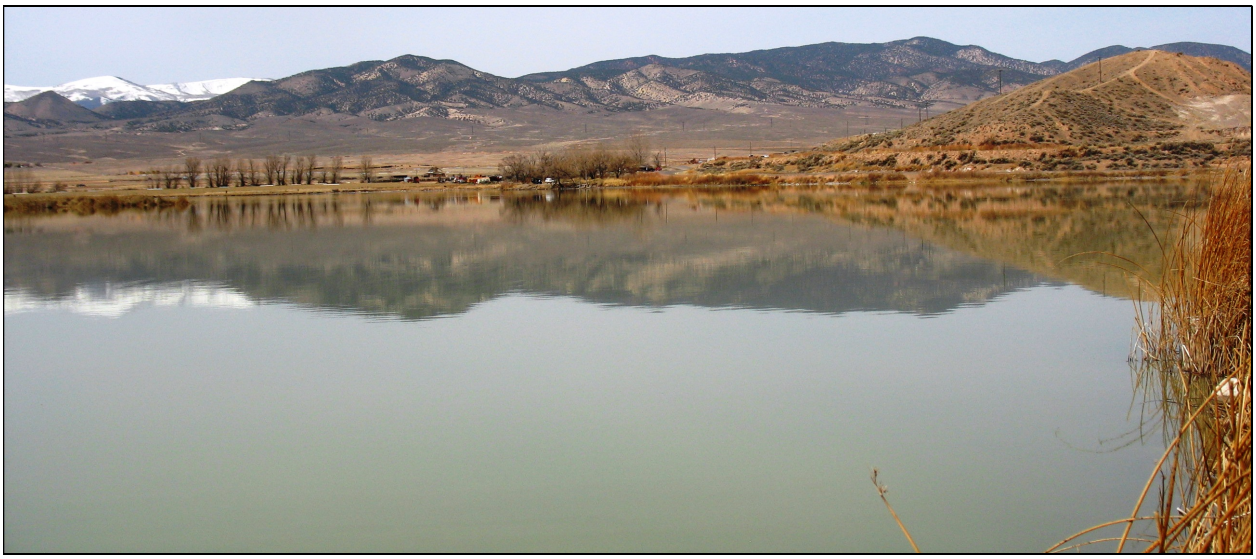

REDMOND LAKE
2020 TREND NET SURVEY

Report prepared by:
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BACKGROUND: Redmond Lake is located in northern Sevier County near the town of Redmond. The lake is an impoundment that covers over 200 acres at full pool and 90 acres at minimum pool. The lake is filled seasonally by overflow from nearby canals and perennially by several springs within the lake. Spring input has been estimated in the past at 10-15 cfs. The lake has two outflow points: a canal at the northeast corner and an outlet at the east corner that empties directly into the Sevier River (Figure 1). The majority of the reservoir outflow exits through the canal and is used in irrigation. Return flow to the Sevier River from this canal is apparently negligible. In addition, release through the direct outlet to the river is apparently rare.

The fishery at Redmond Lake has been dominated by northern pike and common carp since the late 1960s. Channel catfish and largemouth bass have also been present in lower numbers. Historic fishing reports indicate that northern pike and largemouth bass are caught mostly during winter months, due to minimal ice cover, and that fishing has often been poor in summer. Fingerling catfish have been stocked periodically in Redmond Lake in an effort to provide additional fishing opportunities during the summer. A regular quota of 5,000 3-inch catfish has been stocked since 2013 (Table 1). While northern pike have maintained a unique fishery in Redmond Lake, they have eliminated all usable forage fish and rarely attain larger size—most pike observed in gill net surveys have been less than 600 mm (24 inches) in length.

Monitoring of fish populations at Redmond Lake was attempted through regular spring netting surveys during the 1970s and early 1980s. Results of those surveys were highly variable both in level of catch rate and species composition. Due to the difficulty in monitoring fish species and managing the fishery, no surveys were conducted from 1986 to 2011. Attempts have been made to more effectively evaluate the fishery since that time.

