WIDE HOLLOW RESERVOIR
2021 TREND NET SURVEY

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BACKGROUND: Wide Hollow Reservoir is an off-channel impoundment located two miles northwest of Escalante, Utah, adjacent to Escalante Petrified Forest State Park. The reservoir is fed by a diversion from the Escalante River. Since its construction in the mid 1950s, the reservoir has been managed primarily as a rainbow trout (RBT) fishery, with largemouth bass and bluegill sunfish appearing in the 1970s. The trout fishery has been frequently limited by poor late summer water conditions due to reservoir drawdowns and is sustained through the stocking of catchable-sized fish. RBT stocking was shifted from spring to fall in 2019 (Table 1) to better take advantage of favorable environmental conditions during cold months. Despite efforts to improve and sustain the RBT fishery, state park staff have noted waning interest from local anglers in trout fishing at Wide Hollow in the last decade. At the same time, anglers have been traveling to the reservoir to fish for bass and bluegill. (Overall, the park is much more popular with hikers and tourists using it as a base camp for visiting the Escalante area. The reservoir often receives more use from kayaks and paddleboards than anglers.)

The Wide Hollow Reservoir dam was rebuilt in 2009 and 2010 to comply with dam safety guidelines, as well as to enlarge the reservoir and regain volume lost to sedimentation. The new reservoir inundated willows and cottonwoods around most of the shoreline. This new brushy fish habitat, along with increased use by warmwater anglers, prompted DWR to attempt to diversify the Wide Hollow fishery by introducing black crappie. Adult black crappie were transferred from Pineview Reservoir in northern Utah in 2017, while fingerlings were purchased from out-of-state sources in 2018. In the following years, attempts were made to monitor their establishment through electrofishing and fyke nets. While those efforts were unsuccessful in catching crappie, they did collect largemouth bass and bluegill, as well as a number of sunfish that were determined to be bluegill x green sunfish hybrids. It is assumed that these fish were inadvertently introduced to Wide Hollow along with bluegill and/or largemouth bass fingerlings that were stocked from out-of-state sources in 2011 and 2012.

Sport fish monitoring has been inconsistent historically at Wide Hollow Reservoir. Regular trend net surveys were conducted during the 1980s, but then monitoring was abandoned until 2012. Since 2012, an effort has been made to conduct trend net surveys every five years. During that time, 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 over the last decade indicate that the AFS nets catch about 50% fewer trout than did the DWR nets, though the reduced catches are still sufficient to provide measures of population dynamics.

METHODS: Three experimental gill nets (two floating and one diving) were set in Wide Hollow Reservoir on March 24, 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"). Net locations were consistent with those of the of the most recent trend net surveys in 2012 and 2016 (Figure 1). Fish caught were removed from nets on the morning of March 25 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: Nineteen RBT were collected in three nets at Wide Hollow Reservoir on March 25, 2021, for a catch rate of six trout per net-night (Table 2). This catch was higher than that observed in 2016, but lower than 2012 (Fig. 2, Table 3). RBT spanned two size classes (Fig. 3, 4), with nearly equal contributions from the cohort stocked in fall 2020 and RBT stocked in 2019. Although cohorts were distinguishable, the difference in mean length between the two groups was only 59 mm (2.3 in). Overall, RBT averaged 330 mm (13.0 in) in total length (TL), 342 g (0.8 lbs) in weight, with a mean condition (K_{TL}) of 0.92. Mean length was almost equal to the long-term mean, while weight and condition were lower (Fig. 5). Also caught during the survey were one largemouth bass and one hybrid sunfish (Fig. 6).

DISCUSSION: Since regular trend net surveys were resumed at Wide Hollow Reservoir, trout catch – and, presumably, abundance – has been dictated by the interplay of water level, environmental conditions, and stocking. RBT were abundant in 2012 due to a record snowpack in 2011. Survival dropped in 2016 due to drought conditions, though the few fish observed experienced exceptional growth. The switch to fall stocking in 2019 coincided with another record snowpack, resulting in improved survival through another drought year in 2020. Growth, however, was depressed during 2020 as evidenced by little difference in mean size between cohorts stocked in 2019 and 2020 (Table 2.) Results of the 2021 trend net survey demonstrated that the change to fall stocking did improve survival potential of RBT through poor water conditions. Unfortunately, drought conditions continued to worsen in Utah in 2021, prompting fisheries managers to recommend emergency limit increases at many fisheries to allow anglers to utilize fish before they could be lost to reservoir draining or poor environmental conditions. The trout limit at Wide Hollow Reservoir was doubled throughout the summer and fall 2021, while warmwater fish were expected to survive in whatever pool was left by late summer. It was expected that most or all RBT were lost by fall 2021.

