

**A Study on the Upper Trinity River
Proposal to Open as a Winter Fishery
2010 – 2012**



**California Department of Fish and Game
601 Locust St.
Redding, CA 96001**

By

**Bernard Aguilar
Michael Dege
Samuel Plemons**



OBJECTIVES

The objective of the Upper Trinity River Watershed Study (Study) was to monitor the fishery of the Upper Trinity River (UTR), Trinity County, throughout the proposed winter angling season between November through April. The study used direct observation and hook and line survey methods to determine if the UTR could support a year-round fishery. Special emphasis was placed upon the detection and run timing of adfluvial fish.

ACKNOWLEDGEMENTS

Special thanks go to the Heritage and Wild Trout Program, for the design, initial implementation, and assistance throughout the duration of the study. Other individuals that braved the cold waters or helped in hook and line surveys include Kate Grossman, Paul Divine, Andy Hill, Steve Baumgartner, Monty Currier, Matthew Drummond, and Steven Bailey.

INTRODUCTION

Historically, the UTR functioned as a dynamic river reach that effectively created and maintained quality spawning and rearing habitat for anadromous fish. In 1957, construction began on the Trinity River Division (TRD) of Bureau of Reclamation's Central Valley Project (CVP), which transfers water from the Trinity River portion of the Klamath Basin to the Sacramento Basin. Lewiston Dam, part of the CVP, was constructed in 1963 near Lewiston, and is now the upper limit of anadromous fish migration on the Trinity River. Trinity Dam and Lewiston Dam block access to 109 miles of anadromous salmonid habitat, and at times, 90 percent of the Trinity River flow is diverted to the Sacramento Basin, contributing to the decline of Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), and steelhead (*Oncorhynchus mykiss*) (January 2012. Public Draft SONCC Coho Salmon Recovery Plan, pg 39-1).

Today, in the UTR, the dominant fish species is resident rainbow trout (*Oncorhynchus mykiss*). Brook trout (*Salvelinus fontinalis*), are found in some upper stream reaches above Trinity Lake, and nonanadromous Kokanee (Sockeye) salmon (*Oncorhynchus nerka*) are seen during their fall spawning season.

Fishing regulations on the UTR, above Trinity Lake is currently listed under the North Coast District general sport fishing regulations (CCR, Title 14, Sec. 700.(a) (5)), with the season open from the last Saturday in April through November 15, with a daily bag limit of 5 trout per day with 10 total in possession (non-anadromous stream), and no gear restrictions.

The Department of Fish and Game (Department) received a request for a regulation change proposal for this water from California Trout (CalTrout) in the spring of 2010. CalTrout proposed the Department consider opening up a winter fishery (November 16th through the Friday preceding the last Saturday in April) with special regulations consisting of 0 limit (catch and release) with artificial lures and barbless hooks only. The proposed section for the winter fishery is on the mainstem Trinity River (excluding tributaries) from the mouth at Trinity Lake to approximately 13.8 miles upstream to the confluence of Tangle Blue Creek and an unnamed tributary, (Figure 1). Approximately 9.8 miles (71%) are accessible by the public and the remainder 4.0 miles (29%) is of private ownership (Figure 2). The Department has gained support from stakeholders, local communities and the angling public for this potential recreational angling opportunity. The Department agreed to study this fishery to determine the potential effects of opening up to year-round angling.



Figure 1. Location of proposed winter fishery and snorkel survey sections, Upper Trinity River

and counted by size class. Size classes were divided into the following categories; a) young-of-year (YOY), b) small (<6 inches), c) medium (6-11.9 inches), d) large (12-17.9 inches) and e) extra-large (≥18 inches). Divers also attempted to categorize and document the number of wild vs. hatchery fish.

Table 1. Upper Trinity River snorkel survey sections.

Section	Start		End		App. length (miles)
	Latitude	Longitude	Latitude	Longitude	
1 (Sunflower Creek - Graves Creek)	41.21181	122.64727	41.20155	122.64740	0.84
2 (Graves Creek - Meter Meadow)	41.20155	122.64740	41.19078	122.65377	1.00
3 (Meter Meadow - 2888T)	41.19078	122.65377	41.17380	122.66028	1.34
4 (2888T - Bridge)	41.17380	122.66028	41.16147	122.66538	1.01
5 (Bridge - Ramshorn Creek)	41.16147	122.66538	41.15167	122.66904	0.77
6 (Ramshorn Creek - Bridge2)	41.15167	122.66904	41.14308	122.68188	1.01
7 (Sunny Flat - Circle 3)	41.13348	122.69890	41.12296	122.70058	0.97
8 (Circle 3 - Trinity River Campground)	41.12296	122.70058	41.10925	122.70700	0.97

