



**DMAD RESERVOIR
2020 TREND NET SURVEY**

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BACKGROUND: DMAD Reservoir is the penultimate impoundment of the Sevier River and is located to the northeast of Delta in Millard County. The current reservoir was built in 1960 and named for the communities receiving irrigation water from it (Delta, Melville, Abraham, and Deseret). In addition to supporting irrigation, DMAD Reservoir also supplies water to the Intermountain Power Plant. These combined demands cause wide fluctuations in water level throughout the year. At full pool, the reservoir covers 1,200 acres, with a maximum depth of 24 feet and mean depth of 9 feet. The full capacity of 10,990 ac-ft can be drawn down annually to a dead storage of 300 ac-ft, with a maximum depth of 6 ft. Public access is achieved primarily at the south end of the reservoir.

Prior to 1960, the old Delta Reservoir contained populations of largemouth bass, common carp, yellow perch, Utah sucker, Utah chub, walleye, redbreast shiner, black bullhead, and channel catfish. Following enlargement of the dam and reservoir to their present size, white bass were introduced from Utah Lake, while white crappie were brought in from Nevada. Channel catfish stocking occurred periodically from 1972 to the present, while walleye were stocked extensively during the 1960s and 1970s. Regular stocking of channel catfish has occurred since 2011, with an annual quota of 5,000 3-inch fish initiated in 2016 (Table 1). Northern pike have also been increasingly observed by anglers in recent years in and around DMAD Reservoir. Walleye have maintained at only a low density in the Delta area, likely due to poor spawning conditions in the predominant silt substrate. Experience at Willard Bay Reservoir in northern Utah has shown that walleye can still grow well in such situations and that regular stocking can produce a high-quality sport fishery. The development of the state walleye egg take operation at Willard Bay facilitated requested stocking quotas for the Delta reservoirs of 250,000 sac fry starting in 2019 (Table 1). Similar stocking in the 1970s temporarily produced a quality fishery, though stocking ceased when it was assumed that walleye would establish a recruiting population.

Monitoring of fish populations at DMAD Reservoir 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 of the catch, though white bass, white crappie, and carp were the species most commonly caught. Due to the difficulty in monitoring fish species and managing the fishery, no surveys were conducted from 1983 to 2010. Interest in Gunnison Bend (located downstream, southwest of Delta) and DMAD reservoirs was renewed at that time and a netting survey was conducted in fall 2010. The survey, which included fyke nets in addition to gill nets for the first time, yielded favorable catches of catchable-sized white bass, white crappie, and channel catfish. Unfortunately, data collected during the survey were later lost and photos remain the only documentation of the results. However, those results prompted regional staff to place more focus on regular monitoring of the fishery. A 2017 spring survey at DMAD yielded poor results, corroborating inconsistent trends previously observed in spring netting. Based on the 2010 and 2017 surveys (as well as successful historic fall netting at Gunnison Bend Res), fall netting was recommended in the regional sampling strategy.

METHODS: Two experimental gill nets (one diving and one floating) and two fyke net tandems were set in DMAD Reservoir on October 27, 2020, and were allowed to fish overnight. Gill nets 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 28 and counted. Individuals of most species were measured to the

nearest mm (total length [TL]) and weighed to the nearest gram. A subset of white crappie from each net was measured and weighed. 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). Comparison to historic surveys was not possible due to a lack of fall sampling.

RESULTS: The DMAD Reservoir level was near its lowest limit in late October 2020, though it was still possible to launch a boat and set nets. Maximum observed depth was four feet, so both fyke tandems and one gill net were set away from shore (Fig. 1). Water temperature in this shallow depth dropped from over 50° F in the afternoon of Oct 27, to 40°F the next morning. (Ice formation was also observed in the extreme shallows.) Despite the drop in temperature, the netting survey was successful in sampling eight fish species (Table 2). White crappie were the most abundant catch, with over 500 sampled in the two fyke tandems (title page). (Only one crappie was caught in a gill net, so catch rate was calculated for only fyke nets.) This was the most effective white crappie catch ever observed in surveys at DMAD Reservoir. White crappie spanned at least three size classes, though the catch was dominated by small fish measuring 70-130 mm (Fig. 2), and averaged 123 mm in total length (TL), 38 g in weight, with a mean relative weight (W_r) of 93. White crappie ranged in size up to 270 mm (10.6 in) and 293 g (0.6 lb). White bass were the next most abundant species and were caught in all nets. White bass spanned four size classes (Fig. 2) and averaged 204 mm in TL, 162 g in weight, with an average relative weight of 89 (Table 2). White bass ranged in size up to 376 mm (14.8 in) and 652 g (1.4 lb) (Fig. 3). Eight yellow perch measuring 79-183 mm rounded out the panfish catch (Fig. 2).

