Clear Lake Hitch: Lake County Agricultural Stakeholders Commitments and Contributions

INTRODUCTION

Lake County's agricultural stakeholders are committed to protecting and conserving endangered and threatened species that call local lands and streams home. Stakeholders in our community have interacted with, and observed, the Clear Lake hitch for many years. Its success as a species is of high priority to us.

Our goal is to work cooperatively with all agencies and stakeholders in order to reach agreeable and feasible solutions that will positively contribute to the success of the Clear Lake hitch. We recognize the hitch's importance as a species of cultural and historical significance and understand the need to act urgently and with intention.

We feel strongly that protecting the hitch requires science-based data. We further understand that the incorporation of historic data, in concert with data currently available or that may be developed and added to going forward will help to accurately identify and understand impacts affecting the species. To that end, this update outlines our commitments and contributions and provides an initial summary of data that may be useful to inform further discussion.

As invested, local agricultural stakeholders, we appreciate the efforts of the State Water Board and their willingness to reach out to our community of growers. We look forward to continuing to engage in productive dialogue while working collaboratively with other local stakeholder groups in order to develop the best and most feasible set of data-driven solutions.

COMMITMENT and CONTRIBUTIONS

By no means are the following sets of commitments and contributions exhaustive as the Lake County agricultural stakeholders understand this process will be fluid and ongoing, but through preliminary conversation, we present the following list of proposed actions we look forward to undertaking in order to best effectuate the above-stated purpose of positively contributing to the success of the Clear Lake hitch:

- As stakeholders, we commit to continuing to collect data and monitor stream conditions.
- We will engage local farmers to collect frost protection dates and monitor stream flows throughout the tributaries of primary concern: Kelsey, Adobe, Manning, Cole, and Middle Creeks.
- We look forward to an opportunity to have frost protection-related data finalized and shared in aggregate form.

- In support of the first three tasks above, in addition to the on-the-ground local knowledge and expertise of growers in the area, we plan to engage qualified technical experts to interface with agency staff.
- We invite Water Board staff and others to visit our area, speak with agriculturists in the area, and see firsthand some of the existing physical conditions in the watershed and look forward to on-going dialogue with Water Board staff and other stakeholders in the area.
- We will explore the feasibility of pump-back opportunities to augment stream flows during Clear Lake hitch spawning season if low stream flows become of concern, as long as the water being pumped back is of adequate quality, poses no threats to other species, and causes no further complications.
- We support on-going efforts to implement the County of Lake's Big Valley Groundwater Sustainability Plan, including proposed monitoring, minimum thresholds, and the County's plan to fill existing data gaps.
- We are willing to work with Board staff and look further into possible issues relating to existing water measurement and water rights reporting information and possible illegal diversions, including illegal cannabis grows in the area
- As stakeholders invested in the health of the Clear Lake hitch, we commit to encouraging the management of these tributaries to mediate habitat loss and eliminate barriers that prevent spawning. In particular, we support finalizing and implementing priority actions identified in the existing Draft Clear Lake Conservation Strategy.
- Where feasible, we support the use of possible targeted releases from headwaters with the intent to prevent strandings, including related efforts including the County of Lake's proposed Abode Creek Conjunctive Use Project.



Fig1.

CLEAR LAKE HITCH BACKGROUND

Clear Lake Hitch Settings and Life Cycle¹

The Clear Lake hitch is found in tributary streams only during the spawning season. A reproductive adult that is attempting to spawn requires an adequate amount of flow within the tributaries to migrate upstream to appropriate spawning locations. In addition, spawning adults require unimpeded passage within those tributaries to facilitate access to adequate amounts of available spawning. Because the species is not a strong jumper like salmonids, small obstructions such as bridge footings, boulders, or a steep gradient can act as migration barriers.²

The Clear Lake hitch requires water temperatures between 13°C and 18°C to trigger spawning activity and presumably needs water temperatures to be in a similar range for successful egg development.³ To initiate hatching, water temperatures must be maintained at 15-22°C for multiple days.⁴ Laboratory studies show newly hatched hitch have a small yolk sac which they depend on for nourishment until they are able to swim freely (about 3 days).

