State of California
The Resources Agency
Department of Fish and Wildlife

2014 Clear Lake Hitch (*Lavinia exilicauda chi*) Spawning Survey

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Summary

In an effort to determine if any Clear Lake hitch (*Lavinia exilicauda chi*) (hitch) were spawning on the shoreline of Clear Lake, Lake County, a boat electrofishing survey was conducted on May 7, 2014. For the survey a small, targeted portion of the shoreline was sampled that hitch have historically used as a pre-spawn holding area. After the survey was conducted, it was determined that there is the possibility that hitch may be using the lake shoreline to spawn rather than the lake's tributaries. The low numbers of hitch collected made drawing any conclusions about the status of shoreline spawning difficult. The data from this survey in conjunction with previous and future hitch efforts will be used to monitor the status of this fishery.

Introduction

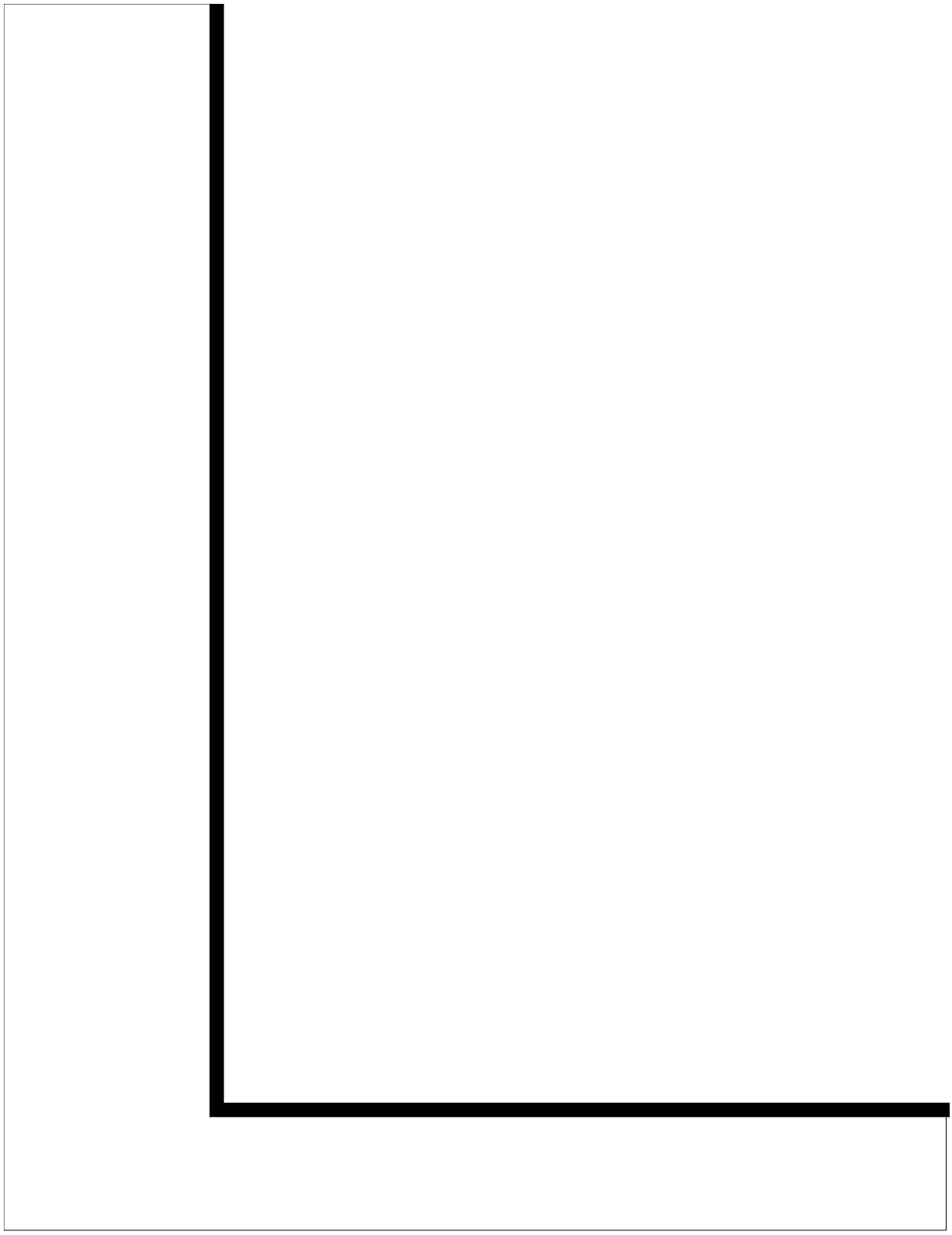
In September of 2012, the Center for Biological Diversity submitted a petition to the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) to list the Clear Lake hitch as a threatened and/or endangered species. This is pursuant to the federal Endangered Species Act 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.

