Milton Reservoir 2012 summary report

June 11-14, 2012

State of California

Department of Fish and Wildlife

Heritage and Wild Trout Program

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Introduction

Milton Reservoir, located on the Middle Yuba River approximately 25 miles northwest of Truckee, CA (Nevada County; Figure 1), contains wild populations of brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*). The California Department of Fish and Wildlife (CDFW) Heritage and Wild Trout Program (HWTP) evaluated Milton Reservoir for candidacy as a designated Wild Trout Water in 2012. On an annual basis, the HWTP is responsible for recommending to the California Fish and Game Commission 25 miles of stream and one lake that fit criteria for designation as Wild Trout Waters. Wild Trout Waters are those that support self-sustaining wild trout populations, are aesthetically pleasing and environmentally productive, provide adequate catch rates in terms of numbers or size of trout and are open to public angling (Bloom and Weaver 2008). Wild Trout Waters may not be stocked with catchable-sized hatchery trout. The HWTP evaluates candidate waters using a phased approach to systematically collect data and evaluate whether or not a stream or lake meets designation criteria.

Milton Reservoir has a surface area of approximately nine hectares and is part of a series of seven reservoirs operated by the Nevada Irrigation District (NID) to provide water and hydroelectric power. In 1981, Milton Reservoir was chemically treated to remove invasive golden shiner (*Notemigonus crysoleucas*) and brown bullhead (*Ameiurus nebulosus*). Following project success, Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) and brown trout were introduced (Hiscox 1981 and 1991) to provide a sport fishery. In subsequent years, rainbow trout were also stocked in Milton Reservoir (Hickey 2013). In 1993, Milton Reservoir was emptied by the NID and sediment removal was performed on the upper portion of the reservoir to increase trout access to the Middle Yuba River, lower water temperatures and increase angler access (Hiscox 1991 and Hickey 2013).

Due to its popularity as a wild trout fishery, the HWTP conducted a Phase 2 (candidate water) assessment of Milton Reservoir in 2012. Goals and objectives of this assessment included determining species composition, size class distribution, fish abundance and angler catch rates. In addition, the efficacy of mark-recapture techniques using angling and gill nets was evaluated.

Methods

A mark-recapture survey was conducted in Milton Reservoir from June 11th-14th, 2012 (Figure 5) and a population estimate for rainbow and brown trouts was generated utilizing the Lincoln-Petersen model. Angling was used to capture and mark fish during the first stage of the survey and gather information on catch rates, species composition and size class distribution. The angling effort occurred over the course of three consecutive days. CDFW personnel (Headquarters and Regional) used fly and spin fishing gear from both shore and in float tubes. All captured fish were identified to species, measured for total length (mm), marked with an adipose or upper-caudal fin clip and released live back into the lake. Any

captured trout that were injured, appeared in poor condition and/or did not appear likely to survive the marking effort were euthanized. These fish were not included in the count of the total number of fish marked but were included in the evaluations of catch rate, species composition and size class. Anglers recorded effort (hrs) for each day and catch per unit effort (CPUE; fish/hr) was calculated for each angler day and averaged across the entire effort. Water temperature (°C) was measured and representative photographs were taken.

Trout were recaptured using five experimental-sinking gill nets (Figures 2-3). Gill nets were placed in areas of presumed high trout densities (determined based on observations from the mark phase), as well as spaced throughout the lake to include both the littoral and limnetic zones. Coordinates were recorded for both ends of each gill net using a hand-held Global Positioning Unit (North American Datum 1983). Gill nets were deployed in the evening and removed the following day, with a minimum set time of 12 hours. Fish were processed separately by gill net. Each fish was identified to species and total length (mm) was measured. All live fish were recovered and released back into the lake. All mortalities resulting from the recapture phase were dispatched (buried or dispersed in dense vegetation).

The NOREMARK program closed population estimation was used to determine population size (White 1996).

Results

Seven anglers participated in the initial phase of the mark-recapture survey and captured one rainbow trout and 53 brown trout in 105.9 hrs of effort (Table 1). CPUE ranged from zero to 2.6 fish/hr with an average of 0.6 fish/hr.

