

NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORTS

F-20-54
2018

BILK CREEK RESERVOIR
WESTERN REGION



**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
JOB PROGRESS REPORT**

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**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROGRESS REPORT**

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Bilk Creek Reservoir*
Period Covered: *January 1, 2018 through December 31, 2018*

SUMMARY

Bilk Creek Reservoir provided angling opportunities throughout 2018. Anglers reported catching rainbow trout, tiger trout, bluegill, and largemouth bass. Catch rates based on angler drop-box reports were 4.48 fish per hour and 19.5 fish per angler. Rainbow trout were stocked to meet angling demands and natural production of largemouth bass and bluegill were sufficient to meet angling pressure. Water levels in Bilk Creek Reservoir varied throughout the year due to irrigation demands, but remained good from the fisheries perspective. Above average runoff resulted in turbid water conditions in spring and early summer.

BACKGROUND

Bilk Creek Reservoir is located on Bilk Creek at the base of the southern end of the Bilk Creek Mountains. The reservoir is almost entirely on private land owned and operated by the Quinn River Crossing Ranch, which uses water from the reservoir for irrigation. The reservoir covers 60 surface acres and stores 670 acre-feet of water with an average depth of 10 feet and maximum depth of 17 feet when full.

The reservoir is a popular destination for local residents of Quinn River Valley, Kings River Valley, Orovada, Denio, and Winnemucca. It currently supports stocked rainbow and tiger trout, bluegill, and largemouth bass fisheries. The largemouth bass and bluegill have self-sustaining populations. The limit at the reservoir is 5 trout and 15 warmwater game fish of which not more than 5 may be black bass.

The trout fishery in Bilk Creek Reservoir is managed under a General Coldwater Fishery Concept in which management is directed towards providing fishing opportunity of a seasonal nature. The fishery may be supported by hatchery stocking programs, but less than 30% of fish should be carried through from one fishing season to the next while the fish generally show minimal growth from stocked size. Angler success rates should range between 0.25 and 0.75 fish per angler hour and 1.0 to 2.0 fish per angler day. Largemouth bass and bluegill fisheries are managed under a Warmwater General Fishery Concept in which management is directed to produce average-sized fish year after year. Special regulations are usually not imposed, although at times, there can be a size restriction. Populations are usually self-supporting, but periodic stocking may be required to supplement existing populations due to inadequate spawning habitat or following low water levels typically associated with drought. Angler catch rates should range between 0.25 and 0.75 fish per hour and 1.0 and 2.0 fish per angler day, and largemouth bass should average 12 inches in length.

OBJECTIVES

- Conduct a general fisheries assessment through opportunistic angler contacts, angler drop-box surveys, and mail-in angler questionnaire data.
- Monitor fish populations during one night of electroshocking.
- Collect body condition data and conduct stomach content analysis on largemouth bass caught during electroshocking surveys to determine the forage that is being utilized.
- Augment the population of bluegill with approximately 500 bluegill from a nearby source.

PROCEDURES

Conduct a general fisheries assessment through opportunistic angler contacts, angler drop-box surveys, and mail-in, angler questionnaire data. Angler use, success, and harvest were assessed through angler drop-box surveys and the Mail-in Angler Questionnaire Survey. Angler drop-box surveys collected basic creel information and assessed angler satisfaction. The survey asked participants to rate three aspects of their fishing day on a scale of -2.0 (highly dissatisfied) to +2.0 (highly satisfied). The drop-boxes were maintained and forms were replenished throughout the year. Mail-in angler questionnaire data is derived from a statewide survey mailed to 30,000 license purchasers from the previous year.

Monitor fish populations during one night of electroshocking. A formal and systematic electroshocking survey was conducted on March 20, 2018 using a 16-foot Smith-Root electroshocking boat with a Smith-Root 7.5 GPP Electrofisher. The settings on the shocker were set at a “high” output range, mode of 15 DC, and 50% range. The entire perimeter of Bilk Creek Reservoir was sampled, which took 5,391 seconds.

