North Fork American River 2012 summary report

September 20-25 and October 1-4, 2012

State of California

Department of Fish and Wildlife

Heritage and Wild Trout Program

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Introduction

The North Fork American River drains the western slopes of the Sierra Nevada Mountains and is a tributary to the American River (Placer County; Figure 1). It originates at Mountain Meadow Lake, in the Tahoe National Forest, and flows approximately 50 miles to its terminus at Folsom Lake. The North Fork American River is a federally-designated Wild and Scenic River for approximately 38 miles upstream of the Iowa Hills Bridge and was the first stream in California to receive Wild Trout Water designation for its wild populations of coastal rainbow trout (*Oncorhynchus mykiss irideus*) and brown trout (*Salmo trutta*). The Wild Trout designated-section is 38 miles long and extends from Palisade Creek downstream to Iowa Hill Bridge (overlap with federal designation). 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.

In 2012, the California Department of Fish and Wildlife Heritage and Wild Trout Program (HWTP) conducted Phase 4 monitoring assessments in the North Fork American River from Iowa Hill Bridge upstream to Sailor Flat. Phase 4 assessments monitor existing designated waters and typically include fishery, habitat and angler use evaluations. Data from these surveys were used to monitor species abundance, distribution and size class structure, as well as angler use, catch rates, catch sizes, satisfaction and gear preferences. These assessments follow the recommendations outlined in the North Fork American River wild trout management plan (WTMP; California Department of Fish and Game 1979).

Methods

Direct observation

The HWTP conducted direct observation surveys on the North Fork American River on September 20th-25th and October 1st-4th, 2012 using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin and Reeves 1988). A total of 29 sections were surveyed spanning a distance of approximately 32 miles. Due to the remote nature of the river and limited access, surveys were grouped into four reaches based on access locations (Iowa Hill Bridge, Dorer Ranch, Mumford Bar and Sailor Flat; Figures 2-5). Within each reach, 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. Between two to four divers participated in each survey effort; the number of divers per section was determined based on wetted width, water visibility, habitat complexity and available personnel. Survey

direction (upstream or downstream) was dependent upon habitat complexity and water velocity.

Divers maintained an evenly spaced line perpendicular to the current and counted fish by species. All observed trout were further categorized 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 (≥ 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 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 (< 6 inches) size class. Additional divers followed behind the primary surveyors to more thoroughly examine areas with decreased visibility (i.e. undercut banks and woody debris complexes), in part, to better observe brown trout. The HWTP tallied foothill yellow-legged frogs (*Rana boylii*) observed during the course of the survey effort and documented location in reference to survey sections.

Divers were instructed in both visual size class estimation and proper snorkel survey techniques (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.) prior to starting the survey. Surveyors measured water and air temperature (ºC), average wetted width and water depth (ft) and water visibility (ft). 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. 1998). Representative photographs were taken and geographic coordinates of the section boundaries were recorded using a Global Positioning System hand-held unit (North American Datum 1983). To calculate estimates of abundance, the HWTP summed all observed fish by species in all sections and divided by the total survey length (fish per mile; fish/mi).

Angler use

The HWTP maintains and monitors an angler survey box (ASB) located at the trailhead to Mumford Bar (Figure 4). Voluntary angler data from this ASB were examined to better understand angler use, catch rates, catch sizes and angler satisfaction. Forms missing pertinent information (date, number of hours fished and/or fish size) were not included in the analysis; all complete forms were examined for the years 2003-2011. Anglers were asked to rate their satisfaction level related to overall fishing experience, size of fish and number of fish, with a range between least satisfied (-2), neutral (0) and most satisfied (+2). Mean catch per unit effort (CPUE; fish per hour; fish/hr) was calculated each year by averaging individual CPUE from each form.

Results

Direct observation

The survey area included the portion of the North Fork American River surveyed in 1994 (Somer 1994) and 2006 (Catot and Weaver 2006), as well as areas not previously surveyed by the HWTP.

A combined total of 6860.1 ft of habitat were surveyed across the 29 sections (approximately 3.5% of the Wild Trout-designated section) with an average wetted width of 52.2 ft and an average water depth of 1.9 ft. Weather conditions were primarily clear and sunny with the exception of one overcast day (Sections 1212-1512). Water visibility ranged from 3 to 20 ft. Surveyed habitat was comprised of 15% riffle, 84% flatwater and 1% pools. Water temperature ranged from 11 to 22 ºC and air temperature was measured between 14 and 30 ºC. Divers observed a total of 832 coastal rainbow trout, 1 brown trout, 2 unknown trout, 240 smallmouth bass (*Micropterus dolomieu*), 14 pikeminnow (*Ptychocheilus grandis*), 1762 minnows (Family Cyprinidae), 2 sculpin (*Cottus* sp.), 42 suckers (*Catostomid* sp.) and 47 unknown fishes (Table 1). Sculpin, suckers and most minnows were not identified to species. Divers also observed 423 foothill yellow-legged frogs, 1 aquatic garter snake (*Thamnophis atratus*), snails (not identified to species) and numerous macroinvertebrates (Trichoptera, Plecoptera, Ephemeroptera, Simuliidae, among others). Foothill yellow-legged frogs were observed in all surveyed reaches. Coastal rainbow trout size class distribution was 16% YOY, 31% small-, 39% medium-, 13% large- and 1% extra-large-sized fish (Figure 6). Estimated abundance was 641 coastal rainbow trout/mi, 1 brown trout/mi, 2 unknown trout/mi, 185 smallmouth bass/mi, 11 pikeminnow/mi, 1356 cyprinids/mi, 2 sculpin/mi, 32 suckers/mi and 36 unknown fishes/mi.

Angler use

A total of 65 forms were evaluated from the Mumford Bar Trailhead ASB with a reported effort of 257 hrs and a reported catch of 602 trout (89% coastal rainbow trout and 11% brown trout). Mean CPUE ranged from 1.6 (2007) to 4.5 fish/hr (2010) with an average of 2.9 fish/hr. In 2011, a total of two forms were completed with an average catch rate of 2.8 trout/hr (Figure 7 and Table 2); this appears similar to the long-term average. Coastal rainbow trout were reported caught in all years and brown trout were only reported caught in 2003, 2004 and 2010 (Figures 8-9). In 2011, anglers reported catching eight coastal rainbow trout and zero brown trout. Angler survey box data show that coastal rainbow trout were the dominant trout species reported caught for all years except 2004 and it appears that small-size fish are the dominant size class for most years. In 2011, size class distribution of captured coastal rainbow trout was 75% medium- and 25% large-sized fish (zero small-sized trout reported caught). Anglers reported using all types of gear including lures, bait and flies or a combination thereof

(Table 3). Anglers appear relatively satisfied with their overall angling experience, size of fish and numbers of fish caught (Table 4).

