Heenan Creek 2011 Summary Report

June 2, 17, 26, 27; July 26, 29; and September 27, 2011

State of California

Natural Resources Agency

Department of Fish and Game

Heritage and Wild Trout Program



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Introduction

The California Department of Fish and Game (DFG) Heenan Lake Wildlife Area is southeast of Markleeville in Alpine County, CA (Figure 1) and contains Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*), listed as Threatened under the Federal Endangered Species Act. Heenan Lake was designated by the California Fish and Game Commission (CFGC) as a Wild Trout Water, in 1983, and was further designated as a Heritage Trout Water, in 1999, for the population of lake-form Lahontan cutthroat trout within their native drainage. Wild Trout Waters are those that support a self-sustaining (wild) trout fishery, are aesthetically pleasing and environmentally productive, provide adequate catch rates in terms of numbers, size, or species of trout, and are open to public angling (Bloom and Weaver 2008). Wild Trout Waters are a sub-set of Wild Trout Waters that highlight wild populations of California's native trout within their historic drainages.

Heenan Lake contains two strains of Lahontan cutthroat trout. One strain, originally from Independence Lake, near Truckee, CA, is believed to be of pure genetic stock (Independence-strain); these fish are marked with an adipose fin clip and are an important brood-stock source used to support hatchery stocking efforts throughout California. The second strain was translocated into Heenan Lake in 1935 (Somer 2009) and is hybridized with rainbow trout (*Oncorhynchus mykiss*) of unknown origin (Heenan Lake-strain). These fish are identified by the presence of an adipose fin and are not used in brood stock management (naturally spawning Independence Lake-strain Lahontan cutthroat trout may also have an intact adipose fin; however, no trout with an adipose fin is used in brood stock management). A fish weir is in place near the mouth of Heenan Creek and a ladder structure directs adult spawners into the raceways constructed by the DFG for the purpose of spawning Independence-strain Lahontan cutthroat trout on an annual basis.

Hybridized Heenan Lake-strain Lahontan cutthroat trout are present in Heenan Creek and a goal of the DFG Heenan Lake Fishery Management Plan (Somer 2009) is to remove these fish from Heenan Creek to avoid potential hybridization with Independence-strain brood stock. This population of introgressed fish poses an ongoing threat to the genetic integrity of Independence-strain Lahontan cutthroat trout in Heenan Lake. It is possible for these hybridized fish to move downstream from Heenan Creek into the lake and spawn with lake-dwelling fish in the inlet below the fish weir. Although these offspring would have an intact adipose fin and, therefore, would not be spawned in subsequent years, the continual influx of rainbow trout alleles into the lake population should be minimized and, if possible, eliminated.

The DFG Heritage and Wild Trout Program (HWTP) has conducted manual removal of fish via electrofishing in Heenan Creek since 2008 (Weaver and Mehalick 2008, 2009, and 2010). In an ongoing effort to continue to eradicate the

stream population, the HWTP again removed fish using backpack electrofishers in Heenan Creek in 2011 and this report summarizes the methods and results.

Figure 1. Map of Heenan Lake Wildlife Area including Heenan Lake and Heenan Creek.



Methods

The fish weir was examined on June 2, 2011 to ensure its integrity as a fish barrier during elevated spring streamflow and the peak spawning period of lake-form LCT. Temporary modifications were made to the weir and fish ladder to prevent lake-form LCT from entering the creek, including the installation of vertical metal paneling (affixed to metal t-posts and rebar) and reinforcement of the horizontal metal grates (Figure 2). A visual survey was conducted in the lower portion of Heenan Creek directly upstream of the fish weir to determine the presence or absence of lake-form fish.

Figure 2. Photograph of modifications made to Heenan Creek fish weir and ladder in June, 2011.



