

State of California
Department of Fish and Wildlife

2023 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake
Tributaries



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Region 2

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Introduction

In September 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 or endangered species 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 2023. During the 2023 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, 2016–2022) 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, 2023 and continued through May 16, 2023. During this period, CDFW staff conducted a total of 10 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**). There is no Site 9 or Site 20 since these locations are no longer surveyed. 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. However, due to high flow and turbid conditions early in the season, staff did not visit all sites every week during the sampling season (**Figure 2** and **Table 2**).

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

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

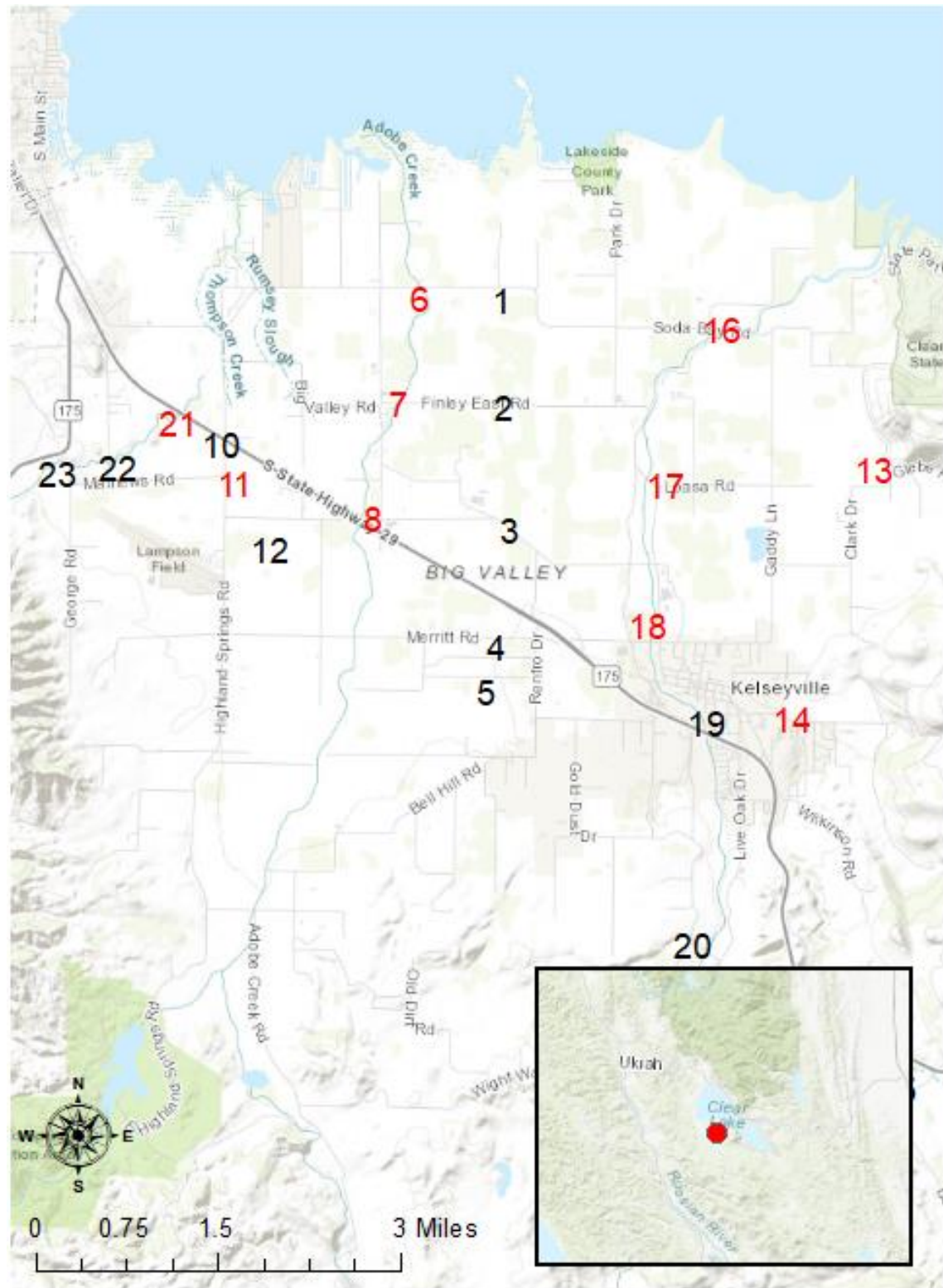


Figure 1. Visual survey sites on Clear Lake tributaries (Lake County, CA). Red-colored indicate where HCH-C were observed in 2023. Location of visual survey sites in relation to Clear Lake found in inset map.



Figure 2. Manning Creek at a non-designated visual survey site (3/15/2023). Photo by B. Ewing

Table 2. Visual Survey Sites and Dates Visited. X = Site Surveyed; NA = turbid/high flows, Site Not Surveyed.

