North Fork of Middle Fork American River 2012 summary report

# August 27-30, 2012

State of California Department of Fish and Wildlife Heritage and Wild Trout Program



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### Introduction

The North Fork of Middle Fork American River (North Fork), located approximately 20 miles northeast of Auburn, CA (Placer County), is tributary to the Middle Fork American River (Figure 1). The North Fork is a west-slope Sierra Nevada stream originating at an elevation of approximately 5600 ft in the Tahoe National Forest and flows in a south-southwest direction for approximately 19 miles. The California Department of Fish and Wildlife Heritage and Wild Trout Program (HWTP) has been evaluating the North Fork watershed for candidacy as a designated Wild Trout Water since 2010. On an annual basis, the HWTP is responsible for recommending to the California Fish and Wildlife Commission 25 miles of stream and one lake that meet criteria for designation as Wild Trout Waters. Wild Trout Waters are those that support self-sustaining wild trout populations, are aesthetically pleasing and environmentally productive, provide adequate catch rates in terms of numbers or size of trout and are open to public angling (Bloom and Weaver 2008). Wild Trout Waters may not be stocked with catchable-sized hatchery trout. The HWTP evaluates candidate waters using a phased approach to systematically collect data and evaluate whether or not a stream or lake meets designation criteria.

The HWTP conducted a Phase 1 initial resource assessment in the North Fork in 2010 to determine whether it meets the minimum qualifications for designation. Based on the results of these surveys, the HWTP moved to a Phase 2 candidate water assessment in 2011 to collect baseline information on the fishery and habitat including species composition, size class structure and abundance (Hogan and Weaver 2011). Phase 2 surveys were continued in 2012 using direct observation methodology.

### Methods

From August 27<sup>th</sup>-30<sup>th</sup>, 2012 the HWTP (Headquarters and North Central Region staff) conducted direct observation surveys on the North Fork (20 sections) and Eldorado Creek (four sections) using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin and Reeves 1988). Due to the remote nature of portions of the river and limited access, particularly in the upper extent of the watershed, surveys were grouped into three reaches based on access locations. The North Fork was surveyed from its confluence with the Middle Fork American River upstream approximately five miles (Figures 2-3); in the vicinity of the Grouse Creek and North Fork confluence (Figures 4-5); and upstream of the Michigan Bluff Last Chance Trail crossing (Figures 4-5). Eldorado Creek was surveyed from the confluence with the North Fork upstream approximately two miles (Figures 2-3). Sections were spaced approximately every one-half mile and the start of each section was 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 one to three divers; the number of divers per section was determined based on wetted width, water visibility and habitat complexity.

Divers maintained an evenly spaced line perpendicular to the current and 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 are generally between zero and three inches in total length. If a trout was observed to be less than six inches in 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-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 (ft), average wetted width (ft), water depth (ft) and water visibility (ft). Water and air temperature (°C; in the shade) were also measured. Habitat type (flatwater, riffle, or pool) was identified following Level 2 protocol as defined in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1988). Representative photographs were taken and coordinates were recorded for the section boundaries using Global Positioning System hand-held units (North American Datum 1983). Fish abundance was estimated for each species and water by dividing the total number of fish observed (sum of all sections) by the total length of stream habitat surveyed (fish per mile; fish/mi).

Single-pass electrofishing was conducted on the North Fork to identify non-game species observed during the direct observation surveys. This effort occurred on August 30<sup>th</sup>, 2012 directly upstream of the Mosquito Ridge Road crossing. Physical measurements of the stream and environmental conditions were taken, including air and water temperature (°C; in the shade) and conductivity (specific and ambient in microsiemens). These factors were used to determine appropriate backpack electrofisher settings (Smith Root). Surveys proceeded in an upstream direction, with netters capturing fish and placing them in five-gallon buckets to be held until processed. Fish were captured opportunistically and surveyors did not attempt to collect all fish within the section. All fish were identified to species, tallied and returned live back into the section.

### Results

The North Fork flows through a relatively confined canyon with dense forests (Figure 6). Twenty sections were surveyed (combined total of 3546.4 ft in length), which consisted of 26% riffle, 50% flatwater and 24% pool habitat (Table 1).