Water level fluctuations have historically made management of a trout fishery challenging at Wide Hollow Reservoir, while largemouth bass and sunfish have maintained populations and generated increased angling interest. Recent adjustments in RBT stocking should continue to provide improved opportunity for trout fishing, however it is uncertain if angler interest in a trout fishery is still high enough to warrant the stocking investment. Some effort should be made to gauge current use and interest in trout fishing at Wide Hollow Reservoir. At the same time, maintenance and improvements in the warmwater fishery should continue. Another group of fingerling black crappie was stocked in 2021 and it is recommended that this stocking be repeated in 2022. Monitoring of warmwater populations and crappie establishment should be conducted through electrofishing and fyke net surveys.

Bluegill x green sunfish hybrids are one of the most popular panfish for stocking in the private pond industry in the U.S. Sources indicate that more than 90% of the hybrids produced are male, making subsequent reproduction almost negligible and unsustainable even though the hybrids are fertile. While hybridization can naturally between bluegill and green sunfish, it is rare and almost all hybrid sunfish are the result of active crossing in a hatchery environment. If not regularly stocked, hybrid sunfish will eventually disappear. Based on this information, it is likely that the hybrid sunfish caught during the 2021 netting survey at Wide Hollow Reservoir was an old fish still remaining from sunfish stocking in 2011 or 2012. It is not expected that these fish will persist in Wide Hollow Reservoir, as long as more are not incidentally included in loads of black crappie fingerlings purchased from hatchery sources in the Midwest.

RECOMMENDATIONS

1. Maintain the annual stocking request of 4,000 catchable-size rainbow trout stocked in the fall at Wide Hollow Reservoir.
2. Engage local contacts in Escalante to help gauge angler interest in coldwater and warmwater fisheries at Wide Hollow Reservoir.
3. Stock 10,000 black crappie fingerlings in 2022. (Change quota requested for Redmond Lake to Wide Hollow Reservoir.)
4. Conduct trend net surveys every five years in the spring to monitor trout. Develop a plan to effectively monitor warmwater fish populations.

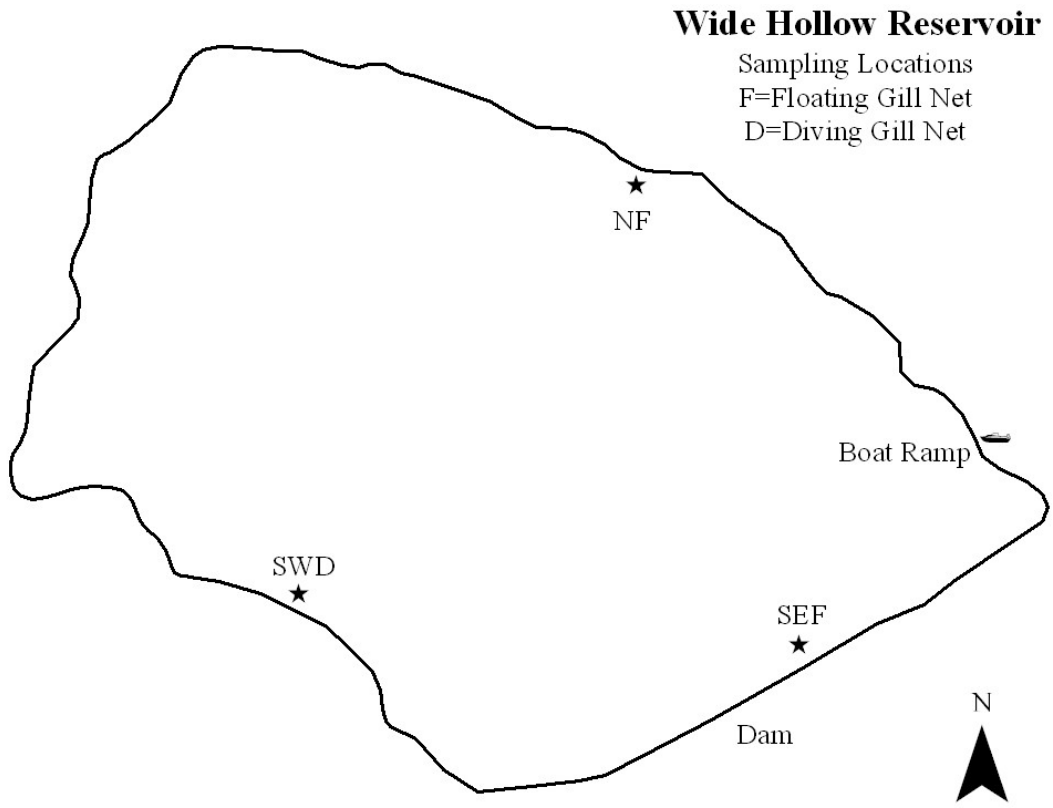

Figure 1. Locations of gill nets set in Wide Hollow Reservoir during trend net surveys.

