State of California
Department of Fish and Wildlife

2019 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 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 2019.

During the 2019 visual survey, CDFW sampled various 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) 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 12, 2019 and continued through May 9, 2019. During this period, CDFW staff conducted a total of seven 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 08:37 – 14:32 and end times ranged from 11:20 – 18:02. 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 high flows, weather, and/or low water quality conditions, staff did not visit sites during the sampling season (e.g. staff did not survey sites during the first week of April; Table 2). Staff began surveys when residents of Lake County first reported sighting of HCH-C to CDFW and ended when staff no longer observed any HCH-C in the tributaries for approximately two weeks.

Table 1. 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, NA = Site Not Surveyed.

Date: 3/12/2019

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

Date: 3/20/2019

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

Table 2
continued

Date: 4/10/2019

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

Date: 4/18/2019

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

Date: 4/24/2019

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

Date: 5/1/2019

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

Date: 5/7/2019

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

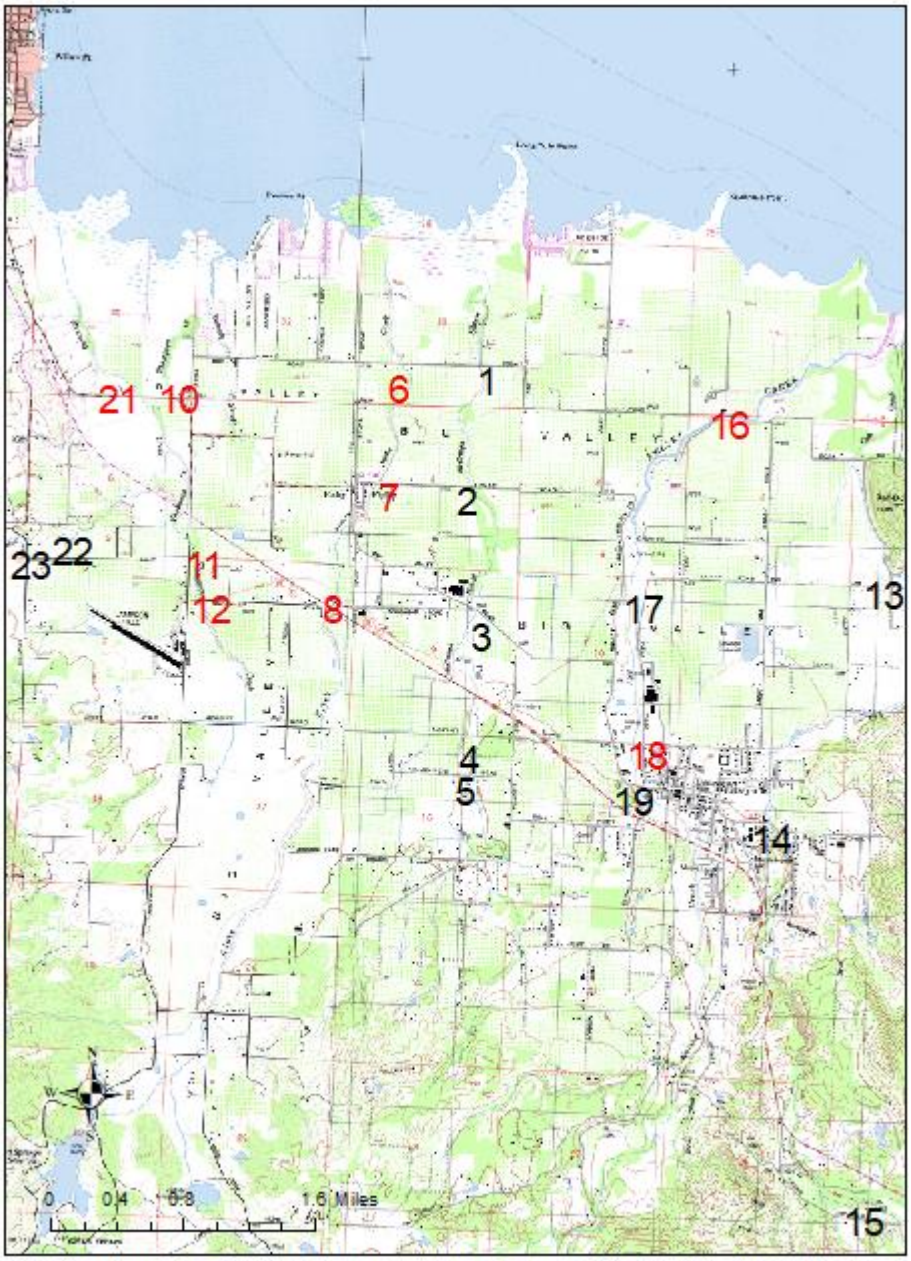

Figure 1. Visual survey sites on Clear Lake tributaries (Lake County, CA). Red colored numbers indicate sites where hitch were observed in 2019.