Hook and Line Survey (angling survey)

Hook and line surveys were conducted by Department staff temporally throughout the proposed winter angling season. Since the goal was to catch fish and collect biological information, no limits were placed on gear or sampling method which included, fly fishing, spin fishing, and bait fishing. Discretion for each sampling location within the survey area was determined by each surveyor, and was based upon areas that appeared to have good habitat to hold fish. The information provided from the surveys provided useful information on the fish-ability and hydrologic conditions of the UTR. Data collected included, size class, species composition, catch-per-unit-effort (CPUE), fish condition ($K = \text{Weight (gm)} / ((\text{Length (mm)})^{3*} (10^5))$), hatchery vs. wild, adfluvial (lake run) vs. resident, and general overall fish health (disease, parasites, scars, deformities, etc.). Special emphasis was placed upon the adfluvial run of trout to assess run-timing, densities, size classes, habitat/site preferences and fish condition. Run-timing is defined as the period of time in which the adfluvial fish migrate from the lake environment to the river to spawn.

Hydrograph Analysis

The winter hydrograph for the proposed winter angling season (Nov – April) was analyzed for each year from 2000-2011 (Appendix A). The flow data came from the California Data Exchange Center (CDEC), from the Trinity River above Coffee Creek (TRC) gauging station, and is available online at (<http://cdec.water.ca.gov/river/rivcond.html>). Department staff downloaded the flow data, which is taken at 15 minute intervals, and averaged for each day for each year (2000-2011) throughout the proposed season. A flow graph for each year for each month during the proposed angling season was also composed using the same CDEC data (Appendix B).

Flow/ Fishability Observations

In conjunction with the hydrograph analysis, a flow to fish-ability analysis was conducted in order to determine the flow range at which the UTR would be fishable during the proposed winter season. This involved visual observations of the river at different flows and determining fish-ability based upon these criteria: fish holding habitat/habit dynamics and wadeability/accessibility. The fish-ability range was developed using the hydrograph analysis and determining the percentage of potential fishable days available throughout the proposed winter season, based upon a fish-ability maximum limit of 800 cfs. The flow to fish-ability analysis was mostly subjective and based upon professional and personal experiences.

RESULTS AND DISCUSSION

Direct Observations

2010 - 2011

Two direct observation surveys (covering four stream sections) were conducted during the proposed winter angling season in 2010 – 2011 (November and February) to assess fish run-timing, species composition, and size class distribution. A third survey was planned for April 2011, but due to high flows and diver safety, the survey was cancelled.

The first snorkel survey was conducted on November 2, 2010. Estimated river flow was 350 cfs. Sections 4 and 5 were randomly chosen. Survey teams consisted of 4 experienced DFG personnel. Water visibility was good and the weather was clear. The water and air temperatures were 49°F and 64°F, respectively. A total of 20 rainbow trout (*Oncorhynchus mykiss*) (RT) were observed in section 4, yielding an estimate of 20 RT/mi. In section 5, a total of 64 RT were observed, yielding an estimate of 83 RT/mi (Table 2). Other aquatic species observed during the survey included sculpin (*Cottus spp.*), Speckled dace (*Rhinichthys osculus*), crayfish (*Pacifasticus spp.*), and foothill yellow-legged frog (*Rana boylei*).

The second snorkel survey was conducted on February 10, 2011. Estimated river flow was 370 cfs. Sections 6 and 7 were strategically chosen based upon distance from the lake in order to give surveyors the best chance in detecting adfluvial run trout. Survey teams consisted of 4 experienced DFG personnel. Water visibility was good and the weather was clear. The water and air temperatures were 50°F and 70°F respectively. A total of 4 RT were observed in section 6, yielding an estimate of 4 RT/mi. In section 7, a total of 3 RT were observed, yielding an estimate of 3 RT/mi (Table 2). Other aquatic species observed on the survey include sculpin (*Cottus spp.*).

Table 2. Direct observation survey results during November 2010 and February 2011.

2010-2011 Upper Trinity River Snorkel Survey											
Date	Section	Distance (miles)	Species	Wild (Y/N)	YOY	0-5.9 in	6-11.9 in	12-17.9 in	≥18 in	Total	RT/Mile
11/2/2010	4	1.01	RT	Y	0	8	11	1	0	20	20
11/2/2010	5	0.77	RT	Y	18	23	20	3	0	64	83
02/10/2011	6	1.01	RT	Y	0	1	1	2	0	4	4
02/10/2011	7	0.97	RT	Y	0	0	0	2	1	3	3

2011 - 2012

Four direct observation surveys were conducted (covering five stream sections) during the proposed winter angling season in 2011 – 2012 (November, February, March, and April).

