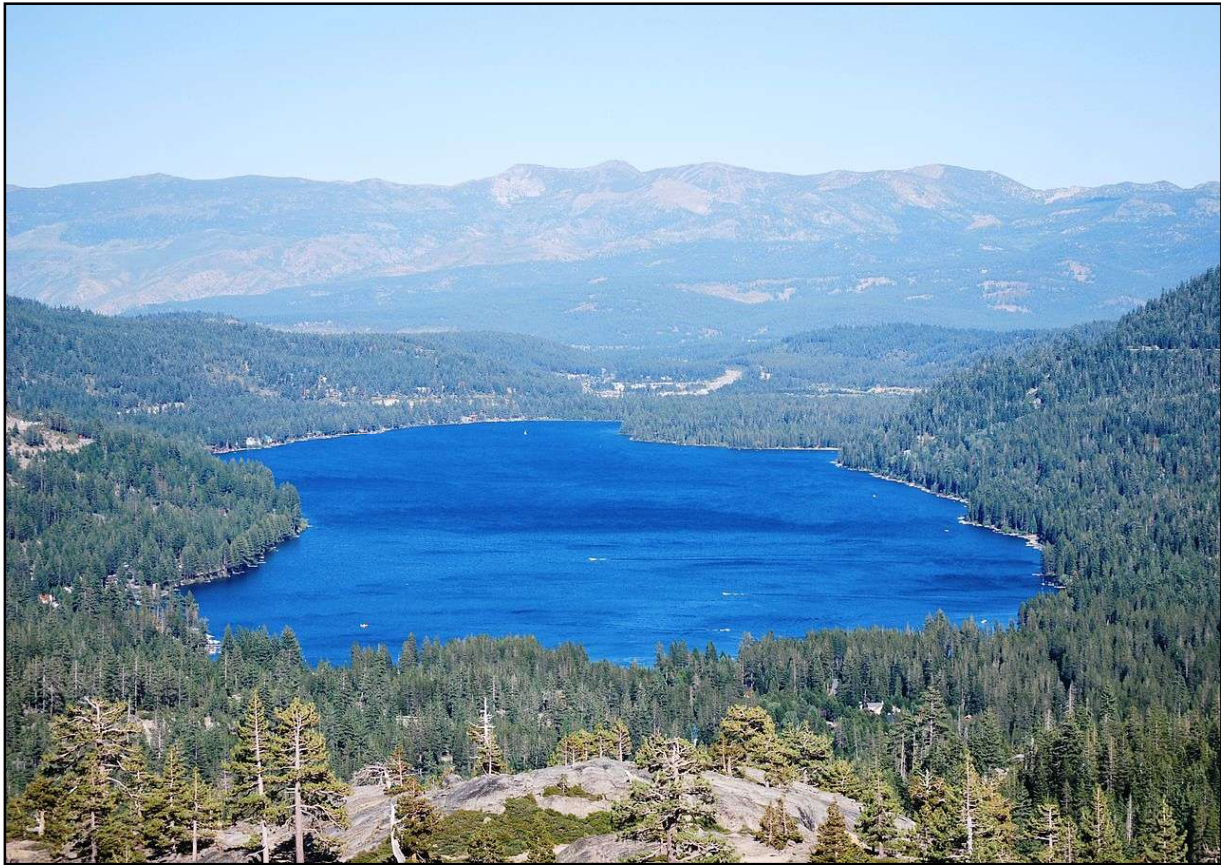


**State of California
California Department of Fish and Wildlife
North Central Region**

**Donner Lake, Nevada County
2015 Angler Survey Box Analysis**



Donner Lake (© Justin Smith / Wikimedia Commons, CC-BY-SA-3.0)

**Bjarni Serup & Mitch Lockhart
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Introduction

Donner Lake is a natural alpine lake located in Nevada County, California, near the city of Truckee and Interstate 80 at an elevation of 5,936 feet above mean sea level. It is three miles long and about ¾ miles wide with a surface area of approximately 1.5 square miles. The maximum water depth of Donner Lake is 328 feet with an average depth of 108 feet. The main tributaries are Summit Creek, Gregory Creek, Billy Mack Creek and numerous springs. Outflow is regulated by a small dam on Donner Creek, the lake's only outlet, which flows for approximately 2.5 miles until its confluence with the Truckee River. The dam at Donner Lake and the stored water are managed by Sierra Pacific Power Co. and Truckee Carson Irrigation District.