Eight northern pike were caught in the two gill nets, averaging 560 mm (22.0 in), 1,347 g (3.0 lbs), with mean relative weight of 95. (Pike catch rate was calculated for just the two gill nets.) Pike spanned several sizes, with the largest measuring 795 mm (31.3 in) and weighing 4,270 g (9.4 lbs) (title page). Four wipers that had travelled downstream from Yuba Reservoir averaged 409 mm (16.1 in), 863 g (1.9 lb), and W_r of 86 (Fig. 4). One small walleye (195 mm) was also caught. The remainder of the catch was made up by 32 common carp spanning at least three size classes (Fig. 5) and 20 black bullheads. None of the other species known to occur in the reservoir or Sevier River (channel catfish, largemouth bass, smallmouth bass, green sunfish, Utah sucker) were observed.

DISCUSSION: The 2010 and 2020 netting surveys demonstrated that fall sampling is most effective for evaluating multiple fish species in DMAD Reservoir. The two species stocked regularly – channel catfish and walleye – were almost absent from the 2020 survey, though the decreased water temperature may have factored into lack of catfish catch. In contrast, the 2010 survey was conducted in late September and caught several catfish. Walleye were stocked only once prior to the 2020 survey, so more surveys will be necessary to fully evaluate their performance. Other absent species are either rare (suckers) or less susceptible to passive nets (black bass, sunfish). Future surveys should be conducted in late September or early October to take advantage of fall activity patterns, while avoiding cold temperatures that could abruptly alter

that activity. In addition, water levels at both DMAD and Gunnison Bend reservoirs will need to be closely monitored to ensure that boat launching and netting conditions are suitable. (Netting could not be conducted at Gunnison Bend Reservoir in fall 2020 because water level was too low to launch a boat.) The regional sampling strategy prescribes surveys at DMAD every third year, coinciding with netting at Gunnison Bend Reservoir and Redmond Lake. While historic spring surveys did not provide suitable data for comparison, future consistent and effective sampling will facilitate the creation of representative population trends.

White crappie currently occur in Utah only in the Delta reservoirs and the connecting Sevier River. While black crappie are more widespread, their preference for brushy spawning habitat make it difficult for them to establish in fluctuating reservoirs. Conversely, white crappie are clearly doing very well in a water characterized by frequent fluctuation, inconsistent vegetation, high turbidity, and competition with rough fish. It is also presumed that white crappie are acting as forage for other sport fish species (white bass, northern pike), due to their abundance and the growth of those predator species. These results have prompted managers to request the introduction of white crappie to other nearby waterbodies that experience similar marginal conditions – Redmond Lake and Piute Reservoir. White crappie will be collected from Gunnison Bend and/or DMAD Reservoir in spring or early summer 2021 for pathogen testing. Collection for transfer to the destination waters will follow in fall 2021.

RECOMMENDATIONS:

1. Conduct netting surveys at DMAD Reservoir in late September or early October, every three years. Set two DWR-style divers and two fyke net tandems.
2. Continue stocking 5,000 fingerling channel catfish and 250,000 walleye sac fry annually. Walleye can be diploid or triploid.
3. Utilize DMAD and Gunnison Bend reservoirs as sources for transfer of white crappie.

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.