The first snorkel survey was conducted on November 29, 2011. Estimated river flow was 100 cfs. Sections 4 and 5 were strategically chosen to make comparisons with the previous year's survey date and data. Survey teams consisted of 4 experienced DFG personnel. Water visibility was good and the weather was clear. A total of 81 RT were observed in section 4, yielding an estimate of 81 RT/mi. In section 5, a total of 108 RT were observed, yielding an estimate of 140 RT/mi (Table 3).

The second snorkel survey was conducted on February 23, 2012. Estimated river flow was 375 cfs. Sections 3 and 7 were randomly chosen. Survey teams consisted of 6 experienced DFG personnel (3 surveyors per section). The water and air temperatures were 42°F in each survey section. A total of 20 RT were observed in section 3, yielding an estimate of 15 RT/mi. In section 7, no RT was observed (Table 3).

A third snorkel survey was conducted on March 29, 2012. Section 5 was randomly chosen. The survey team consisted of 4 DFG personnel. Water temperature was 44°F. No air temperature was taken. There was a light rain and calm wind. Stream flow was estimated at 630 cfs. A total of 5 RT were observed, yielding an estimate of 6 RT/mi (Table 3).

A fourth snorkel survey was conducted on April 13, 2012. Section 8 was randomly chosen. The survey team consisted of 4 DFG personnel. Water temperature was 46°F with snow on the ground. Water visibility was mostly clear. No air temperature was taken. A total of 4 RT were observed, yielding an estimate of 4 RT/mi. (Table 3). Flows were estimated between 800 and 850 cfs.

Table 3. Direct observation survey results during November 2011 and February, March, and April 2012.

2011-2012 Upper Trinity River Snorkel Survey											
Date	Section	Distance (miles)	Species	Wild (Y/N)	YOY	0-5.9 in	6-11.9 in	12-17.9 in	≥18 in	Total	RT/Mile
11/29/2011	4	1.01	RT	Y	11	43	22	5	0	81	81
11/29/2011	5	0.77	RT	Y	13	75	19	1	0	108	140
02/23/2012	3	1.34	RT	Y	0	13	4	0	3	20	15
02/23/2012	7	0.97	-	-	0	0	0	0	0	0	0
03/29/2012	5	0.77	RT	Y	0	0	1	3*	0	5	6
04/13/2012	8	0.97	RT	Y	0	2	0	2	0	4	4

*Considered adfluvial fish

To help address questions of seasonal variation, a summertime survey was added to compare fish counts between winter and summer seasons. The summertime survey was conducted on June 20, 2012. Stream survey sections 2 and 5 were randomly selected. Between the two seasons, the summertime survey resulted in the most number of fish observed (Table 4).

In section 2, river flows were estimated at 178 cfs. Water temperature was 55.4°F and weather condition was clear. A total of 615 RT were observed. All rainbow trout observed were considered to be wild. Other species observed included two Sacramento Suckers (*Castostomus occidentalis*), one sculpin (*Cottus spp.*), and one Signal Crayfish (*Pacifastacus leniusculus*).

In section 5, river flows were estimated at 174 cfs. Water temperature was 67.1°F and weather condition was clear. A total of 532 RT were observed that were considered to be wild. Another 20 were observed that were considered to be of hatchery origin, and 5 RT of unknown origin. Other species observed included 24 Sacramento suckers (*Catostomus occidentalis*), 1 speckled dace (*Rhinichthys osculus*), 2 foothill yellow-legged frogs (*Rana boylei*), 8 aquatic garter snakes (*Thamnophis atratus*), and 1 rubber boa (*Charina bottae*).

Table 4. A summary of Direct Observation survey, June 2012.

June 2012 Upper Trinity River Snorkel Survey											
Date	Section	Distance (miles)	Species	Wild (Y/N)	YOY	0-5.9 in	6-11.9 in	12-17.9 in	≥18 in	Total	RT/Mile
06/20/2012	2	1.0	RT	Y	0	512	101	2	0	615	615
06/20/2012	5	.77	RT	Y	42	451	39	0	0	532	690
06/20/2012	5	.77	RT	N	0	0	8	12	0	20	26
06/20/2012	5	.77	RT	U	0	0	3	2	0	5	6

Hook and line survey (angling survey)

2010 - 2011

Three angling surveys were conducted on the dates of October 1 and November 30, 2010 and February 2, 2011 during the proposed winter angling season to assess run-timing, species composition, size class distribution, wild vs. hatchery origin, fish condition, adfluvial vs. resident fish, CPUE, and overall fish health. The survey teams consisted of 2 to 3 experienced anglers in each stream reach. Data collected included, upstream and downstream waypoints, start time and end time, water temperature, and weather conditions (Table 5). A fourth angling survey was planned for April, but due to high flows the survey was cancelled.