Donner Lake supports a coldwater fishery of brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), lake trout (*Salvelinus namaycush*) and kokanee salmon (*Oncorhynchus nerka*). Currently, the California Department of Fish and Wildlife (Department) actively stocks Donner Lake several times a year with rainbow trout and once a year with kokanee salmon (Table 1). The fishery is managed partly as a rainbow trout "put and take" fishery and partly as a kokanee salmon and rainbow trout "put and grow" fishery. The brown trout and lake trout populations are self-sustaining, wild fisheries established by historical plants. See Appendix I for a complete list of fish planted by the Department at Donner Lake since 2001.

Table 1. Department Planting Events at Donner Lake, 2010 to 2015

<i>Year</i>	<i>Species</i>	<i>Pounds or Number of Fish</i>	<i>Size</i>
2015	Kokanee salmon	25,000	Fingerling
2015	Rainbow trout	9,011 lbs	Catchable
2015	Rainbow trout	96,648	Fingerling
2015	Rainbow trout	100 lbs	Sub-Catchable
2014	Kokanee salmon	49,994	Fingerling
2014	Rainbow trout	15,300 lbs	Catchable
2014	Rainbow trout	100,000	Fingerling
2013	Kokanee salmon	49,997	Fingerling
2013	Rainbow trout	13,200 lbs	Catchable
2012	Kokanee salmon	49,994	Fingerling
2012	Rainbow trout	13,818 lbs	Catchable
2011	Kokanee salmon	50,048	Fingerling
2011	Rainbow trout	16,000 lbs	Catchable
2010	Kokanee salmon	50,050	Fingerling
2010	Rainbow trout	16,000 lbs	Catchable

Methods

In order to assess the fishery at Donner Lake, and its associated angler satisfaction, the Department installed an angler survey box (ASB) at the Donner Lake Boat Ramp, a public boat launch on the northwestern side of the lake (Figure 1), in September of 2014. The Donner Lake Boat Ramp is the primary public access point to launch a boat onto the lake, and is run by Nevada County's Truckee Donner Recreation and Park District.



Figure 1. Map of Donner Lake with the locations of Donner Lake Boat Ramp, Shoreline Park and China Cove marked. The Department's angler survey box (ASB) is installed at Donner Lake Boat Ramp.

At the ASB installation is a sign requesting anglers fill out a volunteer survey form regarding their catch, effort and satisfaction. The angler survey form includes questions regarding hours fished, type of gear and method used and the number of fish landed. In addition, successful anglers can report the size and species of fish landed and whether they kept or released their catch. Lastly, the survey includes three questions regarding the angler's satisfaction with: 1) overall angling experience; 2) size of fish; and 3) number of fish. Answers are recorded on a scale of -2 to 2, with "2" representing most satisfied and "-2"

representing least satisfied. The back of the survey form is reserved for any additional comments. See Appendix II for a copy of the 2015 survey form.

Results

The ASB at Donner Lake contained 36 answered forms in 2015. There was one form from December of 2014 and this form was added to December of 2015. One of the forms however, was filled out by a group of 24 boy scouts fishing for two days in July and landing 44 fish during 288 hours of fishing. This one form was divided into 48 individual anglers (24 anglers per day for two days) which resulted in a total of 83 anglers in 2015 (Table 2). These anglers landed a total of 162 fish or 2.0 fish per angler while on average fishing 5.3 hours. Overall angling totaled 442.5 angling hours in 2015 with a catch per hour of 0.37 fish.

Table 2. 2015 Catch Statistics and Angler Effort for Donner Lake

Number of Anglers	83
Number of Fish Landed	162
Total Hours Fished	442.5
Average Hours Fished	5.3
Fish/Hour	0.37
Number of Fish per Angler	2.0

Of the 83 anglers responding to the survey, 59 anglers (71%) landed at least one fish and 24 anglers (29%) reported catching zero fish (Figure 2). Of the 59 anglers that landed fish, twenty-six landed one fish each while the three most successful anglers landed 10 fish each.