An online survey was submitted to anglers in 2013 in an effort to gauge interest in the sport fishery at Redmond Lake and gather opinions on potential adjustments to fishery management that could improve fishing success. Most respondents rated the current sport fishery as only fair or poor and said that they would be more likely to fish at the lake if the fishery were more diverse. Most also expressed support for chemically removing carp and northern pike in order to improve the fishery. At the same time, Central Region aquatics staff were investigating the potential for eradicating northern pike from Yuba Reservoir and the Sevier River upstream (which would include Redmond Lake). Southern Region staff met with stakeholders to discuss a potential chemical treatment of Redmond Lake and restocking with various warmwater species. Sevier County commissioners expressed support for improving the sport fishery. Irrigators expressed concern, however, over removing carp because they felt that carp helped control emergent vegetation in the canals and ditches downstream of the lake.

Since 2013, adjustments to the Redmond Lake fishery have been postponed as staff investigated potential measures to address irrigators' concerns in a new fishery management strategy. In addition, the management plan at Yuba Reservoir has experienced several shifts in focus and a chemical treatment is not currently being pursued. Staff recommended the introduction of gizzard shad to Redmond Lake after the 2017 netting survey (Hadley 2017) as a replacement species for vegetation control. By 2020, neither a treatment nor introduction of new species had been attempted.

METHODS: Although the regional sampling strategy did not prescribe netting until 2022, administrative staff desired to investigate in fall 2020 the potential of collecting northern pike from Redmond Lake for use in the state tiger musky propagation program. One diving experimental gill net and two fyke net tandems were set in Redmond Lake on October 12, 2020, and were allowed to fish overnight. The gill net measured 6 ft x 125 ft, with five panels of

increasing mesh size (0.75", 1", 1.25", 1.5", 2"). Fyke nets consisted of a 47-ft lead (0.5" mesh), 4 ft x 4 ft square frame opening, and 15-ft net body. Each fyke net tandem consisted of two fyke nets with leads tied together and, for catch rate purposes, was counted as a single, 100-ft net. Net locations were chosen based on water level and habitat availability at the time of sampling (Figure 1). Fish caught were removed from nets on the morning of October 13 and all fish were measured to the nearest mm (total length [TL]) and weighed to the nearest gram. Body condition for sport fish species 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). Results of the 2020 survey were compared to those from historic trend net surveys.

RESULTS: The water level was near its lowest level at Redmond Lake in October 2020, with maximum depth observed at about four feet. Due to this low level, only the northern zone of the lake was accessible for net placement (Fig. 1). The net catch was very low: seven northern pike, one carp, and one channel catfish (Table 2). The fyke net tandems were especially ineffective, catching only two pike and one carp. Trend net catch has been fairly low and inconsistent throughout the monitoring history at the lake (Table 3, Fig. 2), regardless of sampling season or gear. Northern pike averaged 467 mm (18.4 in) in total length (TL), 505 g (1.1 lbs) in weight, with a mean relative weight (W_r) of 74 (Fig. 3). All values were lower than long-term means (Table 3, Fig. 4) and pike ranged in size up to just 513 mm (20.2 in).

DISCUSSION: All previous and current attempts to effectively monitor fish populations in Redmond Lake have yielded inconsistent results. While it has been assumed that northern pike are overpopulated, sampling has never been able to consistently document such density despite multiple attempts to adjust the timing of netting. The highest pike catch rates occurred during mid summer surveys in 1982 and 1986, though these rates would still not be considered high and a summer survey in 1984 yielded a lower rate. Netting surveys at Yuba Reservoir have been conducted during peak pike spawning activity in March, so an early spring gill net survey may be considered for the future. Channel catfish catch has also been inconsistent, though this has probably been more often reflective of stocking rates than netting timing. However, the water temperature during the 2020 survey was 50° F, which may have contributed to the low catch of catfish. If fall surveys are conducted in the future, timing should be shifted to late September when the water may be closer to 60° F. Fyke nets have proved less effective at sampling pike and catfish, so gill nets will need to be employed during surveys targeting those species.