Collect body condition data and conduct stomach content analysis on largemouth bass caught during electrofishing surveys to determine the forage that is being utilized. Stomach samples were not collected from largemouth bass, but a sub-sample of each species captured during electroshocking were measured and weighed. Body condition was evaluated using a relative weight index for each species except for tiger trout, because a standard weight has yet to be developed for this fish (Cassinelli pers. comm. 2019). Relative weight is an index calculated as follows:

$$W_r = (W/W_s) * 100$$

Where W is the individual weight of a fish, W_s is the length-specific standard weight predicted from a weight-length regression developed to represent a species across a geographic range. The standard weight equation (W_s) for rainbow trout was developed by Simpkins and Hubert (1996), for largemouth bass by Henson (1991), and for bluegill by Hillman (1982). The relative weight index uses 100 as a benchmark for the standard body condition of fish. Fish that measure over 100 are considered in good condition and

those less than 100 are in poorer condition, with severity depending on the distance from the benchmark of 100 (Guy and Brown 2007).

Augment the population of bluegill with approximately 500 bluegill from a nearby source. Based on bluegill abundance found during the population survey, it was determined that further augmentation was unnecessary. This objective was not completed in 2018.

FINDINGS

Conduct a general fisheries assessment through opportunistic angler contacts, angler drop-box surveys, and mail-in, angler questionnaire data. A total of 5,926 rainbow trout were stocked in Bilk Creek Reservoir in 2018. The five-year stocking history is shown in Table 1.

Table 1. Bilk Creek Reservoir Five-Year Stocking History, 2014 – 2018.

Year	Species	Strain	Number of Fish	Pounds of Fish	Average Size (inches)	Annual Total	
						Number	Pounds
2018	Rainbow Trout	Eagle Lake	4,145	1,350	9.3	5,926	1,435
	Rainbow Trout	Triploid	1,781	685	9.9		
2017	Rainbow trout	Eagle Lake	1,032	300	9	6,353	2,122
	Rainbow trout	Kamloops	2,289	700	9.1		
	Rainbow trout	Triploid	1,998	732	9.7		
	Tiger Trout	--	1,034	390	9.8		
2016	Rainbow trout	Eagle Lake	4,018	1,400	9.6	7,033	2,207
	Tiger trout	-	499	160	9.3		
	Bluegill	-	510	-	4.25		
	Rainbow trout	-	2,006	647	9.3		
2015	Cuttbow trout	Cuttbow	4,041	1,082	8.6	8,424	2,632
	Rainbow trout	Triploid	4,031	1,450	9.7		
	Tiger Trout	-	314	100	9.3		
	Bluegill	-	38	-	5.3		
2014	Rainbow trout	Triploid	3,170	1,000	9.2	8,025	2,540
	Tiger trout	-	1,115	500	10.4		
	Rainbow trout	Tahoe	3,740	1,040	9.0		

Angler drop-boxes were located at each end of the reservoir and were maintained throughout the year. Twenty-four anglers fished 104.5 hours and caught 468 fish, which were lower than the five-year averages of 38 anglers fishing for 143 hours and catching 513 fish. Table 2 summarizes the five-year angler catch rates and success and Table 3 summarizes the 2018 monthly results reported by anglers. Angler satisfaction scores averaged +1.26 for “overall experience,” +0.65 for “size of fish,” and +1.24 for “number of fish caught.” Satisfaction ratings were summarized over five years in Figure 1.