During the 2014 spring spawning season, CDFW conducted multiple surveys on seven tributaries to Clear Lake to monitor spawning hitch. Monitoring was conducted using visual and hoop net surveys. CDFW staff gathered data from various points along the seven tributaries as well as marking hitch with specific tags/marks to help determine the relative number of hitch migrating upstream to spawn. The low number of hitch seen in the tributaries during the spawning season persuaded CDFW to evaluate if there were hitch spawning in the lake due to the low water flows in the tributaries.

Methods and Materials

A transect of the shoreline at Clear Lake (Figure 1) was sampled for a total of 10,153 electrofishing seconds (169 minutes) at night using an 18 ft. Smith-Root electrofishing boat. Pulsed DC current (8-12 amps) was used to "stun" the fish. When an electrical field was applied to the water it was measured on a counter and this time was recorded as generator seconds. Hitch under electronarcosis were netted and placed in a holding tank. An effort was made to

capture all shocked hitch; however, very small fish sometimes eluded capture as did those fish on the outer edge of the electrical field. These fish could not be collected or identified. The crew consisted of two forward netters, one crewmember working the livewell, and one boat operator. The transect was sampled in a continuous line parallel to shore. All hitch collected were measured in total length (millimeters). The mean length for hitch would then be determined. All hitch 275 mm (10.8 in.) and greater received a Biomark© HPT12 size, individually coded Passive Integrated Transponder (P.I.T.) tag. The P.I.T. tags were implanted into the abdominal cavity of the hitch using a sterilized size 12 GA injector needle and MK10 implanter syringe, entering just above the pelvic fins towards the front of the fish. A Biomark© Model 601 P.I.T. tag reader was used to read tags of any fish that might have been tagged in the tributaries earlier in the season. Hitch that were less than 200 mm (7.9 in.) total length were only measured and not marked or P.I.T. tagged. This was done in order to protect these fish during this delicate life stage. Hitch that were between 200 mm and 275 mm (10.8 in.) total length were given a single hole punch on the upper part of the caudal fin using a single, handheld paper hole puncher.



Catch Per Unit of Effort

Catch per unit effort (CPUE) is defined as the number of hitch collected per minute of shocking time.

CPUE = N/M

where:

N = total number of collected or the total number of hitch and

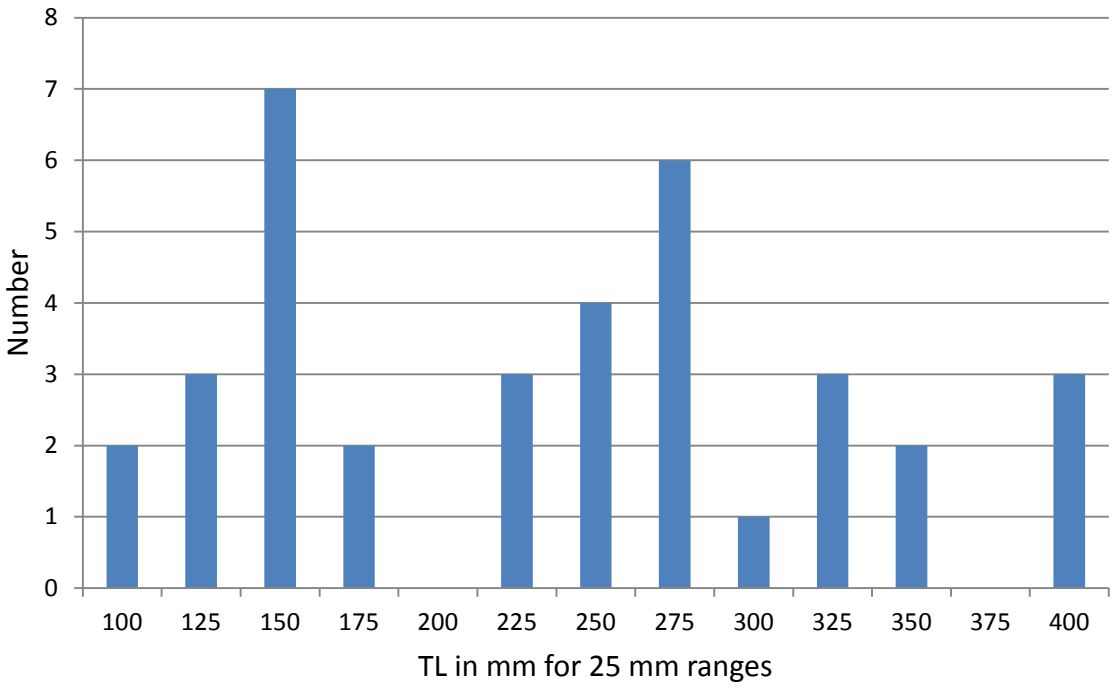
M = number of minutes that the electric field was active in the water

Results and Discussion

A total of 36 hitch were collected with a nine of them being implanted with a P.I.T. tag and 13 of them given a hole punch. These hitch can now be tracked with any future electrofishing and hoop net surveys conducted in Clear Lake and/or its tributaries. Of the 36 hitch collected during the survey, only one appeared to be in spawning mode, which was a male who ejected milt when handled.

The CPUE for hitch was 0.21 hitch/min. while the mean total length was 109 mm (4.3 in.) Hitch captured and measured ranged from 100 - 419 mm (3.9 - 16.5 in.). Hitch collected ranged from young of the year to three plus years of age at the time of sampling (Moyle 2002). The greatest abundance of hitch collected were in the 150 mm size class (Figure 2). These fish are likely one year of age.

Figure 2. Length-frequency distribution for Clear Lake hitch captured by electrofishing at Clear Lake, Spring, 2014.



Conclusions

Although there was only 36 hitch collected during this survey with only one appearing ripe to spawn, it is possible that the other 35 collected had already spawned or were preparing to spawn on the shoreline. It is possible that the dry winter of 2013/2014 had a significant negative impact on this year's hitch spawning run. Since CDFW did not collect many hitch in the tributaries this spring, the lake was surveyed to help determine if hitch were using the lake shoreline to spawn due to the low to no flow in the tributaries. With only 36 hitch collected, it is possible that there is not enough lakeshore spawning to keep a sustainable hitch population in the lake. It is also possible that the hitch could be spawning elsewhere in the lake. CDFW chose the transect that was surveyed due to the fact that it was in close proximity to both major hitch spawning tributaries (Kelsey and Adobe creeks) to Clear Lake. The nine P.I.T. tagged hitch will contribute to the overall number of tagged hitch for the season and help CDFW better monitor the hitch fishery. Future electrofishing hitch surveys will attempt to evaluate the same transect within the same index period.

References

Moyle, P. 2002. Inland Fishes of California. University of California Press, Berkeley and Los Angeles, California. Pg. 138.