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

Mokelumne River, Amador and Calaveras Counties

2013 - 2016 Angler Survey Box Analysis

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Introduction

The Mokelumne River (Mokelumne) is a highly regulated river managed by Pacific Gas and Electric (PG&E). The Mokelumne is not only used for hydropower by PG&E but is managed by East Bay Municipal Utility District (EBMUD) for water usage for the eastern area of the San Francisco Bay. The Mokelumne watershed originates from snowmelt and rain collected on the western slope of the Sierra Nevada mountain range between Highway 88 and Highway 4 (Figure 1). The Mokelumne drains into Pardee Reservoir (Pardee), then Camanche Reservoir, after which it flows through the Central Valley and into the California Delta. The Mokelumne is open all year to the public with the standard regulation of five trout per day with 10 in possession from the Highway 49 bridge to Pardee and is seasonally open from the last Saturday in April through November 15 above the Highway 49 bridge.

California Department of Fish and Wildlife (CDFW) fish files indicate the Mokelumne was stocked between 1930 and 2008 by CDFW for recreational fishing but hasn't been stocked since 2008. Historically, the Mokelumne was planted with rainbow trout (*Oncorhynchus mykiss*, RT). Currently there is both a wild and hatchery population of RT, brown trout (*Salmo trutta*, BN), and kokanee salmon (*Oncorhynchus nerka*, KOK) in the section below the Electra Powerhouse and above Pardee.

In order to assess the fishery, CDFW installed four angler survey boxes (ASB) along the Mokelumne. One was installed just downstream of the Highway 49 bridge at Big Bar, while the remaining three were placed between the Electra Powerhouse and the 49 bridge (Figure 2). Anglers voluntarily fill out a survey sheet and deposit it in the box after they complete their fishing trip. CDFW uses the data collected to assess angler satisfaction, species composition, and general angler statistics on the Mokelumne. This report covers the data collected from the four Mokelumne's ASBs from 2013 - 2016.