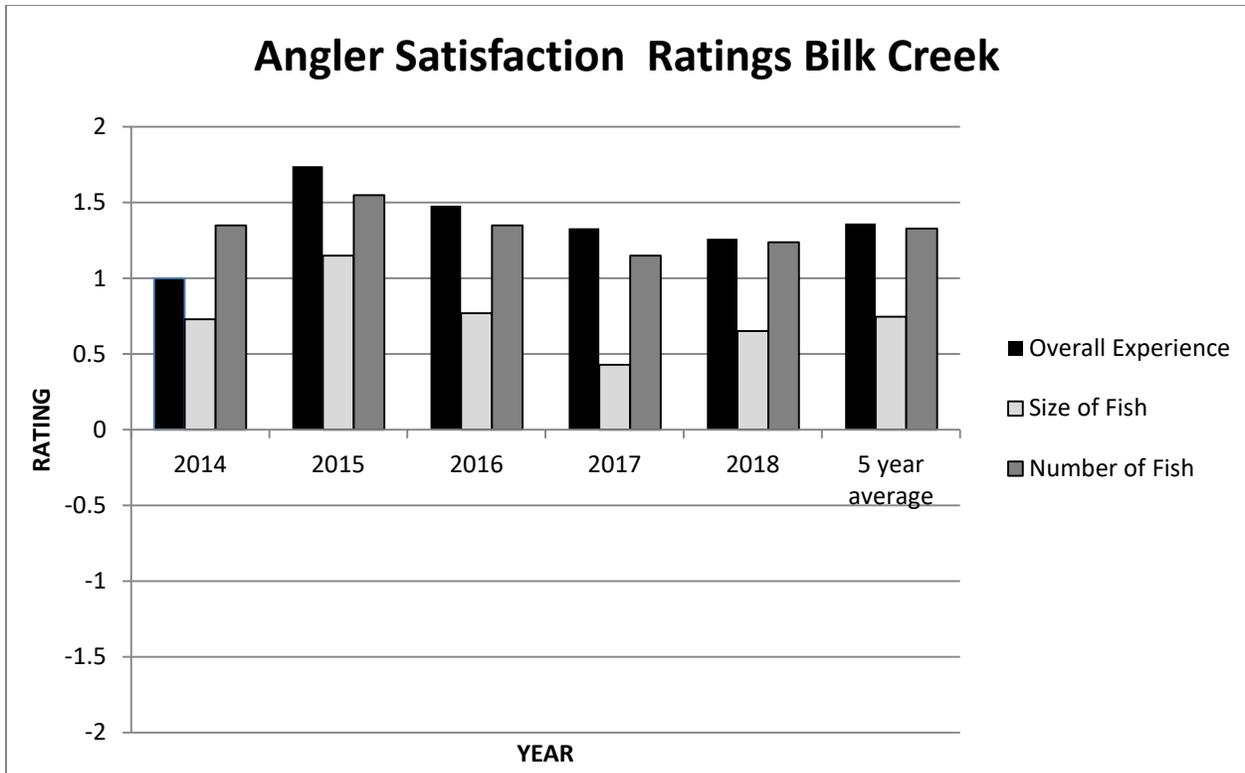


Figure 1. Five-year angler satisfaction rating for Bilk Creek Reservoir (2014-2018).

Table 2. Bilk Creek Reservoir Five-Year Angler Success Rates - Angler Drop Box.

Year	Anglers Reporting	Hours	Fish Caught	Fish Harvested	Percent Harvested	Fish/Angler	Fish/Hour
2014	31	155.5	379	112	29.55%	8.40	1.90
2015	40	136	450	140	31.11%	9.82	3.78
2016	54	183	817	122	14.93%	14.04	4.53
2017	40	136	450	140	31.11%	9.82	3.78
2018	24	104.5	468	30	6.41%	19.50	4.48
5-year average	37.8	143	512.8	108.8	21.22%	12.32	3.70

Drop-box results reported 275 fish (58.8%) were rainbow trout, 109 (23.3%) were largemouth bass, 77 (16.4%) were bluegill, and 7 (1.5%) were tiger trout. The most common size class of rainbow trout caught in 2018 was between 10.0 and 11.9 inches, which is consistent with the five-year average. The most common size class of largemouth bass and bluegill caught was less than 10 inches, which is consistent with the five-year average. For tiger trout, the most common size class reported in 2018 was less than 10 inches and between 10.0 and 11.9 inches. Three tiger trout were reported in each size category, while the most common size caught in the five-year average was less than 10 inches. Length frequencies for the four species of fish in Bilk Creek Reservoir are summarized in Figures 2 through 5.

Table 3. Monthly Angler Use and Success Data Summary: Drop-Box 2018.