The brown trout ranged in total length from 30 to 364 mm with a mean of 249 mm (Figures 6-7). Three brown trout escaped back into Milton Lake before total length could be measured. The one captured rainbow trout was 319 mm in total length. All 54 trout were marked with a fin clip.

The five gill nets were set for a total of 79.7 hrs; effort of individual nets ranged between 15 and 17 hrs, depending on staff availability and how quickly they were processed (Table 2). The gill nets captured a total of 132 brown trout, four of which were marked (3%); total length ranged from 96 to 427 mm with a mean of 270 mm (Table 3). Six Lahontan redside (*Richardsonius egregius*) were captured in the gill nets, ranging from 74 to 84 mm with a mean of 79 mm (Figure 6 and Table 3). Zero rainbow trout were captured in gill nets. Water temperature ranged from 4.5 to 11 °C. Using the Lincoln-Peterson model, population size was estimated at 1435.4 (+/- 1074.1) brown trout in Milton Reservoir. Since no marked rainbow trout were recaptured and Lahontan redsides were not marked, population size was not estimated for either species.

Discussion

To determine potential sampling bias on size classes captured using angling versus gill netting, an analysis was performed to test the following null hypothesis: mean total length of fish captured by angling (248.85 mm) is equal to mean total length of fish captured by gill nets (269.99 mm). A two sample t-test was used because it met the following conditions or assumptions:

- Equal variance: A preliminary F-test indicated the variance of the two groups were equal (test-statistic = 1.825; F-critical (α = .05) = 1.497).

- Normality (normal distribution): The distribution of each sample set was tested for normality. Neither the angling nor the gill net sample sets distributed normally; however, a t-test was still used because the central limit theorem holds for the sample sets due to the large sample sizes.

A two-sample t-test was performed assuming equal variance. Results from the determined the null hypothesis of equal means should be accepted. These results support the assumption there was no difference in size class distribution captured during the mark and recapture phases.

The CDFW North Central Region conducted a creel survey in Milton Reservoir and analyzed these data along with the voluntary information provided from the Angler Survey Box (ASB) for the years 2003 and 2006-2012 (Hickey 2013). The average reported CPUE from voluntary ASB forms (1.04 fish/hr) was similar to that observed during the angling portion of this assessment (0.6 fish/hr). The number of rainbow and brown trouts reported caught varied among years. In 2010, rainbow trout comprised the dominant catch (90%) compared to 2008 when brown trout were reported in higher numbers (90%). No other trout species, including Lahontan cutthroat, were reported caught.

The mark-recapture survey was an effective way to determine population size of brown trout; however, the confidence interval was relatively high. The HWTP recommends future efforts using this sampling technique aim to increase the number of marked trout relative to the total population. In waters with relatively low catch rates (< 2 fish/hr), such as Milton Reservoir, increasing effort and duration of the mark phase should be considered. Due to the presumed low population size of rainbow trout, this technique was not effective in enumerating abundance.

Conclusion

Milton Reservoir meets numerous criteria for Wild Trout Water designation, including the presence of wild trout populations with multiple size classes, suitable habitat, and public access. Henness Pass Road (Country Route 301) off of Highway 89 parallels the northern shore of Milton Reservoir and provides

access to a US Forest Service (USFS) campground and boat ramp. Land ownership is a mixture of private (NID) and public (USFS Tahoe National Forest).

Special angling regulations in Milton Reservoir have been in place since 1982 to protect the trout fishery and control non-game fishes like golden shiner and brown bullhead (Hiscox 1991 and Jensen 1981). Milton Reservoir (identified as Milton Lake in the California Freshwater Sport Fishing Regulations) is open to sport fishing from the last Saturday in April through November 15 with a daily bag and possession limit of two fish, maximum size limit of 12 inches total length and gear restricted to artificial lures with barbless hooks.