Discussion

Coastal rainbow trout were observed in all direct observation sections and appear to be distributed throughout the North Fork American River. Brown trout were only observed in Section 512 but appear in relatively small numbers on the Mumford Bar ASB forms. Smallmouth bass were only observed in Sections 112-512 and appear to be limited to the lower reach of the river; however, there was approximately 11-mile gap between the upstream-most observation of smallmouth bass (Sections 512) and Section 612. The upstream extent of smallmouth bass distribution is currently unknown but is presumed to be between these two sections. The estimated abundance of smallmouth bass in Sections 112-512 was 677 fish/mi; however, this number may be biased due to their presumed limited distribution within the survey area.

Estimated trout abundance in 2012 was compared to previous HWTP direct observation efforts that occurred in 1994 and 2006; however, these previous surveys were limited to the reach of river between Mumford Bar and Beacroft. Trout abundance was estimated separately for those sections conducted in 2012 which occurred in this reach of river (Sections 2012-2512). Coastal rainbow trout abundance was estimated at 293 fish/mi (1994), 1795 fish/mi (2006) and 434 fish/mi (2012). Between Mumford Bar and Beacroft, brown trout were only observed in 1994 and abundance was estimated at 4 fish/mi; however, brown trout were observed outside of this reach in 2012 (Section 512). Abundance was not compared among years for non-salmonids. The differences in observed abundance of coastal rainbow trout may be due, in part, to differences in survey technique and section selection. In 1994, only pools were surveyed whereas, in 2006, sections were selected to provide representative coverage of habitats types found in the North Fork American River. In 2012, sections were selected at random. In addition, previous surveys were limited in geographic scope, whereas the 2012 surveys were performed at various locations throughout the watershed.

The HWTP also examined size class distribution over time for coastal rainbow trout. In 1994, size classes were divided into three categories (< 6 inches; 6-11.9 inches; and ≥ 12 inches), rather than five size classes used in 2006 and 2012 (Table 5). To compare data across time, observed trout were tallied using the 1994 size class categories. For all years, the majority of coastal rainbow trout observed were less than 12 inches.

The number of forms completed each year from the ASB was very low (two forms evaluated in 2011) and are likely not representative of all angling experiences.

During the survey effort, active mining was observed between Sections 112 and 512 in the forms of gold panning and sniping (a type of gold mining using pipets

to suction gold out of river substrate). Other evidence of mining included equipment, tailings and diversions.

Conclusion

The North Fork American River provides anglers with remote fishing opportunities for wild coastal rainbow trout in their historic range and a large portion is designated as Wild and Scenic River. The 2012 surveys provided updated information on the status of the fishery and habitat conditions and were more comprehensive than previous assessments. The data collected will be utilized to evaluate management options and angling regulations. The North Fork American River WTMP is outdated (written in 1979) and the HWTP recommends updating this document to refine management goals and strategies and detail future monitoring efforts. During the process, consideration should be given to incorporating Heritage Trout status to the Wild Trout designation. Heritage Trout Waters are a sub-set of Wild Trout Waters which highlight wild populations of California's native trout found within their historic drainages. The HWTP recommends increasing the geographic extent of sampling, where feasible, delineating upstream distribution of smallmouth bass and identifying cyprinids to species.

Due to poor return rate of angler survey forms, the HWTP recommends evaluating alternate locations for the Mumford Bar ASB as well as installation of new ASBs at other angler access points within the Wild Trout designated-section of the North Fork American River.

The American River has a rich history of gold mining and this activity appears to remain popular 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)). Assessment of the potential aesthetic and biological impacts from mining to the wild trout fishery should be included in the WTMP.

References

Bloom, R. and J. Weaver. 2008. The California Heritage and Wild Trout Program Handbook (Draft). State of California Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program.

Catot, G.C. and J. Weaver. 2006. North Fork American River report. State of California Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program. Rancho Cordova, CA.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998. California salmonid stream habitat restoration manual. 3rd 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.

California Department of Fish and Game. 1979. North Fork American River wild trout management plan. State of California Resources Agency. Inland Fisheries Branch.

Somer, W.L. 1994. North Fork American River snorkel survey of September 14, 1994. Memorandum to Patrick O'Brien. State of California Resources Agency. Department of Fish and Game. Region 2. Rancho Cordova, CA.