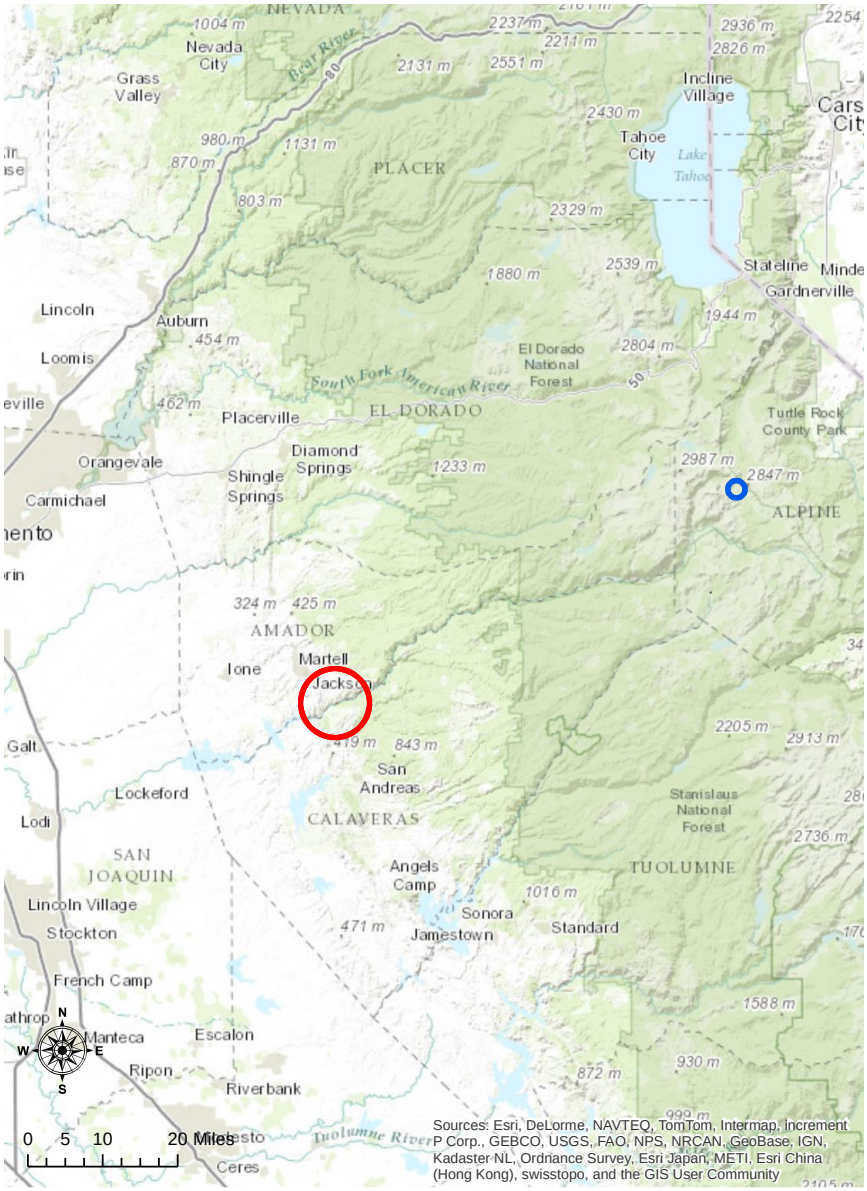

Figure 1. Mokelumne River North Fork Headwater in the Sierra Nevadas (Blue Circle) and the ASB locations on the Mokelumne River near Jackson, CA (Red Circle).

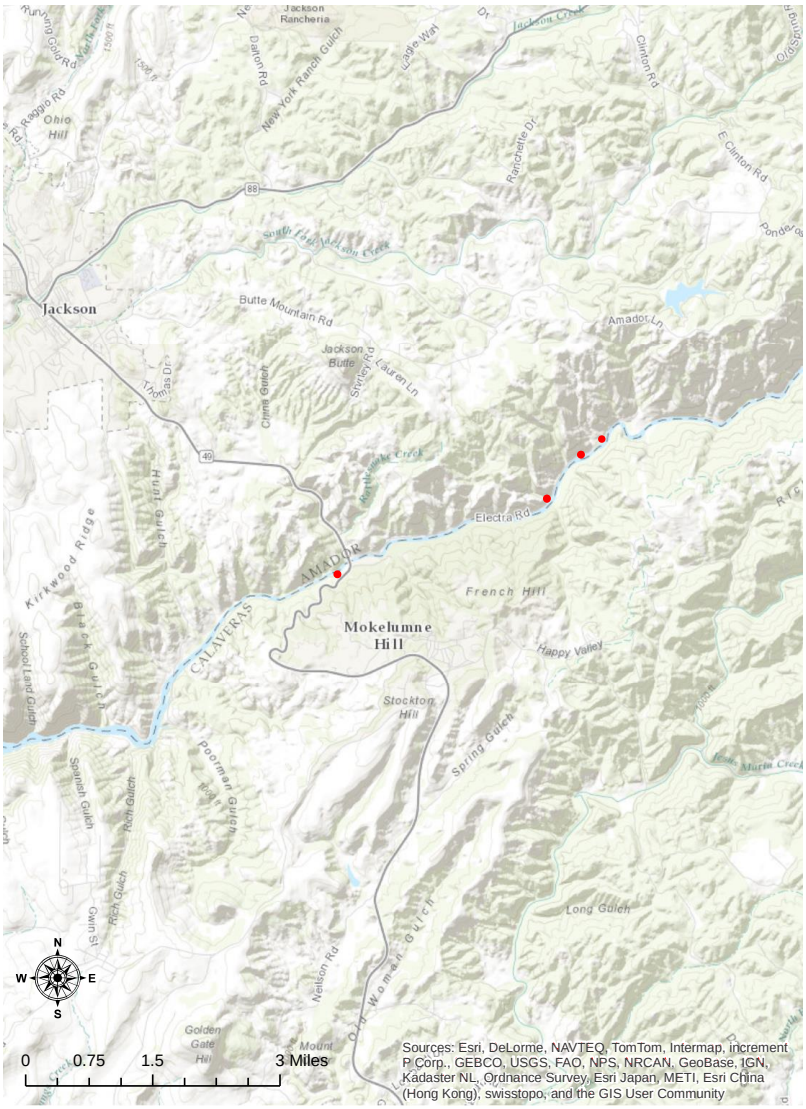

Figure 2. Mokelumne River ASB locations (Amador and Calaveras Counties, CA)

Methods

Anglers were asked to fill out a voluntary survey form about their fishing experience. The survey asks anglers for information regarding hours fished, type of gear used, and the number of landed (kept and released) fish. Anglers were also asked to record the size and species of fish landed. Finally, anglers were asked three questions, and their answers were recorded on a scale of -2 to 2, with "2" representing most satisfied and "-2" representing least satisfied. The questions pertain to satisfaction of overall angling experience, size, and number of fish. The back of the survey form is reserved for anglers who have any additional comments.

