State of California
Department of Fish and Wildlife

2022 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries

Adobe Creek (3/15/2022) Photo by B. Ewing

Ben Ewing
District Fisheries Biologist: Alpine, Amador, Calaveras and Lake Counties
Region 2

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Introduction

In September of 2012, The Center for Biological Diversity submitted a petition to the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) to list the Clear Lake Hitch (*Lavinia exilicauda chi*) (HCH-C) as a threatened and/or endangered species. The proposed listing was pursuant to the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA) (Fish and Game Code, 2050). On August 6, 2014, a decision to list the species as threatened under CESA was made by the California Fish and Game Commission. On December 3, 2020, a decision to not list the species as threatened or endangered under the Endangered Species Act of 1973 was made by the USFWS.

CDFW conducted visual surveys on seven tributaries to Clear Lake (Lake County) to monitor spawning HCH-C in late winter and spring of 2022. During the 2022 visual survey, CDFW sampled specific points along each tributary to help determine the relative number of HCH-C migrating upstream to spawn. This information, combined with previous years' data (Ewing 2014, 2016−2021) and with future surveys at these locations, will assist CDFW with long-term management decisions regarding HCH-C.

Methods

The HCH-C visual survey began on March 15, 2022 and continued through May 10, 2022. During this period, CDFW staff conducted a total of nine surveys at 21 sites on McGaugh Slough, Adobe Creek, Hill Creek, Kelsey Creek, Cole Creek, Manning Creek, and Thompson Creek (**Table 1** and **Figure 1**). Staff recorded a start and stop time to complete the 21-site survey. There is no Site 9 or Site 20. For each visual survey, staff made an upstream and downstream visual count of HCH-C from a bridge crossing (except site 17, which had no bridge) as far as they could in each direction and documented the total HCH-C observed. The time it took to conduct a count at each site depended on the number of HCH-C observed. Staff used fixed observation sites for each visual survey to reduce bias that could result from making HCH-C observations from different points at each given waterbody. HCH-C counts were ideally collected once a week from every site. Due to low flow conditions, staff did not visit all sites during the sampling season (e.g. some sites were completely dry; **Figures 2** and **3**, **Table 2**). In prior years, staff began surveys when residents of Lake County first reported sightings of HCH-C to CDFW and ended when staff no longer observed any HCH-C in the tributaries for approximately two weeks.

Table 1. Global Positioning System (GPS) coordinates in degrees, minutes, seconds, of sites visited for visual surveys.

Site	GPS Point	
1	39° 00' 53.82 N	122° 51' 42.62 W
2	39° 00' 15.26 N	122° 51' 46.10 W
3	38° 59' 36.44 N	122° 51' 41.64 W
4	38° 58' 57.04 N	122° 51' 44.58 W
5	38° 58' 43.98 N	122° 51' 47.31 W
6	39° 00' 53.69 N	122° 52' 14.55 W
7	39° 00' 15.57 N	122° 52' 23.71 W
8	39° 59' 37.67 N	122° 52' 39.56 W
10	39° 00' 40.42 N	122° 53' 44.99 W
11	38° 59' 51.86 N	122° 53' 38.75 W
12	38° 59' 37.21 N	122° 53' 34.48 W
13	38° 59' 51.50 N	122° 48' 53.75 W
14	38° 58' 31.37 N	122° 49' 40.57 W
15	38° 56' 33.05 N	122° 48' 55.47 W
16	39° 00' 39.15 N	122° 50' 07.38 W
17	38° 59' 49.98 N	122° 50' 38.09 W
18	38° 58' 55.84 N	122° 50' 36.87 W
19	38° 58' 42.59 N	122° 50' 34.07 W
21	39° 00' 40.52 N	122° 54' 01.30 W
22	38° 59' 54.97 N	122° 54' 28.49 W
23	38° 59' 54.36 N	122° 54' 45.17 W