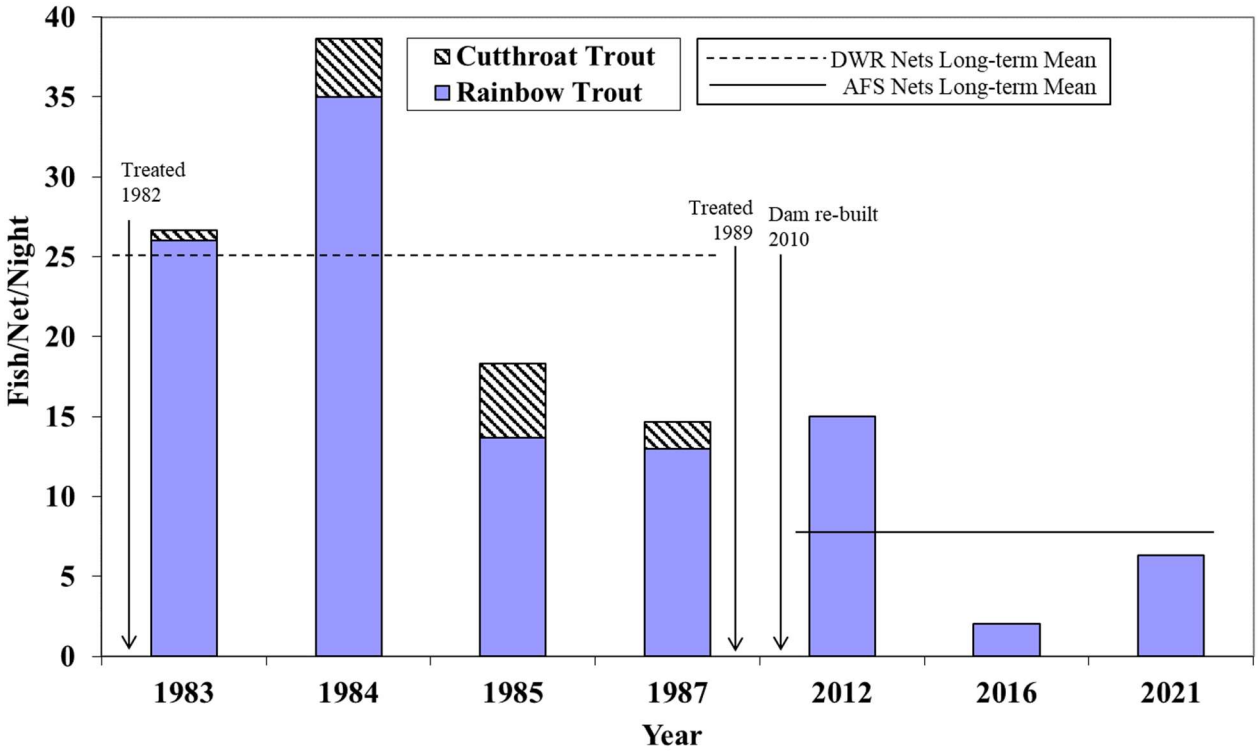

Figure 2. Trout catch rate during trend net surveys at Wide Hollow Reservoir, 1983-2021.

Figure 3. Rainbow trout collected at Wide Hollow Reservoir on March 25, 2021.