Trend net surveys conducted at DMAD and Gunnison Bend reservoirs in recent years have found that white crappie are thriving in marginal environmental conditions – high turbidity, frequent water fluctuation, little to no aquatic vegetation – while also competing with a high density of carp. In addition, these fish are providing a valuable forage for other desirable sport fish, including northern pike. These observations have prompted regional staff to investigate their introduction to other struggling fisheries. Introduction of white crappie has been requested for Redmond Lake in 2021, both through transfer from the Delta reservoirs as well as purchase of fingerlings (if a source can be secured). Fall fyke net surveys have proven very effective for

monitoring white crappie and will be instrumental for monitoring their establishment in Redmond Lake.

RECOMMENDATIONS:

1. Continue stocking 5,000 fingerling channel catfish annually at Redmond Lake.
2. Introduce white crappie to Redmond Lake in 2021 through transfer from Gunnison Bend and/or DMAD Reservoir as well as purchase of fingerlings.
3. Conduct trend net surveys at Redmond Lake every three years, coinciding with surveys at the Delta reservoirs. Conduct fyke net surveys in fall to monitor white crappie. Gill nets may be set during other seasons in order to more effectively target northern pike (March) or channel catfish (late summer to early fall).

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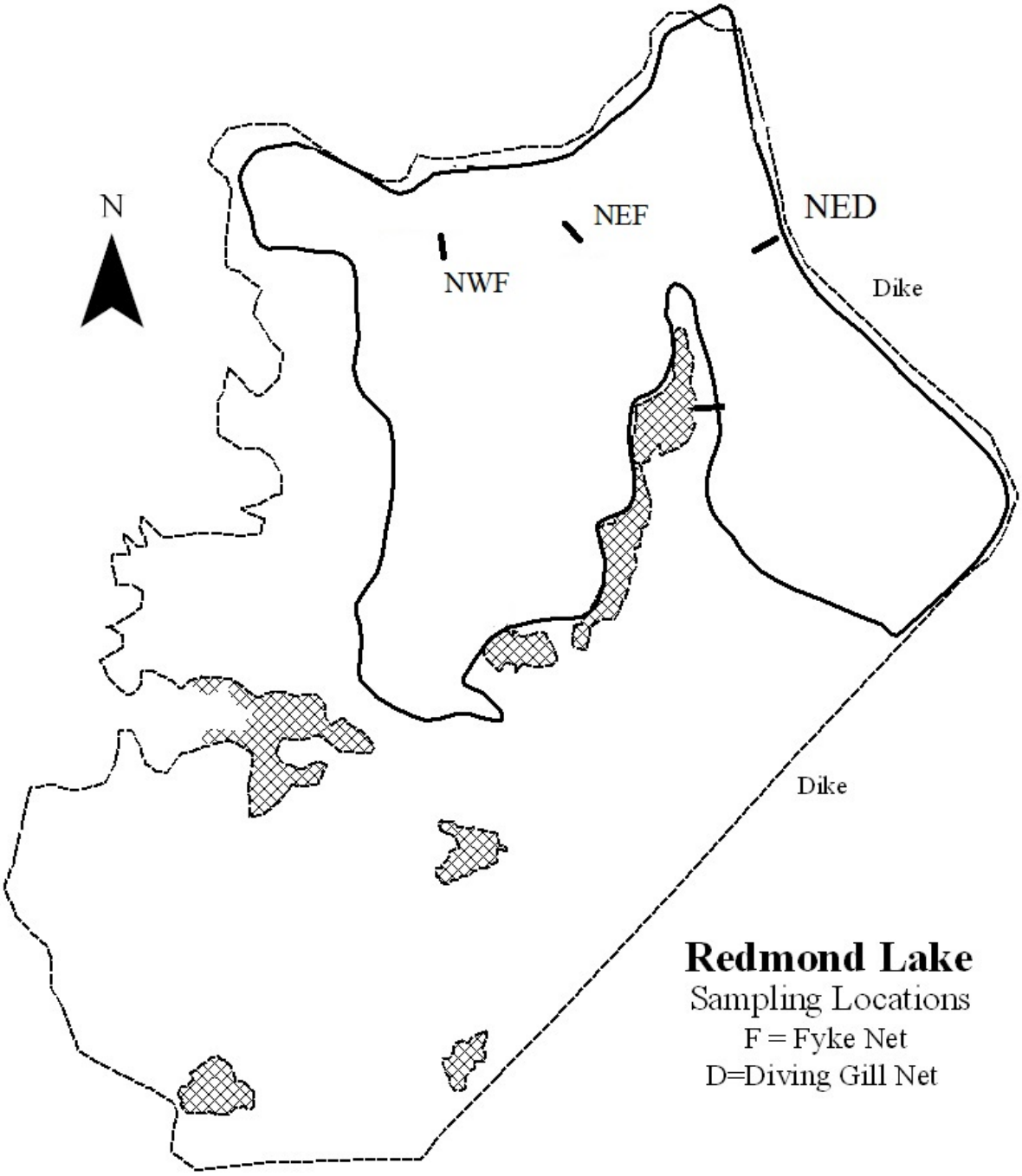