Milton Reservoir has provided anglers with a wild catch and release fishery for the last 30 years and the HWTP recommends the California Fish and Game Commission designate it as a Wild Trout Water. Continued assessments to gather further trend data on fishery, habitat and angler use is recommended.

Sediment, attributed to a landslide near Jackson Meadow Reservoir, was removed from Milton Reservoir in 1993 (Hiscox 1991 and Hickey 2013). However, there are continued concerns pertaining to dam impoundment and the HWTP recommends monitoring possible sedimentation in Milton Reservoir. Performing additional creel surveys should be considered to evaluate the fishery and ASBs should continue to be used as a tool to monitor catch rates, catch size, angler use, angler satisfaction and angler preferences.

References

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Hiscox, J. I. 1981. Chemical treatment and fish rescue. Memorandum to Milton Lake, Nevada County files. State of California Resources Agency. Department of Fish and Game. Region 2.

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Jenson, P. T. 1981. Proposed 1982 angling regulation change; establish more strict regulations on the take of trout from Milton Lake, Nevada County. Memorandum to Assistant Deputy Director Operations. State of California Resources Agency. Department of Fish and Game. Region 2.

White, G. C. 1996. NOREMARK Reference Manual. Department of Fishery and Wildlife. Colorado State University.

Figure 1. Vicinity map of Milton Reservoir

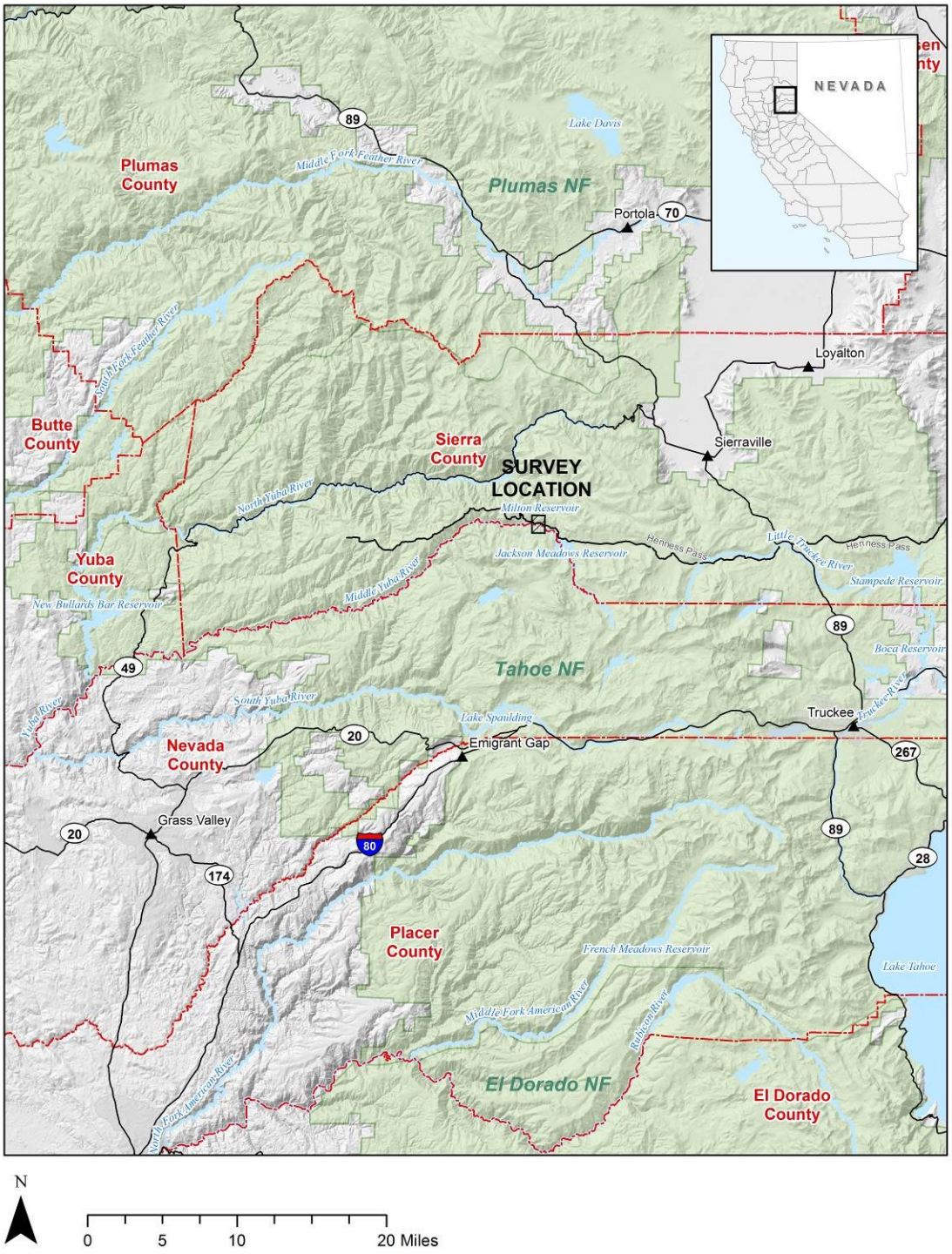

Figure 2. Detail map of 2012 Milton Reservoir gill net and ASB locations

Figure 3. Aerial map of 2012 Milton Reservoir gill net and ASB locations on

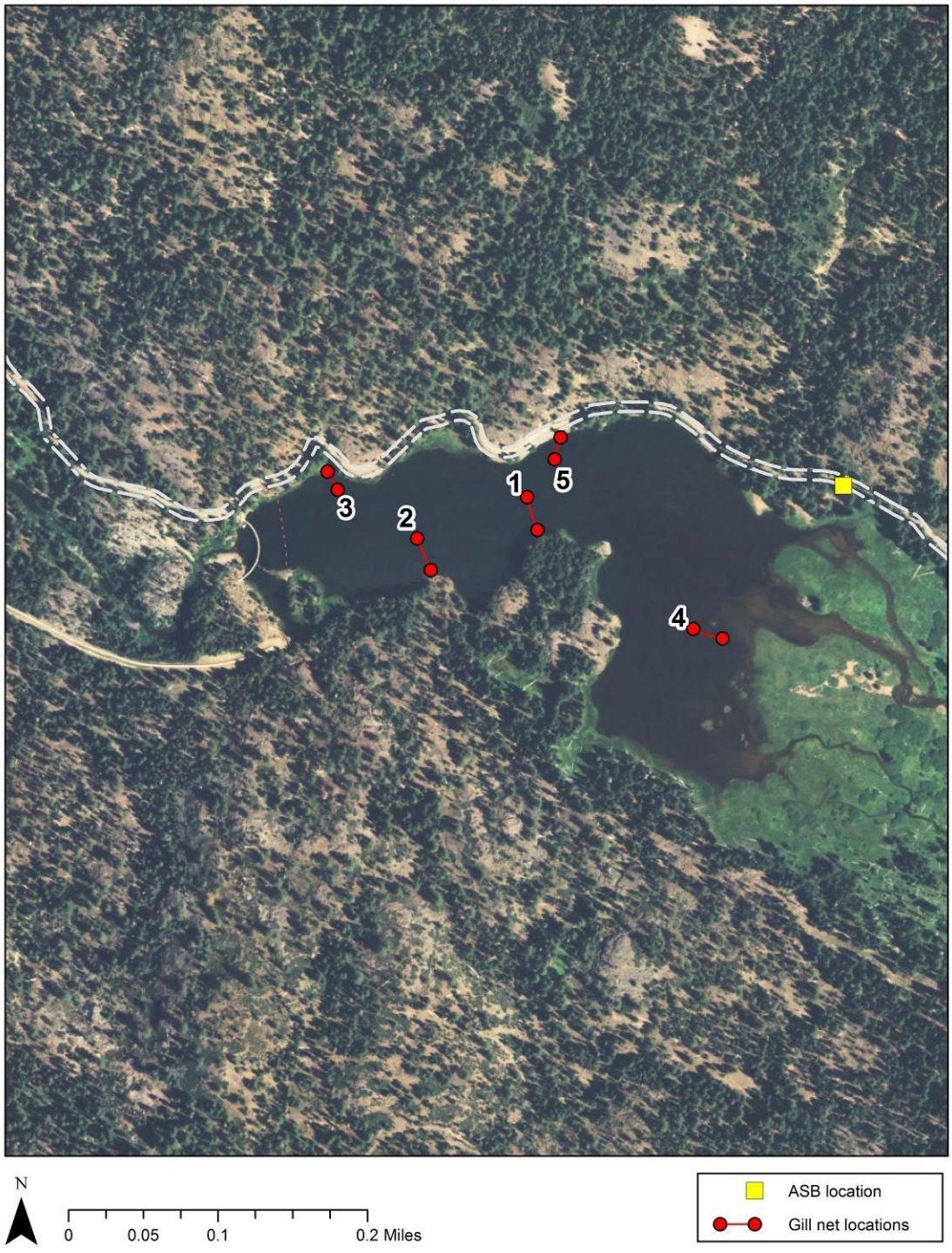

Figure 4. Representative photographs of Milton Reservoir

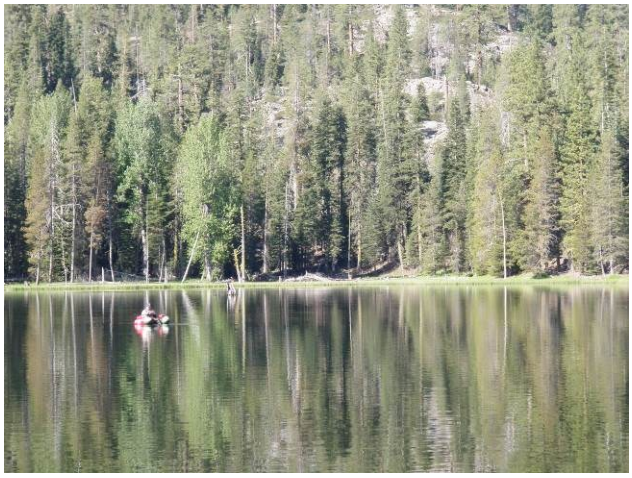

Figure 5. Photographs of 2012 mark-recapture survey in Milton Reservoir

Figure 6. Photographs of brown trout (left) and Lahontan redside (right) captured in Milton Reservoir

Figure 7. Comparison of size class distribution of brown trout captured by survey methodology during 2012 mark-recapture survey on Milton Reservoir