BILK CREEK RESERVOIR	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	TOTAL
ANGLERS	0	0	0	3	3	4	4	3	4	2	1	0	24
HOURS FISHED	0	0	0	16	13	23	16.5	11	13	9	3	0	104.5
BASS HARVESTED	0	0	0	0	0	14	0	0	3	0	0	0	17
BASS RELEASED	0	0	0	4	25	9	15	7	12	20	0	0	92
TOTAL BASS CAUGHT	0	0	0	4	25	23	15	7	15	20	0	0	109
RAINBOW TROUT HARVESTED	0	0	0	1	1	0	4	0	6	0	0	0	12
RAINBOW TROUT RELEASED	0	0	0	6	68	15	68	48	34	20	4	0	263
TOTAL RAINBOW CAUGHT	0	0	0	7	69	15	72	48	40	20	4	0	275
BLUEGILL HARVESTED	0	0	0	0	0	0	1	0	0	0	0	0	1
BLUEGILL RELEASED	0	0	0	0	9	1	8	27	7	24	0	0	76
TOTAL BLUEGILL CAUGHT	0	0	0	0	9	1	9	27	7	24	0	0	77
TIGER TROUT HARVESTED	0	0	0	0	0	0	0	0	0	0	0	0	0
TIGER TROUT RELEASED	0	0	0	0	0	0	6	1	0	0	0	0	7
TOTAL TIGER TROUT CAUGHT	0	0	0	0	0	0	6	1	0	0	0	0	7
TOTAL FISH CAUGHT	0	0	0	11	103	39	102	83	62	64	4	0	468
HARVEST RATES (ALL FISH)													
FISH PER ANGLER	0	0	0	0.33	0.33	3.50	1.25	0.00	2.25	0.00	0.00	0	1.25
FISH PER HOUR	0	0	0	0.06	0.08	0.61	0.30	0.00	0.69	0.00	0.00	0	0.29
CATCH RATES (ALL FISH)													
FISH PER ANGLER	0	0	0	3.67	34.3	9.75	25.5	27.7	15.5	32.0	4.00	0	19.50
FISH PER HOUR	0	0	0	0.69	7.92	1.70	6.18	7.55	4.77	7.11	1.33	0	4.48

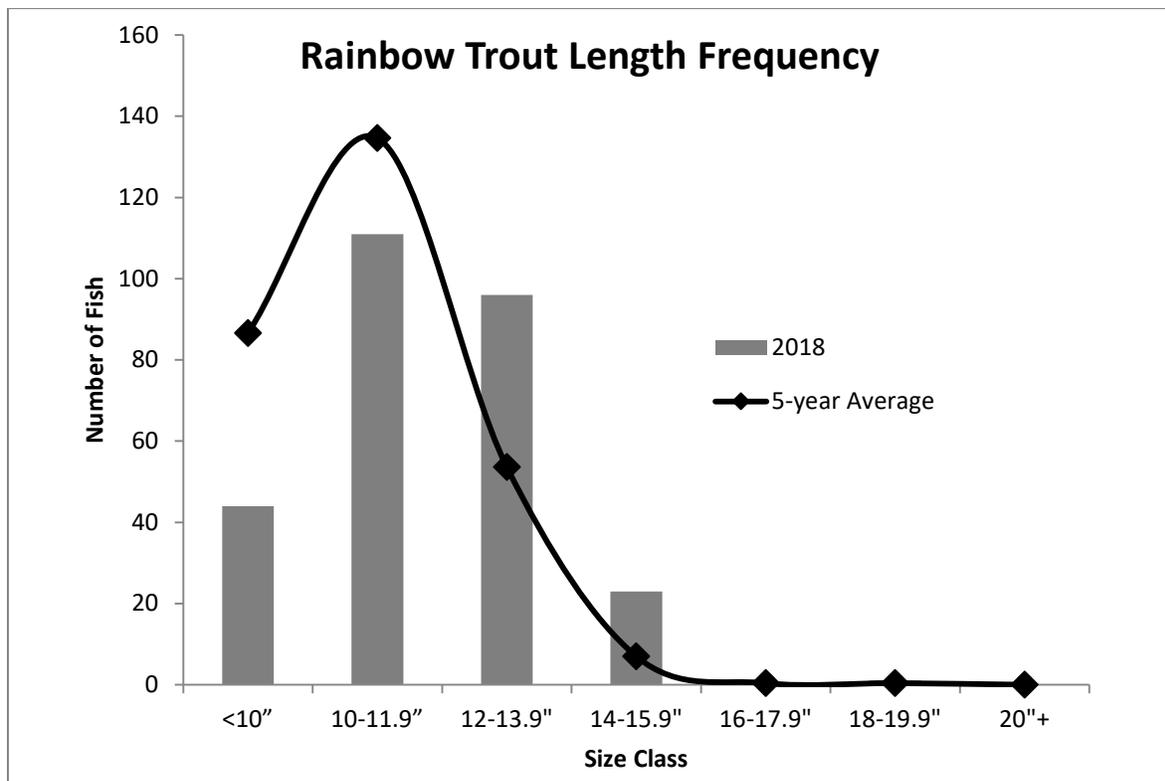


Figure 2. Drop-box length frequency of rainbow trout, Bilk Creek Reservoir 2018.