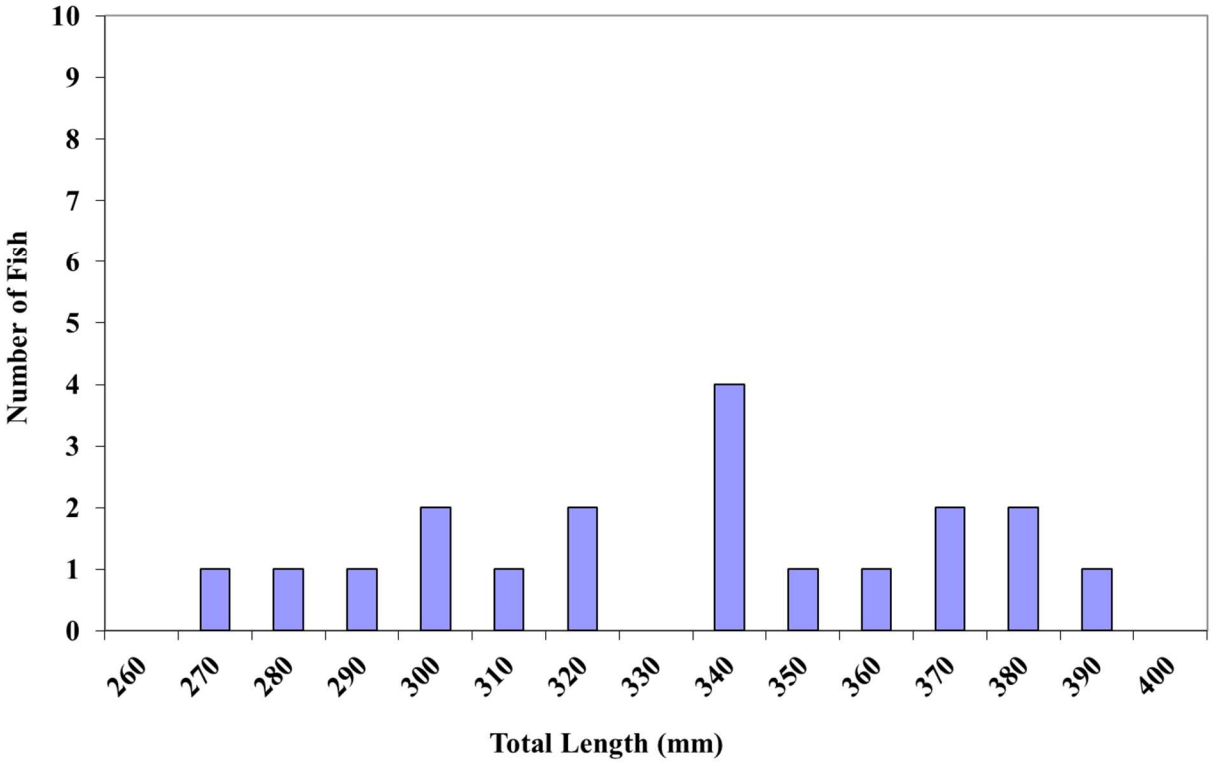

Figure 4. Length distribution of rainbow trout collected at Wide Hollow Reservoir on March 25, 2021.

