

NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORTS

F-20-49
2013

SQUAW CREEK RESERVOIR
WESTERN REGION



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

Table of Contents

<u>Contents</u>	<u>Page</u>
SUMMARY	1
BACKGROUND	1
OBJECTIVES and APPROACHES	2
PROCEDURES	2
FINDINGS	3
MANAGEMENT REVIEW	8
RECOMMENDATIONS	9

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

List of Figures

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Gill Netting Survey – Channel Catfish Length Frequency	6
2	Gill Netting Survey – Brown Trout Length Frequency	7
3	Gill Netting Survey – Largemouth Bass Length Frequency	7

List of Tables

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Stocking Summary - 2013.....	4
2	Stocking History – 2008 to 2012	5

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

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Squaw Creek Reservoir*
Period Covered: *January 1, 2013 through December 31, 2013*

SUMMARY

The mail-in angler questionnaire data estimated use at 522 anglers and 1,779 angler days in 2012. Total catch was 9,105 fish and the success rate was 5.12 fish per angler day. Although the number of fish per day catch rate was on par with recent years, the number of anglers, number of days, and number of fish reported are all well below the 33 year average (1980 to 2012) for the reservoir and, in most cases, the lowest estimates since the early 2000's.

Squaw Creek Reservoir received 11,055 hatchery-reared trout in 2013. This includes 5,039 catchable Tahoe and Eagle Lake strains of rainbow trout, 2,015 catchable bowcutt trout, and 4,001 catchable Sheep Creek-strain brown trout. In addition, the reservoir also received 7,000 sub-catchable channel catfish.

Water conditions (quantity and quality) were documented throughout the summer and fall at Squaw Creek Reservoir. The reservoir remained at or near capacity throughout 2013.

A gill net survey was conducted in September. A total of 64 fish were captured in the three gill nets consisting of 34 channel catfish, 21 brown trout, 6 largemouth bass, 2 bullheads, and a single green sunfish. Total catch rate for the gill netting effort was 0.80 fish per net hour.

An alarming aspect from both angler reports and the gill net survey was the noticeable lack of rainbow and bowcutt trout. In each of the past two years (2012 and 2013), fish kills occurring in late summer have been reported at Squaw Creek Reservoir. Although neither was reported to be severe, the majority of fish killed in both instances was reported to be rainbow and bowcutt trout. At this juncture, the cause of these kills remains a mystery. If kills of stocked rainbow trout continue in the future, consideration concerning the number and timing of stocked rainbow trout should be taken.

At this time, Squaw Creek Reservoir appears to be satisfying the coldwater and warmwater General Fishery Management Concepts.

BACKGROUND

Squaw Creek Reservoir is located in northern Washoe County, approximately 20 mi north of Gerlach. At maximum capacity, the reservoir is 47.5 SA, stores 1,200 acre-

ft, and is 45 ft deep (spillway elevation). Of the two tributaries to the reservoir, the east tributary flows from a warmwater spring.

The reservoir was constructed in 1952 as a private reservoir for water storage. The Nevada Department of Wildlife negotiated with the Holland Land and Livestock Company and agreed to manage the fishery as long as the reservoir would remain open to public fishing. Mr. Jaksick is the present owner of the land and water rights for the reservoir. A history of public abuse at the reservoir has prompted the landowner to post signs that notify the public of a set of 'regulations' for the reservoir.

The fishery at Squaw Creek Reservoir consists of hatchery maintained populations of rainbow, bowcutt, and brown trout. Tiger trout have also been stocked in recent years although carryover of the species is somewhat questionable. The reservoir also supports wild, self-sustaining populations of largemouth bass, Alabama spotted bass, bullhead catfish, and green sunfish. The reservoir is managed under the coldwater and warmwater General Fishery Management Concepts, which establish objectives for angler success rates of 0.30 to 1.25 fish per hour and 2.0 to 3.5 fish per angler day.

OBJECTIVES

General Management Objectives:

- Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts and mail-in angler questionnaire data.
- Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when onsite.
- Continue to support the establishment of a long-term conservation easement that allows public access and recreational opportunities at the reservoir.
- Pursue the installation of an angler survey drop-box if the conservation easement is established.
- Electroshock two established transects during one night in the fall.
- Set gill nets for three net nights in the fall.
- Augment the reservoir with 2,500 channel catfish.