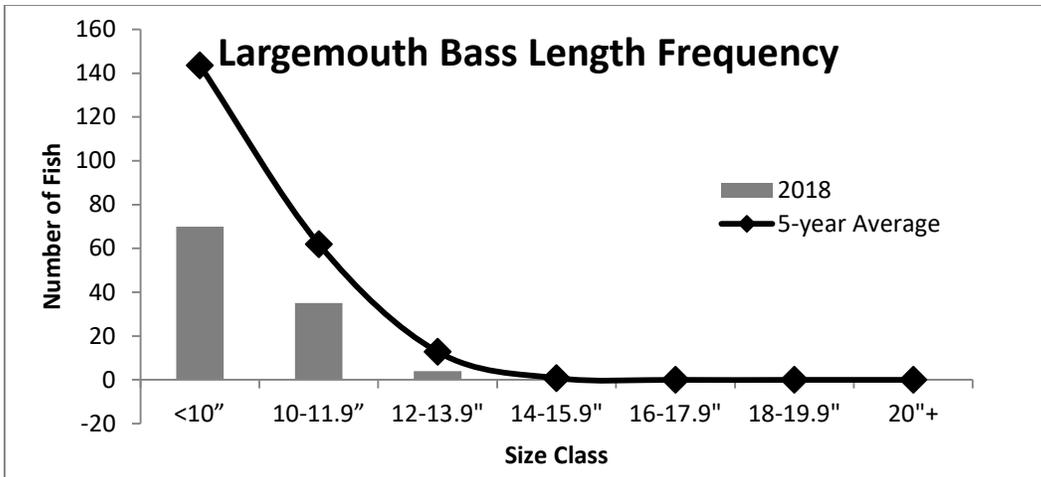


Figure 3. Drop-box length frequency of largemouth bass, Bilk Creek Reservoir 2018.

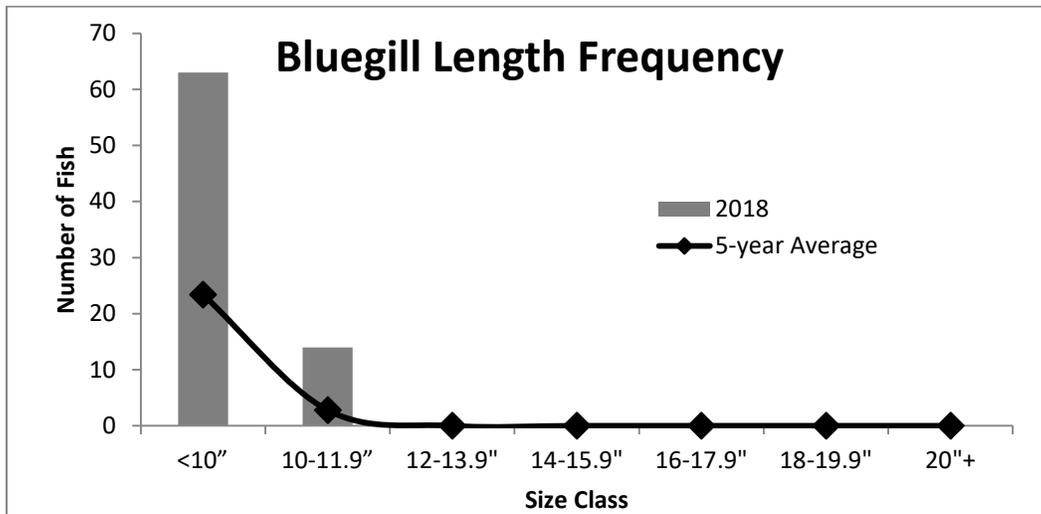


Figure 4. Drop-box length frequency of bluegill, Bilk Creek Reservoir 2018.