Figure 1. Vicinity map of 2012 North Fork American River survey location

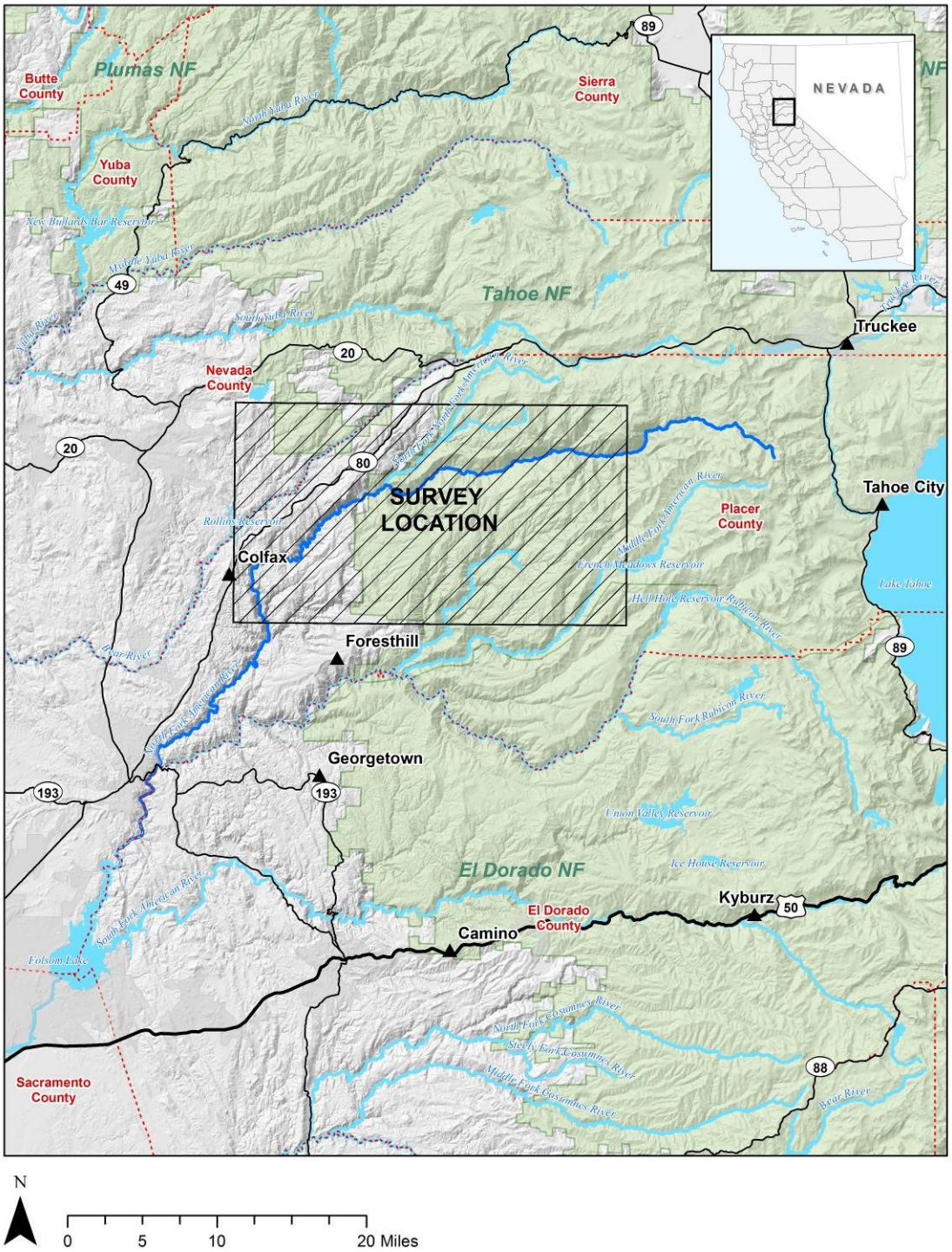

Figure 2. Detail map of 2012 North Fork American River direct observation survey section locations upstream of Iowa Hill Bridge

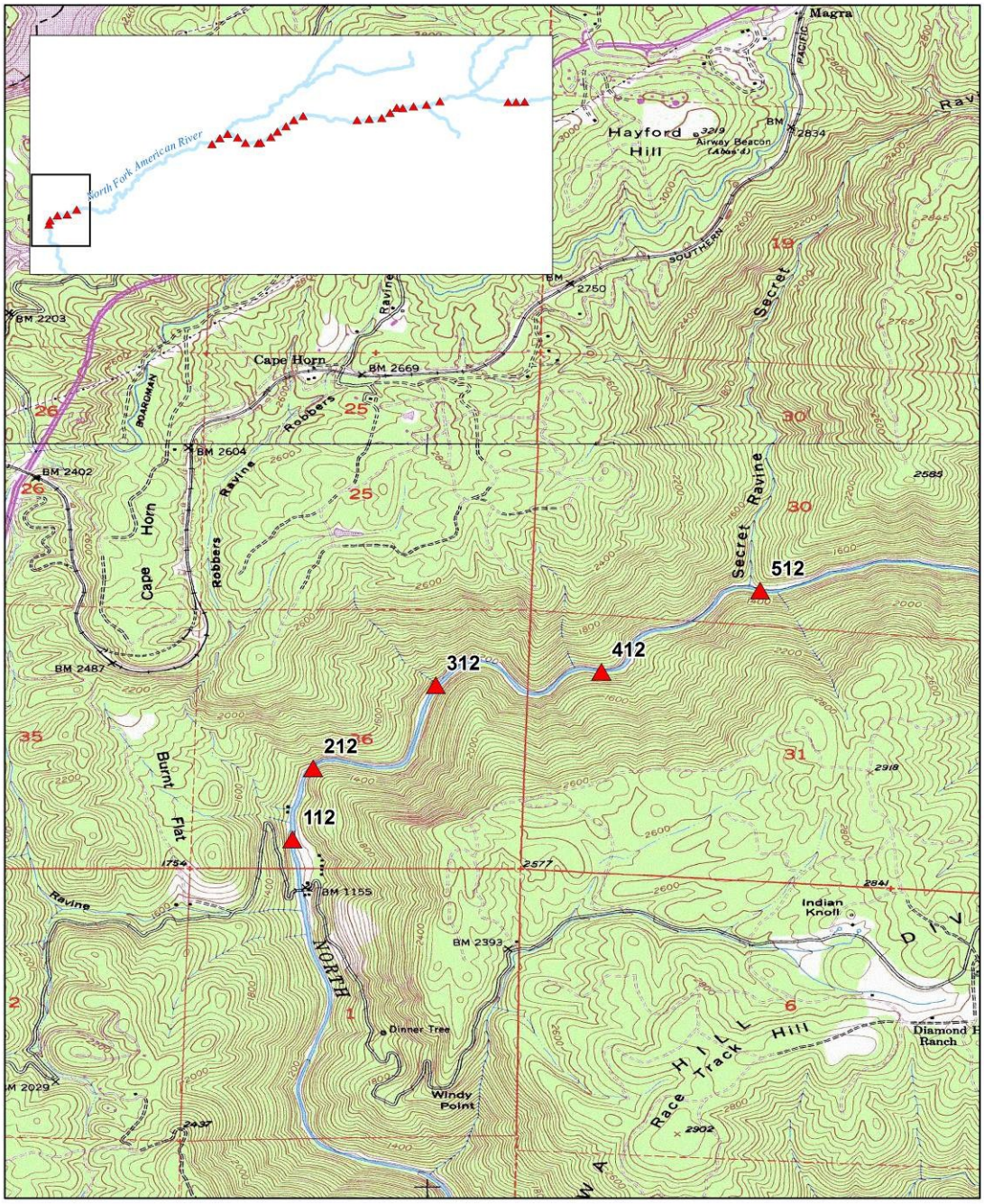

Figure 3. Detail map of 2012 North Fork American River direct observation survey section locations in the vicinity of Dorer Ranch