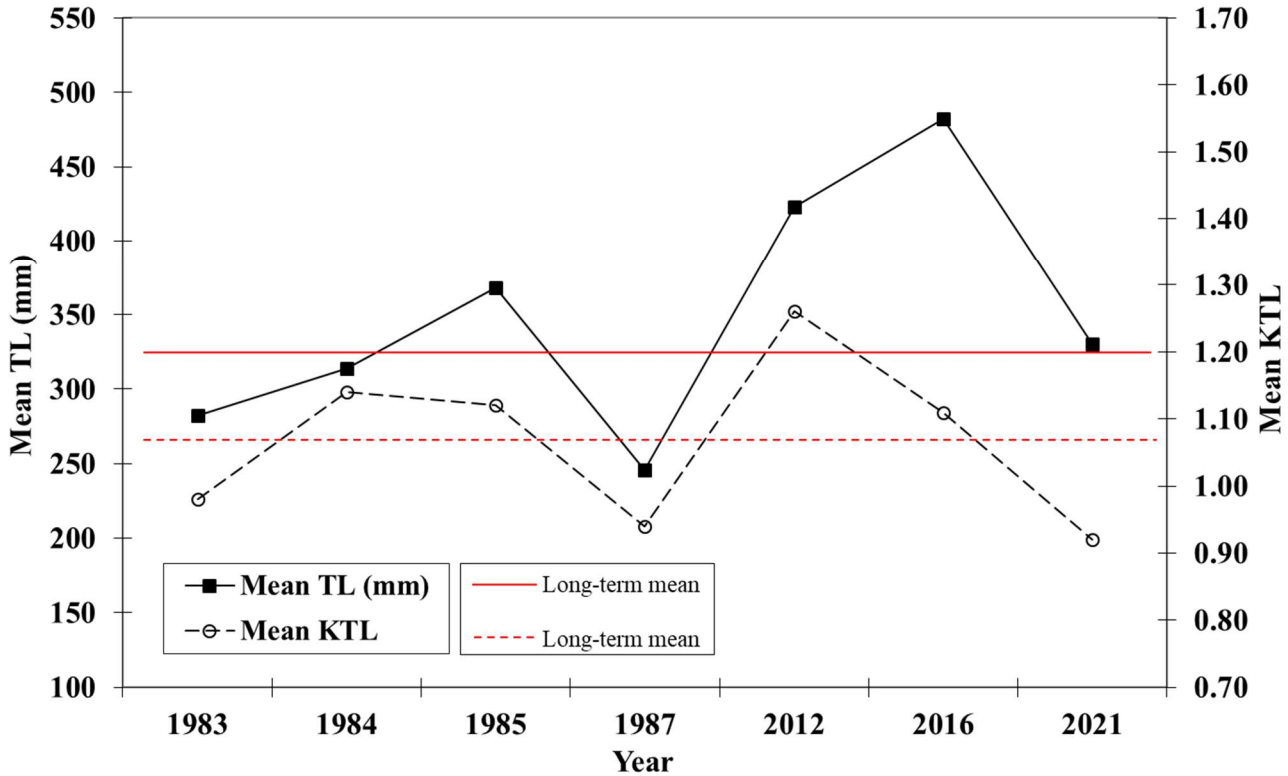

Figure 5. Mean total length (mm) and condition (K_{TL}) of rainbow trout collected in trend net surveys at Wide Hollow Reservoir, 1983-2021.

Figure 6. Largemouth bass (left) and hybrid sunfish (right) collected at Wide Hollow Reservoir on March 25, 2021.

Table 1. Record of sport fish stocking in Wide Hollow Reservoir for the five years prior to the 2021 trend net survey.

	Rainbow Trout			Black Crappie		
Year	**Number**	**Size (in)**	**Season**	**Number**	**Size (in)**	**Source**
2016	5,004	8.2	Spring			
2017	4,982	9.3	Spring	94	9.4	Transfer
2018	5,000	10.1	Spring	2,501	2.6	Purchase
2019	5,098	10.0	Spring			
2019	5,005	7.9	Fall			
2020	3,042	10.0	Fall			
2021 Quota	*4,000*	*10.0*	*Fall*	*10,000*	*3.0*	*Purchase*

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

Summary for Cold Water Sport Fish

				Total Length (mm)			Weight (g)			Condition (Ktl)						
Species / year class	N	Total Weight (kg)	fish per net/night	Mean	SE	Range	Mean	SE	Range	Mean	SE	Range	% total catch	% total biomass	% trout catch	% trout biomass
Rainbow Trout	19	6.50	6.33	330	8.01	270-386	342	24.9	185-494	0.92	0.02	0.74-1.20	90.48	90.44	100.00	100.00
RBT 2020	8	1.87	2.67	296	6.15	270-318	234	15.6	185-299	0.90	0.03	0.74-0.98	38.10	26.03	42.11	28.78
RBT 2019 & prev	11	4.63	3.67	355	5.71	331-386	421	18.3	306-494	0.94	0.03	0.84-1.20	52.38	64.41	57.90	71.22

Summary for Warm Water Sport Fish

		Total	fish per	% total	% total	Total Length (mm)
Species	N	Weight (kg)	net/night	catch	biomass	Range
Largemouth Bass	1	0.52	0.33	4.76	7.21	350
Hybrid Sunfish	1	0.17	0.33	4.76	2.35	202

Table 3. Trend net survey results at Wide Hollow Reservoir, 1983-2021.

					Rainbow trout all ages			
	Net Sets		Total	Trout per	Mean TL	Mean W	Mean	
Date	Flo	Div	Trout	net-night	(mm)	(g)	Ktl	Comments
20-Apr-83	2	1	80	27	282	240	0.98	Treated 1982 re: bluegill
29-Mar-84	2	1	116	39	314	371	1.14	
19-Apr-85	2	1	55	18	368	563	1.12	
31-Mar-87	2	1	44	15	246	167	0.94	Treated 1989 re: bluegill
15-Mar-12	2	1	45	15	423	960	1.26	Dam re-built 2010
9-Mar-16	2	1	6	2	482	1243	1.11	
25-Mar-21	2	1	19	6	330	342	0.92	
Long-term mean				17	324	434	1.08	
DWR Nets (1983-1987)				25				
AFS Nets (2012-2021)				8				