

**STATE OF CALIFORNIA
THE RESOURCES AGENCY**

**CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH CENTRAL REGION**

**DONNER LAKE, NEVADA COUNTY
2014 CREEL SURVEY AND
KOKANEE FISHERY EVALUATION STUDY**

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Abstract

Donner Lake is a natural alpine lake located in Nevada County and is part of the Truckee River watershed. The lake was historically stocked with rainbow trout (*Oncorhynchus mykiss*), kokanee (*Oncorhynchus nerka*), lake trout (*Salvelinus namaycush*), and brown trout (*Salmo trutta*). It is currently being stocked with various size classes of rainbow trout, and fingerling kokanee. This study examined angler catch, preferences, and demographics. Data was collected using a standardized angler survey method. Results showed most anglers lived in Sacramento County, followed by Nevada and Placer County. Anglers using boats had the highest catch rates overall (1.77 fish per angler), but shore based anglers using bait had a measure of success as well (0.62 fish per angler). Overall angler satisfaction was reported at 85%, with a 0.42 catch per hour. 14 boat based anglers who specified fishing for kokanee caught 95% of the total kokanee. All 17 anglers who fished for kokanee or caught kokanee reported a 100% satisfaction with their overall experience. It is recommended that stocking levels be maintained and additional questions regarding the kokanee fishery be added to any future surveys.

Introduction

Donner Lake (Nevada County) is located on the eastern slope of the Sierra Nevada Mountains near the town of Truckee. This natural alpine lake was formed through a combination of faulting and glacial movement. It has a natural terminal moraine on the east end which serves as a dam. The lake is managed as a reservoir, supplementing the natural flow of the Truckee River during droughts through its jointly owned operators Sierra Pacific Power Co. and the Truckee-Carson Irrigation District (Truckee Storage Project, 2011).

Donner Lake historically held two forms of Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*): the Pyramid Lake sub-species coming up river to spawn near Donner Creek; and their lake form known as “silver trout” (California Legislature, Senate, 1872). Due to a combination of habitat loss, overfishing, and possibly parasites/competition from introduced species, cutthroat trout were no longer found in Donner Lake by 1890 (Richards, 2004). Currently, the only sport fish in the lake are introduced species that spawn in the lake or are stocked by CDFW. Stocked species consist of rainbow trout (*Oncorhynchus mykiss*) (RT), kokanee salmon (*Oncorhynchus nerka*) (KOK), lake trout (*Salvelinus namaycush*) (LT), and brown trout (*Salmo trutta*) (BN). RT and KOK are stocked annually. RT is stocked at catchable sizes, and has a small put-and-grow component as well. The KOK are managed exclusively as a put-and-grow fishery as part of CDFW’s Inland Salmon Program (Hopelain, 2003). LT were last stocked in Donner Lake as fingerlings in May 2008 by the American River Hatchery (California Department of Fish and Wildlife). BN have not been stocked since 1979 when 200 catchable sized fish were released. Despite limited stocking, BN are still present in the lake.

In March through June of 2014, Donner Lake was stocked by California Department of Fish & Wildlife (CDFW) with fingerling and catchable size rainbow trout (RT), and fingerling size kokanee (KOK) (Table 1). Stocked RT came from the American River Hatchery and the Mokelumne River Hatchery. KOK were stocked by the Silverado Fisheries Base.

Table 1. —Stocking Data: Donner Lake 2013-2014.

Date	Species	Year Class	Size	Fish/Lb	Pounds	Number
6/23/2014	RT	12	Catchable	1.7	4000	6800
6/16/2014	RT	12	Catchable	2.3	5000	11500
6/16/2014	RT	12	Catchable	2.3	800	1840
6/3/2014	RT	13	Fingerlings	100	1000	100000
5/13/2014	RT	12	Catchable	1.9	2500	4750
4/9/2014	KOK	13	Fingerlings	222	225.2	49994
3/18/2014	RT	12	Catchable	1.6	3000	4800
10/17/2013	RT	11	Catchable	2.2	3000	6600
9/23/2013	RT	11	Catchable	2.3	1400	3220
8/30/2013	RT	11	Catchable	1.9	1400	2660
7/12/2013	RT	11	Catchable	2.9	1400	4060
5/31/2013	RT	11	Catchable	2.2	3000	6600
5/24/2013	KOK	12	Fingerling	121	413.2	49994
4/12/2013	RT	12	Catchable	5.1	3000	15300