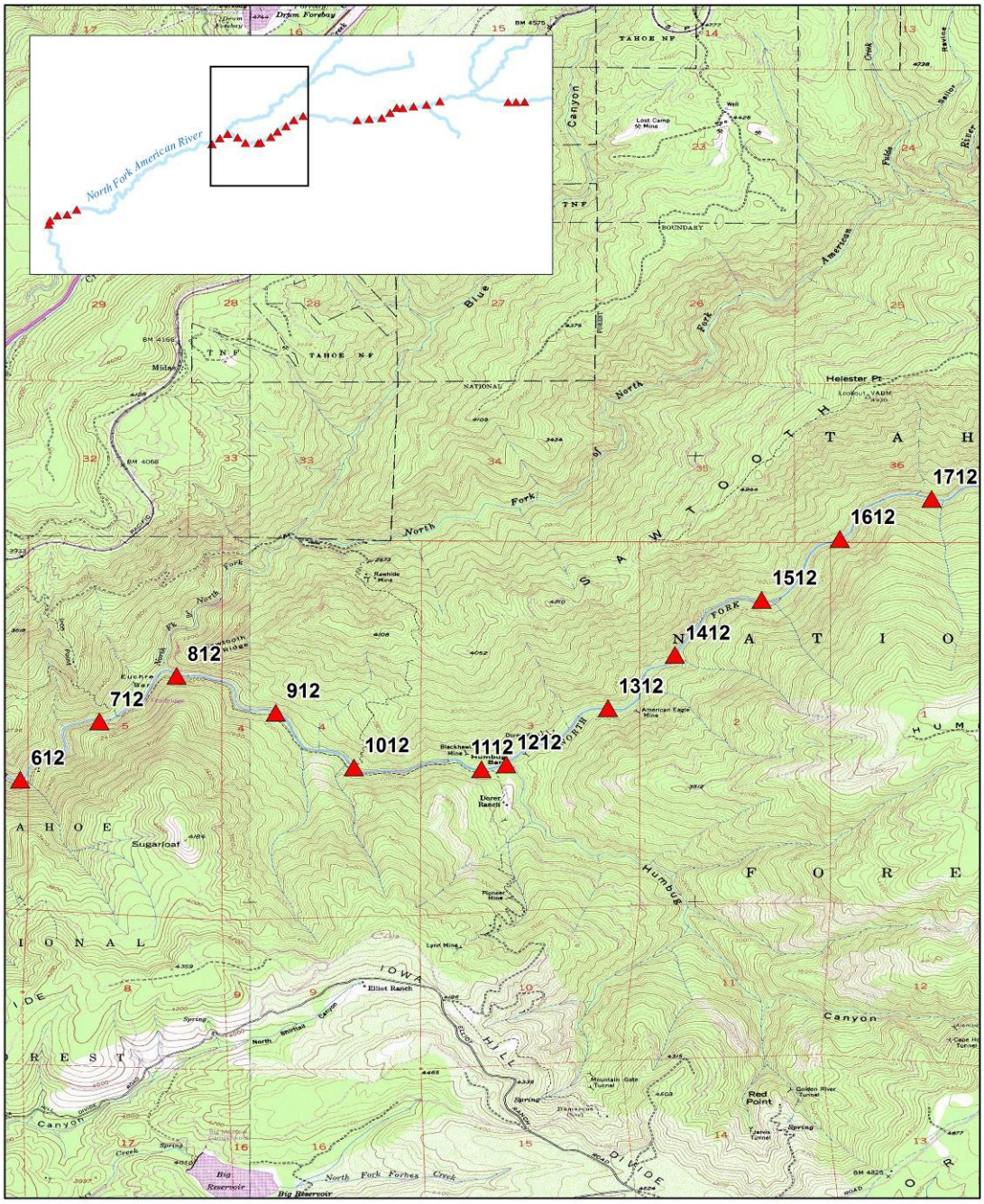

Figure 4. Detail map of 2012 North Fork American River direct observation survey section and ASB locations in the vicinity of Mumford Bar