PROCEDURES

Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts and mail-in angler questionnaire data. Scheduled and opportunistic visits were made to Squaw Creek Reservoir throughout the year for the purpose of collecting creel survey data to contact the greatest number of anglers as possible. Information on angler harvest, effort, and origin were recorded. Harvested fish were measured to fork length in millimeters.

Angler use and success at Squaw Creek Reservoir was also assessed through the Department's Mail-in Angler Questionnaire Survey. Angler questionnaire data is derived from a survey that is mailed to about 10 percent of license purchasers from the

previous year.

Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when onsite. General habitat conditions were documented in June during an initial site visit and again throughout mid to late summer during visits to other northern Washoe County reservoirs. Habitat assessment was based strictly on visual observations of lake level and clarity.

Continue to support the establishment of a long-term conservation easement that allows public access and recreational opportunities at the reservoir. NDOW personnel remain vigilant in exploring various opportunities pertaining to the establishment of a long-term conservation easement with the landowner at Squaw Creek Reservoir.

Pursue the installation of an angler survey drop-box if the conservation easement is established. Attempts are ongoing to work with the landowner at Squaw Creek Reservoir to allow NDOW to install a volunteer, creel survey drop-box.

Electroshock two established transects during one night in the fall. This objective was not completed in 2013 due to man-time constraints and attention given to other projects. Efforts were spent researching and surveying for New Zealand mud snails in the Truckee River as well as assisting other Western Region biologists in various projects.

Set gill nets for three net nights in the fall. Three 150 ft x 6 ft experimental gill nets were set at 1200, 1210, and 1220 hrs on September 17. These nets consist of five panels of 1/2, 3/4, 1, 1 1/2, and 2 in mesh. One net (Set 1) was set along the west shoreline at the south end of the reservoir at a depth of approximately 25 ft (7.6 m). Another net (Set 2) was set along the west shoreline roughly halfway between the north and south end of the reservoir in water approximately 18 ft (5.5 m) deep. The third pelagic net (Set 3) was set in the center of the north end of the reservoir running north to south at a depth of 18 ft (5.5 m). The nets were pulled at 1440, 1450, and 1500 hrs respectively on September 18. All fish captured were identified, measured (salmonids to fork length and total length for other species), and weighed with a hand-type spring scale. Live fish were returned to the reservoir after processing.

Augment the reservoir with 2,500 channel catfish. A total of 7,000 sub-catchable channel catfish averaging 5 in (127 mm) in length was stocked into Squaw Creek Reservoir in late-June.

FINDINGS

Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts and mail-in angler questionnaire data. Opportunistic angler contacts were attempted on three days at Squaw Creek Reservoir in 2013. No anglers were contacted on each occasion.

The mail-in angler questionnaire data estimated use at 522 anglers and 1,779 angler days in 2012. Total catch was 9,105 fish and the success rate was 5.12 fish per angler day. Although the number of fish per day catch rate was on par with recent years, the number of anglers, number of days, and number of fish reported are all well below the 33 year average (1980 to 2012) for the reservoir and, in most cases, the lowest estimates since the early 2000's.

Stocking Program

Squaw Creek Reservoir received 11,055 hatchery-reared trout in 2013 (Table 1). This includes 5,039 catchable Tahoe and Eagle Lake strains of rainbow trout, 2,015 catchable bowcutt trout, and 4,001 catchable Sheep Creek-strain brown trout. In addition, the reservoir received 7,000 sub-catchable channel catfish.

Table 1. Squaw Creek Reservoir Stocking Summary – 2013

Date	Species	Number	Size (in.)	Strain
2/19/13	Rainbow	1,499	9.1	Eagle Lake
4/10/13	Rainbow	1,502	10.5	Eagle Lake
10/2/13	Rainbow	2,038	9.8	Tahoe
Rainbow Total		5,039	9.1 – 10.5	
10/2/13	Bowcutt	2,015	10.2	Bowcutt
Bowcutt Total		2,015	10.2	
4/10/13	Brown	4,001	9.5	Sheep Creek
Brown Total		4,001	9.5	
6/27/13	Channel Catfish	7,000	5.0	Channel Catfish
Channel Catfish Total		7,000	5.0	
Total (All Fish)		18,055		

Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when onsite. Water conditions at Squaw Creek Reservoir typically remain stable from one year to the next and are not subject to the usual annual drawdowns of other western reservoirs. The reservoir remained at or near capacity in 2013.