The species composition and number of fish landed is shown in Table 3. Forty-eight percent of the fish landed at Donner Lake in 2015 were rainbow trout, while kokanee salmon made up 27.2%, lake trout 17.3%, “unknown” comprising 6.8% and brown trout yielding 0.6% of the total catch. In a creel survey from 2014 (Richardson 2015), angler responses showed that rainbow trout made up 78% of the total catch, kokanee 17% and lake trout 5% of the total catch. One brown trout was landed in 2014.

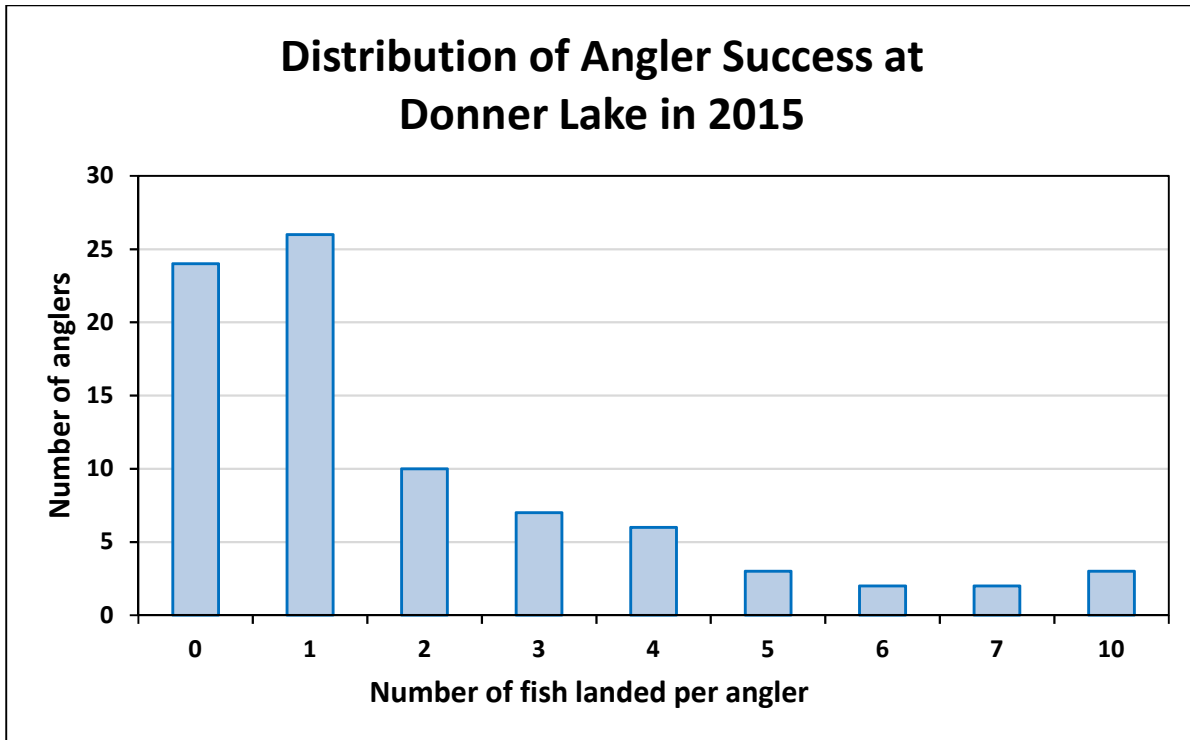


Figure 2. Distribution of angler success at Donner Lake in 2015 measured as number of reported fish landed per angler.

Table 3 also includes numbers of kept or released fish by species. The total harvest in 2015 was 64 fish or 41% of the total catch. Rainbow trout made up 81% of the total harvest and 67% of the rainbow trout landed were kept. The numbers of "kept" and "released" fish in Table 3 does not add up to 162 (total number of fish landed) because one angler who landed five "unknown" fish did not specify whether those five fish were kept or released.