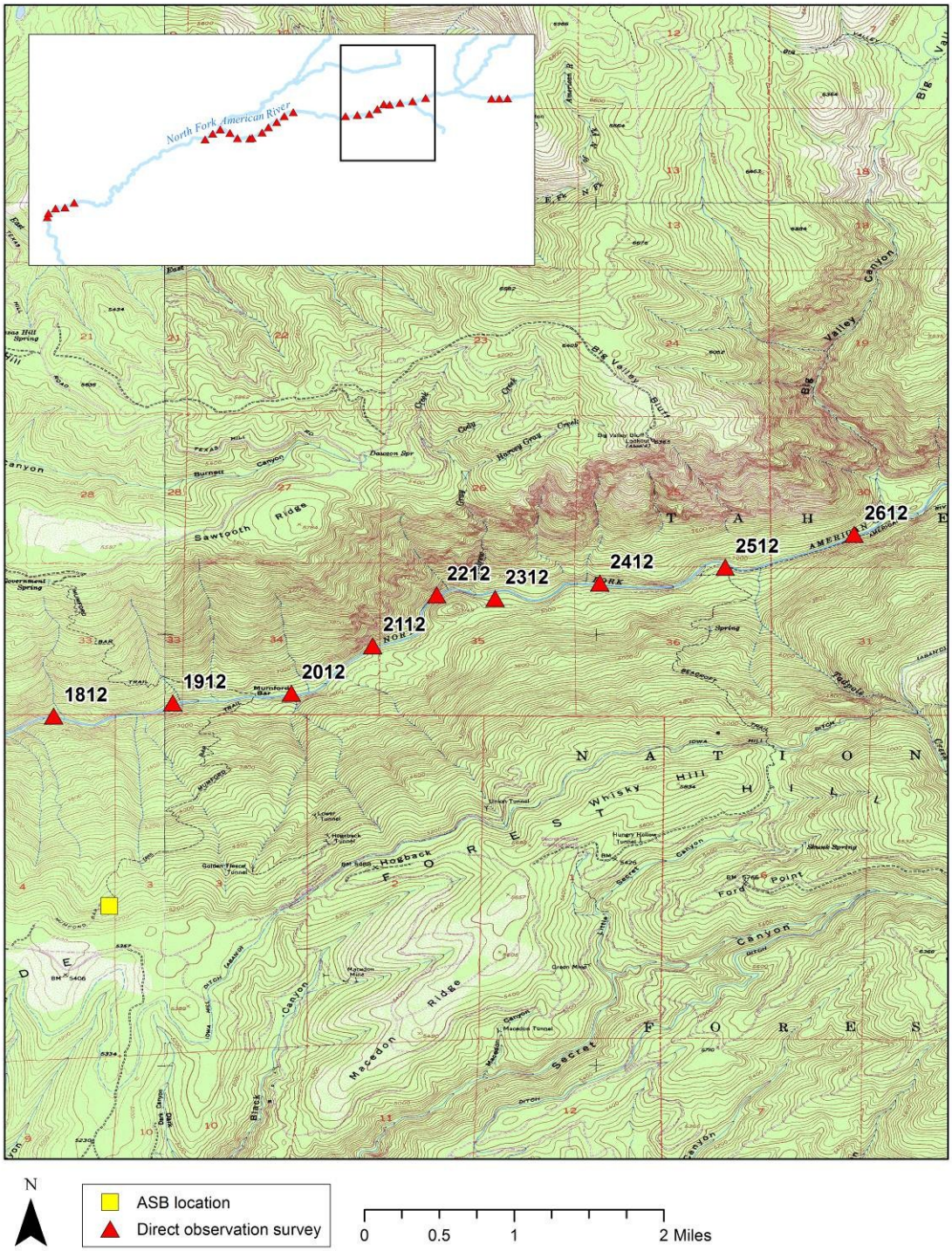

Figure 5. Detail map of 2012 North Fork American River direct observation survey section locations in the vicinity of Sailor Flat

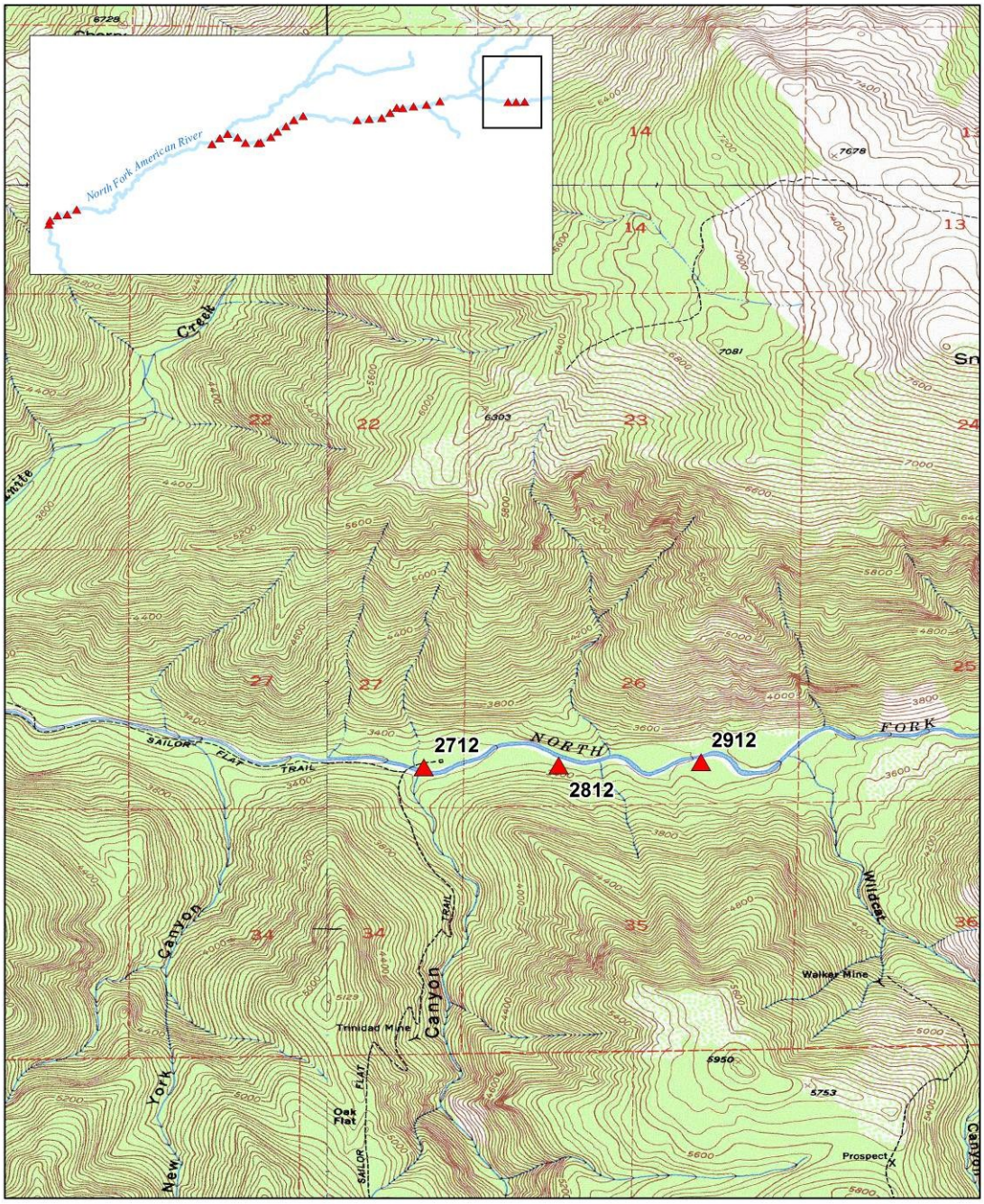

Figure 6. Graph of North Fork American River 2012 direct observation survey data: observed coastal rainbow trout size class distribution