The objectives of this creel survey were to:

- Examine Donner Lakes' overall fishery
- Determine whether anglers were satisfied with their experience
- Determine, whether stocked KOK are growing large enough to satisfy anglers
- Determine if stocked RT yield good catch rates in Donner Lake

Methods

Donner Lake is a little under 3 miles long, $\frac{3}{4}$ miles wide, and at full pool 9,500 surface acres. The lake sits at an elevation of 5,960 feet above mean sea level (Department of Water Resources, 2013). Donner Lake is surrounded by roads, although the Southeast end past China Cove is restricted to authorized vehicles only (Figure 1). Donner Memorial State Park, located on the east and south east shore provide campsites, day use areas, boat rentals, and fishing access (Donner Memorial State Park, 2015). Residential areas surround much of Donner Lake, limiting most of the public shore access to the south side of the lake. There is one public boat ramp in the

northwest corner of the lake (see Figure 1) operated by the Truckee Donner Recreation and Parks District. There is a boat launch fee at this marina. The Truckee Donner Recreation and Parks District also manages 37 free public piers on the north end of the lake (Parks and Facilities, n.d.). Due to these restrictions, most shore anglers were located at the marina, China Cove, and the public piers. This survey utilized on-site angler contact methods, using both roving and access point creels. Roving creels occurred most frequently. Of the total surveyed days, 15 (54%) were spent roving in a state truck, and 6 (21%) were utilized roving via boat. 25% of the time (7 days), clerks were stationed at the public boat ramp for an access point survey.



Figure 1. —Satellite view of Donner Lake. Imagery taken April 29, 2014 (Google Earth, 2014)

The survey attempted to utilize a two stage sampling design in which the sampling period was first stratified into weekend/weekday then stratified again by AM/PM (Malvestuto, 1996). The date selection was not purely random but dependent on staff availability, and budget restraints. The 2014 survey consisted of 28 days (17 weekdays; 11 weekend days) selected from March 3, 2014 through August 15, 2014. The number of days surveyed varied from month to month as staff availability allowed.

Contact was established in as courteous a manner possible, to minimize intrusion of the angler's leisure time. After the clerk identified themselves and what they were doing, anglers were asked if they would participate in the survey. If they were not willing, they were politely thanked for their time. If the angler agreed to participate, the angler was asked a series of questions aimed at analyzing Donner Lake's recreational sport-fishery. This survey examined:

- Angler origin
- Angling effort
- Catch rate
- Angler satisfaction
- Size of fish
- Species caught.

Zip codes were collected from surveyed anglers to determine the distance they traveled. Anglers were then categorized by county and displayed on a map of California. During the survey there were a number of anglers with unknown zip codes, who stated they were from Nevada. Since county is not needed for out of state anglers, these unknown zip codes were grouped under the zip code 89557.

Angler effort was determined by time spent actively fishing on the day surveyed. This was compared to the number of fish caught. A ratio-of-means or total-ratio was used to estimate angler success (Murphy & Willis, 1996). The catch per unit of effort (CPUE) in this survey was based on the number of fish caught per hour of fishing using hook and line (Pacific Fishery Management Council, 2013). This index was used to measure the economic efficiency of Donner Lake's fishery in 2014. Gear type and technique (boat vs. shore) was used in conjunction with CPUE to determine the most effective fishing methods.

Each angler was asked between one and three standardized “yes or no” questions to determine angling satisfaction. Every angler interviewed was asked the question: “Were you satisfied with your angling experience today?” In addition, the survey was designed to ask every angler regardless of catch the question “Were you satisfied with the number of fish caught?” Only anglers who caught one or more fish were asked “Were you satisfied with the size of fish caught?”