Species	Number of Fish	Kept	Released	Percent of Total Catch
Rainbow trout	78	52	26	48.1
Kokanee salmon	44	4	40	27.2
Lake trout	28	6	22	17.3
Unknown	11	1	5	6.8
Brown trout	1	1	0	0.6
Total	162	64	93	100

Figure 3 displays the length distribution of fish landed at Donner Lake in 2015. The modal class for rainbow trout was 6-7.9" with 42 (54%) of the rainbow trout landed being in that size class. The modal class for kokanee salmon was 10-11.9" and 20 (45%) of the kokanee salmon landed were in this size

class. For lake trout, the modal class was 16-17.9", with 9 of the 28 (32%) lake trout landed being in that size class. The one brown trout landed was in the 8-9.9" size class.

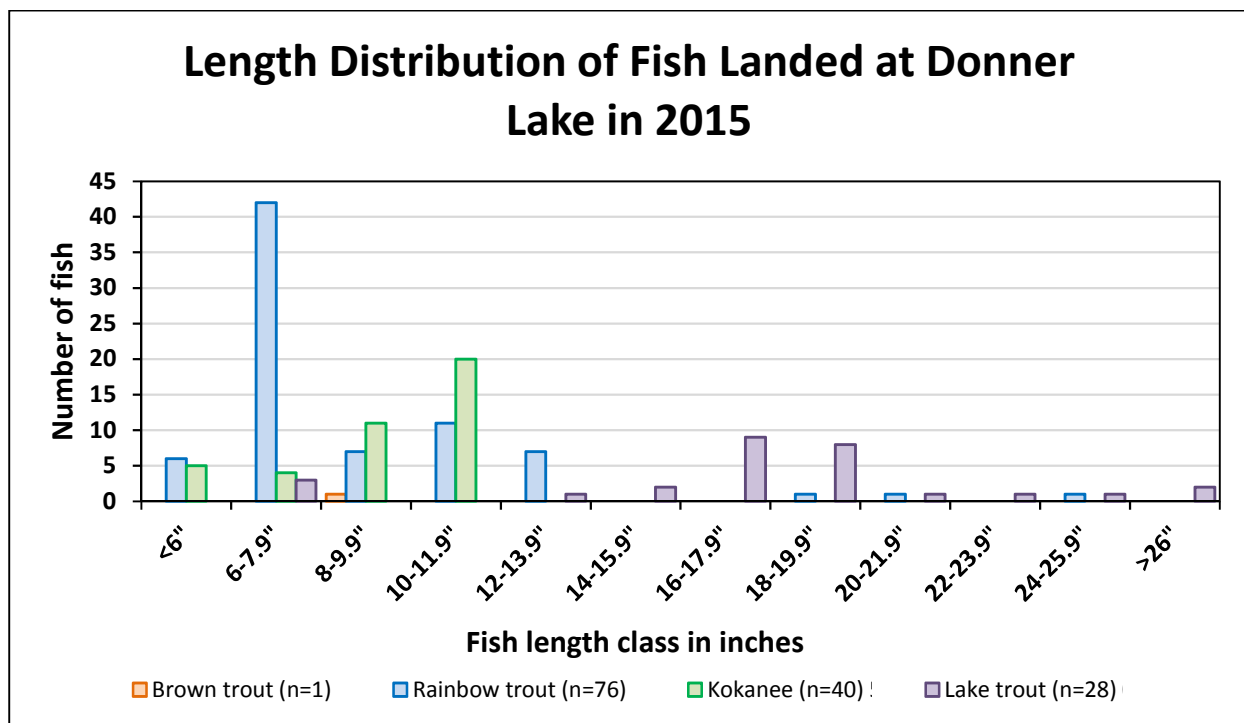


Figure 3. Length distribution in inches of reported fish at Donner Lake in 2015.

In 2015, anglers at Donner Lake were most successful in August and September where a total of 5 anglers averaged a catch per hour of 1.0 fish. The month with the most anglers and highest number of fish landed was July, where 60 anglers landed a total of 93 fish and averaged a catch per hour of 0.3 fish (Table 4). February and December had zero anglers and discounting July the average number of anglers per month was 2. One angler did not report the date on the ASB form so the total number of anglers in Table 4 is 82.