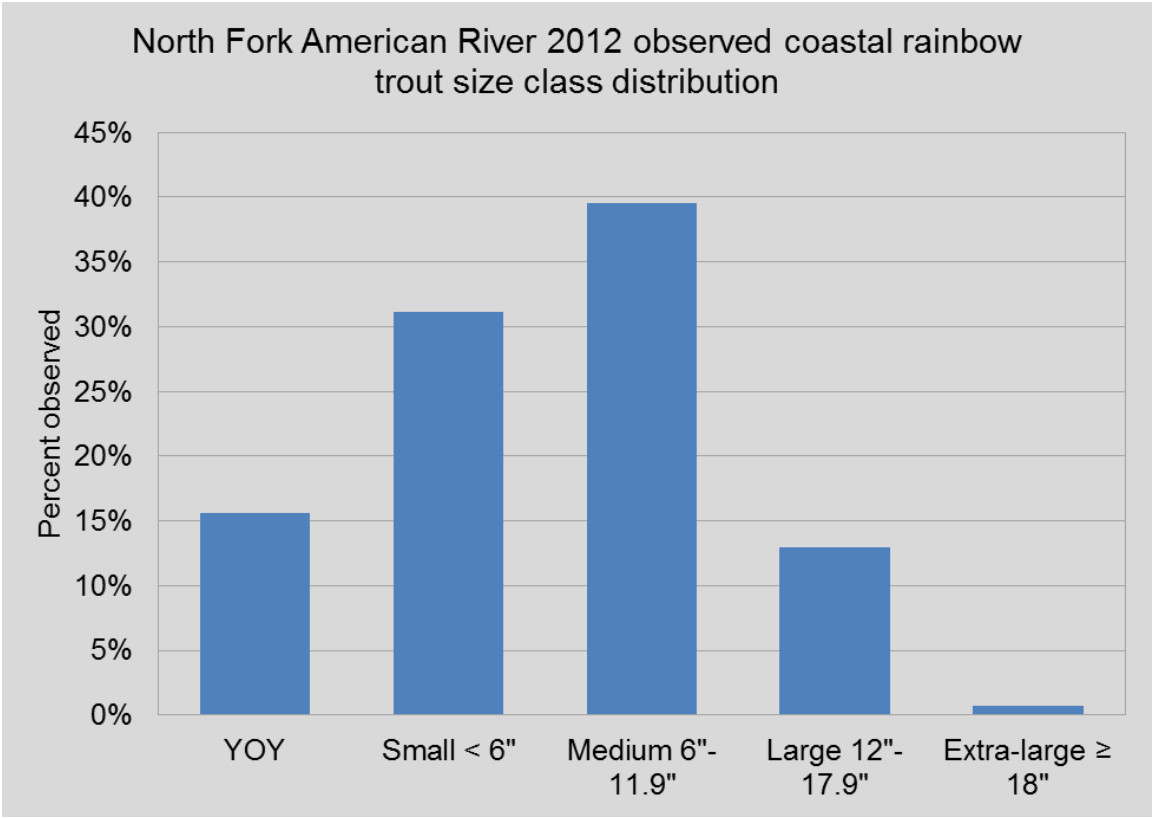

Figure 7. Graph of North Fork American River 2003-2011 ASB data: average CPUE (fish/hr) by year (long-term average in red)

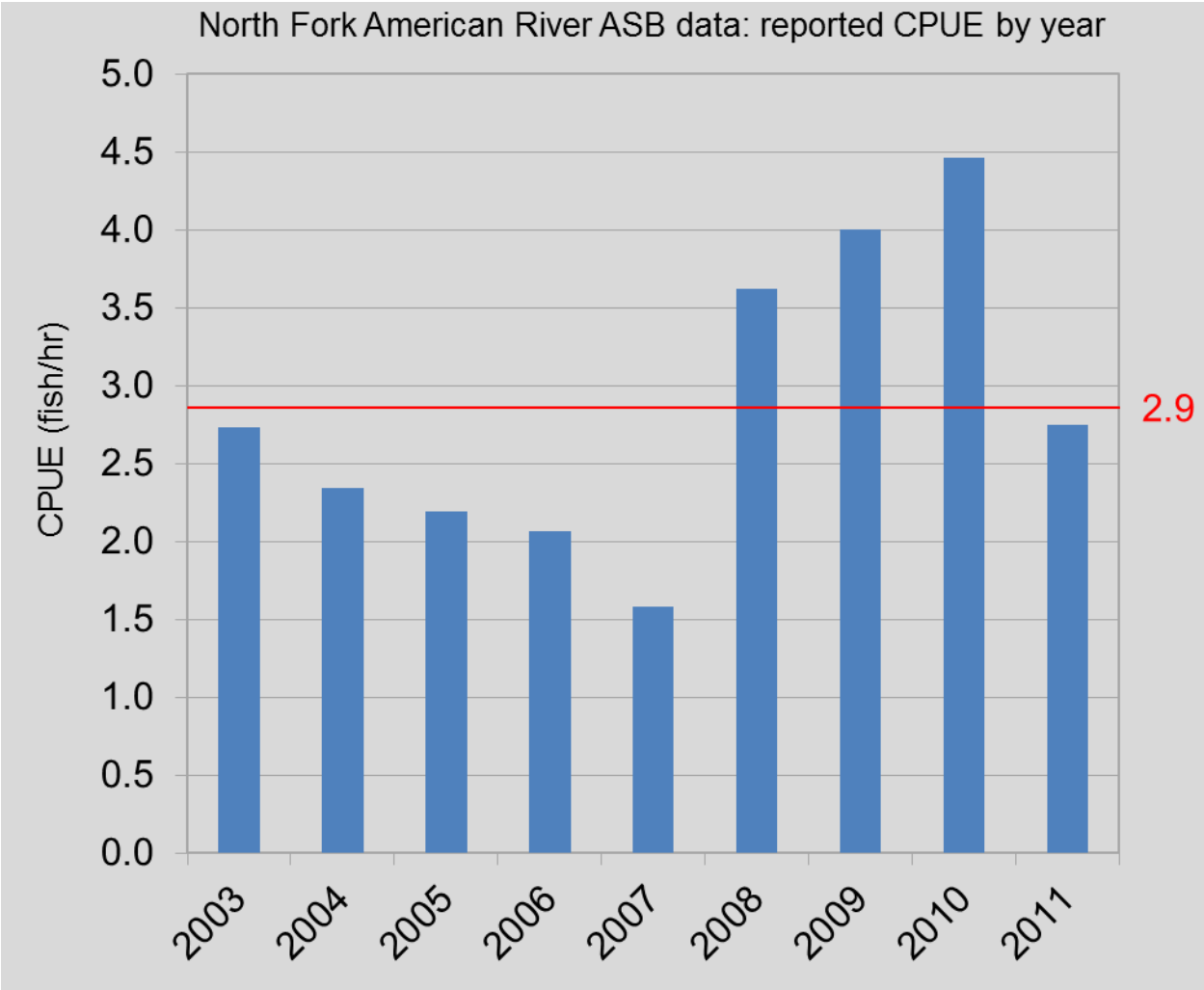

Figure 8. Graph of North Fork American River 2003-2011 ASB data: coastal rainbow trout size class distribution by year

