

# **Introduction to A Selective Bibliography for Auburn Ravine and Western Placer County Streams, with an emphasis on Auburn Ravine steelhead and rainbow trout**

Ronald Otto

September 2014

Auburn Ravine Preservation Committee, and Ophir Property Owners Association, Inc.

Soothing to the eye as well as the spirit, Auburn Ravine, Coon and Dry Creeks in Western Placer County provide us an essential connection with the natural world in the foothills and adjacent valley communities. Due to vast alterations of the Sacramento-San Joaquin River, Bay-Delta system flows and other stressors, anadromous (migratory/sea-run) Central Valley steelhead populations have plummeted, as have several other important species. The accompanying selective bibliography and appendix include references considered in our discussion of Auburn Ravine fish, particularly related to restoration of steelhead and rainbow trout (*Oncorhynchus mykiss*), with limited discussion of Chinook salmon (*Oncorhynchus tshawytscha*) in Auburn Ravine and the Dry Creek drainage. This information is directed toward members of the public who want to learn more of these and other remarkable fishery resources, their history and important place in our Western Placer County anadromous streams. These streams ultimately flow to the Pacific Ocean. They are a part of, and are directly affected by and contribute to the health of, the greater Sacramento River and Bay-Delta system. We hope you find this information useful. (Hallock 1961; CDFW 1967-2013; CDFG 1999; McEwan 1999 & 2001; Lindley 2006; Moyle 2008; NMFS/NOAA 2009; FISHBIO (1-4) 2014; DFW & NMFS files; elsewhere)

Auburn Ravine and neighboring Western Placer County streams provide vital riparian habitat and share a rich heritage of anadromous salmon and steelhead as well as resident trout. Much of Auburn Ravine has been classified as Critical Habitat for protected Central Valley steelhead. This is in part because cool, clear water from the Sierra Nevada has been imported to Auburn Ravine for more than 150 years. This water is used for agricultural purposes in the foothills and valley nearby. Considerable cold water habitat has been created that is capable of supporting resident rainbow trout, migratory steelhead and salmon. Although diminished from their historical abundance, remnant populations of Chinook salmon and steelhead can still return to Western Placer foothill streams when sufficient rainfall events occur to allow upstream passage. These iconic fish reportedly once ascended Auburn Ravine in considerable numbers and are the object of extensive community and agency restoration efforts. Ensuring adequate water flows and water quality, as well as gaining year-round fish passage to and from the headwaters in the foothills to the Sacramento River have been, and remain, key objectives. For example, the Ophir Property Owners Association and Auburn Ravine Preservation Committee have been working to achieve these goals for the protection and restoration of Auburn Ravine resident trout and migratory steelhead and salmon for three decades or more. Long time Ophir resident Anacleto "Slim" Goodall began fishing Auburn Ravine and surrounding streams toward the end of the Great Depression. In a signed memo he stated that for the Auburn Ravine it "was a

known fact that steelhead and salmon came up to the Wise Powerhouse [in Ophir] back in those days.” He also noted that the fishing really slowed down in the 1960s and was perplexed by this. (See above; Drake 1989; Van Riper 1989; Sarkisian 1990; Goodall 1991; Spaulding 1991; Hiscox 1992; Healey Pers. Comm. 2013; DFW files; elsewhere)

Sampling of upper Auburn Ravine in Ophir by California Department of Fish and Wildlife/DFW scientists found up to nearly 8,000 estimated steelhead/rainbow trout per mile. Moreover, previous sampling in Auburn Ravine showed a pronounced fall to spring reduction in juvenile steelhead or rainbow trout biomass, which has been suggested to demonstrate emigration of juvenile steelhead smolts to downstream areas and/or the ocean as is typical of a normal steelhead stream. (CH2MHILL Aub. Stream Study 1996; Aub. Wastewater Fac. Plan FEIR 1997; Aub. Rav./Coon Cr. Eco. Rest. Plan 2002; Bailey 2003; Navicky 2008; DFW files; elsewhere)