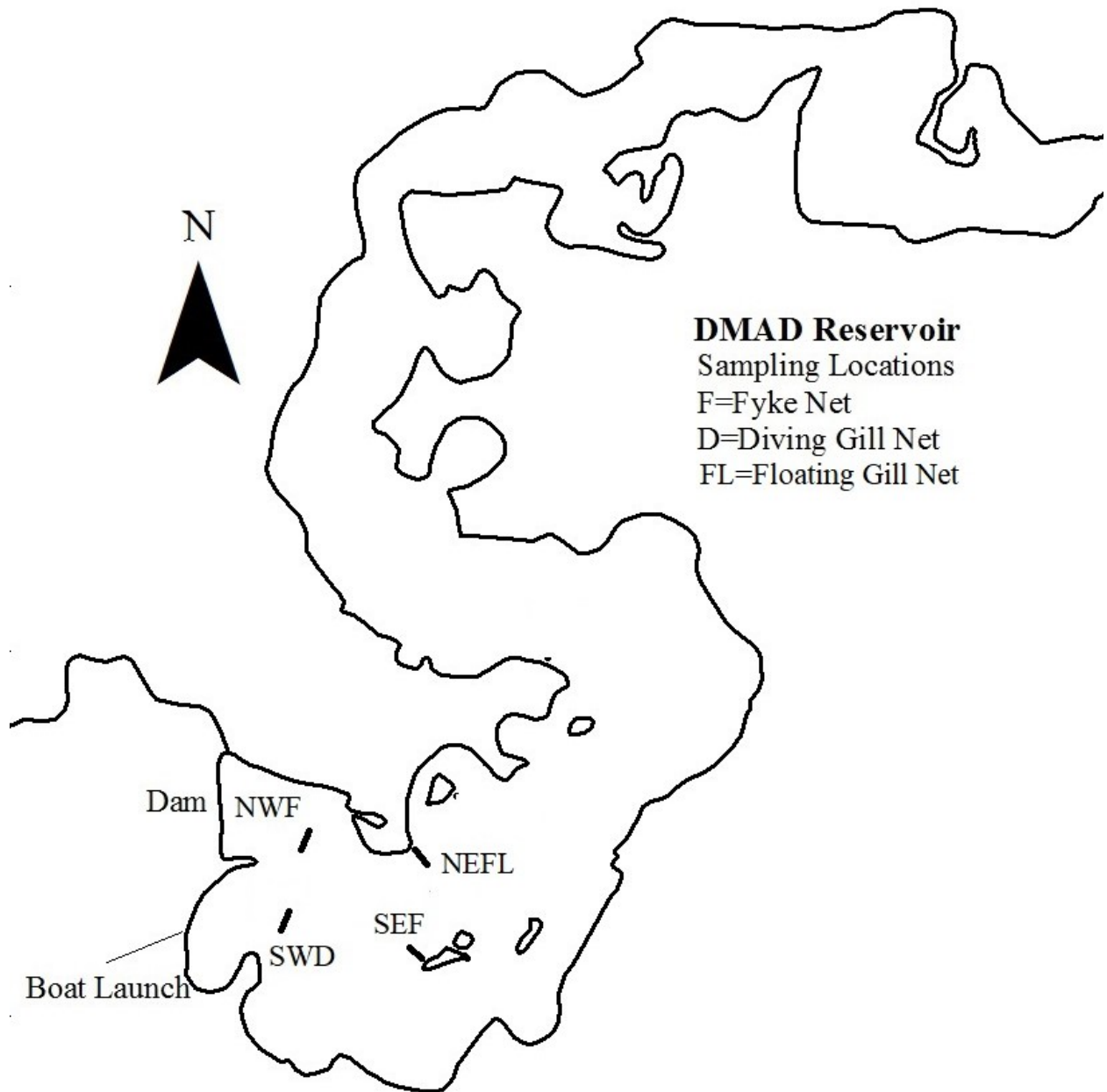


Figure 1. Locations of gill and fyke nets set at DMAD Reservoir during the 2020 trend net survey.

