Drought assessments of Little Kern Golden Trout (*Oncorhynchus mykiss whitei)*

2015

Tulare County

State of California

Department of Fish and Wildlife

Heritage and Wild Trout Program

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Overview

In 2013, the California Department of Fish and Wildlife (CDFW) Heritage and Wild Trout Program (HWTP) initiated drought assessments on several waters in California. The CDFW Threatened Trout Committee and HWTP staff developed a prioritized list of streams with native trout species of high conservation value that may be at risk due to drought conditions. This list was prioritized based on genetic integrity with a focus on putative populations, species on federal and/or state endangered species lists, and perceived threat level. The latter included consideration of slope, aspect, streamflow, water source, and surrounding land use activities. A structured decision-making matrix was created to aid staff in assessing drought conditions, evaluate whether fish rescues were necessary to protect certain populations and identify potential locations for translocations (within the same waterbody, within basin or out-of-basin; Table 1).

Little Kern Golden Trout are listed as threatened under the Federal Endangered Species Act and drought monitoring locations were established in 2013 in five key tributaries to the Little Kern River. These streams were originally selected because they support populations with high genetic integrity and a severe fire burned this area in 2011. These sites were surveyed in 2014 and 2015 (Hogan et. al. 2014); this report summarizes the results of the 2015 drought assessments in Lion, Sheep, Tamarack, Willow, and No Name creeks.

Need

Negative effects from drought on inland native trout populations and their habitats have been historically documented and, in some cases, led to localized extirpation. Recent drought conditions (2012-present) have been exceptionally severe and related impacts on inland fishes may be further exacerbated by water diversions, presence of barriers (artificial and natural), reduced snowpack, increased summer water temperatures, and decreased winter water temperatures. Despite negative effects of the drought in California, population persistence and recovery may be expected if habitat conditions improve and/or recolonization from reconnected populations occurs.

Methods

Field crews opportunistically resurveyed the benchmark locations established in 2013-2014 for streamflow (cubic feet per second; cfs), water and air temperature (ºC), and dissolved oxygen (mg/L). The methods employed in 2015 were an abbreviated version of the survey protocols developed for other inland trout populations, based on parameters outlined in the Drought Response Implementation Plan and Rescue-Translocation Decision Model (Model; Table 1).

Results

Little Kern River

The Little Kern River, tributary to the Kern River, is located in the southern Sierra Nevada Mountains approximately 65 miles northeast of Bakersfield, CA (Tulare