A surprising amount of additional documentation has been done for Western Placer streams’ fishery resources, both anecdotally by local residents and by fishery professionals. For instance, fish biologists have observed on a number of occasions juvenile steelhead smolts ready to travel toward the ocean; in addition, very small young-of-the-year fish and larger adult rainbow or steelhead trout have been noted in Auburn Ravine. Many fish have also been caught there and in other Western Placer anadromous streams over the years. Photographs and limited scale samples of some steelhead/rainbow trout have been taken prior to release by the author in upper Auburn Ravine over three decades. Spawning Auburn Ravine fall-run Chinook salmon as well as juveniles have been identified on many occasions. And presence of juvenile and adult salmon and steelhead has also been well documented for the Dry Creek drainage, including Secret and Miners Ravines. Auburn Ravine rotary screw trap monitoring conducted during the winter and spring of 2013 by DFW found different life stages of juvenile steelhead/rainbow trout including smolts, even though opportunities for anadromy have been significantly compromised for some time. This study also found juvenile winter- and spring-run Chinook salmon present—fish that are not known to spawn in Auburn Ravine. DFW’s recent analysis indicates that some winter- and more numerous spring-run Chinook salmon juveniles, perhaps from the Feather River, may move into and use Auburn Ravine for non-natal rearing. This is due to its relatively warmer water and more abundant prey that can produce more rapid growth rates and conceivably lead to better survival. Similar use of Dry Creek by juvenile winter-run salmon has also been documented. DFW observed during their recent study that seasonal flashboard dam operations and current water management practices may hinder or prevent successful downstream fish emigration to the Sacramento River, which may lead to poor survival of juvenile Chinook salmon spawned upstream in Auburn Ravine. The above also demonstrate the need of better understanding existing water management and diversion practice impacts on all life histories and life stages of salmon and steelhead in Central Valley tributary streams, including Auburn Ravine and other Western Placer anadromous streams—with potential modification of operations and structures. Although related discussions have occurred a number of times previously, recent DFW screw trap findings lend additional weight to the need of effectively addressing this long-held concern. All of this is supportive of the essential role of foothill anadromous streams in broader Central Valley anadromous fishery restoration efforts. (See above; CH2MHILL Aub. Stream Study 1996; Aub. Wastewater Fac. Plan FEIR 1997; CalFed 1997;

Lincoln 1998 & 1999; CDFG 1999; McEwan 1999 & 2001; Titus 2001, 2003 & 2013; Aub. Rav./Coon Cr. Eco. Rest. Plan 2002; Bailey 2003 & 2005; Lindley 2006; Navicky 2008; PG&E 2008 & 2011; Limm 2009; PCWA 2009; NMFS 2009; Sprague Pers. Comm. 2012 & 2013; Lincoln 2013; Parker Pers. Comm. 2014; Healey 2014; DFW & NMFS files; elsewhere)

Smaller in size, but otherwise closely resembling silvery bright adult steelhead, fish commonly referred to as “half-pounders” have been caught in the Lower American and Yuba Rivers as well as elsewhere in the region, including Western Placer anadromous streams. These fish leave fresh water as juveniles and enter the ocean very briefly before returning to fresh water as half-pounder steelhead to overwinter. Following this they spend a much longer time in the ocean where they grow significantly, mature and prepare to return as adults to spawn in fresh water. Fish also thought to be half-pounder steelhead have been previously caught in Auburn Ravine over a number of years, and have been observed by a fish biologist jumping at the face of an in-stream seasonal diversion structure apparently blocking upstream passage in the spring. Further research is needed locally and system-wide to confirm the life history of these fish as it has been questioned whether true half-pounder steelhead are in fact present in the Sacramento River system; and if they are present, it is yet to be determined to what extent. (See above; Snyder 1925; Kesner 1972; O'Brien 1990; Aub. Wastewater Fac. Plan FEIR 1997; Aub. Rav./Coon Cr. Eco. Rest. Plan 2002; Bailey 2003 & 2005; Lee 2007 & 2014, Pers. Comm. 2013 & 2014; Moyle 2008; Peterson 2011; Sprague Pers. Comm. 2012 & 2013; Healey Pers. Comm. 2013 & 2014; FISHBIO (2) 2014; DFW & NMFS files; elsewhere)