Figure 1. Locations of gill and fyke nets set at Redmond Lake during the 2020 trend net survey.

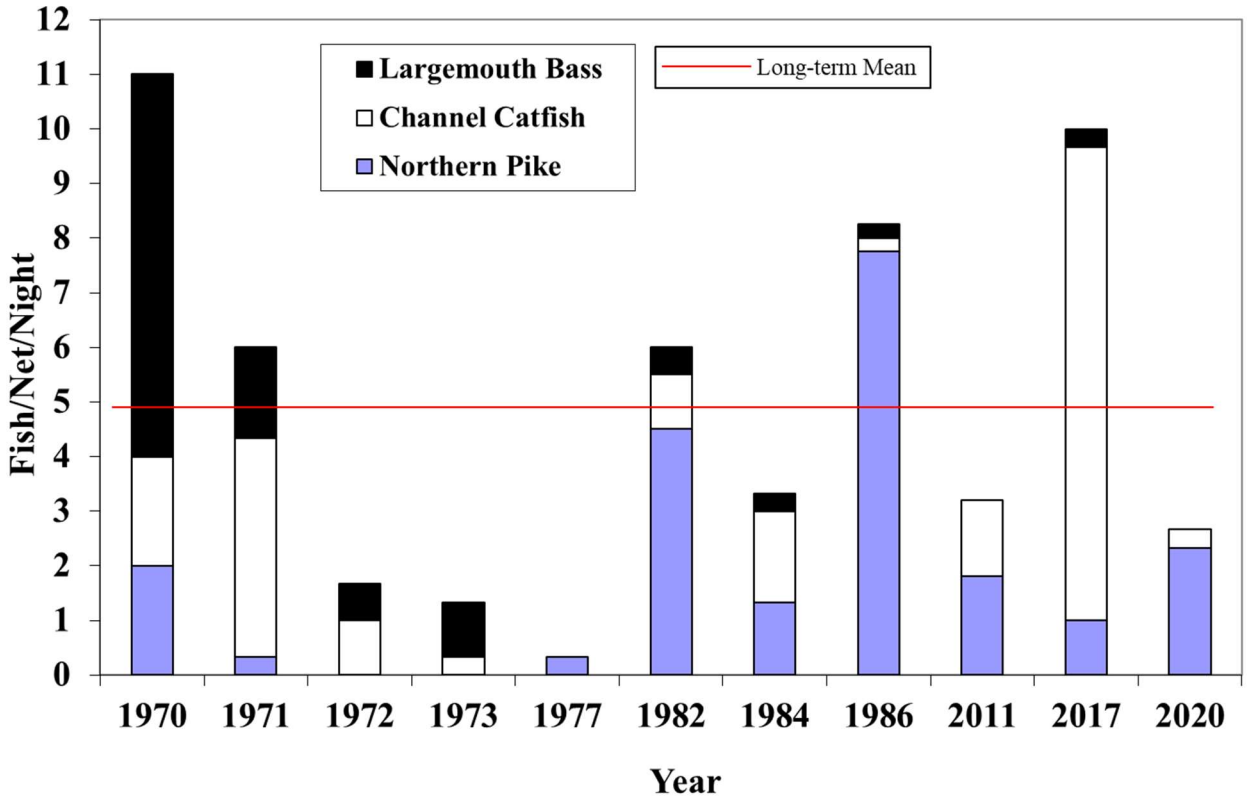

Figure 2. Sport fish catch rate during spring trend net surveys at Redmond Lake, 1970-2020. Long-term mean is all sport fish species combined.


Figure 3. Northern pike collected at Redmond Lake on May 4, 2017.

