NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORTS

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2017

KNOTT CREEK RESERVOIR
WESTERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROGRESS REPORT

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ANNUAL PROGRESS REPORT

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Knott Creek Reservoir*
Period Covered: *January 1, 2017 through December 31, 2017*

SUMMARY

The 2017 fishing season at Knott Creek Reservoir started on June 10, 2017 and ended on November 15, 2015. Knott Creek Reservoir was stocked with 1,999 rainbow trout, 2,018 cuttbow trout, and 752 tiger trout. Anglers participating in the Mail-in, Angler Questionnaire Survey reported on angler use and success, and angler drop-box forms were maintained throughout the season and collected once closed. Opportunistic angler contacts were conducted on the opening weekend of the fishing season. Based on these methods of determining angler success, this fishery was consistent with the management objectives.

The water level in Knott Creek Reservoir was at approximately 70 percent at the start of the 2017-fishing season. Water from the reservoir was used for irrigation and the reservoir was near the 1,000 AF minimum pool by the end of the fishing season in November. An algae bloom did occur in June and July, which resulted in a small scale fish die off.

BACKGROUND

Knott Creek Reservoir is located in the Pine Forest Range at an elevation of 6,400 feet. The dam was reconstructed in 1988 when an initial 500 acre-feet minimum pool was purchased by the state. In 2003, another 500 acre-feet was purchased through the Southern Nevada Public Lands Management Act bringing the minimum pool agreement to 1,000 acre-feet. The reservoir covers 216 surface acres and stores 2,700 acre-feet of water with a maximum depth of 24 feet. In addition to recreational angling, Knott Creek Reservoir is also used for irrigation at Knott Creek Ranch.

Currently, Knott Creek Reservoir is managed as a trophy, coldwater fishery with special regulations. The fishing season is open from the second Saturday in June through November 15, with only artificial lures and flies with single barbless hooks permitted. The harvest limit is one trout per day having a minimum size of 18 inches.

OBJECTIVES

- Conduct a general fisheries assessment through opportunistic angler contacts, 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.

- Concurrent to angler contacts made on the fishing opener, collect body condition data (relative weight or K factor) on rainbow trout, tiger trout, and bowcutt trout caught by anglers.
- Monitor Knott Creek upstream of Knott Creek Reservoir in the summer and fall using visual observations and two days of spot electroshocking for juvenile trout.

PROCEDURES

Conduct a general fisheries assessment through opportunistic angler contacts, angler drop-box surveys, and Mail-in Angler Questionnaire Survey. Opportunistic angler contacts were made in June 10, 2017. The majority of the anglers at Knott Creek Reservoir used float tubes or boats. Contacts were made by boat when anglers were on shore and not fishing. The angler drop-box was maintained prior to the fishing season opening on June 10, 2017 and through November 15, 2017, the last day of the season. Anglers participating in the drop-box survey rated their satisfaction regarding angling experience, size of fish, and number of fish caught on a scale of -2 (worst) to +2 (best). The 2016 mail-in angler questionnaire results were summarized. The voluntary angler questionnaire was randomly mailed to 30,000 anglers fishing in 2016 to estimate angler use and success.

Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when on site. Knott Creek Reservoir was visited in May, June, July, September, October, and November 2017 to monitor lake level, water clarity, and aquatic vegetation.

Concurrent to angler contacts made on the fishing opener, collect body condition data (relative weight or K factor) on rainbow trout, tiger trout, and bowcutt trout caught by anglers. Five trout were measured and weighed to assess body condition of trout in Knott Creek Reservoir.

Monitor Knott Creek upstream of Knott Creek Reservoir in the summer and fall using visual observations and two days of spot electroshocking for juvenile trout. Monitoring for juvenile trout in Knott Creek upstream of the reservoir was not conducted in 2017 due to low flows.

FINDINGS

Conduct a general fisheries assessment through opportunistic angler contacts, Angler Drop-Box Surveys, and Mail-in Angler Questionnaire Survey. Knott Creek Reservoir was stocked with 1,999 triploid rainbow trout, 2,018 bowcutt trout, and 752 tiger trout in 2017. The stocking history from 2013 through 2017 is summarized in Table 1.

The mail-in, angler questionnaire results for 2016 indicated angler use was above the five-year average, with 2,064 anglers fishing Knott Creek Reservoir in 2016. The average annual number of anglers fishing over the past 5-years was 1,802 anglers.

In 2016, estimated angler success was 6.08 fish per day and 15.98 fish per angler, which was slightly below the five-year average of 7.75 fish per day and 23.93 fish per angler. The angler questionnaire history is summarized in Figures 1 and 2.

