State of California
Department of Fish and Wildlife

2020 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries

Photo by I. Chellman

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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. Currently, the HCH-C is under status review by the USFWS to determine if the species warrants being protected by the ESA.

CDFW conducted visual surveys on seven tributaries to Clear Lake (Lake County) to monitor spawning HCH-C In late winter and spring of 2020. During the 2020 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) 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 17, 2020 and continued through April 21, 2020. 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. Start times ranged from 08:15 – 15:46 and end times ranged from 08:20 – 16:23. 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; **Table 2**). Additionally, due to the COVID-19 pandemic in 2020, staff was not able to complete the entire visual survey season, which was scheduled to end May 12. 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

Table 2. Visual Survey Sites and Dates Visited. X = Site Surveyed, Dry = Site Not Surveyed.

Date: 3/17/2020 and 3/18/2020

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	x	10	x	13	x
2	x	7	x	5	x	11	x	14	x
3	x	8	x			12	x	15	x

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

Date: 3/30/2020 and 3/31/2020

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	x	10	x	13	x
2	x	7	x	5	x	11	x	14	x
3	x	8	x			12	x	15	x

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

Date: 4/7/2020 and 4/8/2020

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	x	10	x	13	x
2	x	7	x	5	x	11	x	14	x
3	x	8	x			12	x	15	x

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

Date: 4/14/2020

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	x	10	x	13	x
2	x	7	x	5	x	11	x	14	Dry
3	x	8	x			12	x	15	Dry

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

Date: 4/21/2020

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	Dry	10	Dry	13	Dry
2	x	7	x	5	Dry	11	Dry	14	Dry
3	Dry	8	x			12	Dry	15	Dry

