

State of California
Department of Fish and Wildlife

2021 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries



Adobe Creek (3/24/2021) Photo by B. Ewing

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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 2021. During the 2021 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, 2017, 2018, 2019, 2020) 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 16, 2021 and continued through April 14, 2021. During this period, CDFW staff conducted a total of five 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 shortened 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

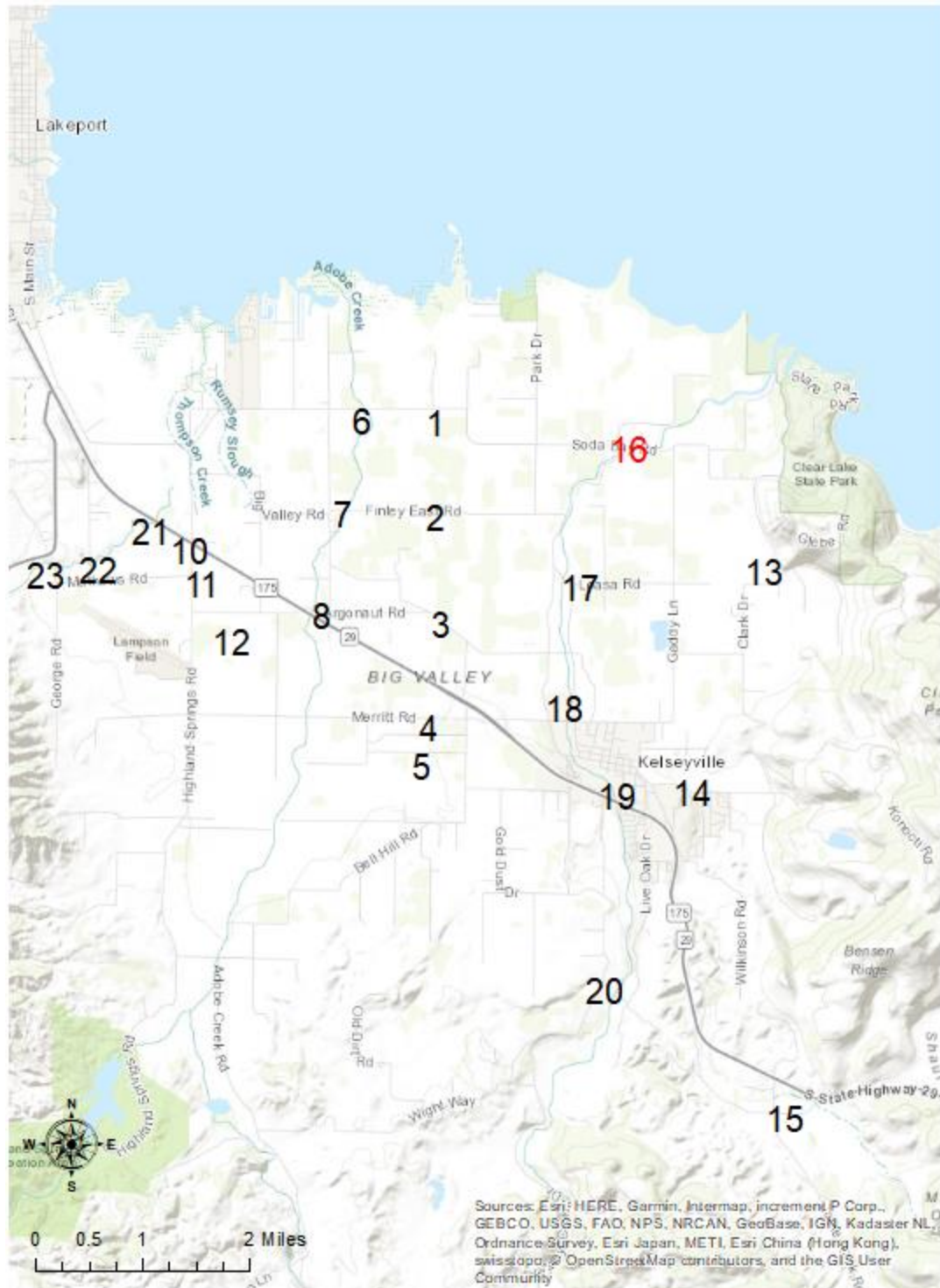


Figure 1. Visual survey sites on Clear Lake tributaries (Lake County, CA). Red colored number indicate where HCH-C were observed in 2021.



Figure 2. Adobe Creek (3/24/2021). Photo by B. Ewing



Figure 3. Kelsey Creek (4/7/2021). Photo by B. Ewing

Table 2. Visual Survey Sites and Dates Visited. X = Site Surveyed; Dry downstream (DD) = Site Not Surveyed.

Date: 3/16/2021

McGaugh Slough		Adobe Creek		Hill Creek		Thompson Creek		Cole Creek	
Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed
1	x	6	x	4	DD	10	x	13	x
2	x	7	x	5	DD	11	x	14	DD
3	x	8	x			12	x	15	DD
Kelsey Creek		Manning Creek							
Site	Surveyed	Site	Surveyed						
16	x	21	x						
17	x	22	DD						
18	x	23	DD						
19	x								

Date: 3/24/2021

McGaugh Slough		Adobe Creek		Hill Creek		Thompson Creek		Cole Creek	
Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed
1	x	6	x	4	DD	10	x	13	x
2	DD	7	DD	5	DD	11	DD	14	DD
3	DD	8	DD			12	DD	15	DD
Kelsey Creek		Manning Creek							
Site	Surveyed	Site	Surveyed						
16	x	21	x						
17	x	22	DD						
18	x	23	DD						
19	x								