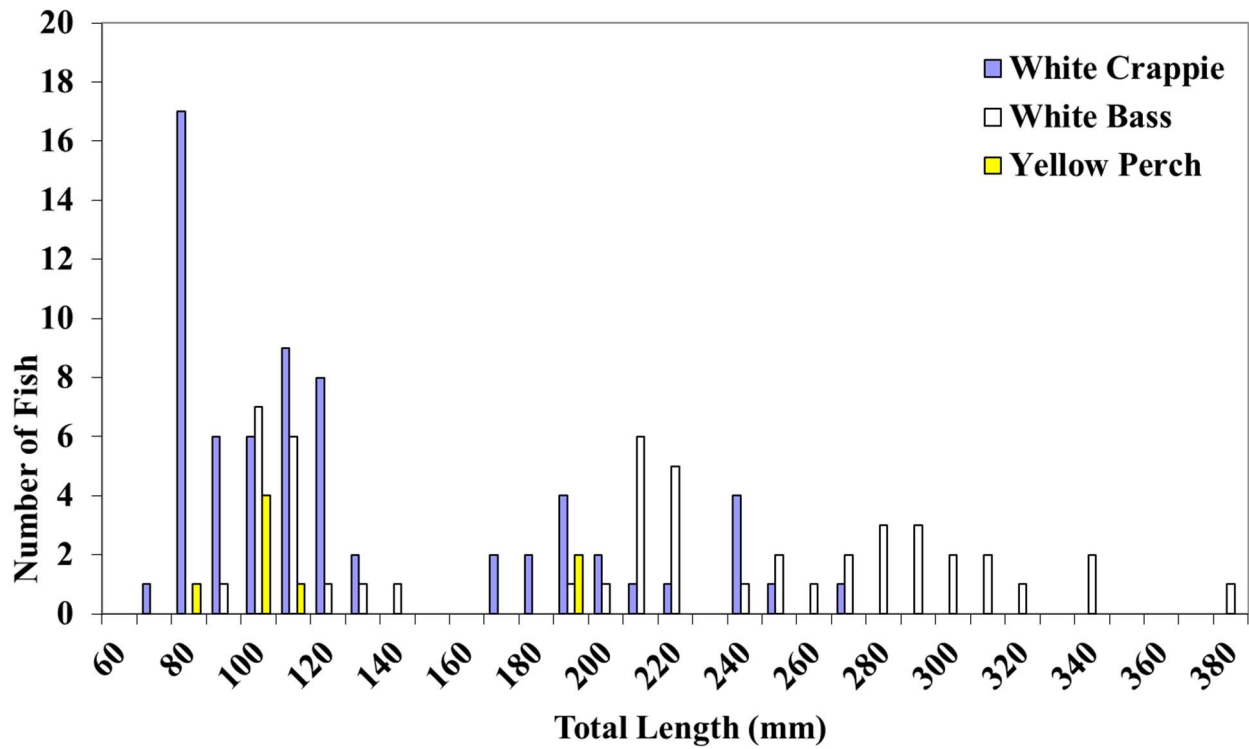


Figure 2. Length distribution of panfish species collected at DMAD Reservoir on October 28, 2020.



Figure 3. White bass collected at DMAD Reservoir on October 28, 2020.



Figure 4. Wiper collected at DMAD Reservoir on October 28, 2020.

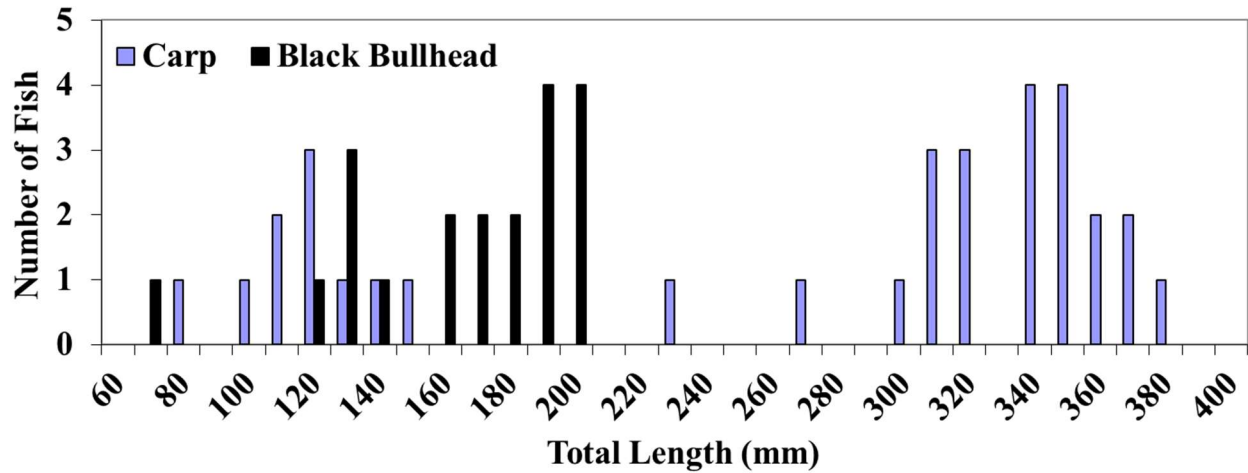


Figure 5. Length distribution of common carp and black bullheads collected at DMAD Reservoir on October 28, 2020.

