

# **North Arm Rice Creek 2009 Summary Report**

*July 23, 2009*

**State of California**

**Natural Resources Agency**

**Department of Fish and Game**

**Heritage and Wild Trout Program**

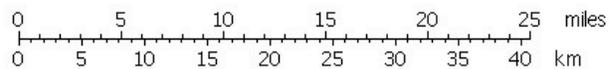
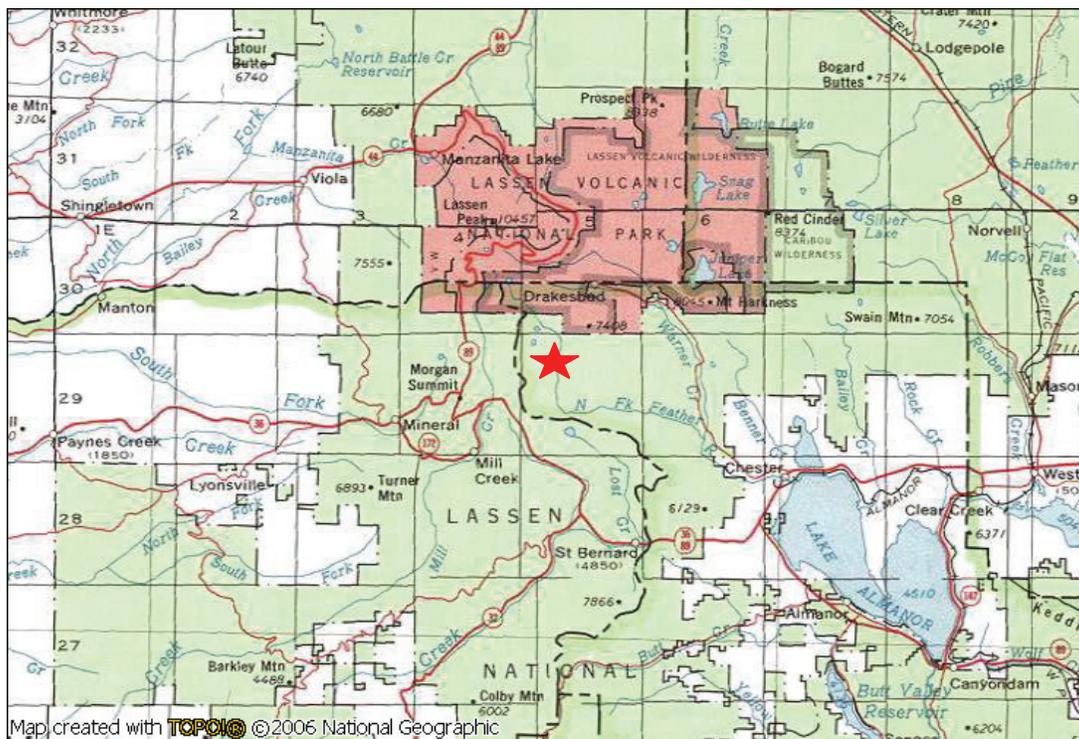


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## Introduction:

North Arm Rice Creek (Plumas County) is located approximately 11 miles northwest of Chester, CA and is tributary to the North Fork Feather River (Figure 1). North Arm Rice Creek drains Crumbaugh Lake south of Lassen Peak and supports wild populations of rainbow trout (*Oncorhynchus mykiss irideus*) and brown trout (*Salmo trutta*). In 2007, the California Department of Fish and Game (DFG) Heritage and Wild Trout Program (HWTP) conducted fisheries and habitat assessments via multiple-pass electrofishing on two sections of North Arm Rice Creek to investigate its potential for Wild Trout designation (Phase 2 candidate Wild Trout Water surveys). Wild Trout Waters are those that support self-sustaining trout populations, are aesthetically pleasing and environmentally productive, provide adequate catch rates in terms of numbers or size of fish, and are open to public angling. Wild Trout Waters may not be stocked with catchable-sized hatchery trout (Bloom and Weaver 2008). Based on the results of these surveys, it was recommended that population and habitat assessments be performed annually over the next several years to gain further insight into the recreational fishery potential, trout population status, and other aspects of this stream (Weaver and Mehalick 2007). In 2009, the HWTP continued its Phase 2 assessments on North Arm Rice Creek via direct observation snorkel surveys at four locations (Figure 2). This report summarizes the results of these surveys.