Continue to support the establishment of a long-term conservation easement that allows public access and recreational opportunities at the reservoir. At this juncture, the landowner works with us on a short-term basis.

Pursue the installation of an angler survey drop-box if the conservation easement is established. At this juncture, the landowner would not like to see an angler drop-box to installed at Squaw Creek Reservoir.

Electroshock two established transects during one night in the fall. This objective was not completed in 2013 due to man time constraints and attention given to other projects. Efforts were spent researching and surveying for New Zealand mud snails in the Truckee River as well as assisting other Western Region biologists in various projects.

Table 2. Squaw Creek Reservoir Stocking History 2008 – 2012

Year	Species	Number	Size Range (in.)
2008	Rainbow	26,922	7.2
	Bowcutt	2,078	9.7
2008 Total		29,000	
2009	Rainbow	6,030	8.9 – 9.3
	Brown	1,019	7.7
	Bowcutt	4,132	9.9 – 10.0
	Tiger	1,018	7.1
2009 Total		12,199	
2010	Rainbow	3,203	9.5 – 9.7
	Brown	4,002	10.3
	Bowcutt	2,001	9.5
	Tiger	1,001	10.3
	Channel Catfish	4,810	7.0
2010 Total		15,017	
2011	Rainbow	7,032	10.0 – 10.4
	Brown	3,997	10.5
	Bowcutt	2,001	9.7
	Channel Catfish	3,500	Unknown
2011 Total		16,530	
2012	Rainbow	7,602	9.0 – 10.0
	Brown	4,001	10.2
2012 Total		11,603	
Total		84,349	

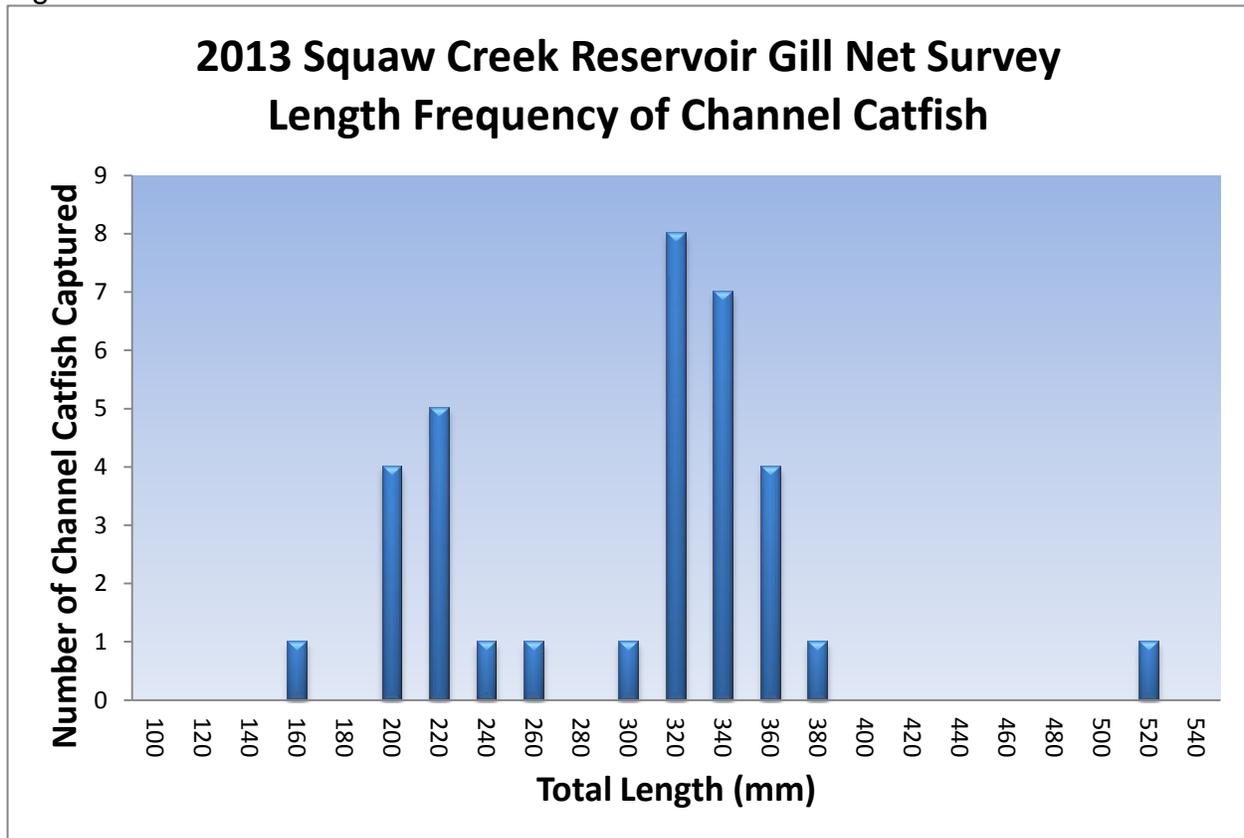
Set gill nets for three net nights in the fall. A gill net survey was conducted in September. A total of 64 fish was captured in the 3 gill nets consisting of 34 channel catfish, 21 brown trout, 6 largemouth bass, 2 bullheads, and a single green sunfish. Total catch rate for the gill netting effort was 0.80 fish per net-hour. Although not enumerated, a number of crayfish were also captured in the nets.