Once able to swim freely, young Clear Lake hitch require aquatic invertebrate prey.⁵ For cover and temperature regulation, downstream migrating fry likely requires instream and/or overhanging streamside vegetation. The fry/juvenile life stage requires adequate stream flow to stay alive, and adequate flow needs to be maintained for at least a month to migrate downstream into the lake.⁶ Recent otolith analysis

¹ USFW, Special Species Assessment, April 2020

² Murphy 1948b, p. 102; Macedo 1994, p. 4; CDFW 2014, p. 8

³ Swift 1965, pp. 75, 77; Moyle 2002, p. 138; Feyrer 2019a, p. 227

⁴ Swift 1965, pp. 75, 77; Moyle 2002, p. 138

⁵ Kimsey 1960, p. 212

⁶ Murphy 1948b, pp. 105, 106, 109; Swift 1965, pp. 75, 77–79; Moyle et al. 1995, p. 154

shows the time until lake entry is associated with how long water is retained within the natal habitat. The time until lake entry ranged from 11 days to over 21 weeks.⁷

Outside of the spawning season, the Clear Lake hitch is primarily found in Clear or Thurston Lakes. They can be found in either the littoral zone (nearshore) as juveniles or the limnetic zone (sun-lit, offshore open water) as adults. During the spawning season, most adults likely migrate into the lake tributaries; however, some reproductive adults may stay within the lake and spawn along the shore, the mouth of tributaries, or in back-water-like areas of Clear Lake, like Rodman Slough. During extreme drought conditions, the only successful reproduction may be within the lakes.

Within a month of hatching, young Clear Lake hitch migrate into the lake before their natal stream dries⁸. Once in the lake juveniles require stands of tules and/or other submerged aquatic vegetation to act as cover from aquatic and avian predators. Nearshore habitats containing vegetation also provide for invertebrate prey items, including insects, planktonic crustaceans, and chironomid midges. Juveniles also require the lake water to be of sufficient quality (i.e., well-oxygenated and minimally contaminated) and for water temperatures to be 15° or greater for survival.⁹ During a year-long electro-fishing survey of the Clear Lake shoreline, hitch was the 7th most common species collected.¹⁰ Over the course of the study, habitat parameters were recorded and there was a positive relationship found between weed cover and hitch presence, and the amount of vegetated shoreline and hitch presence.¹¹ Weed cover was defined as "...macrophyte coverage in the littoral zone which includes submerged, emerged, and floating vegetation."¹² These results are reasonable as the hitch uses vegetation as cover from predators. Some reproductive adults likely elect to spawn within the lake instead of migrating into the tributaries. Spawning observations along the Clear Lake shoreline have been noted in the past and self-sustaining populations of Clear Lake hitch have been documented in isolated ponds without a tributary access. Lake or pond spawning Clear Lake hitch have been documented spawning in areas with only a mud substrate that contains no gravel, so it is possible lake spawning does not require gravel to successfully spawn.¹³ In addition, more recent studies suggest lake spawning occurs more frequently than first thought, especially during drought conditions. Lake spawning includes spawning along the shoreline, in the mouths of tributaries, and in Rodman Slough, which is a backwater-like area in Clear Lake¹⁴.

Juvenile hitch transitions to adulthood when they reach about 50 mm and they move from the lake's nearshore habitat out into open water. At this stage of life the hitch require a diet almost exclusively composed of Daphnia, but also other zooplankton species and adult midges and insects¹⁵. Adult Clear Lake hitch require adequate water quality (i.e., well oxygenated and minimally contaminated) within Clear and Thurston Lakes to ensure they continue to survive.¹⁶ A recent lake monitoring effort suggests

⁷ Feyrer et al. 2019a, p. 1693

⁸ Murphy 1948b, pp. 105, 106, 109; Swift 1965, pp. 75, 77–79; Moyle et al. 1995, p. 154; Feyrer et al. 2019a, p. 1693

⁹ Franson 2012, p. 15; CDFW 2014, p. 9

¹⁰ Ewing et al. 2016, pp. 50– 51

¹¹ Ewing et al. 2016, p. 54–55

¹² Ewing et al. 2016, p. 54

¹³ Kimsey 1960, p. 214; Geary 1978, p. 22

¹⁴ Feyrer et al. 2019a, p. 195

¹⁵ Lindquist et al. 1943, p. 199; Geary 1978, pp. 17, 25; Geary and Moyle 1980, p. 388; Moyle et al. 1995, p. 153; Moyle 2002, pg. 137–138; Moyle et al. 2014, p. 3