Figure 1. Vicinity map of North Arm Rice Creek (red star).



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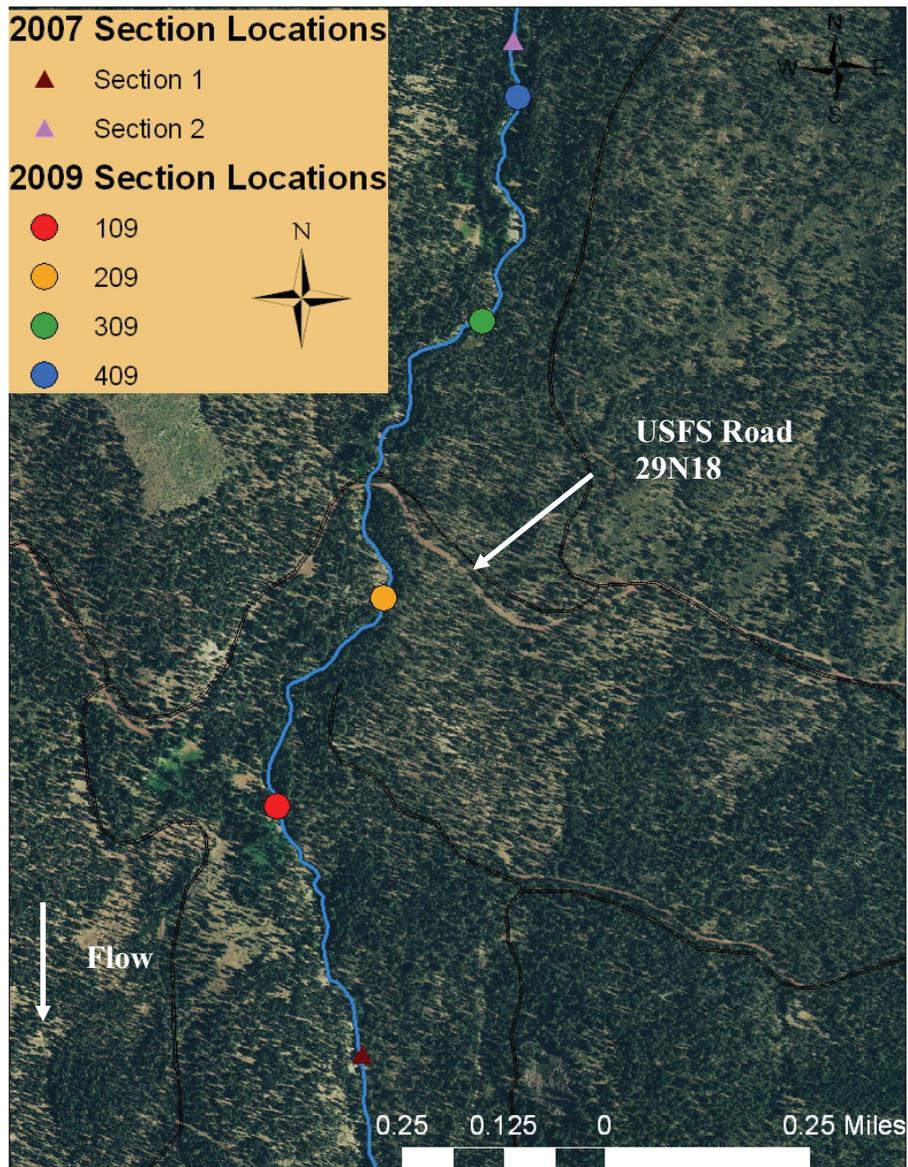
## **Methods:**

Direct observation surveys were conducted at four locations on North Arm Rice Creek on July 23, 2009 using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin & Reeves, 1988). Sections were located in the vicinity of United Forest Service Road (USFS) 29N18 and were spaced approximately every one-quarter mile with the start of each section selected at random. Specific section boundaries were located at distinct breaks in habitat type and/or stream gradient. Surveys were conducted in an upstream direction with three divers. The number of divers was determined based on wetted width, water visibility, and habitat complexity.