Substrate was dominated by boulders and cobble with some bedrock and gravel. Water temperature was measured between 15 and 22 °C and air temperature ranged from 21 to 32 °C, depending on the time of day. Mean wetted width was 42.6 ft and mean water depth was 1.6 ft. A total of 696 coastal rainbow trout (*Oncorhynchus mykiss irideus*), two unknown trout, 22 suckers (*Catostomus* sp.), 1832 minnows (Family Cyprinidae), four sculpin (*Cottus* sp.) and one unknown fish were observed. Size class distribution of coastal rainbow trout was 5% YOY, 70% small-, 23% medium- and 3% large-sized fish (Figure 7). Observed unknown trout were in the small-size class. Fish abundance was estimated at 1036 coastal rainbow trout/mi, 3 unknown trout/mi, 33 suckers/mi, 2728 minnows/mi, 6 sculpin/mi and 1 unknown fish/mi (Figures 8-9). A potential barrier to upstream fish migration was observed at the upper boundary of Section 2012 which consisted of a bedrock-sheet waterfall approximately 10 ft in height.

Four sections were surveyed in the lower two miles of Eldorado Creek (Figure 10), which totaled 531.7 ft in length and consisted of 30% riffle, 49% flatwater and 20% pool habitat (Table 2). Substrate was dominated by boulders, cobble and gravel with some bedrock. Water temperature was measured between 16 and 18 °C and air temperature ranged from 20 to 28 °C, depending on the time of day. Mean wetted width was 25.4 ft and mean water depth was 1.0 ft. A total of 105 coastal rainbow trout and 4 sculpin were observed. Size class distribution of coastal rainbow trout was 75% small-, 23% medium- and 2% large-sized fish (Figure 11). Abundance was estimated at 1043 coastal rainbow trout/mi and 40 sculpin/mi (Figure 12).

Non-game fishes collected from the single-pass electrofish effort included riffle sculpin (*Cottus gulosus*), speckled dace (*Rhinichthys osculus*), Sacramento pikeminnow (*Ptychocheilus grandis*), California roach (*Lavinia symmetricus*) and Sacramento suckers (*Catostomus occidentalis*). Some captured sculpin were less than three inches in total length and were unable to be identified to species.

### Discussion

The results of the 2012 direct observation survey show a distribution of coastal rainbow trout, minnows, suckers and sculpin throughout the lower five miles of the North Fork (Sections 112-1012). Coastal rainbow trout and minnows appear to be the most abundant species in the terms of fish density in this lower reach of river. Coastal rainbow trout were observed in all sections surveyed for the North Fork and Eldorado Creek. The upstream-most minnow observed was in Section 1512. Three species of minnows were identified during the single-pass electrofish effort; however, based on native species distribution in this watershed, hardhead (*Mylopharodon conocephalus*) may also be present in the system. Sculpin were only observed in one section of Eldorado Creek; however, due to benthic habitat preferences and cryptic coloration, direct observation methodology is likely biased against detecting sculpin and may not be representative of abundance or distribution.

Estimated 2012 coastal rainbow trout abundance for the North Fork and Eldorado Creek was compared to the HWTP direct observation survey data from 2011. However, the previous survey on the North Fork was from the confluence with the Middle Fork American River upstream five miles, which corresponded to 2012 survey Sections 112-1012. Trout abundance was estimated separately for those sections conducted in 2012 that overlapped with the 2011 surveys (Figures 13-14 and Tables 3-4). Coastal rainbow trout density decreased nearly 75% from 2011 to 2012 (1560 fish/mi in 2011 and 330 fish/mi in 2012). Estimated coastal rainbow trout density in Eldorado Creek decreased approximately 50% (2300 fish/mi in 2011 and 1043 fish/mi in 2012).

Coastal rainbow trout size class distribution appeared similar in both 2011 and 2012 with small-sized fish (less than six inches including YOY) comprising the dominant size class in both the North Fork and Eldorado Creek (Figures 13-14). Approximately 75% of all trout observed were less than six inches in total length. The percent of YOY differentiated within the small-size class appeared to decrease from 2011 to 2012.