Despite multiple threats to their existence and a precipitous decline in numbers, Central Valley steelhead display considerable life history variability as well as adaptability and resilience which have served them well. However, this alone may not be enough in an increasingly hostile environment. Current research confirms that anadromous steelhead and resident rainbow trout that share rivers mate freely and constitute a single interbreeding population, and that rainbow trout populations with access to the ocean are often found to be partially anadromous. Their progeny can either opt to remain in fresh water or migrate to the ocean. Hatcheries now produce most Central Valley steelhead. The hatcheries have made frequent use of North Coast fish, primarily from the Eel River, and this has changed the fishery significantly. Central Valley dams prevent access to most of the historical spawning and rearing habitat previously used by steelhead, but do provide cool water and plentiful food which are thought to encourage fish to remain. Furthermore, notable problems with Delta habitat and the hazards entailed with migration from fresh water to the ocean and back lead to low probability of survival for migratory steelhead. Successfully addressing this challenge is critical to restoration of Central Valley steelhead. Due to existing conditions, it has been suggested that Central Valley resident rainbow trout below dams are flourishing while ocean-going steelhead clearly are not, and that their protection under the Endangered Species Act may need to be re-visited. There is an unequivocal need of far more information on Central Valley steelhead life history, their abundance and what can be done to enhance it, the population impacts of hatchery fish spawning with wild fish, and their relationship with main stem and tributary resident rainbow trout. This could be particularly relevant to Auburn Ravine. As we move forward, we should keep in mind the admonition that restoration that focuses exclusively on increasing absolute numbers while ignoring the need to increase population diversity may be inadequate. To achieve more effective restoration, habitat, flow, and passage requirements as well as limitations also need to be better understood and more successfully addressed. This should

include all life histories and stages of resident rainbow trout and migratory steelhead from their natal streams to the Pacific Ocean. (See above; Grant 1997; McEwan 1999 & 2001; Nielsen 2003 & 2005; Lindley 2006; Lee 2007, Pers. Comm. 2013 & 2014; Garza 2008; Zimmerman 2008; Moyle 2008 & 2013; NMFS 2009; Sprague Pers. Comm. 2012 & 2013; Courtier 2013; Lincoln 2013; Healey Pers. Comm. 2013 & 2014; FISHBIO (1-4) 2014; DFW & NMFS files; elsewhere)

Further research is needed to more fully appreciate potential benefits to both healthy populations of resident rainbow trout and diminished migratory steelhead that share river or stream habitat. Principally, how can we best maximize the health and recovery of protected Central Valley steelhead? Again, it also appears that Western Placer anadromous streams play an essential role in support of juvenile winter- and spring-run salmon, and that our local streams are important to a much larger system which, in turn, is vital to our local fisheries.

We are early in our journey toward more fully understanding these as well as other imperiled anadromous and resident fish that inhabit the Sacramento-San Joaquin Rivers, their tributaries, the Delta and San Francisco Bay. While major changes are currently proposed to this immense water system regarding conveyance, flows, governance, mitigation requirements, fishery management, storage and other key matters, local efforts are ongoing to actively create healthier streams and fisheries close at hand. This makes it all the more crucial that we remember a well-informed and actively-involved public can still have a powerful influence.

I am most appreciative of the generous guidance, resources, and encouragement provided by fisheries professionals Dennis Lee, Michael Healey, Rob Titus, and Gary Sprague. And I'm grateful to Jack Parker, who began fishing Auburn Ravine in the 1960s, for his accounts, as well as to Patricia Otto and Reginald Otto for their review.

Contact:  
10170 Wise Road

Auburn (Ophir), CA 95603  
[rottoophir@gmail.com](mailto:rottoophir@gmail.com)