Divers, maintaining an evenly-spaced line perpendicular to the current, counted fish by species. All observed trout were further separated and counted by size class. Size classes were divided into the following categories: young of year (YOY); small (< 6 inches); medium (6-11.9 inches); large (12-17.9 inches); and extra-large ( $\geq$  18 inches). YOY are defined by the HWTP as age 0+ fish, emerged from the gravel in the same year as the survey effort. Depending on species, date of emergence, relative growth rates, and habitat conditions, the size of YOY varies greatly, but is generally between zero and three inches in total length. If a trout was observed to be less than six inches total length but it was difficult to determine whether it was an age 0+ or 1+ fish, by default it was classified in the small (<6 inches) size class.

Divers were instructed in both visual size class estimation and proper snorkel survey techniques prior to starting the survey (establishing a dominant side, determining the extent of their visual survey area, how and when to count (or not count) fish observed, safety considerations, etc.). For each section, surveyors measured section length along the thalweg, water and air temperature (in the shade), average wetted width and water depth, and water visibility. Habitat type (flatwater, riffle, or pool) was identified and GPS coordinates were recorded for the section boundaries. Representative photographs were taken.

Figure 2. North Arm Rice Creek 2007 electrofishing (Sections 1 and 2) and 2009 direct observation (Sections 109-409) survey section locations.



### Results:

The weather was clear and sunny on July 23, 2009 with air temperatures ranging between 25 °C and 30 °C, depending on the time of day. Water temperature was measured between 11 °C and 17 °C. Sections 109 and 209 were located downstream of the USFS Road 29N18 crossing; this reach of the river is higher in gradient and flows through a confined canyon. Substrate was dominated by cobble and gravel with some boulders. There were a few cascades and waterfalls located in this area; the largest one observed was approximately 25

feet in height and likely a barrier to upstream fish migration (located between Sections 209 and 309; Figure 3). Sections 309 and 409 were located upstream of the USFS Road 29N18 crossing where the gradient was less steep; substrate was also dominated by cobble and gravel with some boulders. A total of 435.6 feet of stream was surveyed among the four sections, which averaged 27.7 feet in wetted width and 0.7 feet in depth (Table 1). Water visibility was 10 feet or greater in all of the sections. A total of 79 rainbow trout in the small and medium-size classes were observed with an estimated density of 958 fish per mile (Table 2). No other fish species were observed.

Figure 3. 2009 photographs of North Arm Rice Creek including 25-foot waterfall observed between Sections 209 and 309 (left) and Section 409 (right).

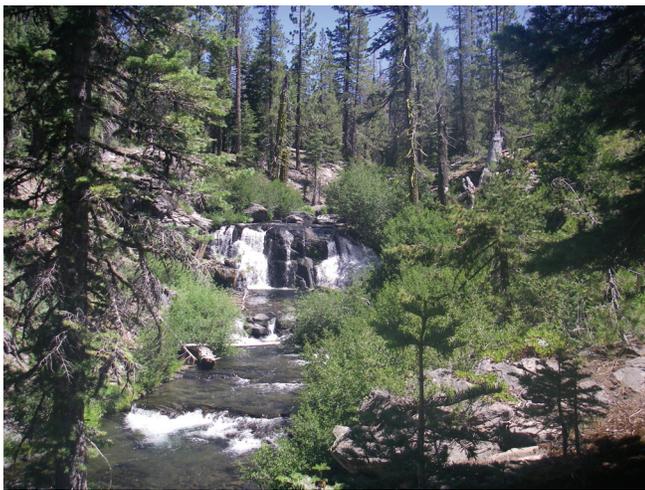


Table 1. Summary of 2009 North Arm Rice Creek direct observation habitat data.

Section number	Section length (feet)	Water visibility (feet)	Habitat type percentage			Average water depth (feet)	Average wetted width (feet)
			Flatwater	Pool	Riffle		
109	126.5	10	0	0	100	0.6	29.4
209	50.6	10	100	0	0	0.8	31.1
309	87.5	10	65	0	35	0.9	19.5
409	171.0	10	50	0	50	0.6	30.8
Average	n/a	10		n/a		0.7	27.7

Table 2. Summary of 2009 North Arm Rice Creek direct observation data including the number of rainbow trout observed by size class per section and estimated densities.