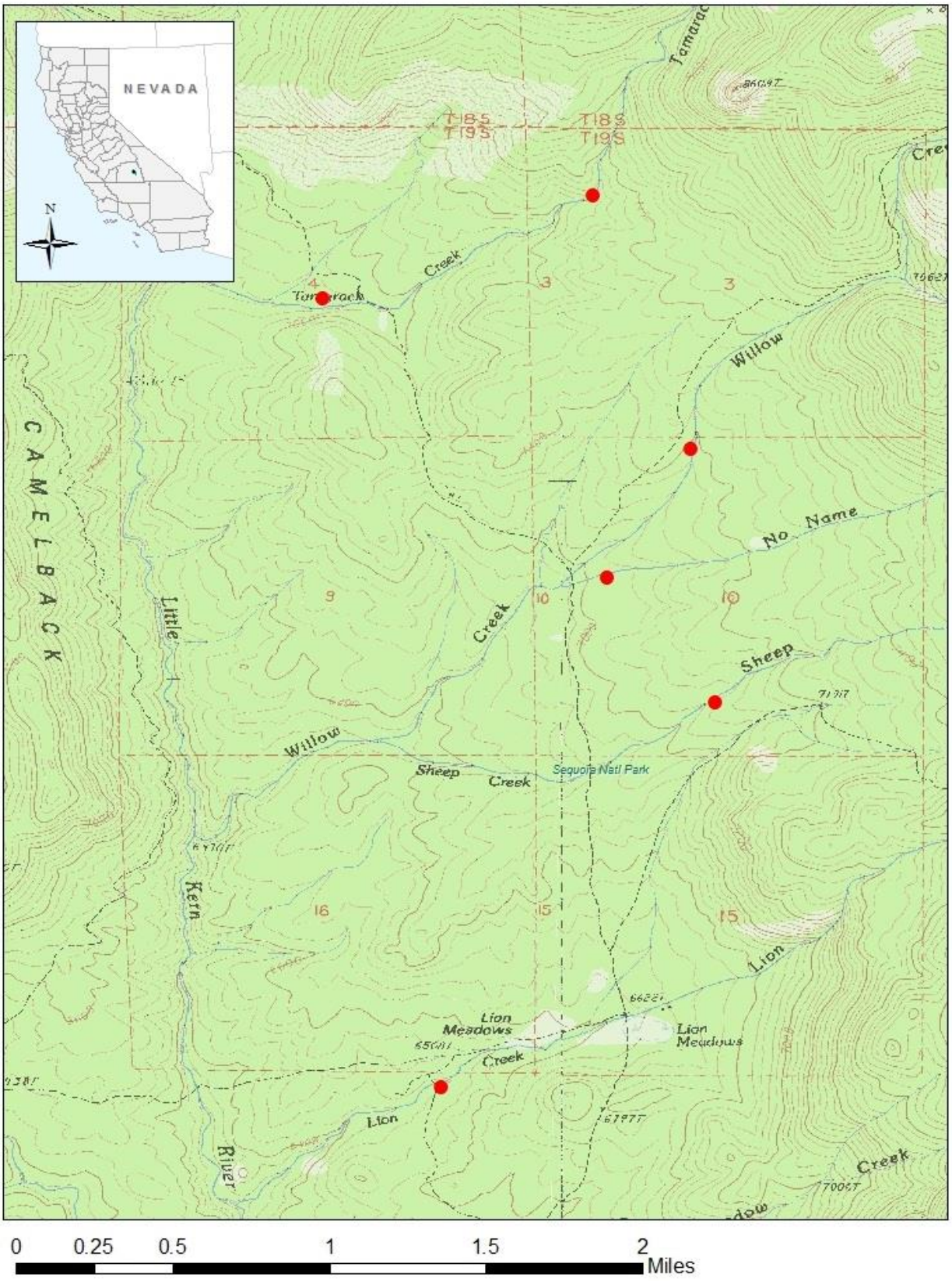
County). Little Kern Golden Trout are the only native salmonid in this basin. Drought assessments were conducted in Lion, Sheep, Tamarack, Willow, and No Name creeks on July 14, 2015 (Figure 1; Table 2).

From 2013 to 2015, it appears streamflow decreased slightly. Water temperature varied across years and was likely the result of diurnal variation and the timing of data collection. In 2015, No Name Creek was dry at the benchmark location. This tributary is the smallest of those surveyed and was the most heavily affected by the 2011 Lion Fire. Previous surveys indicated low trout density in No Name Creek. It likely never supported a robust population due to its small size and higher risk from both drought conditions and fire impacts. Past connectivity with Sheep Creek may have allowed for the No Name Creek trout population to disperse downstream and seek refuge as the stream was drying.

Dissolved oxygen was measured at two locations and was 6.27 mg/L in Lion Creek and 8.53 mg/L in Sheep Creek. Both were within the normal threshold for trout.

Little Kern Golden Trout in Lion, Willow, Sheep, and Tamarack creeks were determined to be at moderate risk due to drought. Depletion electrofish surveys conducted in 2013 estimated abundance between 30 trout/mi (No Name Creek) and 1148 trout/mi (Tamarack Creek). The HWTP recommends continued monitoring of Little Kern Golden Trout throughout the entire range in perpetuity.

Figure 1. Overview map of the eastern tributaries surveyed in the Little Kern River basin



Literature Cited

Hogan, S., C. Zuber, and C. Buchanan. 2014. Drought assessments of imperiled native trout populations in California. State of California Department of Fish and Wildlife Heritage and Wild Trout Program. Rancho Cordova, CA.

