	<b>2,023</b>	2.9				
2019	27,208	5.5					<b>1,987</b>	2.5				
	<b>5,001</b>	10.0	<b>6,750</b>	6.0	25,696	2.6						
2020	<b>6,075</b>	10.0										
	19,256 2,803	4.0 10.7	<b>6,732</b>	8.3	<b>1,995</b>	3.7	<b>2,000</b>	3.1			<b>300</b>	1.2
<i>2021 Quota</i>	<i>6,000</i>	<i>10.0</i>	<i>5,000</i>	<i>8.0</i>	<i>2,000</i>	<i>6.0</i>	<i>2,000</i>	<i>5.0</i>	<i>---</i>	<i>---</i>	<i>1,000</i>	<i>2.0</i>

Table 2. Summary of the results from the 2021 trend net survey at Koosharem Reservoir.

<b>Water:</b>	Koosharem Reservoir			<b>Catalog #:</b> VI 508												
<b>Date Set:</b>	4/20/2021	<b>Time:</b>	14:00	<b>Weather:</b> Cold												
<b>Date Pulled:</b>	4/21/2021	<b>Time:</b>	9:00	<b>Water Temp:</b> 47 F												
<b># Nets:</b>	2 Floaters, 1 Diver			<b>Collectors:</b> M. Hadley, M. Jensen, A. Silva, A. Jackson												
<b>Summary for Sport Fish</b>																
Species	N	Total Weight (kg)	fish per net/night	Total Length (mm)			Weight (g)			Condition (Ktl)			% total catch	% total biomass	% total trout	% trout biomass
				Mean	SE	Range	Mean	SE	Range	Mean	SE	Range				
Brook Trout	6	3.56	2.00	341	27.5	211-395	593	97.3	146-794	1.41	0.06	1.15-1.55	85.71	85.71	89.04	89.04
Tiger Trout	1	0.44	0.33	---	---	358	---	---	438	---	---	0.95	14.29	14.29	10.96	10.96
Trout	7	4.00	2.33	343	23.4	211-395	571	85.2	146-794	1.35	0.08	0.95-1.55	100.00	100.00	---	---
<b>Summary for Non-Sport Fish</b>																
Species	N	Total Weight (kg)	fish per net/night	% total catch	% biomass	TL range										
None																
<b>Comments:</b>	Catch included numerous recently stocked brood RBT and 8-inch CTT.															