Channel catfish were captured at a rate of 0.43 fish per net-hour and accounted for 53.1% of the total catch during the survey. The 34 channel catfish captured ranged in length from 5.98 in (152 mm) to 19.88 in (505 mm) with an average total length of 11.37 in (288 mm). Weight of the catfish caught averaged 0.59 lbs (267 g) and ranged from 0.09 lbs (40 g) to 3.70 lbs (1,680 g).

Length frequency analysis of the channel catfish captured reveals four distinct age classes inhabiting the reservoir (Figure 1). A length breakpoint of 160 mm separates a load of 7,000 channel catfish that was stocked just three months prior to the survey in June. A low representation of this size class (one fish) should not be cause for alarm. Because they were stocked at an average size of 5.0 in (127 mm), most were likely too small to be caught in the gill nets. Length breakpoints of 260 mm and 380 mm separate an additional two size classes, respectively. The smaller of these size classes represent fish that were stocked in 2011 (3,500 fish of unknown size), while the other represents fish stocked in 2010 (4,810 fish at an average length of 7.0 in). The remaining age class is represented by a single fish measuring 19.88 in (505 mm)

and weighing 3.70 lbs (1,680 g) that was stocked prior to 2010.

Figure 1.



Brown trout accounted for 32.8% of the total catch and they were captured at a rate of 0.26 fish per net-hour. The 21 brown trout captured ranged in size from 8.46 in (215 mm) to 11.22 in (285 mm) and averaged 9.92 in (252 mm) in length (Figure 2). Weight averaged 0.36 lbs (161 g) and ranged from 0.22 lbs (100 g) to 0.48 lbs (220 g). All brown trout captured in survey activities represent a single size class belonging to a load of 4,001 brown trout that were stocked in April of this year at an average length of 9.5 in (241 mm).

Largemouth bass were captured at a rate of 0.08 fish per net-hour and accounted for 9.4% of the total catch. The 6 largemouth bass captured ranged in size from 3.23 in (82 mm) to 12.64 in (321 mm) and averaged 5.79 in (147 mm) in total length. Weight averaged 0.33 lbs (150 g) and ranged from 0.04 lbs (20 g) to 1.10 lbs (500 g). Largemouth bass captured in survey activities represent two distinct size classes (Figure 3). Fish shorter than 160 mm represent class II or younger fish. These smaller sized largemouth bass provide positive evidence of continued reproduction and recruitment of the population at Squaw Creek Reservoir. A single adult fish of spawning size measuring 12.64 in (321 mm) represents the remaining size class.

Figure 2.