Kept fish were not measured to the nearest millimeter. Instead, anglers and creel surveyors estimated fish total length by inches which served to break individual fish into size categories. Since the surveys were often conducted by boat, this decision was made to eliminate the risk of losing an anglers’ catch when transferring fish from boat to boat. Lengths were not collected for the fish released by anglers. Species and the total number of fish caught were recorded for all fish whether kept or released.

Results

Angler zip codes were analyzed and presented by county (Figure 2). The county with the most anglers was Sacramento with 83, followed by Nevada and Placer County with 55 and 51 anglers respectively. Overall, Figure 2 shows a trend where the majority of anglers at Donner Lake originate along the Highway 50/I-80 corridor. Not included on the map are anglers from out of state including; 29 anglers from Nevada, 3 from Colorado, 3 from Missouri, and 1 from Indiana.

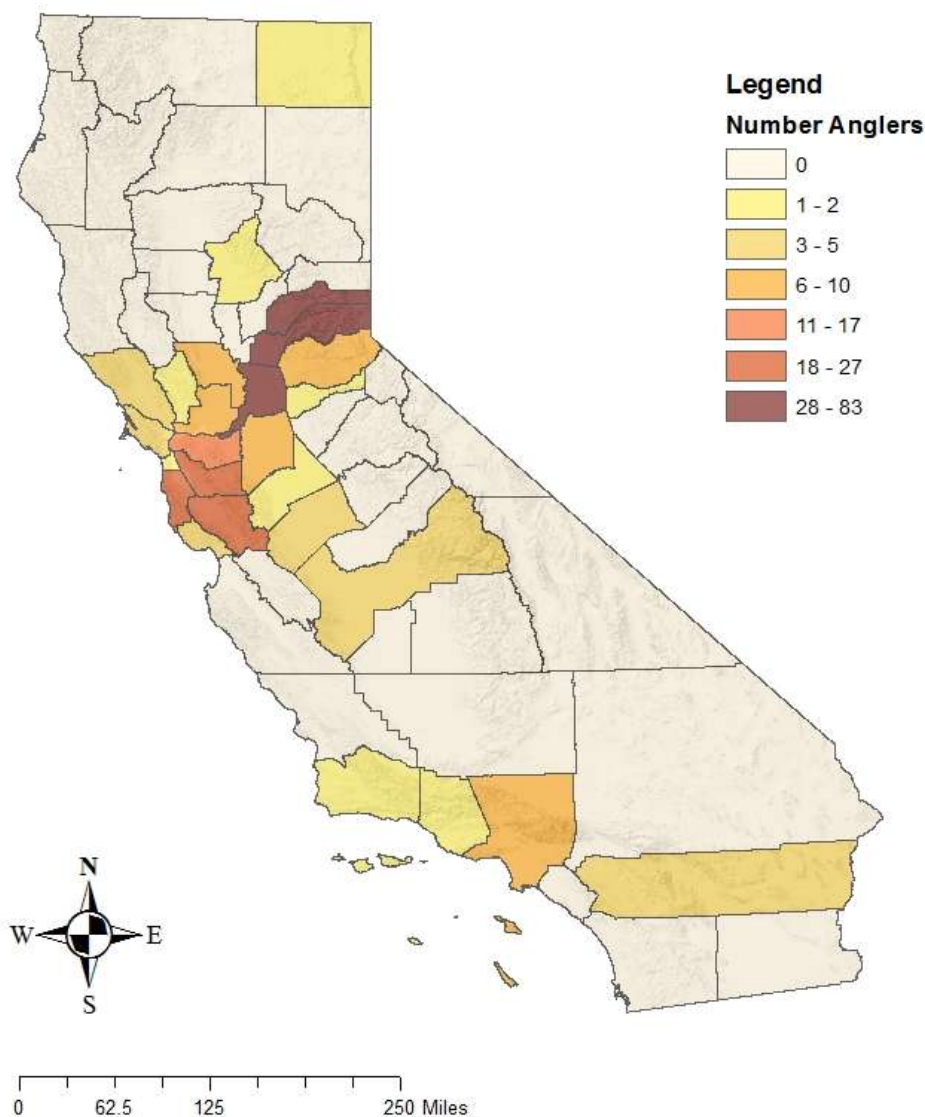


Figure 2. — Donner Lake 2014 angler density by county

During the 2014 fishing season, CDFW staff surveyed 399 anglers that fished a total of 770.13 hours for an average of 1.93 hours of fishing time per angler. A total of 323 fish were reported caught during the survey period for a CPUE of 0.42 fish per hour (Table 2). Eighty-four percent of the anglers were shore based, and sixteen percent of surveyed anglers were in boats. Anglers who fished in boats tended to have a higher catch rate than shore based anglers. Shore anglers averaged 0.62 fish per angler. Anglers in boats averaged 1.77 fish per angler. In Table 3, boat based anglers had a higher average CPUE at 0.53. In comparison, shore based anglers averaged a CPUE of 0.38. Boat based anglers had a higher CPUE in using bait and lures. Shore based fishermen were most successful when using bait.

Table 2. — General catch statistics at Donner Lake. 2014

Number Anglers	399
Total Fish	323
Number of Fish per Angler	0.81
Total Hours	770.13
Average CPUE	0.42

Table 3. — Catch statistics by technique and gear type at Donner Lake. 2014