Bait was the preferred type of gear among anglers fishing on Donner Lake (Table 5). Sixty-four anglers (77.1%) used bait while fishing and these anglers landed on average 0.29 fish per hour. Lures were the second most popular gear type used and the 15 anglers (18%) fishing with lures were the most efficient at catching fish, landing on average 0.68 fish per hour. Two anglers used both bait and lures and landed a total of one fish while averaging a catch per hour of 0.11 fish. One angler used both bait, lures and fly and landed six fish which resulted in a catch per hour of 0.40 fish. One angler did not answer (DNA) the question regarding method used. Anglers using bait kept a total of 53 fish or 52% of their catch. Anglers using lures kept a total of 4 fish or 9% of their catch.

Table 4. Angler Catch and Effort per Month for Donner Lake in 2015 (n=82)

Month	Number of Anglers	Hours Fished	Number of Fish Landed	Catch per Hour
January	1	7.0	5	0.7
February	0	0	0	0.0
March	2	7.0	5	0.7
April	3	12.0	7	0.6
May	2	9.5	4	0.4
June	1	6.0	4	0.7
July	60	338.0	93	0.3
August	3	12.5	13	1.0
September	2	8.0	8	1.0
October	5	31.0	21	0.7
November	3	7.5	2	0.3
December	0	0	0	0.0

Table 5. Gear Used, Catch per Hour and Harvest at Donner Lake in 2015

Method	Number of Anglers	Percent of Anglers	Fish Landed	Fish Kept	Fish Released	Hours Fished	Catch per Hour
Bait*	64	77	102	53	44	348	0.29
Lure	15	18	46	4	42	67.5	0.68
Bait and Lure	2	2	1	1	0	9	0.11
Bait/Lure/Fly	1	1	6	6	0	15	0.40

* One angler landed five fish but did not specify whether they were kept or released

Of the 83 anglers who completed angler survey forms, a total of 82 answered the survey question related to their overall satisfaction with the fishing experience at Donner Lake in 2015 (Table 6). On average, the Overall Angler Satisfaction (OAS) was positive with a value of 0.96. Eighty anglers expressed an average satisfaction of 0.16 with the size of the fish they landed. The satisfaction with the number of fish landed was also positive for the 73 respondents with an average satisfaction value of 0.91. These results correspond with the 2014 creel survey which also showed that a majority of the anglers at Donner Lake had a positive fishing experience.

Table 6. Angler Satisfaction at Donner Lake in 2015

Overall Satisfaction (n=82)	Size of Fish (n=80)	Number of Fish (n=73)
0.96	0.16	0.91

Maximum positive satisfaction 2, minimum negative satisfaction -2.

Table 7 shows OAS related to the number of fish landed per angler. The level of satisfaction increases with the number of fish landed. Anglers reporting a zero catch had an average OAS of 0.62 and anglers reporting a catch of more than four fish per trip had the highest average OAS value at 1.80.

Table 7. Overall Angler Satisfaction (OAS) Compared to Catch

Number of Fish Landed	Number of Anglers	Average OAS
0	24	0.62
1	26	0.85
2	9	0.56
3	7	1.29
4	6	1.67
4 or more	10	1.80

Table 8 differentiates satisfaction in relation to gear used. Anglers using both bait and lure reported dissatisfaction with their overall fishing experience with an average OAS value of -1.50. Anglers using bait had the highest average OAS value of 1.00, whereas anglers fishing with lures had an OAS value of 0.93.