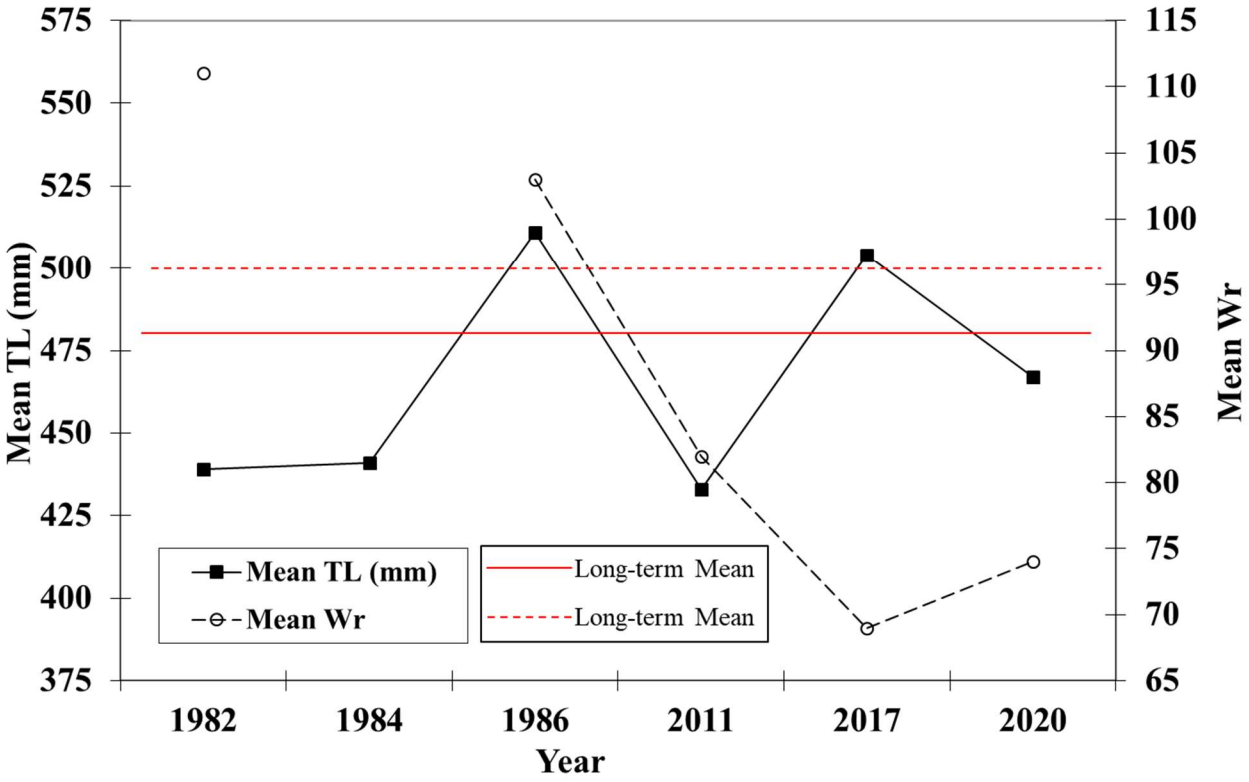

Figure 4. Mean total length (mm) and relative weight (W_r) of northern pike collected during trend net surveys at Redmond Lake, 1982-2020.

Table 1. Record of channel catfish stocking in Redmond Lake for the five years prior to the 2020 trend net survey.

Year	Number Stocked	Mean Length (in)
2015	4,996	3.1
2016	4,998	3.4
2017	5,000	3.9
2018	5,000	3.4
2019	5,000	3.3
2020 Quota	*5,000*	*3.0*

Table 2. Summary of the results from the 2020 trend net survey at Redmond Lake.

Water:	Redmond Lake					**Catalog #:**	VI 516								
Date Set:	10/12/2020		**Time:**	16:00		**Weather:**	Calm, cool								
Date Pulled:	10/13/2020		**Time:**	8:00		**Water Temp:**	50 F								
# Nets:	1 DWR diver, 2 fyke tandems					**Collectors:**	M. Hadley, R. Hepworth, M. Jensen								
Summary for Warmwater Sportfish															
		Total	**fish per**	**Total Length (mm)**			**Weight (g)**			**Relative wt. (Wr)**			**% total**	**% total**	
Species	**N**	**Weight (kg)**	**net/night**	**Mean**	**SE**	**Range**	**Mean**	**SE**	**Range**	**Mean**	**SE**	**Range**	**catch**	**biomass**	
Channel Catfish	1	1.25	0.33	---	---	500	---	---	1251	---	---	102	11.11	18.32	