Technique	Gear	# Anglers	Hours fished	Fish Caught	Fish per Angler	CPUE
Shore	Bait	271	426.5	183	0.68	0.43
	Bait/Lure	47	87.65	19	0.40	0.22
	Lure	15	26.5	6	0.40	0.23
	Fly	0	0	0	0.00	0.00
	Unknown	1	11	0	0.00	0.00
Boat	Bait	3	6	5	1.67	0.83
	Bait/Lure	11	28	10	0.91	0.36
	Lure	51	184.475	100	1.96	0.54
	Fly	0	0	0	0.00	0.00
	Unknown	0	0	0	0.00	0.00

To get a broader view on angler preferences and attitudes toward the fishery, all surveyed anglers were asked how they were enjoying their fishing experience that day. Approximately 85% of anglers were satisfied with their fishing experience and 58% were satisfied with the number of fish caught (Table 4). Out of the anglers who caught at least one fish, 87% were satisfied with the size of the fish they caught. Table 4 lists all the anglers who fished and/or caught KOK at Donner Lake during 2014. There were 15 anglers who specified fishing for KOK. Of those 15 anglers, 14 caught at least one KOK. There was 1 angler who fished for LT that caught KOK, and 1 angler who did not specify species that caught KOK. Out of these anglers, overall satisfaction was at 100% and fish number satisfaction was at 76%. Satisfaction with the size of KOK caught was at 94%.

Table 4. — Overall angler satisfaction and satisfaction of *Oncorhynchus nerka* (Kokanee) (KOK) anglers at Donner Lake 2014.

Angler Satisfaction		Yes	No	Unknown	Percent Satisfied
Overall angler satisfaction	Overall Fishing Experiences	340	54	5	85.21%
	Number of Fish Caught	230	104	65	57.64%
	Fish Size	111	15	2	86.72%
KOK angler satisfaction	Overall Fishing Experiences	17	0	0	100.00%
	Number of Fish Caught	13	3	1	76.47%
	Fish Size	16	1	0	94.12%

Figure 3 grouped all kept fish into size classes with approximately 1 inch bins and separated fish according to species. RT lengths ranged from 8 to 17 inches, with 10 inches being the most frequently kept size class. KOK kept a narrow range of sizes, from 8 to 14 inches. LT tended to be on the larger end of the scale, ranging between 16 and 27 inches. This figure indicates that the majority of fish kept were RT between 10 and 12 inches in total length.