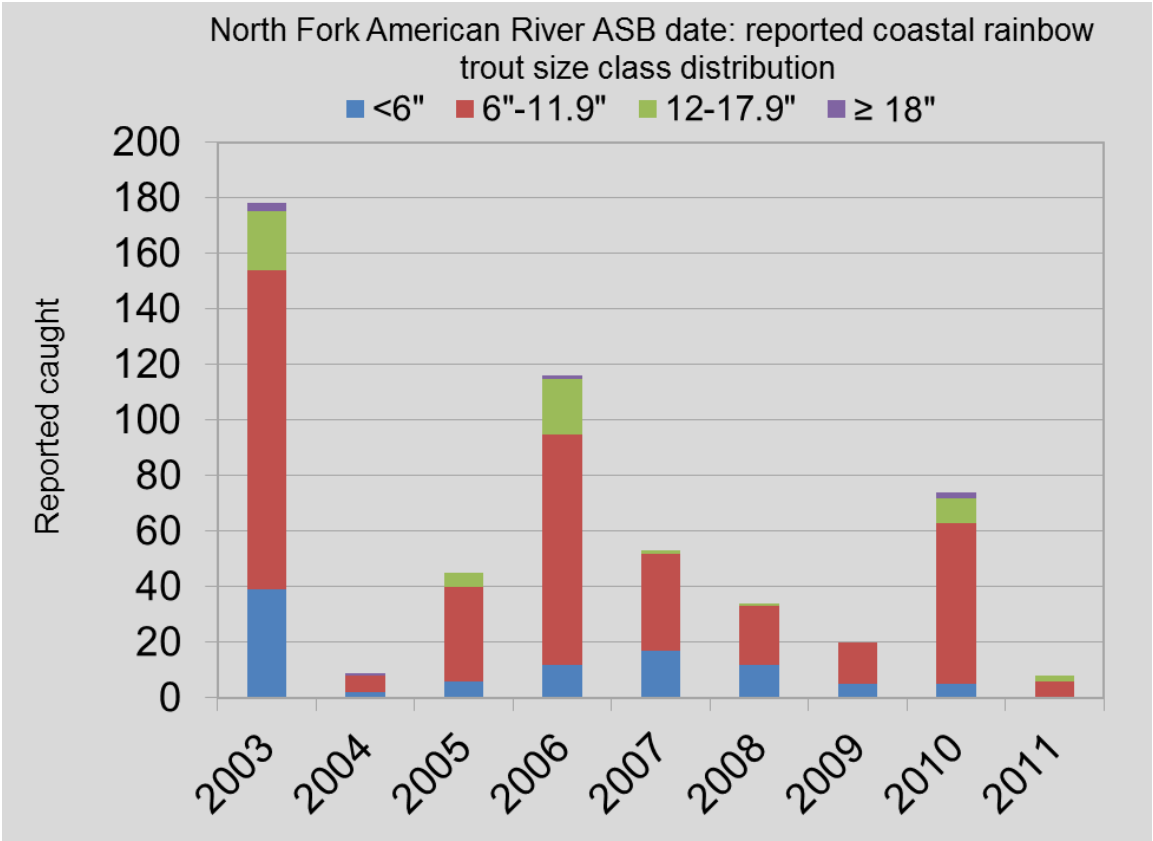

Figure 9. Graph of North Fork American River 2003-2011 ASB data: brown trout size class distribution by year