¹⁶ Franson 2012, p. 15; CDFW 2014, p. 9

adult hitch can be found throughout the lake where dissolved oxygen conditions are adequate (i.e., not hypoxic) and do not restrict themselves to open water.¹⁷

IMPACTS on SPECIES VIABILITY

Within the lake environment, both juvenile and adult Clear Lake hitch require clean water for survival. To increase juvenile survival and the likelihood that juveniles will be able to contribute to recruitment, the Clear Lake hitch requires tules and/or other submerged vegetation within nearshore habitats to provide cover from predators and for prey. Adults require prey items in the open waters of the lake, which contributes to adult survival and provides resources to produce eggs and milt for reproduction.

The USFWS Special Species Assessment, April 2020, notes six factors influencing the hitch's future viability:

FACTOR	IMPACT on VIABILITY
 the loss of spawning habitat due to past watershed modifications that have blocked access to or altered the flow regime of tributary streams 	reduces early life stage survival, reproductive success, and the likelihood of recruitment;
2. the loss of wetland/tule habitat that juveniles require for rearing	also reduces early life stage survival and the likelihood of recruitment;
3. the effects of poor lake water quality	reduces adult and juvenile survival;
4. the effects of increased competition from a combination of introduced fish species and habitat loss	reduces survival of all life stages, reproduction, and the likelihood of recruitment
5. Exhaustive multi-year drought	further reduces tributary flow;
 6. the implementation of regulatory mechanisms (i.e., CESA, Lake County's Clear Lake Shoreline Ordinance, and SGMA) and management actions (i.e., Lake County's Aggregate Resources Management Plan, Middle Creek Flood Damage Reduction and Ecosystem Restoration Project, and other restoration actions occurring throughout the watershed) 	improves conditions in the watershed and provide protection to individual hitch.

PRELIMINARY DATA

SPRING 2018:

¹⁷ Feyrer et al. 2019b, pp. 5– 7



USGS GAUGE HEIGHT - Spring 2018 ---- Hitch run: 3/28-4/1 (4 days)

---- Frost protection; occurs after hitch run: 4/17-19; 30 (4 nights)





---- Hitch run: 3/28-4/1 (4 days)

---- Frost protection; occurs after hitch run: 4/17-19; 30 (4 nights)

SPRING 2019



USGS GAUGE HEIGHT - Spring 2019 ---- Hitch run: 4/3-4; 7-11; 18-24 (12 days) ---- Frost protection; occurs after hitch run: 4/30 (1 night)



A85005 : Kelsey Creek near Kelseyville

KCK GAUGE HEIGHT - Spring 2019 ---- Hitch run: 4/3-4; 7-11; 18-24 (12 days) ---- Frost protection; occurs after hitch run: 4/30 (1 night)

SPRING 2020



USGS GAUGE HEIGHT

---- Hitch run: 4/13 – 4/18 (5 days)

---- Frost protect; frost & run overlap: 3/31, 4/14, 5/3-4 (4 nights)



KCK GAUGE HEIGHT ---- Hitch run: 4/13 – 4/18 (5 days) ---- Frost protect; frost & run overlap: 3/31, 4/14, 5/3-4 (4 nights)

DATA SUMMARY

Data collected by the Chi Council reflects a minimal correlation between Clear Lake hitch spawning season and frost events in the years 2018, 2019, and 2020. Furthermore, graphs reflecting stream flow at both Kelsey Creek gauges illustrate that stream flow is not impacted during or following a frost event where groundwater pumping is used for frost protection.

Additional data submitted in the Groundwater Sustainability Plan (GSP) for the Big Valley Basin demonstrates the health of the basin and finds that agricultural pumping has minimal impact on the basin's health.

CONCLUSION

Whether it be the Clear Lake hitch or any other species that find habitat within Lake County, the agricultural stakeholders that have presented the above are committed to the protection and conservation of species we share the land and water with. We believe the best possible way to meet this goal is through collective effort, using the best science-based data available. We look forward to working with all stakeholders, and especially State Water Board staff to collect all relevant and needed information and data regarding the hitch. We subsequently look forward to using that data to best inform our decisions and efforts as we collaboratively proceed.