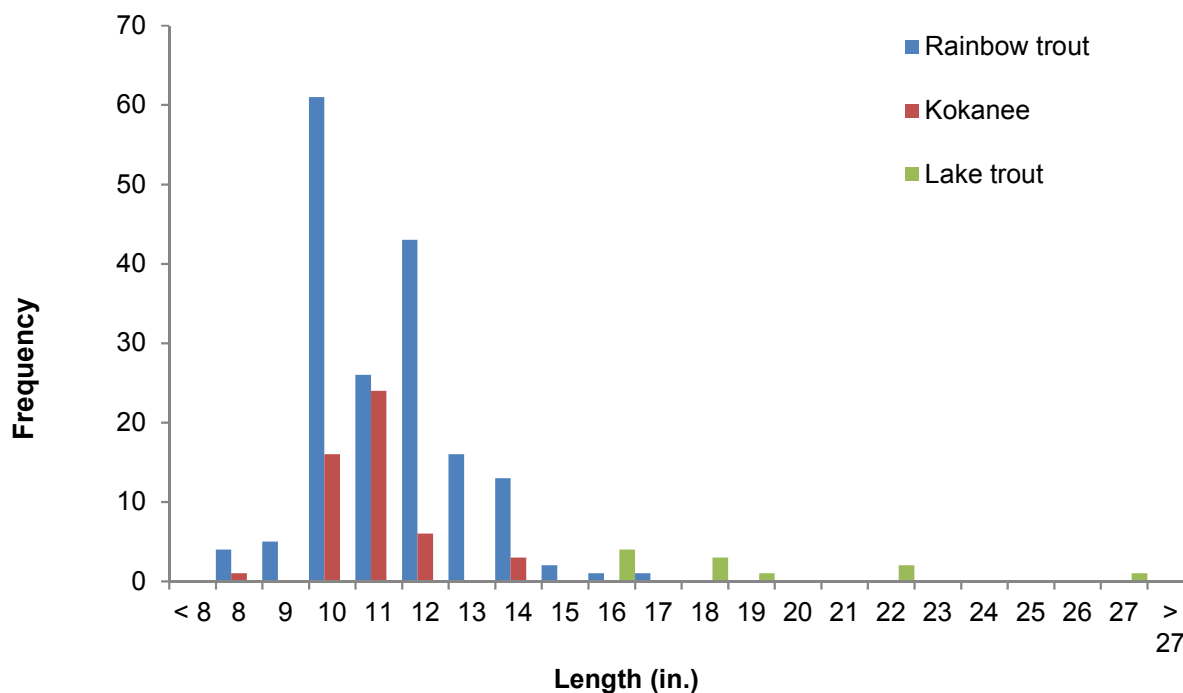


Figure 3. — Length frequency histogram of kept *Oncorhynchus mykiss* (RT), *Oncorhynchus nerka* (KOK), and *Salvelinus namaycush* (LT) in Donner Lake 2014.

The most frequently caught fish during the survey period was RT. In total there were 182 RT kept by anglers (out of 233 total kept fish), accounting for 78% of the total take (Table 5). Kept KOK accounted for 17%, while only 5% of the total take were LT. The only BN, 50% of the KOK, and 52% of the LT were released back into Donner Lake. Only 19% of the RT was released into the lake (Figure 4).

Table 5. — Fish caught at Donner Lake. Creel 2014.

Species	Count
Rainbow trout released	42
Rainbow trout kept	182
Kokanee released	40
Kokanee kept	40
Lake trout released	12
Lake trout kept	11
Brown trout released	1