Table 1. Drought Response Implementation Plan and Rescue-Translocation Decision Model

Assessment effort	Observed conditions	Threat Level (1 to 4, 4 being the highest risk)	Response
Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, measure discharge, estimate population size by size class, and document water source.	Instream water quality is sufficient to maintain biological function and fish health, flow is contiguous and is >.5 cfs, pool habitat exists which exceeds 300mm in depth, population exceeds 200 adults, and wetted habitat is > 2000 meters	1	Document conditions/status, make recommendations on monitoring schedule,
Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is sufficient to maintain biological function and fish health, flow is not contiguous and is <.5 cfs, pool habitat exists which exceeds 300mm in depth, population exceeds 200 adults, and although wetted habitat is not contiguous it is > 2000 meters	2	Document conditions/status, make recommendations on monitoring schedule, and identify a reference location for future measurements and comparisons.
Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is sufficient to maintain biological function and fish health, flow is contiguous and is <.5 cfs, pool habitat does not exist which exceeds 300mm in depth, population exceeds 200 adults, and wetted habitat is contiguous for > 2000 meters	2	Document conditions/status, make recommendations on monitoring schedule, and identify a reference location for future measurements and comparisons.

Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is sufficient to maintain biological function and fish health, flow is not contiguous and is <.5 cfs, pool habitat exists which exceeds 300mm in depth, population is below 200 adults, and although wetted habitat is not contiguous it is > 2000 meters	2	Document conditions/status, make recommendations on monitoring schedule, and identify a reference location for future measurements and comparisons.
Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is sufficient to maintain biological function and fish health, flow is not contiguous and is <.5 cfs, pool habitat exists which exceeds 300mm in depth, population is > 200 adults, and wetted habitat is < 2000 meters	2	Document conditions/status, make recommendations on monitoring schedule, and identify a reference location for future measurements and comparisons.
Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is sufficient to maintain biological function and fish health, flow is not contiguous and is <.5 cfs, pool habitat exists which exceeds 300mm in depth, population is below 200 adults, and wetted habitat is < 2000 meters	3	Initiate translocation assessment strategy and or rescue alternatives and formulate plan
Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is sufficient to maintain biological function and fish health, flow is contiguous and is <.5 cfs, pool habitat exceeding 300mm in depth does not exist, population is < 200 adults, and wetted habitat is contiguous for > 2000 meters	3	Initiate translocation assessment strategy and or rescue alternatives and formulate plan

Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is not sufficient to maintain biological function and fish health, flow is contiguous and is >.5 cfs, pool habitat exceeding 300mm in depth does not exist, population exceeds 200 adults, and wetted habitat is > 2000 meters	4	Initiate translocation assessment strategy and or rescue alternatives and formulate plan
Delineate connected and non-connected wetted habitat, document barriers, count and measure mean/maximum pool depth, gather stream temp, estimate discharge, and estimate population size by size class.	Instream water quality is not sufficient to maintain biological function and fish health, flow is not contiguous and is <.5 cfs, pool habitat exceeding 300mm in depth does not exist, population is < 200 adults, and wetted habitat is < 2000 meters	4	Initiate translocation assessment strategy and or rescue alternatives and formulate plan

Table 2. Comparison of streamflow and water temperature in Little Kern River tributaries from 2013 to 2015

Water	Date	Streamflow (cfs)	Water temperature (ºC)
Lion Creek	6/29/2013	0.14	15.2
	8/9/2014	0.1	18
	7/14/2015	0.08	17.6
Sheep Creek	6/29/2013	0.55	11.9
	8/10/2014	0.49	10
	7/14/2015	0.58	11
Tamarack Creek-lower	7/15/2013	0.7	11.3
	8/10/214	0.6	12
	7/14/2015	0.53	12.4
Tamarack Creek-upper	7/12/2013	0.69	10.4
	8/10/2014	0.49	15
	7/14/2015	0.38	11.5
No Name	6/30/2013	0.22	15
	8/10/2014	0.02	13
	7/14/2015	0	NULL
Willow Creek	7/14/2013	0.66	11.5
	8/10/2014	0.42	10
	7/14/2015	0.24	11.3