Manual removal efforts were conducted on June 17, 26, and 27; July 26 and 29; and September 27, 2011 using Smith Root backpack electroshockers. All captured fish were measured to the nearest inch using a calibrated landing net (total length) and were euthanized and dispatched (buried or dispersed in dense vegetation). In 2008, Heenan Creek was subdivided into four sections from the fish weir upstream approximately one mile (Sections 1-4) for the purpose of monitoring removal efforts and fish densities in discrete portions of the drainage (Figure 3). In June, 2011, the HWTP completed a single-pass electrofishing effort of Sections 1-3 to determine the current distribution of fish in the system. Zero fish were captured in Section 3 and all subsequent efforts in 2011 were, therefore, focused in Sections 1 and 2. Streamflow in Section 4 was too low to effectively electroshock. In previous years, complete passes of each section were conducted; in 2011, areas where fish densities appeared the highest were targeted. In all areas of the creek where gravel was located, HWTP surveyors actively trampled the streambed in an effort to dislodge eggs and limit recruitment.

Figure 3. Map of Heenan Creek section locations.



Results

The 2011 removal effort captured a total of nine stream resident fish which ranged in size from three to eight inches in total length; 67% of these fish were less than six inches (Figure 4). Captured fish were relegated to a relatively small portion of stream habitat from the road crossing (culvert), at the upper extent of Section 1, upstream approximately one-quarter mile (into the lower portion Section 2). No fish were observed or captured downstream of the road crossing. DFG hatchery personnel onsite at Heenan Lake for the annual fish spawn in June, 2011, reported observing a few larger-sized fish upstream of the fish weir; based on their size, they presumed these were lake-form fish that had somehow bypassed the weir. However, zero larger-sized fish were captured or observed by HWTP personnel in 2011 during electrofishing efforts. Since 2008, there has been a large reduction in the number of fish captured in each subsequent year (Figure 5).





Figure 5. Length frequency histogram of stream-resident fish captured in Heenan Creek 2008-2011.



Discussion

The smaller-sized fish captured during the June effort (\leq 5 inches) were likely age 1+ fish; the low numbers captured indicate limited spawning success in 2010. The relative lack of smaller-sized fish captured in subsequent electrofishing efforts in 2011 may also indicate that recruitment in Heenan Creek was either limited or did not occur in 2011.

In June, 2010, a breach to the fish weir occurred and lake-form LCT moved upstream into the lower portion of Heenan Creek (Weaver and Mehalick 2010). These fish were removed manually with nets and returned to Heenan Lake. During this process, surveyors actively trampled the gravel and dislodged eggs. Based on the absence of fish captured in this portion of the creek in 2011, it is likely that reproduction and/or recruitment of lake-form LCT were unsuccessful.

Conclusion

The HWTP has conducted manual removal efforts in Heenan Creek for four consecutive years; the results show a strong downward trend in the number of fish captured in each subsequent year, which indicates successful depletion of the fish population. It is likely that reproduction and/or recruitment of the stream population did not occur in 2011. Few fish appear to remain in the system and the HWTP recommends continued removal efforts in 2012. In order to maximize the chances of halting future spawning, it is recommended that a removal effort be conducted as early as possible in the spring before spawning typically occurs. However, due to high elevation, possibility of snow, and corresponding road closures in the area, access may be limited during the ideal timeframe (April to May, 2012).

The malfunction of the fish weir in 2010 and observations of presumed lake-form fish in the lower portion of Heenan Creek by DFG hatchery personnel in June, 2011 indicate that the fish weir and its integrity as a fish barrier should be reevaluated for long-term project success. At a minimum, it should be examined each spring during high flows and before the spawning season to ensure its effectiveness as a barrier. In addition, it would be of value to better understand species composition and the proportion of hybrid fish found within the lake in order to gauge how much influence the Heenan Creek population has had on the lake's trout population assemblage. As outlined in the Heenan Lake Fishery Management Plan, long-term project success will be accomplished with the removal of all hybridized fish (in both Heenan Creek and Heenan Lake) and removal of the fish weir to allow fish passage and natural spawning of Independence-strain Lahontan cutthroat trout in Heenan Creek (Somer 2009). Due to the presence of hybridized fish in both parts of this system, these objectives are not likely to be met until a chemical treatment of both the creek and lake can be performed. However, since a chemical treatment is unlikely to occur in the near future, the HWTP recommends continuing multiple (spring and

fall) annual electrofishing removal efforts throughout Heenan Creek to minimize genetic threats to the Independence Lake-strain population.

References

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