Table 1. Knott Creek Reservoir Stocking Data, 2013-2017.

Year	Species	Strain	Number of Fish	Pounds of Fish	Average Size (inches)	Annual Total	
						Number	Pounds
2013	Rainbow	Triploid	4,357	2,010	10.5	7,743	3,135
	Bowcutt	-	2,522	1,025	10.1		
	Tiger trout	-	864	100	6.6		
2014	Rainbow	Triploid	5,000	1,760	9.6	6,764	2,440
	Tiger		1,764	680	9.9		
2015	Rainbow	Triploid	2,028	600	9.0	5,806	1,850
	Tiger trout	-	1,727	550	9.3		
	Rainbow	Triploid	2,051	700	9.5		
2016	Rainbow	Triploid	2,502	900	9.7	6,097	2,050
	Tiger trout	-	1,052	400	9.6		
	Bowcutt	Marlette	2,543	750	9.0		
2017	Rainbow	Triploid	1,999	766	9.9	4,769	1,966
	Cuttbow	-	2,018	750	9.8		
	Tiger	-	752	450	11.4		

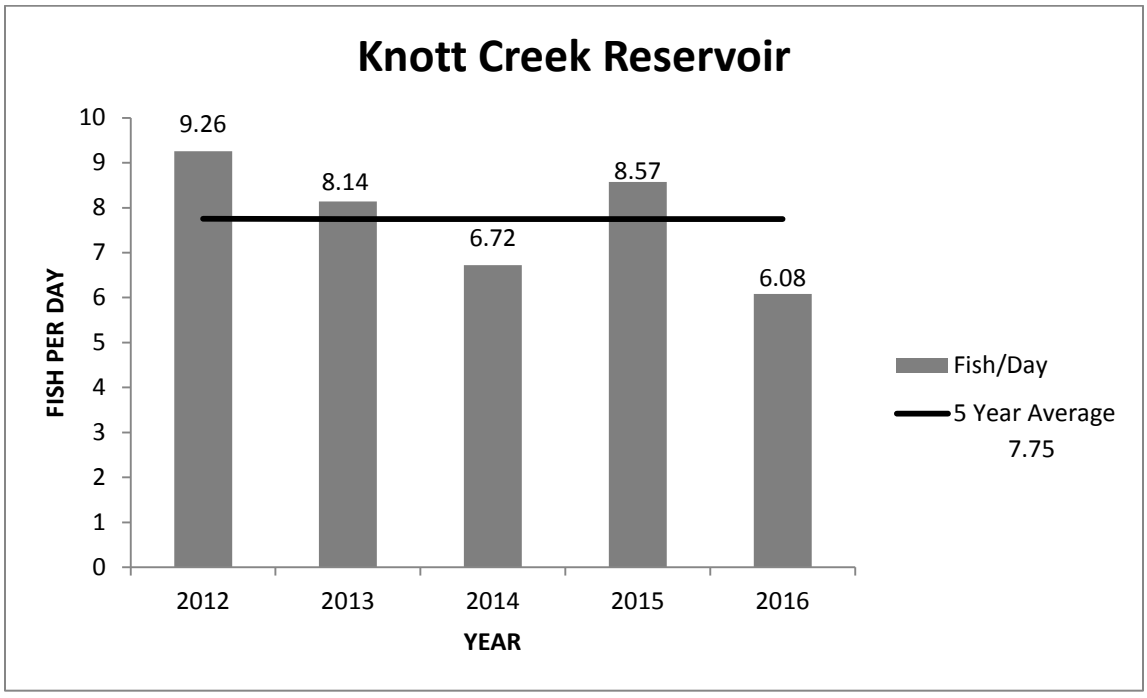

Figure 1. Knott Creek Reservoir Angler Questionnaire fish/day, 2012-2016.

Seven anglers submitted drop-box forms in 2017. The average angler satisfaction rating for angling experience was 1.31, size of fish 1.25, and number of fish caught 0.88. Angler success was 5.25 fish per angler and 0.85 fish per hour. The angler drop-box data is summarized in Table 2 and 3.