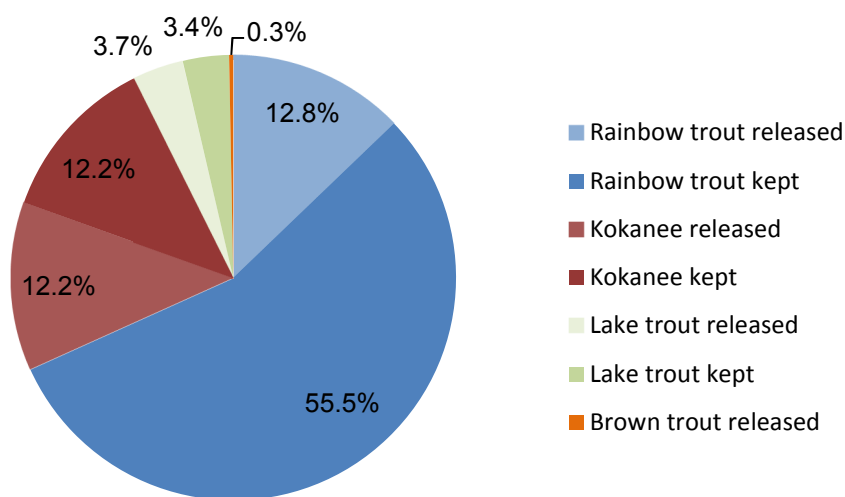


Figure 4. — Classification percentages of *Oncorhynchus mykiss* (rainbow trout), *Oncorhynchus nerka* (kokanee), *Salvelinus fontinalis* (lake trout), and *Salmo trutta* (brown trout) in Donner Lake 2014.

Stocking events of catchable sized RT were compared to kept and released RT trout in 2014 (Figure 5). Only anglers who specified angling for “RT”, “any”, or “trout” were included in the graph. Daily CPUE is shown with the assumption that all species of trout was caught with equal effort (Murphy & Willis, 1996), with only RT listed. The stocking events in March and April show little correlation to CPUE. After the last two stocking events, the CPUE initially increases. As time progresses and more of the hatchery trout are caught, the CPUE lowers.

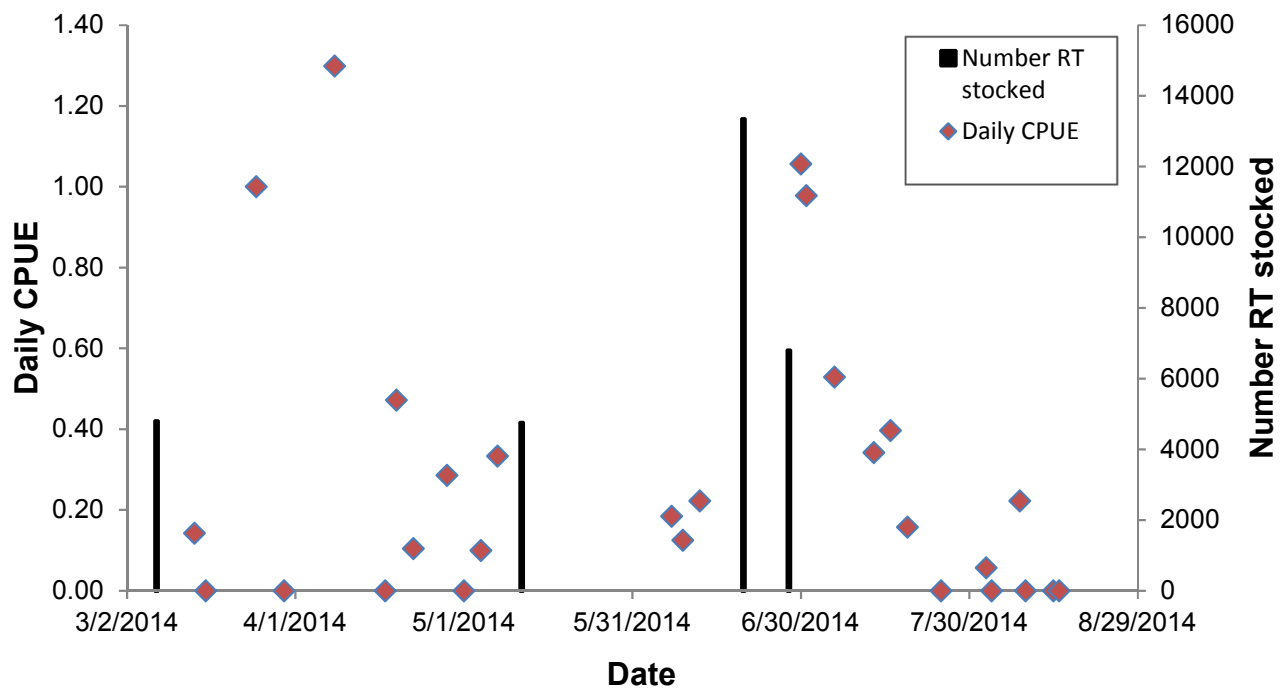


Figure 5. — Daily Catch Per Unit Effort (CPUE) of *Oncorhynchus mykiss* (RT) in Donner Lake between March and August 2014. Stocking events shown above consisted of RT of catchable size, released by the American River Hatchery and the Mokelumne River Hatchery.