		2023 Survey Dates									
Location	Site	3/15	3/22	3/30	4/3-4	4/11	4/17	4/26	5/2-3	5/9-10	5/15-16
McGaugh Slough	1	x	x	x	x	x	x	x	x	x	x
	2	x	x	x	x	x	x	x	x	x	x
	3	x	x	x	x	x	x	x	x	x	x
Hill Creek	4	x	NA	x	x	x	x	x	x	x	x
	5	x	x	x	x	x	x	x	x	x	x
Adobe Creek	6	x	x	x	x	x	x	x	x	x	x
	7	x	NA	NA	x	x	x	x	x	x	x
	8	x	NA	x	x	x	x	x	x	x	x
Thompson Creek	10	x	x	x	x	x	x	x	x	x	x
	11	x	NA	x	x	x	x	x	x	x	x
	12	x	x	x	x	x	x	x	x	x	x
Cole Creek	13	x	x	x	x	x	x	x	x	x	x
	14	x	x	x	x	x	x	x	x	x	x
	15	x	x	x	x	x	x	x	x	x	x
Kelsey Creek	16	x	x	NA	x	x	x	x	x	x	x
	17	x	x	NA	x	x	x	x	x	x	x
	18	x	NA	x	x	x	x	x	x	x	x
	19	x	NA	x	x	x	x	x	x	x	x
Manning Creek	21	x	x	x	x	x	x	x	x	x	x
	22	x	x	x	x	x	x	x	x	x	x
	23	x	x	x	x	x	x	x	x	x	x

Results

Staff observed 2,548 HCH-C during the 2023 visual survey season. The 2023 total was the highest on record (2022, n = 306; 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 2023 were from Kelsey, Manning, Cole, Thompson, and Adobe Creeks, five of the seven tributaries surveyed in 2023. No fish were observed in McGaugh Slough or Hill Creek. Staff observed HCH-C in Adobe Creek at site 6 (Soda Bay Road Bridge Crossing) on April 11, 17, and 26 and at sites 7 (Finley East Road Bridge Crossing) and 8 (Argonaut Road Bridge Crossing) on April 17 and 26. Staff observed HCH-C in Kelsey Creek at site 16 (Soda Bay Road) on April 11 and April 26, site 17 (Dorn Crossing) on April 11, and site 18 on April 11 and April 17. Staff

observed HCH-C in Thompson Creek at site 11 (Highland Springs Road Crossing) on April 3/4 and April 11 and at site 12 (Argonaut Road Crossing) on April 11. Staff observed HCH-C in Cole Creek at site 13 (Clark Road Crossing) on April 11 and at site 14 (Konocti Road Crossing) on April 11 and April 17. Staff observed HCH-C in Manning Creek at site 21 (Soda Bay Road Crossing) on April 11. Adobe Creek was the most frequented tributary by HCH-C in 2023, 2022, and 2018 and in 2014 was a close second being near identical to Kelsey Creek when total observations equaled 559 HCH-C in Adobe and 560 HCH-C in Kelsey Creek (Ewing 2022, 2018, and 2014). In 2022, all HCH-C observations in Adobe Creek occurred on April 27 (Ewing 2022). In 2018, HCH-C observations in Adobe Creek occurred from March 28 – April 25 (Ewing 2018). In 2014, 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, 2016–2023.

Year	No. of HCH-C
2014	1,119
2016	693
2017	517
2018	1,153
2019	612
2020	1,672
2021	120
2022	306
2023	2,548

Discussion

In 2023, a record rainfall total during the wet season resulted in high and consistent stream flows, increasing the amount of HCH-C spawning in the tributaries (CDWR 2023). Staff observed all HCH-C at ten sites on five tributaries. All the tributary sites retained water during the entire survey period, enhancing the opportunity for HCH-C upstream migration. Due in part to these conditions, including high and consistent flows, HCH-C that spawned in Adobe, Cole, Manning, Kelsey, and Thompson Creeks may have great recruitment survival this year.

The number of HCH-C observed in 2023 is a positive sign, particularly when compared with HCH-C counts during recent prior years' (i.e., 2021–2022). The very low lake level in 2022, due to recent drought years, was also a cause for concern. Additionally, a survey conducted by the United States Geological Survey (USGS) in 2022 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 and 6 HCH-C in 2022. The high number of HCH-C observed in 2023 suggests that at least a limited number of HCH-C spawned in Clear Lake in recent dry water years.

In accordance with the high HCH-C counts during tributary surveys, CDFW also observed an increase in HCH-C captures in Clear Lake. In spring 2023, CDFW conducted a relative population estimate of HCH-C in Clear Lake using boat electrofishing during which staff collected a record 1000 HCH-C.

The number of HCH-C seen in the tributaries in 2023 being the highest on record may have been due to having more tributaries available for spawning. During prior years HCH-C may have been spawning in Clear Lake given the lack of access to the tributaries due to flow conditions; however lake spawning for HCH-C is not ideal due to the susceptibility to egg predation by Common Carp (*Cyprinus carpio*) (Kimsey 1960).

In spring 2024, CDFW will continue to survey the same 21 sites to monitor the HCH-C population during the spawning season. Additionally, CDFW will continue investigating reports of HCH-C sightings in other areas of the Clear Lake watershed.

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