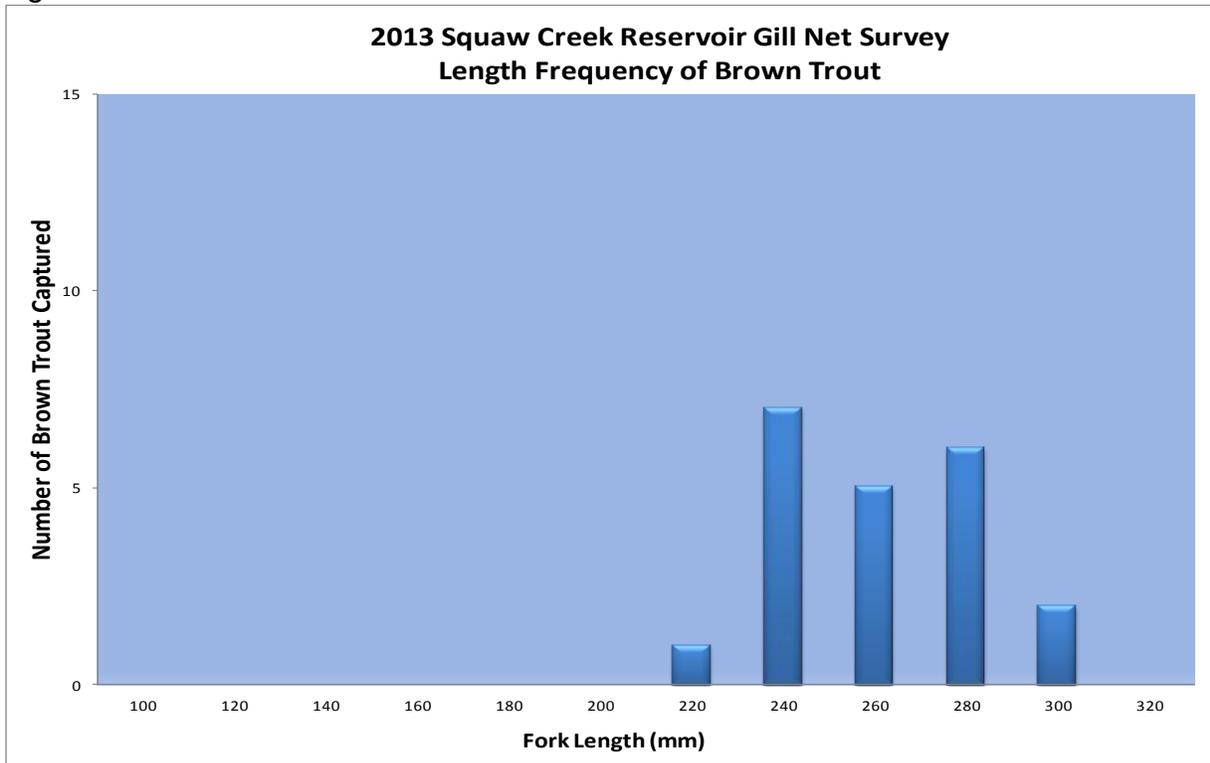
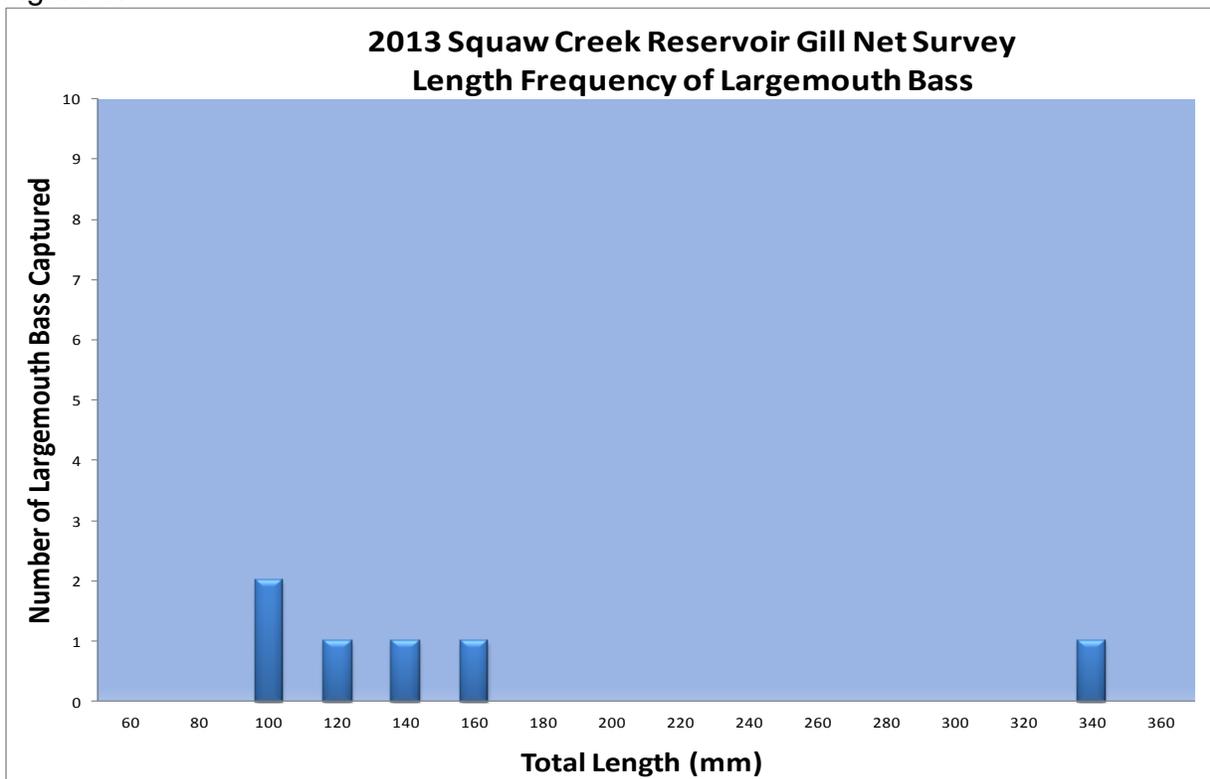