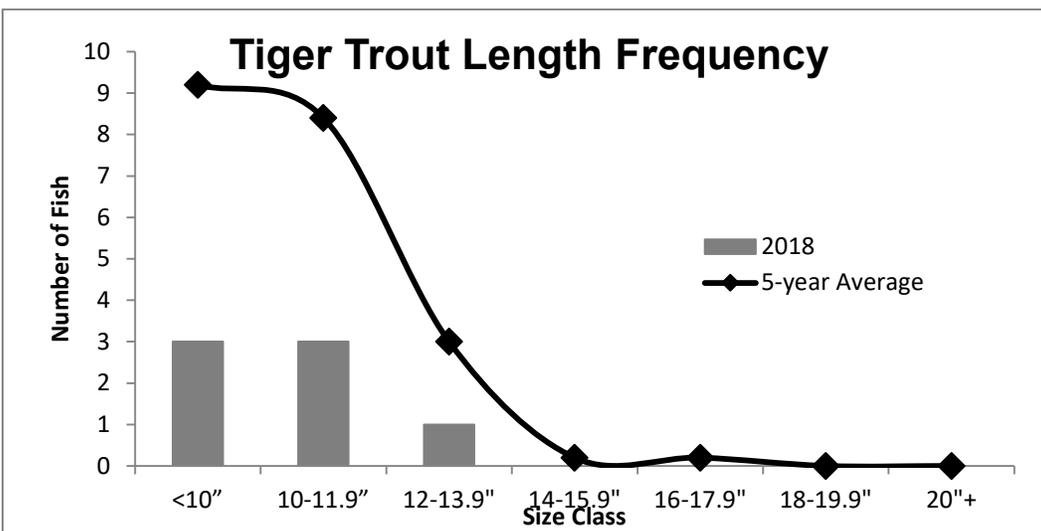


Figure 5. Drop box length frequency of tiger trout, Bilk Creek Reservoir 2018.

The 2017 Mail-in Angler Questionnaire Survey estimated 440 anglers fished 972 days to catch 5,198 fish at Bilk Creek Reservoir. Estimated angler success was 6.56 fish per day and 14.51 fish per angler. Average fish caught per day was slightly above the five-year average of 6.33 (Figure 6), while average fish caught per angler was slightly below the five-year average of 17.8 (Figure 7).

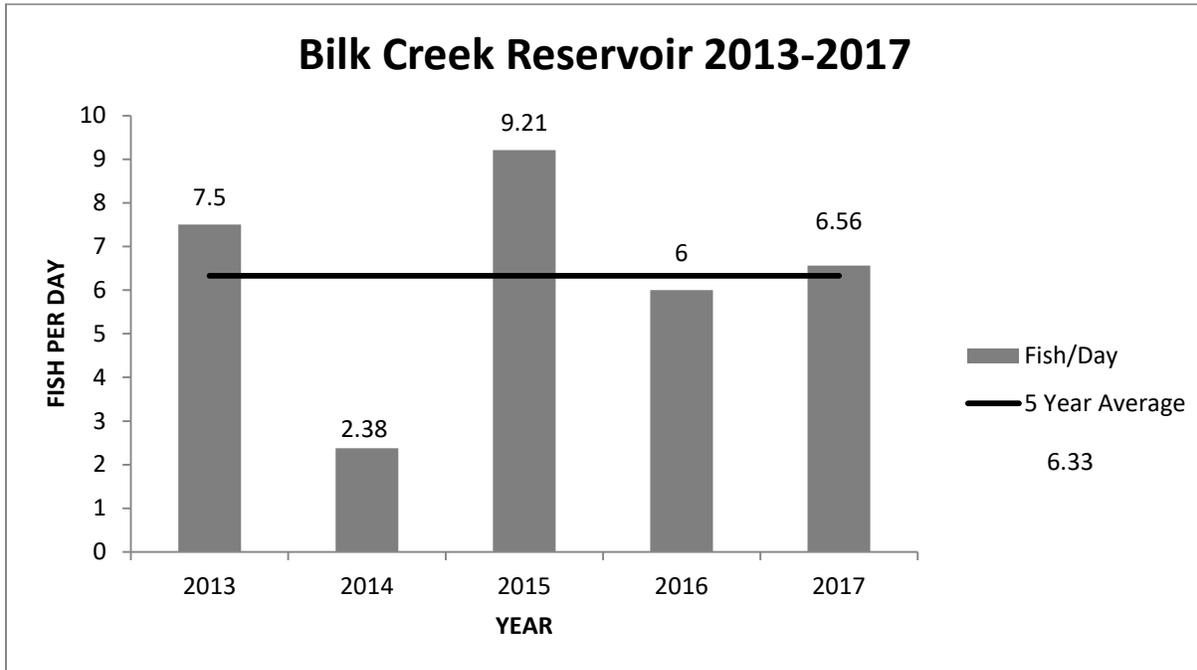


Figure 6. Bilk Creek Reservoir Angler Questionnaire fish/day, 2013 – 2017.