Discussion

Most of the anglers lived within a couple hours' drive or were familiar with the Highway 50/I-80 corridor. There were a significant number of Nevada residents fishing the lake, which corresponds to the lakes proximity to the state border.

The majority of anglers fished from the shore and used bait (Table 3). Incidentally, bait was the most successful method used from shore. Boat based anglers mostly used lures and caught more fish per angler than shore based anglers. The most successful technique was bait fishing from a boat but the data is inconclusive since only 3 anglers surveyed used this method.

Angler satisfaction with the overall fishery at Donner Lake was at 85.21% (Table 4). This corresponds well with the average total CPUE of 0.42. If an angler spent a couple hours fishing Donner Lake in 2014, he or she had a reasonable chance of catching a fish. This also implies that most anglers surveyed enjoyed their overall fishing experience at Donner Lake. However, it was unclear if overall satisfaction meant the experience out on the lake or specifically their fishing experience. 65 (16%) of anglers were not asked whether they were satisfied with the numbers of fish they had caught that day (Table 4).

Anglers who specifically mentioned fishing for KOK or had caught KOK that day were listed as KOK anglers. These anglers had an overall satisfaction level of 100%. They were also overwhelmingly satisfied with the size and the numbers of fish caught. Anglers who specifically mentioned fishing for KOK caught 95% of the KOK reported. Anglers who fished for "anything that will bite" were far more likely to catch RT than any other fish. They were also more likely to be a shore angler than a boat angler. It is unknown how many anglers fished for KOK and when, failing to catch any, stated they were "fishing for anything that bites".

A total of 29,690 catchable RT and 100,000 fingerling RT were planted in Donner Lake from March through June of 2014. A pattern of catch is established in Figure 5 only towards the end of the surveyed year. This may have to do with the quantity of RT

stocked in Donner in June (over twice the catchable sized RT released than in March and May combined), exaggerating the trend. Weather conditions may have had a hand in the variable trend during the first half of the survey. Comments from the creel surveyors mention wind, rain, and snow on 5 surveyed days up to June 12. While a total of 224 RT were recorded caught during the 2014 season, it is impossible to determine an actual catch rate short of conducting a tag/recapture survey.

Approximately 49,994 fingerling KOK were planted during 2014 (Table 1). Any kept KOK that were caught in 2014 were holdovers from previous years. 23 LT were caught during the 2014 season. Although this number is lower than both the RT and KOK caught at Donner Lake, CDFW does not feel that it necessarily indicates a lack of LT in the lake. Generally LT are very elusive and occupy deep water (18 - 53 m) which makes them harder to catch than other trout in the lake (Page & Burr, 1991). There was only one angler who recorded catching a BN in Donner Lake in 2014. Since the fish was released back into the lake, the species wasn't verified. BN have not been stocked at Donner since 1979 (California Department of Fish and Wildlife). It is possible the fish caught was a wild BN, or misidentified. BN results are inconclusive because BN can be elusive and difficult to fish, and the sample size of BN anglers is too small to draw meaningful conclusions.

Recommendations

- Add a question in future surveys that asks how satisfied the angler was with the KOK fishery, and/or whether they were fishing for KOK that day
- Put an angler survey box in the marina for future data collection. The marina was a popular site for both boat and shore anglers.
- Put a sign at the marina with tips for proper fish ID. Kokanee can look similar to rainbow trout to the untrained eye.
- Maintain stocking rates at Donner Lake with fingerling KOK, catchable RT and fingerling RT.

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