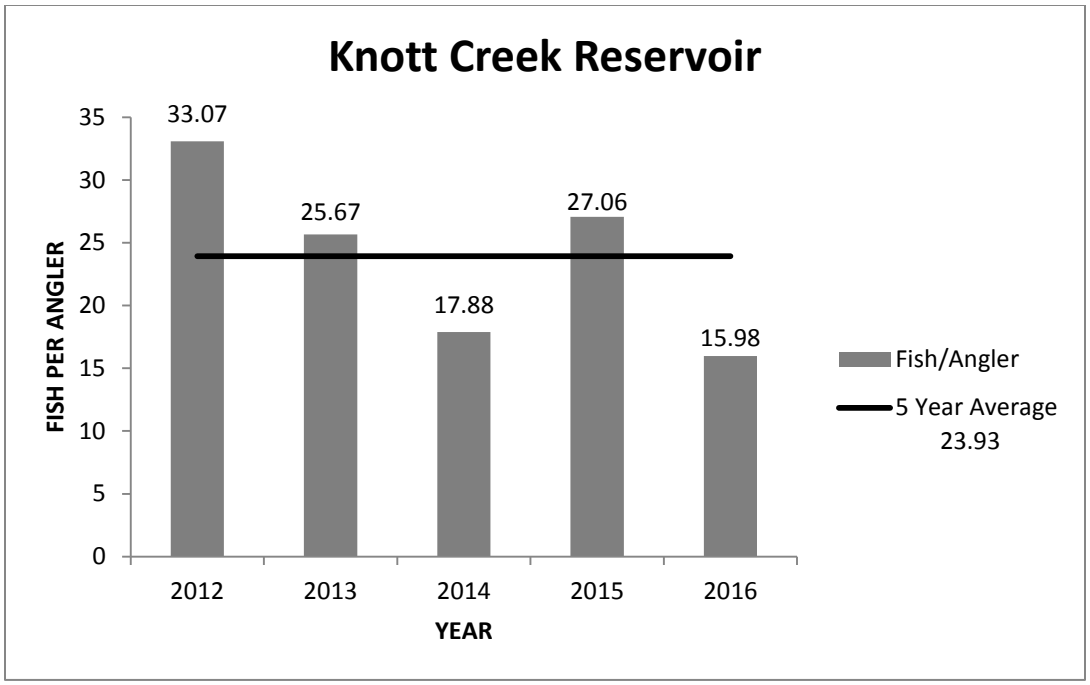

Figure 2. Knott Creek Reservoir Angler Questionnaire fish/angler, 2012-2016.

Table 2. Knott Creek Reservoir Monthly Drop Box Angler Use and Success Data.

Month	# of Anglers	# of Angler Hours	Angler Satisfaction			# of Fish Caught	# of Fish Harvested	Fish/ Angler	Fish/ Hour
			Angling Experience	Size of Fish	# of Fish				
June	1	3	2	2	1	1	1	1	0.33
July	4	56	1.25	1	0.5	65	0	16.25	1.16
August	1	4	1	1	1	7	1	7	1.75
October	1	2	1	1	1	2	0	2	1
Annual Summary	7	65	1.31	1.25	0.88	75	2	5.25	0.85

Table 3. Drop-Box Length Frequency and Species Composition Data.

Species	# Caught	Size Class							
		<10”	10-11.9”	12-13.9”	14-15.9”	16-17.9”	18-19.9”	20-22”	>22”
Rainbow trout	48	6	2	10	8	13	7	2	0
Tiger trout	17	1	2	4	3	7	0	0	0
Bowcutt trout	10	3	0	4	0	0	2	1	0

Angler contacts were made on the opening weekend of June 10 and 11, 2017. Anglers fished primarily from float tubes or boats and they were contacted via boat while out on the water. Anglers were also contacted while on shore. Angler success averaged 4.29 fish per angler and 0.66 fish per hour. The data from angler contacts is summarized in Table 4.

Table 4. Opportunistic Angler Surveys, June 10-11, 2017.

Month	Survey Days	Anglers	Angler Hours	Fish	Fish/Angler	Fish/Hour
June	2	21	136.5	90	4.29	0.66
Summary	2	21	136.5	90	4.29	0.66

Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when on site. At the start of the fishing season, Knott Creek Reservoir was at approximately 1,750 AF, which was 750 AF above legal minimum pool of 1,000 AF of water for the reservoir. Knott Creek Ranch did release water for irrigation use in 2017, however, in November, the reservoir was near the 1,000 AF minimum pool.

During each site visit to Knott Creek Reservoir, a general habitat assessment was conducted that included water temperature, water level, water clarity, and road conditions. Table 5 summarizes the 2017 assessment. The water clarity remained good to fair throughout the 2017-fishing season. In late June and early July, an algae bloom occurred along with a small-scale fish die-off. Approximately 200 fish carcasses were observed during this event.

Table 5. General Habitat Assessments at Knott Creek Reservoir, 2017.