Figure 3.



The remaining fish captured in the gill net survey were comprised of two bullheads and a single green sunfish. These fish accounted for a combined 4.69% of the total catch and a combined catch rate of 0.04 fish per net-hour. The single green sunfish measured 5.5 in (139 mm) and weighed 0.13 lbs (60 g). The bullheads were of similar size and averaged 9.74 in (247 mm) in length with an average weight of 0.51 lbs (230 g).

Excluding the rainbow trout, numbers, size, species ratio, and body condition of fish captured in the gill net survey are on par with previous surveys of the reservoir. Much of this can likely be attributed to continued favorable water conditions found at the reservoir. During periods of drought when many local reservoirs are susceptible to adverse habitat conditions, the constant water source and water levels at Squaw Creek Reservoir prove conducive to the maintenance of its fishery. Reservoir and fishing conditions should remain favorable throughout 2014 and beyond.

Augment the reservoir with 2,500 channel catfish. A total of 7,000 sub-catchable channel catfish averaging 5.0 in (127 mm) in length were stocked into Squaw Creek Reservoir in late-June.

MANAGEMENT REVIEW

Angler use and success rates documented in the Mail-in Angler Questionnaire Survey exceed the guidelines of a General Fishery Management Concept, which calls for 2.0 to 3.5 fish per angler day. This fishery is popular with anglers for producing high catch rates and an opportunity to fish in a semi-remote setting. In the past two years (2012 and 2013), angler reports and fish population surveys indicated moderate to severe summer fish kills with the reservoir's rainbow trout populations.

The remote location of this reservoir complicates the collection of angler data through angler contacts. An angler drop-box would be useful for collecting specific angler data throughout the year.

An alarming aspect from both angler reports and the gill net survey was the noticeable lack of rainbow and bowcutt trout caught. This is especially worrisome given the fact that 3,001 rainbow trout had been stocked this year prior to the gill net survey and in addition to the 7,602 rainbow trout that were stocked in 2012. In each of the past two years (2012 and 2013), fish kills occurring in late summer have been reported at Squaw Creek Reservoir. Although neither was reported to be severe, the majority of fish killed in both instances was reported to be rainbow and bowcutt trout. A documented fish kill concerning predominantly trout was also documented in 2007. Subsequent to the fish kill reported in August of this year, a basic suite of water quality parameters was performed at the reservoir that showed all tested factors within normal levels. Because Squaw Creek Reservoir is fed by a constant water supply from two springs, these kills are peculiar. Even more puzzling is the fact that brown trout stocked at the same time as rainbow trout this year were present in the gill nets. At this juncture, the cause of these kills remains a mystery. If kills of stocked rainbow trout

continue in the future, consideration concerning the number and timing of stocked rainbow trout should be taken.

RECOMMENDATIONS

General Management Objectives:

- Conduct a general assessment of angler use, success, and harvest through opportunistic angler contacts and mail-in angler questionnaire data.
- Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when onsite.
- Continue to work towards establishing a conservation easement that allows public access and recreational opportunities at the reservoir over the long-term.
- Pursue the installation of an angler, creel survey drop-box if the conservation easement is established.
- Electroshock two established transects during one night in the fall.
- Conduct that gill net surveys every two years to document the status and trend of the Squaw Creek Reservoir fishery.
- That consideration is given to the timing and numbers of rainbow trout stocked in the future if fish kills continue.

Prepared By: Chris Crookshanks
Biologist III
Western Region

Date: February 9, 2014