Table 1. Record of channel catfish and walleye stocking in DMAD Reservoir for the five years prior to the 2020 trend net survey.

| <u>Year</u> | <u>Channel Catfish</u> | | <u>Walleye</u> | |
|----------------------|------------------------|--------------------|----------------|--------------------|
| | <u>Number</u> | <u>Length (in)</u> | <u>Number</u> | <u>Length (in)</u> |
| 2015 | 11,745 | 3.2 | | |
| 2016 | 5,044 | 3.4 | | |
| 2017 | 5,000 | 3.9 | | |
| 2018 | 4,986 | 3.3 | | |
| 2019 | 4,999 | 3.6 | 524,030 | 0.3 |
| 2020 <i>Quota</i> | 5,000 | 3.0 | 250,000 | 1.0 |

Table 2. Summary of the results from the 2020 trend net survey at DMAD Reservoir.

| Water: | DMAD Reservoir | | | | | Catalog #: | VI 386 | | | | | | | |
|--|--|-------------------|--------------------|-------------------------|---------------|--------------------|---|------|----------|-------------------|------|--------|---------------|-----------------|
| Date Set: | 10/27/2020 | | Time: | | | Weather: | Sunny, cold | | | | | | | |
| Date Pulled: | 10/28/2021 | | Time: | | | Water Temp: | 40 F | | | | | | | |
| # Nets: | 1 DWR diver, 1 DWR floater, 2 fyke tandems | | | | | Collectors: | M. Hadley, J. Hudson, T. Shamo, J. Watson | | | | | | | |
| Summary for Warmwater Sportfish | | | | | | | | | | | | | | |
| Species | N | Total Weight (kg) | fish per net/night | Total Length (mm) | | | Weight (g) | | | Relative wt. (Wr) | | | % total catch | % total biomass |
| | | | | Mean | SE | Range | Mean | SE | Range | Mean | SE | Range | | |
| White Crappie | 535 | 2.58 | 267.00 | 123 | 6.63 | 67-270 | 38 | 7.53 | 2-293 | 93 | 2.23 | 54-136 | 81.31 | 7.04 |
| White Bass | 50 | 8.10 | 12.50 | 204 | 11.8 | 81-376 | 162 | 23.5 | 4-652 | 89 | 1.95 | 45-121 | 7.60 | 22.13 |
| Northern Pike | 8 | 10.78 | 4.00 | 560 | 49.0 | 394-795 | 1347 | 450 | 373-4270 | 95 | 8.38 | 52-122 | 1.22 | 29.44 |
| Yellow Perch | 8 | 0.18 | 4.00 | 116 | 14.7 | 79-183 | 23 | 9.06 | 5-67 | 88 | 7.34 | 50-119 | 1.22 | 0.50 |
| Wiper | 4 | 3.45 | 1.00 | 409 | 18.8 | 361-453 | 863 | 109 | 650-1160 | 86 | 3.79 | 79-97 | 0.61 | 9.43 |
| Walleye | 1 | 0.05 | 0.25 | --- | --- | 195 | --- | --- | 54 | --- | --- | 80 | 0.15 | 0.15 |
| Summary for Non-Sport Fish | | | | | | | | | | | | | | |
| Species | N | Total Weight (kg) | fish per net/night | total length range (mm) | % total catch | % total biomass | | | | | | | | |
| | | | | | | | | | | | | | | |
| Common Carp | 32 | 10.22 | 8.00 | 75-373 | 4.86 | 27.91 | | | | | | | | |
| Black Bullhead | 20 | 1.24 | 5.00 | 70-198 | 3.04 | 3.39 | | | | | | | | |
| Comments: White crappie and yellow perch catch rates based on fyke nets only. Northern pike catch rate based on gill nets only. | | | | | | | | | | | | | | |