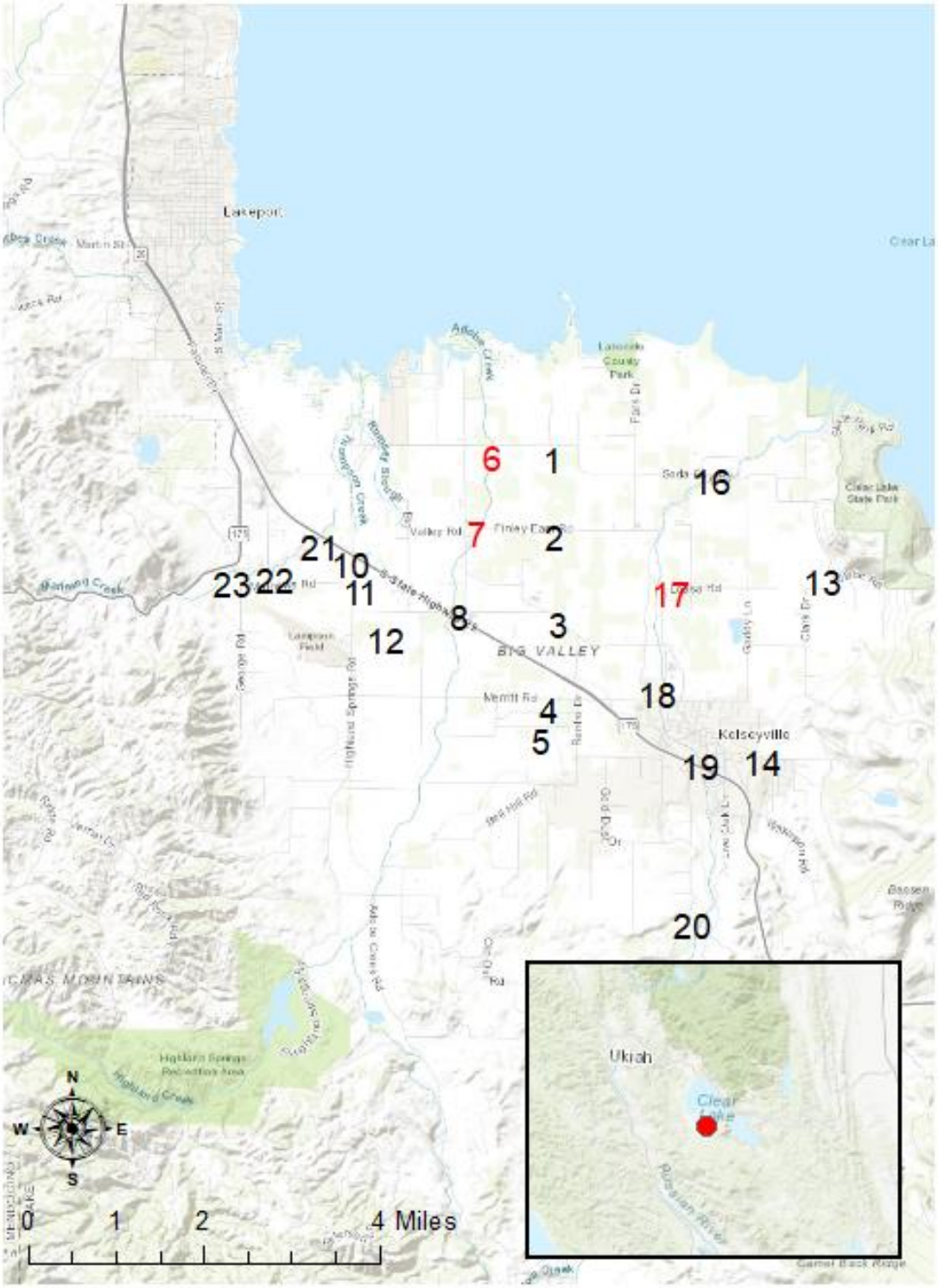

Figure 1. *Visual survey sites on Clear Lake tributaries (Lake County, CA). Red-colored numbers indicate where HCH-C were observed in 2022. Location of visual survey sites in relation to Clear Lake found in inset map.*

Figure 2. Cole Creek (2/18/2022). Photo by B. Ewing

Figure 3. Adobe Creek (5/4/2022). Photo by B. Ewing

Table 1. Visual Survey Sites and Dates Visited. X = Site Surveyed; Dry downstream (DD) = Site Not Surveyed.