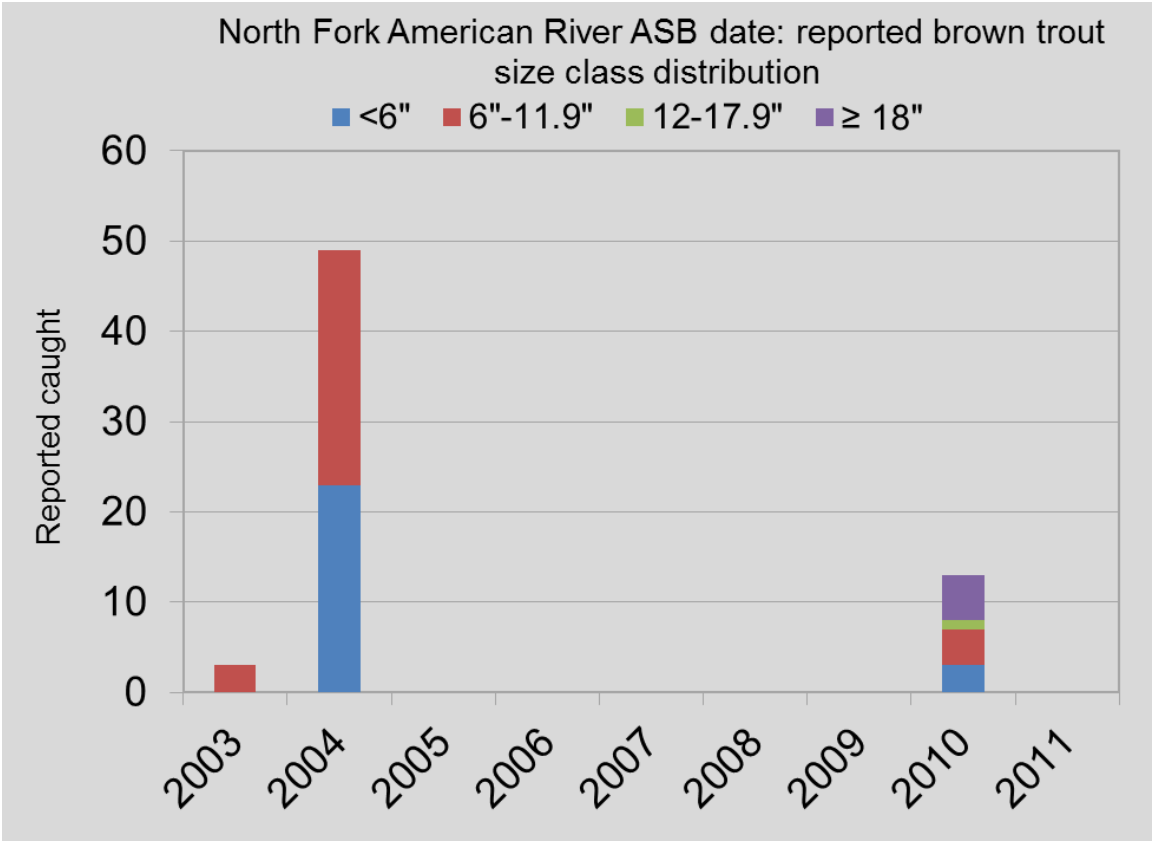

Table 1. North Fork American River 2012 direct observation survey data for trout

Section	Section length (ft)	Habitat type	Species	Number of fish observed						Estimated density (fish/mi)
				YOY	Small	Medium	Large	Extra-large	Total	
					< 6"	6"-11.9"	12"-17.9"	≥ 18"		
112	870.0	flatwater	coastal rainbow trout	0	0	4	0	0	4	24
212	82.8	flatwater	coastal rainbow trout	0	1	5	0	0	6	383
312	186.4	riffle	coastal rainbow trout	0	4	4	0	0	8	227
412	132.2	riffle	coastal rainbow trout	0	0	1	0	0	1	40
512	599.3	flatwater	coastal rainbow trout	0	2	5	0	0	7	62
			brown trout	0	0	1	0	0	1	9
			unknown trout	0	0	2	0	0	2	18
612	355.0	flatwater	coastal rainbow trout	0	5	37	2	0	44	654
712	370.0	flatwater	coastal rainbow trout	0	4	16	4	1	25	357
812	144.5	flatwater	coastal rainbow trout	0	19	38	7	0	64	2339
912	82.4	flatwater	coastal rainbow trout	0	0	7	3	0	10	641
1012	443.2	flatwater	coastal rainbow trout	0	1	2	2	0	5	60
1112	207.8	flatwater	coastal rainbow trout	0	22	16	8	0	46	1169
1212	280.0	flatwater	coastal rainbow trout	0	0	7	4	0	11	207
1312	260.0	flatwater	coastal rainbow trout	0	0	1	1	0	2	41
1412	85.3	pool	coastal rainbow trout	0	9	6	3	0	18	1114
1512	71.2	riffle	coastal rainbow trout	8	19	7	2	0	36	2670
1612	207.0	flatwater	coastal rainbow trout	1	1	1	0	0	3	77
1712	148.5	flatwater	coastal rainbow trout	5	15	24	7	0	51	1813
1812	257.0	flatwater	coastal rainbow trout	2	6	19	12	2	41	842
1912	225.5	riffle	coastal rainbow trout	11	12	8	5	0	36	843
2012	175.9	flatwater	coastal rainbow trout	0	7	20	3	1	31	931
2112	225.9	flatwater	coastal rainbow trout	0	3	14	2	0	19	444
2212	60.7	riffle	coastal rainbow trout	0	1	5	1	0	7	609
2312	279.0	riffle	coastal rainbow trout	2	8	2	4	0	16	303
2412	405.0	flatwater	coastal rainbow trout	7	0	5	10	2	24	313
2512	142.7	flatwater	coastal rainbow trout	3	1	1	4	0	9	333
2612	166.7	flatwater	coastal rainbow trout	0	1	0	1	0	2	63
2712	144.7	flatwater	coastal rainbow trout	16	47	33	13	0	109	3977
2812	194.0	flatwater/riffle	coastal rainbow trout	53	66	40	11	0	170	4627
2912	57.4	flatwater	coastal rainbow trout	22	5	1	0	0	28	2576

Table 2. Summary of North Fork American River ASB data from 2003-2011

Year	Number of forms analyzed	Effort (hrs)	Total brown trout reported caught	Total coastal rainbow trout reported caught	Total trout reported caught	CPUE (fish/hr)
2003	20	71.5	3	178	181	2.7
2004	7	28.5	49	9	58	2.3
2005	6	23.0	0	45	45	2.2
2006	11	56.5	0	116	116	2.1
2007	9	35.5	0	53	53	1.6
2008	3	8.5	0	34	34	3.6
2009	1	5.0	0	20	20	4.0
2010	6	26.0	13	74	87	4.5
2011	2	2.5	0	8	8	2.8

Table 3. Summary of North Fork American River ASB gear preference data from 2003-2011

Year	Reported gear type					
	Bait	Bait and lure	Lure	Lure and fly	Fly	Unknown
2003	5%	0%	45%	0%	45%	5%
2004	14%	0%	71%	0%	14%	0%
2005	67%	0%	17%	17%	0%	0%
2006	0%	27%	27%	18%	18%	9%
2007	0%	0%	78%	11%	11%	0%
2008	0%	0%	0%	0%	100%	0%
2009	0%	0%	0%	0%	100%	0%
2010	17%	33%	50%	0%	0%	0%
2011	50%	0%	50%	0%	0%	0%

Table 4. Summary of North Fork American River ASB angler satisfaction data 2003-2011

Year	Number of forms analyzed	Angler satisfaction with overall fishing experience	Angler satisfaction with size of fish captured	Angler satisfaction with number of fish captured
2003	20	1.1	1.1	0.9
2004	7	1.0	0.5	0.4
2005	6	-0.2	-0.5	0.5
2006	11	1.7	1.7	1.7
2007	9	1.0	-0.4	1.6
2008	3	2.0	1.0	2.0
2009	1	2.0	1.0	2.0
2010	6	1.5	1.8	1.8
2011	2	1.0	1.0	1.0
Average		1.2	0.8	1.3

Table 5. North Fork American River direct observation survey data 1994-2012

Survey date	Number of coastal rainbow trout observed				Number of brown trout observed			
	< 6"	6"-11.9"	≥12"	Total	< 6"	6"-11.9"	≥12"	Total
09/13/94	27	124	62	213	0	1	2	3
09/12/06	191	57	24	272	0	0	0	0
10/02-03/12	32	47	27	106	0	0	0	0