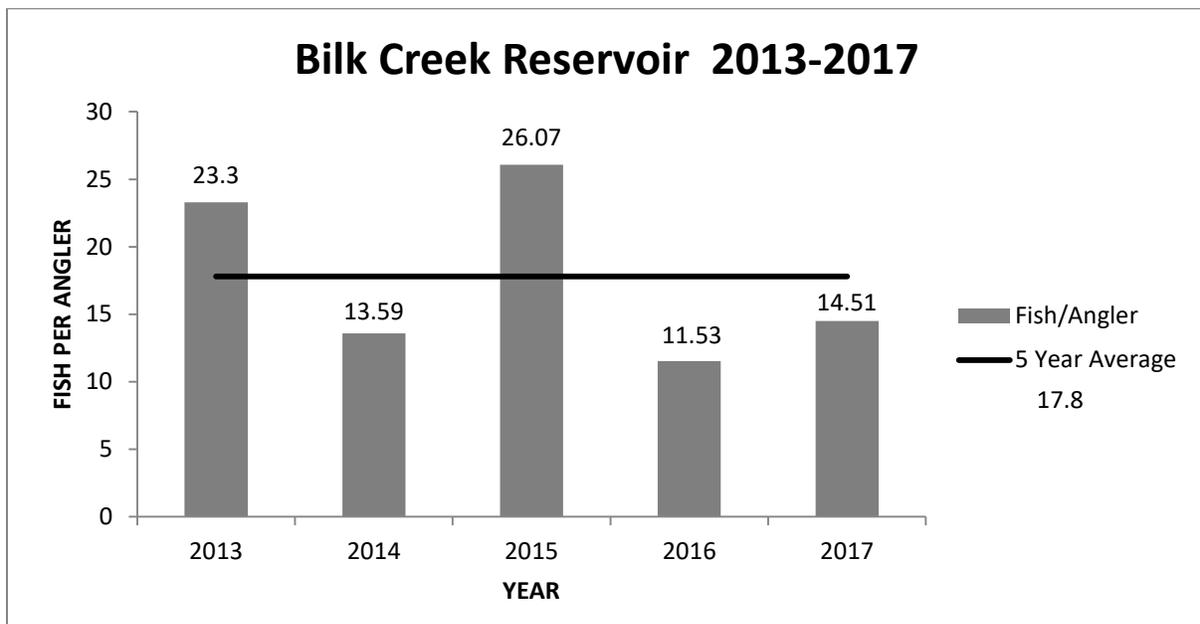


Figure 7. Bilk Creek Reservoir Angler Questionnaire fish/angler, 2013 – 2017.

Above average runoff occurred in 2018, bringing ample water to Bilk Creek Reservoir and early spring water releases prevented using the spillway. Water clarity was poor throughout the spring and into early summer and as stream flows receded in June, it improved. During each site visit to Bilk Creek Reservoir, a general habitat assessment was conducted at the reservoir that included water temperature, water level, water clarity, and road conditions. Table 4 summarizes the assessments that occurred in 2018.

Table 4. General Habitat Assessments at Bilk Creek Reservoir, 2018.

Date	Water Temperature (°F)	Water Level	Water Clarity	Road Conditions	Number of Anglers	Comments
3/20/2018	44	80%	Turbid	Good	2	
4/3/2018	48	80%	Turbid	Good	9	
5/8/2018	53	90%	Turbid	Good	3	
6/9/2018	63	80%	Cloudy	Good	2	
7/19/2018	72	75%	Clear	Good	0	
12/31/2018	42 (12ft deep)	80%	Clear	Good	0	4 in of ice

Monitor fish populations during one night of electroshocking. The electrofishing survey resulted in the capture of 222 fish at a catch rate of 148.2 fish/hour. A total of 126 largemouth bass were captured and averaged 258 mm (10.2 in), 68 bluegill averaged 159 mm (6.3 in), 24 rainbow trout averaged 267 mm (10.5 in), and four tiger trout averaged 296 mm (11.7 in). Sampling results are summarized in Table 5.