Table 8. Overall Angler Satisfaction by Gear Used at Donner Lake 2014/2015

Gear	OAS
Bait (n=64)	1.00
Lure (n= 15)	0.93
Bait/Lure (n=2)	-1.50

Discussion

Anglers landed rainbow trout from the beginning of March through October with the catch being randomly dispersed over those months and not showing any correlation with stocking events. Of the 78 rainbow trout landed in 2015, 48 of the 78 rainbow trout (62%) were 7.9 inches or smaller. Compared to the creel survey in 2014, this is a significant decrease in size compared to 10 to 12 inch modal size class for rainbow trout in 2014. This difference may be explained by the lack of rainbow trout fingerlings

stocked in 2013. 100,000 rainbow trout fingerlings were stocked in 2014 and it is the carry-overs from 2014 that are showing up in the two smallest size classes in the 2015 ASB data (Appendix II).

The modal size class reported for Kokanee salmon was 10 to 11.9 inches or approximately two-year old fish (Koons pers comm 2016). The absence of larger size classes might be due to small sample size or may indicate Kokanee are spawning at two years old. Fisheries Branch is conducting an age analysis of the Kokanee population in Donner Lake, the results of which may help to add context to these ASB data.

Lake trout was the third most common fish landed during the 2015 reporting period. Anglers reported catching a variety of size classes, including an individual measuring 26 inches. The fishery is open and accessible year round but fish are likely easier to target for shore anglers during the spring and fall when cool temperatures draw lake trout closer to the surface.

A standard measurement of the quality of a given fishery is catch per hour (Miko et al. 1995). The average catch per hour reported via angler surveys forms during 2015 was 0.37 fish. In contrast, the 2014 creel survey reported 0.42 fish per hour. Other studies have suggested catch rate benchmarks for rainbow trout between 0.25 and 0.50 fish per hour (Hicks et al. 1983; Miko et al. 1995). However, catch per hour is sensitive to bias especially in surveys with small sample sizes because very successful anglers can have a significant impact on catch rates. Another metric, less susceptible to avidity bias, is the percentage of anglers that land at least one fish. In their study of Missouri trout lakes, Hicks et al. (1983) considered angler success to be 'high' when 80% of anglers landed at least one rainbow trout per trip. At Donner Lake in 2015, 71% of anglers landed a minimum of one fish and the OAS value for all anglers was 0.96.

Interestingly, 24 anglers did not land any fish at Donner Lake had a positive OAS value of 0.62. Most likely this is a result of the Boy Scout group which reported an average OAS of 1.00 even though 17 out of the 48 Boy Scout anglers did not catch anything. For example, the average OAS for the zero-catch group drops to -0.29 if the 17 zero-catch Boy Scouts are excluded from the group. This result supports the notion reported by McCormick and Porter (2014) that younger anglers tend to have higher levels of satisfaction with a low catch rate than older anglers.

Discounting the Boy Scout group, which accounted for 58% of 83 anglers, the number of respondents at Donner Lake in 2015 was small. In contrast, the 2014 creel survey included 399 anglers. Currently, the Department has a single ASB at the Donner Lake Boat Ramp. The number of respondents may increase if additional ASBs are installed at or near other fishing access points. The most notable public access points are marked in Figure 1. On the north shore alone there are 37 public piers, a boat ramp and

fishing pier at Shoreline Park plus an unknown number of private piers on the south side of the lake. According to the 2014 creel survey report, most shore anglers were found at the Donner Lake Boat Ramp, at China Cove and at the public piers. Consideration should be given to place more ASBs at Donner Lake in an effort to increase response rates.

Recommendations

- Anglers did not fill out many survey forms in 2015.
 - Install ASBs at Shoreline Park, in front of the public piers near Donner Lake Boat Ramp, and at Donner Lake Memorial State Park near China Cove access points.
 - Increase the visibility of the ASB's with an information board behind the ASB that includes useful information such as species ID, summaries of ASB and creel data, and a plug for the online fishing guide.
 - Retrieve catch data from fishing guides and boat screeners working on Donner Lake.
- Modify the survey form and tailor it towards the Donner Lake fishery.
 - Ask anglers if they fished from a boat or from shore.
 - Ask anglers to specify length of lake trout exceeding 26 inches.
 - Ask anglers which species they are targeting when fishing on Donner Lake.
 - Include Kokanee salmon in the catch data section.