One brown trout was observed approximately 1.6 miles upstream of the confluence with the Middle Fork American River in 2011(Hogan and Weaver 2011). No brown trout were observed in 2012. Brown trout are found in the Middle Fork American River and anglers report catching them in the North Fork and Eldorado Creek during fall months. It is likely that high summer water temperatures limit the distribution of brown trout in the North Fork; however, they may exhibit a fluvial life history utilizing portions of the watershed during periods of lower water temperatures, such as during the fall spawning period.

During the survey effort, active mining was observed at numerous locations in the forms of sluice box mining, gold panning and power sluicing. Evidence of mining, including equipment, tailings and diversions were observed throughout the drainage.

### Conclusion

The North Fork meets numerous criteria for Wild Trout Water designation, including the presence of wild trout populations with multiple size classes, no stocking of hatchery fish, suitable habitat and public access. Current angling regulations for the American River and all tributaries above Folsom Lake (Placer, Eldorado, Amador and Alpine counties) allow for year-round angling with a split season. From the last Saturday in April through November 15<sup>th</sup>, there is a bag limit of five per day and ten in possession with no gear restrictions. For the remainder of the year, there is a zero-bag limit and gear restricted to artificial lures with barbless hooks. The majority of the watershed falls within national forest lands administered by the US Forest Service (USFS), with some roads and a trail network providing limited access; some portions of the North Fork are remote and require instream hiking.

The American River has a rich history in gold mining and this activity is still prevalent throughout the watershed. Currently, suction dredging, including the method known as "booming", is prohibited within 100 yards of any California river, stream or lake (Fish & G Code § 5653 subd. (d)). As noted, other legal forms of mining were observed in 2012.

The HWTP recommends continued Phase 2 candidate water assessments in the North Fork watershed, including other tributaries. Consideration should be given to the installation of angler survey boxes to monitor angler use, catch rates and sizes, angler satisfaction and angler preferences. The HWTP should collaborate with local stakeholders, including the USFS, private landowners, miners and recreational users (including anglers). During the evaluation process, the HWTP recommends monitoring potential aesthetic and biological impacts from mining to the wild trout fishery. North Coast Region staff are drafting a basin-wide management plan for the American River which will include both the Middle Fork American River and North Fork. This management plan will provide further direction and insight on future fisheries assessments and management direction.

### References

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Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998. California salmonid stream habitat restoration Manual. 3<sup>rd</sup> Edition. Vol. 1. State of California Resources Agency. Department of Fish and Game. Inland Fisheries Division.

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.

Hogan S. and J. Weaver. 2011. North Fork Middle Fork American River 2011 summary report. State of California Natural Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program. Rancho Cordova, CA.



Figure 1. Vicinity map of 2012 North Fork survey location

Figure 2. Detail map of 2012 North Fork (Sections 112-1012) and Eldorado Creek (Sections 112-412) 2012 direct observation survey locations



Figure 3. Aerial map of 2012 North Fork (Sections 112-1012) and Eldorado Creek (Sections 112-412) direct observation survey locations



Figure 4. Detail map of 2012 North Fork direct observation survey locations in the vicinity of Grouse Creek and Michigan Bluff Last Chance Trail (Sections 1112-2012)



Figure 5. Aerial map of 2012 North Fork direct observation survey locations in the vicinity of Grouse Creek and Michigan Bluff Last Chance Trail (Sections 1112-2012)



Figure 6. Representative photographs of the North Fork in 2012





Figure 7. North Fork 2012 direct observation survey data: percent of coastal rainbow trout observed by size class



Figure 8. North Fork 2012 direct observation data: estimated trout abundance by section



Figure 9. North Fork 2012 direct observation data: estimated non-game fish abundance by section

Figure 10. Representative photographs of Eldorado Creek in 2012





Figure 11. Eldorado Creek 2012 direct observation data: percent of coastal rainbow trout observed by size class



Figure 12. Eldorado Creek 2012 direct observation data: estimated fish abundance by species and section



Figure 13. North Fork 2011 and 2012 (Sections 112-1012) direct observation survey data: percent of coastal rainbow trout observed by size class

Figure 14. Eldorado Creek 2011-2012 direct observation survey data: percent of coastal rainbow trout observed by size class