Results

Staff observed a total of 612 HCH-C during the 2019 visual surveys. The 2019 total was the second lowest on record (2018, n=1,153; 2017, n=517; 2016; n=693; 2014; n=1,119). HCH-C were observed in five of the seven tributaries surveyed in 2019. These five tributaries included McGaugh Slough, Adobe Creek, Kelsey Creek, Thompson Creek, and Manning Creek. Staff observed the most HCH-C in Manning (n=250), followed by Adobe (n=205), Kelsey (n=108), Thompson (n=34), and McGaugh (n=15). Manning was the most frequented tributary by HCH-C

in 2019 as well as the 2017 visual survey (Ewing 2017). All of the HCH-C observed in Manning in 2019 occurred on March 20, compared to March 15 – April 27 in 2017 (Ewing 2017) (Figure 2).

For a third consecutive year, staff observed all HCH-C in Manning at site 21 (Soda Bay Road Bridge Crossing). Staff also observed HCH-C at all three sites in Adobe (Soda Bay Road, Finley East Road, and Argonaut Road Bridge Crossings) for a third consecutive year. The 108 HCH-C staff observed in Kelsey Creek were documented at sites 16 and 18 (Soda Bay Road and Merritt Road Bridge Crossings). The 34 HCH-C staff observed in Thompson Creek were documented at sites 10, 11, and 12 (Soda Bay Road, Highland Springs/Mathews Road, and Highland Springs/Argonaut Bridge Crossings). The 15 HCH-C staff observed in McGaugh Slough were documented at site 3 (Big Valley/Argonaut Bridge Crossing) (Figure 1).

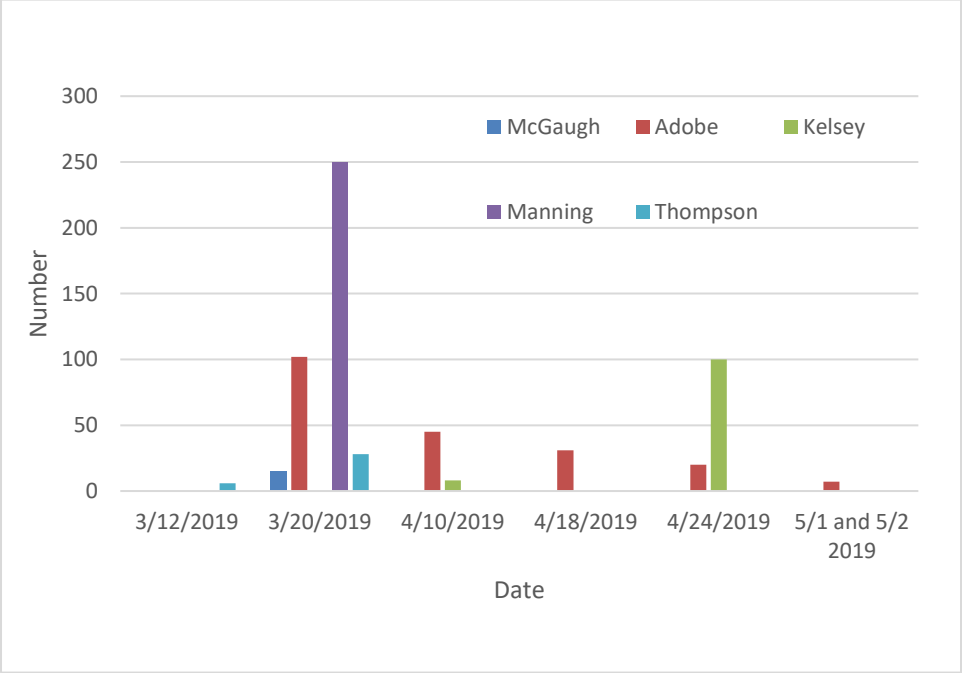

Figure 2. Number of Clear Lake HCH-C seen from McGaugh Slough, Adobe Creek, Kelsey Creek, Manning Creek, and Thompson Creek in 2019.

Discussion

In 2019, an above average total rainfall with consistent stream flows and low turbidity during the wet season may have made viewing HCH-C in the creeks easier. However, HCH-C observations decreased in 2019 when compared to recent surveys. Although the number of HCH-C observed was lower than 2018, HCH-C were seen in five of the seven waters surveyed. The 2012 – 2016 drought may have negatively affected HCH-C reproductive output and survival. These potential effects may now be showing the impact it had on the HCH-C cohorts for these

years. With the decrease in recruitment/survival during the drought years, many of these HCH-C that would be adults now, are not present. 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.

In spring of 2020, 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

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. Unpublished. http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=89711

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