		2022 Survey Dates								
Location	**Site**	**3/15**	**3/23**	**3/29**	**4/5**	**4/13**	**4/19**	**4/27**	**5/4**	**5/10**
McGaugh Slough	**1**	x	x	x	x	x	x	x	x	x
	2	DD	DD	DD	DD	DD	DD	DD	DD	DD
	3	DD	DD	DD	DD	DD	DD	DD	DD	DD
Hill Creek	**4**	DD	DD	DD	DD	DD	DD	DD	DD	DD
	5	DD	DD	DD	DD	DD	DD	DD	DD	DD
Adobe Creek	**6**	x	x	x	x	x	x	x	x	x
	7	DD	DD	DD	DD	DD	DD	x	x	DD
	8	DD	DD	DD	DD	DD	DD	x	x	DD
Thompson Creek	**10**	x	x	x	x	x	x	x	x	x
	11	DD	DD	DD	DD	DD	DD	DD	DD	DD
	12	DD	DD	DD	DD	DD	DD	DD	DD	DD
Cole Creek	**13**	x	x	x	x	x	x	x	DD	x
	14	DD	DD	DD	DD	DD	DD	DD	DD	DD
	15	DD	DD	DD	DD	DD	DD	DD	DD	DD
Kelsey Creek	**16**	x	x	x	x	x	x	x	x	x
	17	x	x	x	x	x	x	x	x	x
	18	x	x	x	x	x	x	x	x	x
	19	x	x	x	x	x	x	x	x	x
Manning Creek	**21**	x	x	x	x	x	x	x	x	x
	22	DD	DD	DD	DD	DD	DD	DD	DD	DD
	23	DD	DD	DD	DD	DD	DD	DD	DD	DD

Results

Staff observed 306 HCH-C during the 2022 visual survey season. The 2022 total was the second lowest on record (2021, n = 120; 2020, n = 1,672; 2019, n = 612; 2018, n = 1,153; 2017, n = 517; 2016, n = 693; 2014, n = 1,119) (**Table 3**). All HCH-C observed in 2022 were from Kelsey and Adobe Creeks, two of the seven tributaries surveyed in 2022. Staff observed HCH-C in Adobe Creek at sites 6 (Soda Bay Road Bridge Crossing) and 7 (Finley East Road Bridge Crossing) on April 27. Staff observed HCH-C in Kelsey Creek at site 17 (Dorn Crossing) during two surveys on April 27 and May 4. Adobe Creek was the most frequented tributary by HCH-C in 2022, 2018, 2016, as well as a near identical first place tie in the 2014 visual surveys when total observations equaled 559 in Adobe and 560 in Kelsey Creek (Ewing 2018

and 2014). In 2018, all HCH-C observations in Adobe Creek occurred from March 28 – April 25 (Ewing 2018). In 2014, all HCH-C observations in Adobe Creek occurred from March 13 – March 18 (Ewing 2014).

Table 3. Clear Lake Hitch Visual Survey Totals from McGaugh Slough, Adobe Creek, Hill Creek, Thompson Creek, Cole Creek, Kelsey Creek, and Manning Creek from 2014, 2016−2022.

Year	Number
2014	1,119
2016	693
2017	517
2018	1,153
2019	612
2020	1,672
2021	120
2022	306

Discussion

In 2022, a below average rainfall total during the wet season resulted in low to no stream flows, decreasing the amount of HCH-C spawning in the tributaries (California Department of Water Resources 2022). All HCH-C were seen at three sites on two tributaries. The majority of the tributary sites did not have water in them during the survey period, preventing any opportunity for HCH-C upstream migration. It is also possible that the HCH-C that were able to spawn in Adobe and Kelsey Creeks had many of their eggs desiccated due to receding streams (**Figures 4-6**).

Figure 4. Adult HCH-C on Adobe Creek (April 2022). Photo by A. Tyler

Figure 2. *HCH-C rescue site on Adobe Creek by Big Valley Road on May 4, 2022 (photo by L. Santana)*

Figure 6. Same pool on Adobe Creek in Figure 5 on May 16, 2022. (Photo by L. Santana)

Additionally, a survey conducted by the United States Geological Survey (USGS) in 2021 noted a large decrease in HCH-C observed in Clear Lake (F. Feyrer, Pers. Comm). The USGS collected 280, 290, and 76 HCH-C in 2017, 2018, and 2019 respectively, but only 40 HCH-C in 2021. It may be possible that there were few HCH-C in Clear Lake to begin their 2022 upstream migration into these tributaries. In the spring of 2022, CDFW was also conducting a population estimate of HCH-C in Clear Lake in which only 357 HCH-C were collected. Although the number of HCH-C seen in 2022 was the second lowest on record, it may have been due to fewer tributaries available for spawning. Instead of spawning in tributaries, HCH-C may have been spawning in Clear Lake; however lake spawning for is not ideal due to the susceptibility to egg predation by Common Carp (*Cyprinus carpio*) (Kimsey 1960).

In spring 2023, CDFW will continue to sample the same 21 sites. Additionally, CDFW will continue investigating reports of HCH-C sightings in other areas of the Clear Lake watershed.

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