Date: 3/31/2021

McGaugh Slough		Adobe Creek		Hill Creek		Thompson Creek		Cole Creek	
Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed
1	DD	6	DD	4	DD	10	DD	13	DD
2	DD	7	DD	5	DD	11	DD	14	DD
3	DD	8	DD			12	DD	15	DD
Kelsey Creek		Manning Creek							
Site	Surveyed	Site	Surveyed						
16	x	21	DD						
17	x	22	DD						
18	x	23	DD						

19 x

Date: 4/7/2021

McGaugh Slough		Adobe Creek		Hill Creek		Thompson Creek		Cole Creek	
Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed
1	DD	6	DD	4	DD	10	DD	13	DD
2	DD	7	DD	5	DD	11	DD	14	DD
3	DD	8	DD			12	DD	15	DD

Kelsey Creek		Manning Creek	
Site	Surveyed	Site	Surveyed
16	x	21	DD
17	x	22	DD
18	x	23	DD
19	x		

Date: 4/14/2021

McGaugh Slough		Adobe Creek		Hill Creek		Thompson Creek		Cole Creek	
Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed	Site	Surveyed
1	DD	6	DD	4	DD	10	DD	13	DD
2	DD	7	DD	5	DD	11	DD	14	DD
3	DD	8	DD			12	DD	15	DD

Kelsey Creek		Manning Creek	
Site	Surveyed	Site	Surveyed
16	x	21	DD
17	x	22	DD
18	x	23	DD
19	x		

Results

Staff observed a total of 120 HCH during the 2021 visual survey season. The 2021 total was the lowest on record (2020, n = 1,672; 2019, n = 612; 2018, n = 1,153; 2017, n = 517; 2016, n = 693; 2014, n = 1,119). Similar to 2020, all HCH-C were observed in Kelsey Creek, one of the seven tributaries surveyed in 2021. Also similar to last year, staff observed all HCH-C in Kelsey Creek for the entire season on a single day, March 31, at site 16 (Soda Bay Road). Kelsey Creek was the most frequented tributary by HCH-C in 2021, 2020 as well as the 2014 visual surveys (Ewing 2020 and 2014). In 2014, all HCH-C observed in Kelsey Creek occurred from March 11 – April 10 (Ewing 2014).

Discussion

In 2021, a below average total rainfall 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 2021). All HCH-C were seen once at one site. Some 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 Kelsey Creek had many of their eggs desiccated due to receding streams (**Figure 4**).

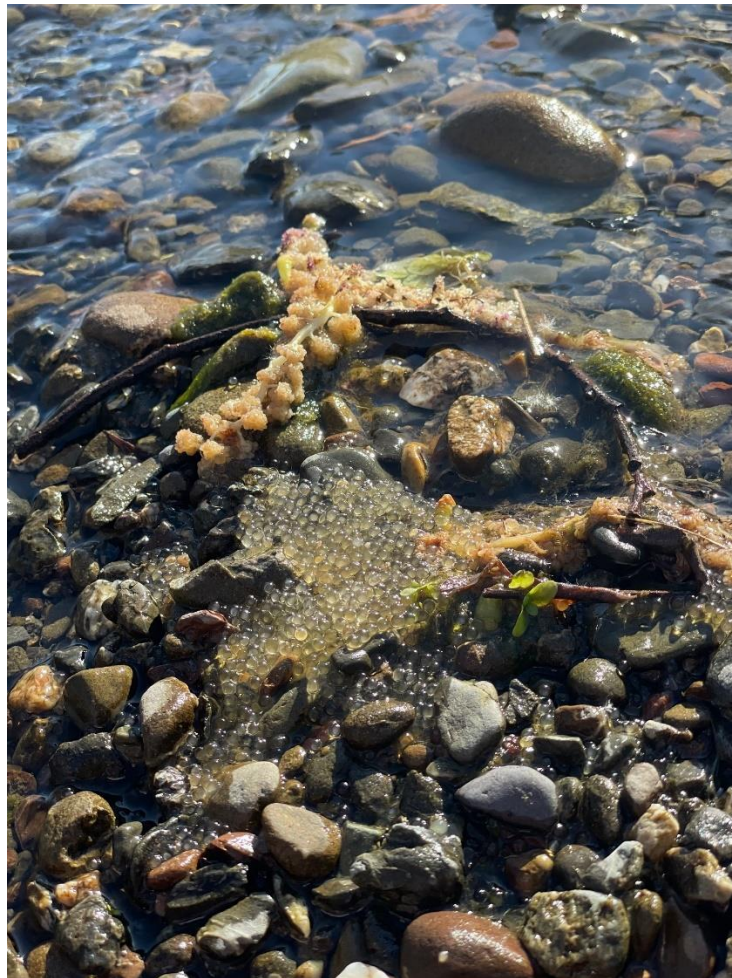


Figure 4. Eggs desiccated on Middle Creek (3/31/2021). Photo by M. Deligiannis

Additionally, a survey conducted by the United States Geological Survey (USGS) in 2019 noted a large decrease in HCH-C observed in Clear Lake (F. Feyrer, Pers. Comm). The USGS collected 280 and 290 HCH-C in 2017 and 2018 respectively, but only 76 HCH-C in 2019. It may be possible that there were few HCH-C in Clear Lake to begin their 2021 upstream migration in the creeks. In the spring of 2021, CDFW was

also conducting our population estimate of HCH-C in Clear Lake in which HCH-C numbers were low. Although the number of HCH-C seen in 2021 was less than any prior surveyed year, it may have been due to fewer tributaries that HCH-C could spawn in. Instead of spawning in the creeks, HCH-C may have been lake spawning. Lake spawning for HCH-C is not ideal due to the susceptibility to egg predation by Common Carp (*Cyprinus carpio*) (Kimsey 1960).

In spring 2022, 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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