Results

From 2013 – 2015, a total of 28 anglers responded to the survey. In 2016, a total of nine anglers responded to the survey. From 2013-2015 a total of 18 fish were landed, with 88.8 hours of fishing (0.20 fish/hour). The catch per angler was 0.64. In 2016 a total of nine fish were landed with 15.25 hours of fishing (0.59 fish/hour). Catch per angler increased as well to 1.00 in 2016.

Anglers used bait, lures, and flies while fishing the Mokelumne (Table 1). Approximately 39% (11 anglers) used bait to catch fish, and had a catch of 0.45 fish per angler from 2013 - 2015. Three anglers used bait as their primary method of fishing and had a catch of 0.33 fish per angler in 2016. From 2013 – 2015, the least frequent known methods were lure fishing (n=4) and multiple-methods (n=4), in which only 14% of the anglers reported using each. In 2016, the least frequent method was lure fishing, in which only 11% of the anglers reported using. Anglers that didn't record their angling tackle method had the highest catch of 3.5 fish per angler from 2013 – 2015. Anglers that used multiple angling tackle methods had the highest catch of 1.7 fish per angler in 2016.

Table 1. The frequency of anglers that used each angling method and their corresponding catch rates from 2013 – 2015 and 2016.

	2013 - 2015		2016	
Angling method	Number of Anglers	Catch per Angler	Number of Anglers	Catch per Angler
Bait	11	0.45	3	0.33
Lure	4	0.25	1	0.00
Fly	7	0.28	2	1.50
Multiple	4	0.75	3	1.67
Not recorded	2	3.50	0	0.00
Total	28		9	

In 2016, six RT, two BN, and one KOK were reported to have been caught which is down from the 2013 - 2015 period in which eight RT, five BN, and five KOK were reported caught (Figure 2).

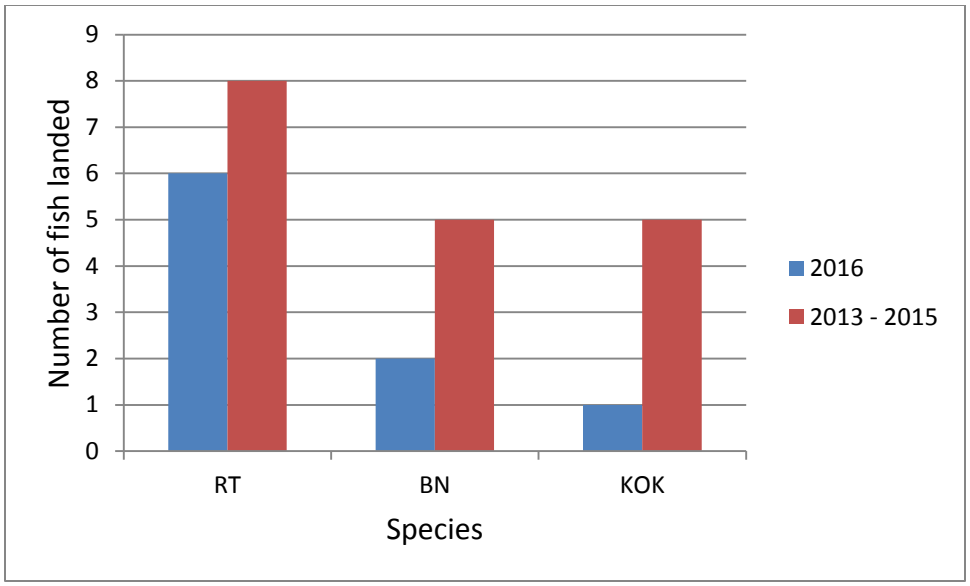

Figure 2. Number of each species of fish caught from 2013 through 2016 on the Mokelumne River.

ASB data for 2016 showed that 77.8% (7 fish) of the landed fish measured less than 12 inches in total length. From 2013 – 2015, 56.5% of landed fish measured less than 12 inches in total length. Sixty-one percent of landed fish that were recorded as kept or released were released from 2013 – 2015. This value increased to 100% in 2016.