Literature Cited

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Appendix I. Department Planting Events at Donner Lake, 2001 to 2015

Year	Species	Pounds or Number of Fish	Size
2015	Kokanee salmon	25,000	Fingerling
	Rainbow trout	9,011	Catchable
	Rainbow trout	96,648	Fingerling
	Rainbow trout	100	Sub-Catchable
2014	Kokanee salmon	49,994	Fingerling
	Rainbow trout	15,300	Catchable
	Rainbow trout	100,000	Fingerling
2013	Kokanee salmon	49,997	Fingerling
	Rainbow trout	13,200	Catchable
2012	Kokanee salmon	49,994	Fingerling
	Rainbow trout	13,818	Catchable
2011	Kokanee salmon	50,048	Fingerling
	Rainbow trout	16,000	Catchable
2010	Kokanee salmon	50,050	Fingerling
	Rainbow trout	16,000	Catchable
2009	Rainbow trout	15,988	Catchable
2008	Kokanee salmon	50,086	Fingerling
	Lake trout	49,996	Fingerling
	Rainbow trout	20,000	Catchable
2007	Kokanee salmon	32,469	Fingerling
	Lake trout	13050	Fingerling
	Rainbow trout	16,000	Catchable
2006	Kokanee salmon	20,500	Fingerling
	Rainbow trout	16,000	Catchable
2005	Kokanee salmon	50,165	Fingerling
	Lake trout	53,750	Fingerling
	Rainbow trout	19,000	Catchable
2004	Kokanee salmon	50,040	Fingerling
	Lake trout	49,950	Fingerling
	Rainbow trout	20,000	Catchable
	Rainbow trout	1,600	Sub-Catchable
2003	Kokanee salmon	47,520	Fingerling
	Lake trout	50,750	Fingerling
	Rainbow trout	27,000	Catchable

2002	Kokanee salmon	50,050	Fingerling
	Lake trout	50,400	Fingerling
	Rainbow trout	32,000	Catchable
2001	Kokanee salmon	5,024	Fingerling
	Lake trout	65,125	Fingerling
	Rainbow trout	27,000	Catchable

Appendix II. Department's 2015 Angler Survey Form for Donner Lake

Donner Lake

The California Department of Fish and Wildlife is conducting an evaluation of the fishery at Donner Lake. We request your help in this evaluation by providing the following information in this survey. Please use this form for one day's fishing at Donner Lake by one angler only.

Date Fished: _____

mm/dd/yyyy

Hours Fished: _____

Primary gear type used (check one):

? Lure ? Bait ? Fly ?

Enter the total number of fish caught and released by species and size class:

Size	Rainbow trout		Brown trout		Lake Trout		Other:	
	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Less than 6"								
6"-7.9"								
8"-8.9"								
10"-11.9"								
12"-13.9"								
14"-15.9"								
16"-17.9"								
18"-19.9"								
20"-21.9"								
22"-23.9"								
24"-25.9"								
>26"								

Please indicate your level of satisfaction with the following statements regarding your fishing experience today:

	Least satisfied		Neutral	Most satisfied	
Overall angling experience today:	-2	-1	0	+1	+2
Size of fish:	-2	-1	0	+1	+2
Number of fish:	-2	-1	0	+1	+2

Please use the back of this form for any additional comments. Thank you for helping us manage and protect California's fisheries.

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Date Fished: _____

mm/dd/yyyy

Hours Fished: _____

Primary gear type used (check one):

Lure ? Bait ? Fly ?

Enter the total number of fish caught and released by species and size class:

Size	Rainbow trout		Brown trout		Lake Trout		Other:	
	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Less than 6"								
6"-7.9"								
8"-8.9"								
10"-11.9"								
12"-13.9"								
14"-15.9"								
16"-17.9"								
18"-19.9"								
20"-21.9"								
22"-23.9"								
24"-25.9"								
>26"								

Please indicate your level of satisfaction with the following statements regarding your fishing experience today:

	Least satisfied		Neutral	Most satisfied	
Overall angling experience today:	-2	-1	0	+1	+2
Size of fish:	-2	-1	0	+1	+2
Number of fish:	-2	-1	0	+1	+2

Please use the back of this form for any additional comments. Thank you for helping us manage and protect California's fisheries.