Northern Pike	7	3.54	2.33	467	13.3	415-513	505	50.1	325-710	74	2.27	68-81	77.78	51.81	
Summary for Non-Sport Fish															
		Total	**fish per**	**% total**	**% total**		**total length**								
Species	**N**	**Weight (kg)**	**net/night**	**catch**	**biomass**		**range (mm)**								
Common Carp	1	2.04	0.33	11.11	29.87		585								

Table 3. Trend net survey results at Redmond Lake, 1970-2020.

				Northern				Channel					
				Pike	Northern Pike			Catfish	Channel Catfish			Carp	
	Nets Set			per	Mean TL	Mean W	Mean	per	Mean TL	Mean W	Mean	per	
Date	Fyke	Div	Flo	Net-Night	(mm)	(g)	Wr	Net-Night	(mm)	(g)	Wr	Net-Night	Comments
20-Mar-1970	0	2	0	2.00	462	679		2.00	252	155		0.00	Treated 1968
17-May-1971	0	2	1	0.33				4.00				0.67	
8-May-1972	0	2	1	0.00				1.00				0.00	
3-May-1973	0	1	2	0.00				0.33				0.00	
5-Apr-1977	0	3	0	0.33				0.00				8.00	
27-Aug-1982	0	2	0	4.50	439	779	111	1.00	338	410	121	13.00	
19-Jul-1984	0	3	0	1.33	441	483		1.67	552	2112		4.33	
8-Jul-1986	0	4	0	7.75	511	934	103	0.25				4.25	
27-Apr-2011	3	2	0	1.80	433	490	82	1.40	412	616	94	4.40	
3-May-2017	0	3	0	1.00	504	612	69	8.67	430	717	89	7.00	
13-Oct-2020	2	1	0	2.33	467	505	74	0.33				0.33	
Long-term mean				1.94	479	754	96	1.88	423	805	93	3.82	