	Section length	Habitat		Number of fish observed					Estimated
Section			Species		Small	Medium	Large		densitv
	(ft)	type		YOY	< 6"	6"-11.9"	12"-17.9"	Total	(fish/mi)
			coastal rainbow trout	0	0	2	0	2	157
112	67.4	flatwater	minnow	-	-	-	-	75	5875
			coastal rainbow trout	1	0	0	0	1	21
212	249.0	riffle	minnow	-	-	-	-	170	3605
			coastal rainbow trout	0	3	3	0	6	392
312	80.8	flatwater	minnow	-	_	_	-	50	3267
	184.4	flatwater	coastal rainbow trout	0	4	3	0	7	200
412			sucker	-	-	-	-	8	229
			minnow	-	-	-	-	546	15634
		pool	coastal rainbow trout	0	2	3	1	6	162
512	195.5		sucker	-	-	-	-	2	54
			minnow	-	-	-	-	58	1566
		flatwater	coastal rainbow trout	0	1	1	0	2	62
640			sucker	-	-	-	-	1	31
612	1/1.5		sculpin	-	-	-	-	3	92
			minnow	-	-	-	-	644	19827
	507.0	flatwater	coastal rainbow trout	4	11	1	0	16	167
740			sucker	-	-	-	-	1	10
712			sculpin	-	-	-	-	1	10
			minnow	-	-	-	-	38	396
	306.7	flatwater	coastal rainbow trout	7	15	5	1	28	482
812			sucker	-	-	-	-	6	103
			minnow	-	-	-	-	193	3323
	103.4	riffle	coastal rainbow trout	4	13	5	0	22	1123
912			sucker	-	-	-	-	4	204
			minnow	-	-	-	-	12	613
1012	166.0	rifflo	coastal rainbow trout	6	26	5	0	37	1177
1012		0 IIIIe	minnow	-	-	-	-	45	1431
1112	69.7	pool	coastal rainbow trout	0	14	4	0	18	1364
1212	110.6	flatwater	coastal rainbow trout	0	41	7	0	48	2292
1312	97.8	flatwater	coastal rainbow trout	0	74	21	2	97	5237
1412	97.1	flatwater	coastal rainbow trout	0	20	10	2	32	1740
1512	88.5	flatwater/ riffle	coastal rainbow trout	0	6	2	0	8	477
			minnow	-	-	-	-	1	60
			unknown fishes	-	-	-	-	1	60
1612	237.2	riffle	coastal rainbow trout	10	37	25	4	76	1692
	251.2		unknown trout	0	2	0	0	2	45
1712	106.7	riffle	coastal rainbow trout	1	13	7	0	21	1039
1812	121.5	pool	coastal rainbow trout	0	58	18	2	78	3390
1912	122.6	flatwater	coastal rainbow trout	0	61	14	2	77	3316
2012	463.0	pool	coastal rainbow trout	0	87	21	6	114	1300

# Table 1. North Fork 2012 direct observation survey data

	_		Species	Number of fish observed						
Section	Section length (ft)	Habitat type		YOY	Small	Medium	Large	Extra- large	Total	Estimated density (fish/mi)
					< 6"	6"-11.9"	12"-17.9"	≥ 18"		
112	175.0	flatwater	coastal rainbow trout	0	33	8	0	0	41	1237
212	161.5	riffle	coastal rainbow trout	0	13	6	0	0	19	621
			sculpin	-	-	-	-	-	4	131
312	87.2	flatwater	coastal rainbow trout	0	14	3	0	0	17	1029
412	108.0	pool	coastal rainbow trout	0	19	7	2	0	28	1369

### Table 2. Eldorado Creek 2012 direct observation survey data

Table 3. North Fork 2011 and 2012 (Sections 112-1012) direct observation survey data

Year	Numbe	Estimated					
	YOY	Small	Medium Large		Total	density	
		< 6"	6"-11.9"	12"-17.9"	TOLAT	(fish/mi)	
2011	251	267	143	10	671	1560	
2012	2 22 75		28	2	127	330	
	945						

Table 4. Eldorado Creek 2011-2012 direct observation survey data

	Numb	Estimated					
Year	YOY	Small	Medium Large		Total	density	
		< 6"	6"-11.9"	12"-17.9"	TOLAI	(fish/mi)	
2011	57	38	17	5	117	2300	
2012	0	79	24	2	105	1043	
	1671						