Anglers continued to report being unsatisfied with their overall angling experience. From 2013 – 2015, anglers reported a -0.54 value while in 2016 angler response improved slightly to -0.38 . When reporting their satisfaction with the number of fish caught, anglers had a positive experience with a 0.40 from 2013 – 2015 which improved to 0.75 in 2016. Anglers were satisfied with the size of the trout caught with a 0.50 value reported from 2013 – 2015 but this value decreased to -0.25 in 2016.

Discussion

The number of respondents over the four year period continues to be low, which inhibits CDFW's ability to gather information from the survey. With more respondents, CDFW could gather more precise information on whether the fishery is satisfactory or unsatisfactory for anglers and make possible management changes. It is essential CDFW maintain the trend of increasing angler participation in the ASB survey, which provides information on complete fishing trips. CDFW staff should continue to notify anglers of the ASB at the Mokelumne, and emphasize the importance of angler participation in the survey. Unfortunately there appears to be a lot of tampering with the ASB's on the Mokelumne which inhibits gathering information on the fishery. Removing the pencils from the boxes, taking ASB sheets that haven't been filled out and putting them in the filled out section of the box, and vulgar messages/drawings on filled-out sheets have been a constant issue with the survey. Due to this continued problem and lack of angler response, CDFW will look into relocating these boxes to another body of water.

Data gathered from the 2016 Mokelumne ASB indicate anglers to have caught at least 1.00 fish per angler. This is an increase from 2013 – 2015 in which there were 0.64 fish per angler. Catch rates for anglers using multiple methods of tackle continues to be the highest documented method of catch per angler. Only six anglers used multiple methods of tackle, three in 2016 and there were 33 or more anglers using other types of tackle. These few multiple method anglers may have been more skilled at fishing this river, resulting in a much higher average catch rate.

ASB surveys continue to show more RT than BN caught by anglers. CDFW has not planted the Mokelumne since 2008, when 1,500 lbs. of RT were planted, but EBMUD and CDFW continue to put allotments of half pound to three pound RT into Pardee. This might suggest why more RT are caught, but ASB data also indicate that the wild BN population in the Mokelumne is in good condition with a fair number being caught.

Approximately 78% of fish caught in the Mokelumne measured less than 12 inches in total length in 2016. This is an increase from the 57% seen from 2013 – 2015. This increase might suggest why all of the fish reported landed were released. Anglers were not satisfied with the size of fish they were catching (-0.25), which may be influencing their overall fishing experience. EBMUD has planted one to three pound RT into Pardee in the recent past and CDFW has been planted half pound RT for many years. However, anglers are not reporting catching many of these larger fish going up the Mokelumne, which is the main tributary to Pardee. The RT may be staying in the reservoir after they are planted, thus not giving anglers fishing the Mokelumne an opportunity to catch them. The section of the Mokelumne where the ASB's are located is a highly regulated stretch of water managed for hydropower by PG&E. The high flow variations that occur regularly throughout the year likely have a negative effect on the fishery.

CDFW snorkel surveys in 2006 showed large numbers of kokanee observed (Mehalik 2006), but only six have been reported caught over the last four years. A potential way to improve the fishery with greater numbers and sizes would be to decrease the number of ramp-up and ramp-down flows on the river. The four years of drought the state endured prior to fall 2015 might also be contributing to the low number of anglers seen since lower flows and increased water temperatures might be increasing the number of salmonids seeking shelter in the cooler water of Pardee.

The overall fishing experience for anglers was negative on the Mokelumne. Although anglers expressed an overall dissatisfactory angling experience, anglers were satisfied with the numbers of fish caught. The dissatisfactory overall angling experience might not then have anything to do with actual fishing but rather outside factors such as low river conditions due to recent drought conditions, weather, manipulated flows, fishing access, crowds, setting, etc.

Recommendations

- When available CDFW staff should encourage anglers to fill out the ASB forms in future trips. The ABS information should be used to estimate angler CPUE, while possible future roving surveys should be used to estimate the total number of anglers fishing at the Mokelumne.

- When possible, PG&E should try to minimize pulse flows and/or have more gradual increase/decrease in ramping rates.
- If possible, CDFW should post results from the ASB in hopes of informing the public that their feedback is useful. Sharing these data may result in less tampering to remaining pencils and sheets.

References:

Mehalik, Stephanie. 2006. Wild Trout Snorkel Survey Observation Form. California Department of Fish and Game. California Wild Trout Fish Files. Unpublished. 1701 Nimbus Road, Rancho Cordova, CA.