Table 5. Bilk Creek Reservoir Electrofishing Survey Results, 2018.

Species	CPUE	Composition (% of catch)
Largemouth bass	84.1 fish/hour	56%
Bluegill	45.4 fish/hour	30%
Rainbow trout	16 fish/hour	12%
Tiger trout	2.7 fish/hour	2%
All fish	148.2 fish /hour	--
General Warmwater Sportfish	129.5 fish/hour	--
Coldwater fish	18.7 fish/hour	--

Collect body condition data and conduct stomach content analysis on largemouth bass caught during electrofishing surveys to determine the forage that is being utilized. The relative weight indexes for fish species in Bilk Creek Reservoir are summarized in Table 6. Fifty largemouth bass were evaluated and 66% were under the W_r benchmark of 100, while 34% of the sample was above this benchmark. From 24 bluegill, 17% were under the W_r benchmark of 100, while 87% of the sample was above this benchmark. Rainbow trout ($n=14$) showed 79% under the W_r benchmark of 100, while 21% of the sample was above this benchmark. Overall, most of the fish evaluated were considered near the standard body condition for the species. Electrofishing survey data is summarized in Table 6. Additional population abundance and relative weight sampling should examine changes that can occur annually with environmental and biological differences.

Table 6. Relative Weight Index Results Bilk Creek Reservoir, 2018.

Species	Average Relative Weight Index	Relative Weight Range
Largemouth bass	95.8 (n=50)	79.9-126.9
Bluegill	117.4 (n=24)	80.5-158.3
Rainbow trout	95.7 (n=14)	80.6-115.9

Augment the population of bluegill with approximately 500 bluegill from a nearby source. Bluegill were introduced in 2015 and 2016 to establish a self-sustaining population for improving forage conditions of largemouth bass as well as providing additional angling opportunity. Results from the population survey conducted in March found multiple age classes of bluegill in good numbers and the decision was made to suspend augmentation efforts. It appears the population has become maintained through natural reproduction.

MANAGEMENT REVIEW

Drop-box surveys and mail-in questionnaire surveys indicate that Bilk Creek Reservoir is exceeding the standards of a general coldwater and warmwater fishery. In addition, angler satisfaction ratings were positive. Angler success rates for the 2017 mail-in questionnaire and the 2018 angler drop-box survey were well above the standards set for a general coldwater and warmwater fisheries management concepts of 0.25 to 0.75 fish/hour and 1.0 to 2.0 fish/day. The objective of a warmwater general fisheries management concept is to have largemouth bass average 12 inches. In 2018, the most common size class reported by anglers was less than 10 inches, while the electroshocking survey found largemouth bass averaged 10.2 inches. In 2016, bluegill was introduced as a forage species for largemouth bass, as well as increasing angling opportunity. In theory, the addition of this forage species should increase size and length of largemouth bass. Further sampling will examine largemouth bass size structure based on improved forage conditions.

A standard systematic electroshocking survey was conducted for the first time in 2018 to gather information on species abundance, population composition, and body condition. Continued year-to-year sampling will be helpful in examining CPUE trends. Body condition of largemouth bass was measured using a relative weight index and many were near the standard.

RECOMMENDATIONS

- Conduct a general fisheries assessment of angler use, success, and harvest through, return of angler drop-box surveys and mail-in, angler questionnaire data.
- Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when on site.
- Monitor fish populations in Bilk Creek Reservoir by one night of electroshocking and collect body condition data and conduct stomach content analysis on largemouth bass to determine what forage is being utilized.

REFERENCES

- Cassinelli, J.D., 2019. Personal Communication. Standard weights of trout. Idaho Fish and Game.
- Guy, C.S. and M. Brown. 2007. Analysis and interpretation of Freshwater Fisheries Data. American Fisheries Society. Bethesda Maryland.
- Henson, J. C. 1991. Quantitative description and development of a species-specific growth form for largemouth bass, with application to the relative weight index. Master's thesis. Texas A&M University, College Station.
- Hillman, W. P. 1982. Structure and dynamics of unique bluegill populations. Master's thesis. University of Missouri, Columbia.
- Simpkins, D. G. and W. A. Hubert. 1996. Proposed revision of the standard weight equation for rainbow trout. *Journal of Freshwater Ecology*, 11: 319-326.

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