Section	Section Length (feet)	YOY	Number of rainbow trout observed				Total	Estimated Density (fish/mile)
			Small	Medium	Large	XLarge		
			0"-5.9"	6"-11.9"	12"-17.9"	>18"		
109	126.5	0	7	3	0	0	10	417
209	50.6	0	23	6	0	0	29	3026
309	87.5	0	3	3	0	0	6	362
409	171.0	0	29	5	0	0	34	1050
Total	435.6	0	62	17	0	0	79	958

### Discussion:

Data from the HWTP 2007 electrofishing surveys estimated fish densities of 1024.5 rainbow trout per mile (average of both Sections 1 and 2) and 442 brown trout per mile in the vicinity of Section 1 (Weaver and Mehalick 2007). No brown trout were captured in Section 2 or farther upstream in the system during the 2007 survey. It is noteworthy that the density estimates for rainbow trout in both 2007 and 2009 utilizing different sampling methods were nearly the same (1024.5 fish/mile in 2007 and 958 fish/mile in 2009).

Two goals of the 2009 direct observation surveys were to delineate the distribution of brown trout and to possibly identify a barrier that may be limiting upstream fish movement. The four direct observation survey sections in 2009 were purposefully located in the portion of the river between the two multiple pass electrofishing sections established in 2007 (Figure 2). However, zero brown trout were observed in any of the 2009 direct observation survey sections. It is possible that a barrier exists somewhere between Sections 1 and 109 or that brown trout may have been present but were not observed during the dives. Areas with abundant cover, such boulder-dominated substrate, may bias the detectability of different trout species, specifically brown trout, during direct observation surveys (Pert et. al. 1997). As mentioned, a 25-foot waterfall between Sections 209 and 309 was located during the 2009 surveys. Given the lack of detection of browns in sections upstream of this barrier in both 2007 (using backpack electroshockers) and 2009 (using direct observation), it is assumed that brown trout are not distributed upstream of this barrier. Future surveys focusing immediately upstream and downstream of the 25-foot falls should be performed in order to determine species composition above and below this barrier.

North Arm Rice Creek is publicly accessible via a network of USFS roads, is open to fishing, and contains wild populations of both rainbow and brown trout. Fishing regulations fall under the DFG's Sierra District General Regulations with

an open season from the last Saturday in April through November 15 and a bag limit of five trout per day with ten in possession. Based on the HWTP's criteria for identifying candidate Wild Trout Waters, North Arm Rice Creek has potential for designation. Population and habitat assessments should be performed annually over the next few years to gain further insight into population dynamics and trends of this fishery. Although large fish (>12") were not encountered in either of the 2007 and 2009 survey efforts, the fish captured and observed appeared wild and estimated densities of rainbow trout are adequate to provide good recreational angling opportunities. Due to the presence of smaller fish and multiple size classes, it is assumed that natural reproduction occurs in this system.

The HWTP recommends expanding Phase 2 candidate water assessments to a watershed level by including the North Fork Feather River and other headwater tributaries. In 2009, the HWTP conducted Phase 2 candidate water assessments on Warner Creek, a tributary to the North Fork Feather River and recommended continuing Phase 2 assessments on this water (Weaver and Mehalick 2009). The North Fork Feather River is currently stocked with hatchery trout at Lake Almanor but little is known about the distribution of these hatchery fish farther upstream in the watershed. The HWTP recommends pursuing Phase 2 candidate water assessments on the North Fork Feather River watershed, including Warner Creek and North Arm Rice Creek to better understand the influence and distribution of hatchery fish in the system and to gain population-level information including estimates of trout abundance. These surveys should also include first and second-order headwater streams including the South Fork Rice Creek, Kings Creek, and Hot Springs Creek to assess their role(s) in trout population dynamics in this watershed, as well as to evaluate their potential as recreational fisheries. Angler use, success, and satisfaction should also be monitored via installation of one or more Angler Survey Boxes to collect voluntary angler data on this water.

### **References:**

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Hankin, D.G., and G.H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. *Canadian Journal of Fisheries and Aquatic Sciences*. 45:834-844.

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