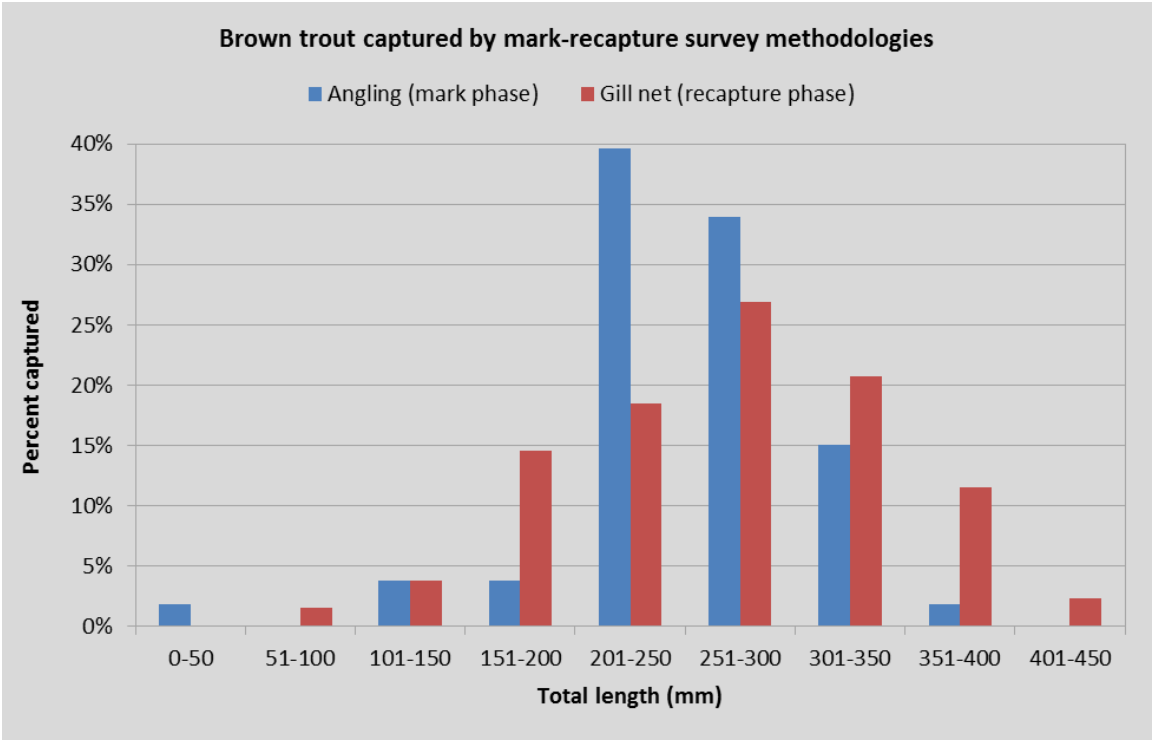

Table 1. Milton Reservoir 2012 angling data

Angler	Date	Effort (hrs)	Species	Number of fish captured					CPUE (fish/hr)
				Small < 6"	Medium 6" - 11.9"	Large 12" - 17.9"	Unknown size	Total	
Dettmar	6/11/2012	3.25	-	0	0	0	0	0	0.0
Hanson	6/11/2012	1.82	brown trout	0	2	1	1	4	2.2
Webster	6/11/2012	5.00	brown trout	0	1	0	0	1	0.2
Zuber	6/11/2012	3.00	brown trout	0	1	0	0	1	0.3
Coates	6/12/2012	2.00	brown trout	0	4	0	0	4	2.0
Dettmar	6/12/2012	8.25	brown trout	1	0	0	0	1	0.1
Ewing	6/12/2012	7.41	brown trout	0	15	4	0	19	2.6
Hanson	6/12/2012	9.65	rainbow trout	0	0	1	0	7	0.7
			brown trout	0	2	2	2		
Webster	6/12/2012	11.50	-	0	0	0	0	0	0.0
Zuber	6/12/2012	9.75	brown trout	0	5	1	0	6	0.6
Coates	6/13/2012	3.25	-	0	0	0	0	0	0.0
Dettmar	6/13/2012	8.25	brown trout	1	1	0	0	2	0.2
Ewing	6/13/2012	7.25	brown trout	0	6	1	0	7	1.0
Hanson	6/13/2012	5.75	-	0	0	0	0	0	0.0
Mehalick	6/13/2012	3.50	-	0	0	0	0	0	0.0
Webster	6/13/2012	8.00	brown trout	0	2	0	0	2	0.3
Zuber	6/13/2012	8.25	-	0	0	0	0	0	0.0
Average									0.6

Table 2. Milton Reservoir 2012 gill net effort data

Gill net number	Start time	End time	Total time (hr)
1	17:50	9:15	15.42
2	18:10	10:05	15.92
3	18:00	9:30	15.50
4	18:43	11:25	16.70
5	18:30	10:40	16.17
	Total		79.70

Table 3. Milton Reservoir 2012 gill net data

Gill net number	Species	Total captured	Number of recaptures (marked fish)	Number of mortalities
1	brown trout	35	2	21
	Lahontan redside	3	0	3
2	brown trout	28	0	19
3	brown trout	24	0	14
	Lahontan redside	1	0	1
4	brown trout	19	1	12
	Lahontan redside	1	0	1
5	brown trout	26	1	9
	Lahontan redside	1	0	1
Total	brown trout	132	4	75
	Lahontan redside	6	0	6