Date	Water Temperature (°F)	Water Level	Water Clarity	Road Conditions	Comments
5/24/2017	51	75%	Clear	Fair/Poor	
6/10/2017	63	75%	Clear	Fair/Poor	
6/19/2017	68	75 %	Clear	Fair/Poor	
7/17/2017	70	70%	Green	Fair/Poor	Algae bloom occurring
7/27/2017	72	65%	Green/Clear	Fair/Poor	Algae bloom occurring
9/19/2017	58	65%	Clear	Fair/Poor	
11/2/2017	48	50%	Clear	Fair/Poor	

Concurrent to angler contacts made on the fishing opener, collect body condition data (relative weight or K factor) on rainbow trout, tiger trout, and bowcutt trout caught by anglers. Five rainbow trout were measured and weighed on June 10, 2017 to collect data on body condition. Relative weight is an index that is calculated as:

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

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) used to analyze rainbow trout was developed by Simpkins and Hubert 1996. The relative weight index uses 100 as a benchmark for the standard body condition of fish. Measures that are over 100 are considered good condition and measures less than 100 are considered to be in poorer condition with severity depending on the distance from the benchmark of 100 (Guy and Brown 2007).

Only a small sample of five rainbow trout was measured and weighed from Knott Creek Reservoir. The relative weight index ranged from 73.9 to 92.7 with an average of 86.54 (Table 6). All rainbow trout were below the benchmark of 100.

Table 6. Body Condition Measures of Rainbow Trout in Knott Creek Reservoir - 2017

Knott Creek Reservoir 2017					
Species	**Observed Lengths (mm)**	**Observed Weights (*W*) (g)**	**Standard Weight (*Ws*)**	**Relative Weight Index (*Wr*)**	
Rainbow	390	480	649.2	73.94	
Rainbow	410	680	755.19	90.04	
Rainbow	400	650	700.86	92.74	
Rainbow	330	330	391.73	84.24	
Rainbow	430	800	872.19	91.72	
				86.54	Average

Monitor Knott Creek upstream of Knott Creek Reservoir in the summer and fall using visual observations and 2 days of spot electroshocking for juvenile trout. Electroshocking Knott Creek upstream of the reservoir did not take place in 2017 due to low flows.

MANAGEMENT REVIEW

Angler success reported from the 2017 angler drop-box, 2016 mail-in angler questionnaire, and 2017 opportunistic angler contacts were consistent with standards of the assigned Coldwater, Trophy Fisheries Management Concept. Angler satisfaction ratings from the 2017 angler drop-box survey were all positive ratings. Angler success rates for the 2016 mail-in angler questionnaire survey were just slightly below the 5-year average for fish per angler and fish per day. Angler success rates from the 2017 angler drop box were 0.85 fish per hour and 5.25 fish per day. Angler success for a Coldwater Trophy Fishery Concept should range between 0.5 and 1.7 fish per day and zero to 1.0 fish per angler. Knott Creek Reservoir is meeting the Coldwater Trophy Fishery Concept based on angler success rates.

Five rainbow trout were measured and weighed in order to collect information on body condition. The relative weight index for these fish ranged from 73.9 to 92.7 with the average being 86.54, which is below the benchmark of 100, which is considered to be in good condition. Several factors can influence relative weight such as the time of year fish are sampled, pre-spawn, and post-spawn fish. This was the first year trout were measured and weighed to assess body condition. Over time, a standard weight can be developed specifically for trout in Knott Creek Reservoir, but it will require sampling a larger number of fish at different times of the year over several years.

An algae bloom occurred at the reservoir in late June and early July resulting in a die-off of approximately 200 trout. This is not uncommon at Knott Creek Reservoir. The severity of fish die-offs is driven by the duration and the intensity of the algae

bloom. During the 2017 algae bloom, water was released from the lower outlet structure on the dam. This is done in order to increase water circulation in the reservoir. Typically, water is released from the upper outlet structure that is set at the minimum pool water level. After releasing water from the lower outlet structure for approximately one week, the algae bloom and the resulting fish die-off seemed to subside. It is not exactly known if releasing water from the lower outlet structure plays a role in algae bloom duration and severity, but preliminary evidence indicates that this helps control reoccurring algae blooms.

RECOMMENDATIONS

- Conduct a general fisheries assessment through opportunistic angler contacts, 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.
- Collect fish condition data (relative weight) on rainbow trout, tiger trout, and bowcutt trout.
- Monitor Knott Creek upstream of Knott Creek Reservoir in the summer and fall using visual observations and 2 days of spot electroshocking for juvenile trout.

REFERENCES

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