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

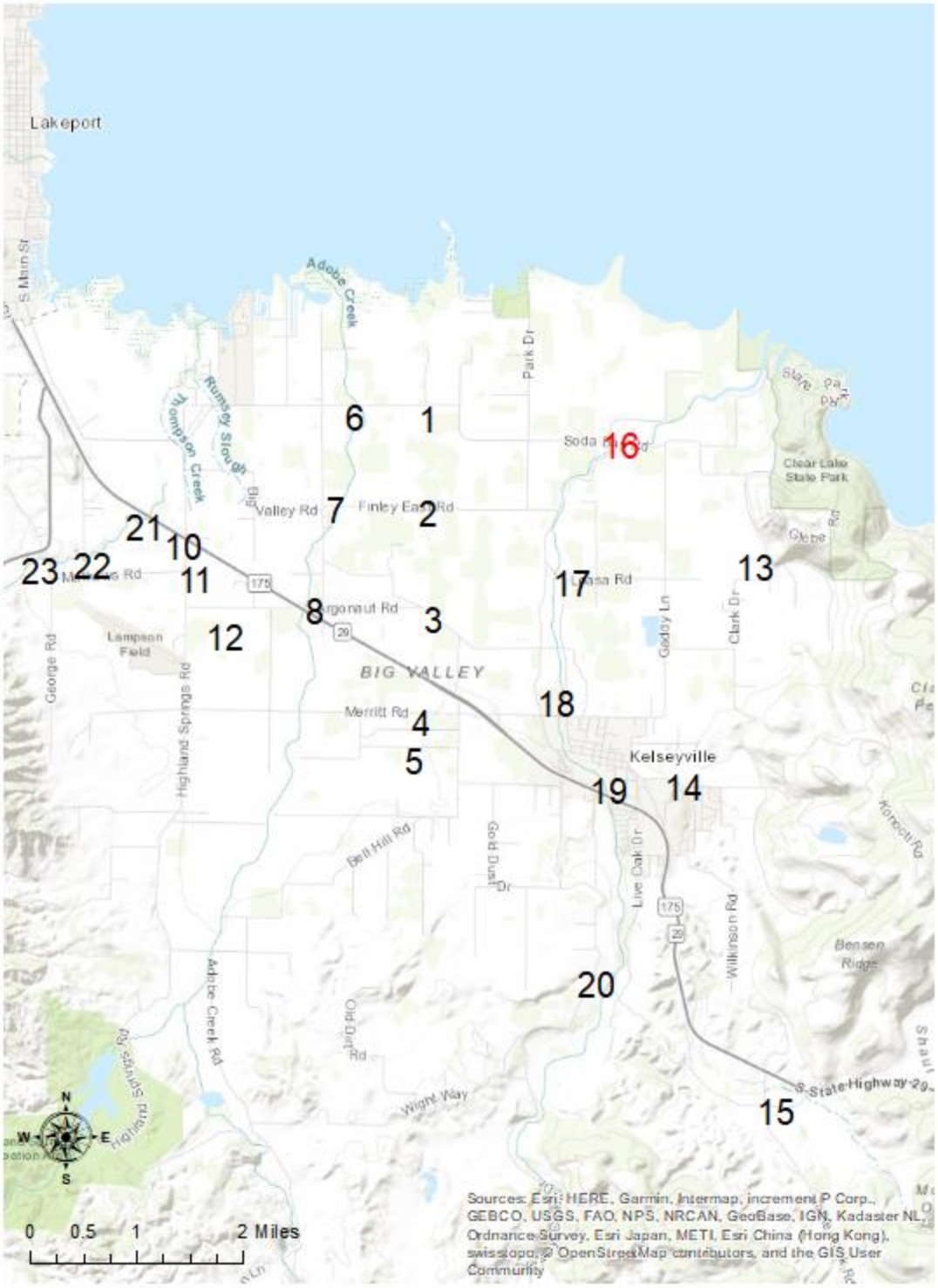

Figure 1. Visual survey sites on Clear Lake tributaries (Lake County, CA). Red colored number indicate where HCH-C were observed in 2020.

Results

Staff observed a total of 1,672 HCH-C during the 2020 visual survey season. The 2020 total was the highest on record (2019, n = 612; 2018, n = 1,153; 2017, n = 517; 2016, n=693; 2014, n=1,119). All HCH-C were observed in Kelsey Creek, one of the seven tributaries surveyed in 2020. Staff observed all HCH-C in Kelsey Creek for the entire season on April 14 (**Figures 1 and 2**). All HCH-C observed in Kelsey Creek were found at site 16 (Soda Bay Road). Kelsey Creek was the most frequented tributary by HCH-C in 2020 as well as the 2014 visual survey (Ewing 2014). In 2014, all HCH-C observed in Kelsey Creek occurred from March 11 – April 10 (Ewing 2014).

Figure 2. HCH-C observed at Site 16 on Kelsey Creek on April 14, 2020. (Photo by B. Ewing)

Discussion

In 2020, a below average total rainfall during the wet season resulted in low stream flows and low turbidity, which made viewing any HCH-C in the creeks easier (California Department of Water Resources 2020). Even though the number of HCH-C seen in 2020 increased from any previous year's survey, 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. 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 2020 upstream migration in the creeks. In the spring of 2020, CDFW was also conducting our population estimate of HCH-C in Clear Lake. Although the number of HCH-C seen in 2020 was more than 2019, it may have been because there were 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).

Due to the COVID-19 pandemic, CDFW staff was forced to cancel the final three weeks of visual surveys. It is possible that more HCH-C would have been seen and seen in more tributaries other than Kelsey Creek. However, due to the deteriorating water conditions in the tributaries at the time of cancellation, it is likely no more HCH-C would be seen in 2020.

In spring 2021, 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.

Literature Cited

California Department of Water Resources (CDWR). 2020. 2020 WY Precipitation Summary. Accessed on 21 May 2020. Available from: http://cdec.water.ca.gov/reportapp/javareports?name=PRECIPSUM

Ewing, B. 2014. 2014 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries. Region 2 Fish Files. California Department of Fish and Wildlife. http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=89711

Ewing, B. 2016. 2016 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries. Region 2 Fish Files. California Department of Fish and Wildlife. http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=124050

Ewing, B. 2017. 2017 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries. Region 2 Fish Files. California Department of Fish and Wildlife. http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=147076

Ewing, B. 2018. 2018 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries. Region 2 Fish Files. California Department of Fish and Wildlife. http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=162008

Ewing, B. 2019. 2019 Clear Lake Hitch (*Lavinia exilicauda chi*) Visual Surveys on Clear Lake Tributaries. Region 2 Fish Files. California Department of Fish and Wildlife. http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=174313

Kimsey, J. B. 1960. Observations on the spawning of hitch in a lacustrine environment. Calif. Fish and Game, 46 (2): 211-215.