Table 5. Angling survey dates, 2010 - 2011.

2010-2011 Upper Trinity River Angling Survey Effort								
Date	Personnel	Start Time	End Time	Water Temp. (F)	cfs	Weather	Upstream End	Downstream End
10/1/2010	SP, MC, SB	1210	1310	40	<100	CLR	41.16336, -122.66473	41.16057, -122.66660
11/30/2010	SP, MD	1110	1315	39	138	CLD	41.11331, -122.70460	41.11097, -122.70685
11/30/2010	SP, MD	1350	1420	39	138	CLD	41.14311, -122.68154	41.14298, -122.68204
2/2/2011	SP, MC	1040	1100	39	400	CLR	41.14310, -122.68201	NA
2/2/2011	SP, MC, SB	1200	1400	40	400	CLR	41.15428, -122.66870	41.14865, -122.67270
2/2/2011	SP, MC, SB	1450	1538	42	400	CLR	41.16180, -122.66505	NA

The first angling survey was conducted on October 1, 2010 between waypoints (N 41.16336, W - 122.66473) and (N 41.16057, W -122.66660). Angler SP caught 6 fish in one hour (CPUE = 6 fish/hr). Angler MC caught 3 fish in one hour (CPUE = 3 fish/hr). Angler SB did not catch any fish. All fish caught appeared to be wild and resident (Table 6). Fly and spinning gear were used.

The second angling survey was conducted on November 30, 2010. The crew consisted of 2 experienced anglers (SP and MD). Fly fishing gear was used for both sections. In the first section angling was conducted between waypoints (N 41.11331, -122.70460) and (N 41.11097, -122.70685). Angler SP caught 1 fish in 2 hours (CPUE = 0.5 fish/hour). This fish appeared to be wild and resident. Angler MD did not catch any fish. In the second section angling was conducted between waypoints (N 41.14311, -122.68154) and (N 41.14298, -122.68204). In one-half hour of angling, none were successful in catching fish (CPUE = 0) (Table 6).

The third angling survey was conducted on February 2, 2011. The crew consisted of 3 experienced anglers (SP, MC and SB). Three separate sections were selected to fish. Spinning gear and bait were used. In the first section, only 2 anglers (SP and MC) fished and angling was conducted in a spot location (hole) at waypoint (N 41.14310, W -122.66870). No fish were caught by either angler in a combined 0.3 hours effort (CPUE = 0). In the second section, angling was conducted between waypoints (N 41.15428, W -122.66870) and (N 41.14865, -122.67270). Angler SP caught 2 fish in 2 hours (CPUE = 1 fish/hr). Both fish caught appeared to be wild adfluvial fish. Angler MC caught 1 fish in 2 hours (CPUE = 0.5 fish/hr). This fish also appeared to be wild and adfluvial. Angler SB was unsuccessful in 2 hours of effort (CPUE = 0). In the third section, angling was conducted at a spot location (hole) at waypoint (N 41.16180, -122.66505). Angler SP caught one fish in 0.8 hours (CPUE = 1.3 fish/hr). This fish appeared to be wild and adfluvial and was weighed and measured. It was determined to have a *K* factor of 0.98 (good condition – length to weight). Angler MC was unsuccessful in 0.2 hours effort and angler SB was also unsuccessful in 0.8 hours effort (both CPUE = 0) (Table 6).

Table 6. Angling survey results, 2010 - 2011.

2010-2011 Upper Trinity River Angling Survey CPUE											
Date	Angler	Species	Wild (Y/N)	YOY	0-5.9 in	6-11.9 in	12-17.9 in	≥18 in	Total	Effort (hours)	CPUE
10/1/2010	SP	RT	Y	0	4	2	0	0	6	1	6.0
10/1/2010	MC	RT	Y	0	2	1	0	0	3	1	3.0
10/1/2010	SB	na	na	0	0	0	0	0	0	1	0.0
11/30/2010	MD	na	na	0	0	0	0	0	0	2.08	0.0
11/30/2010	SP	RT	Y	0	0	1	0	0	1	2.08	0.5
11/30/2010	SP	na	na	0	0	0	0	0	0	0.5	0.0
11/30/2010	MD	na	na	0	0	0	0	0	0	0.5	0.0
2/2/2011	SP	na	na	0	0	0	0	0	0	0.1	0.0
2/2/2011	MC	na	na	0	0	0	0	0	0	0.2	0.0
2/2/2011	SB	na	na	0	0	0	0	0	0	2	0.0
2/2/2011	MC	RT	Y	0	0	0	1*	0	1	2	0.5
2/2/2011	SP	RT	Y	0	0	0	2*	0	2	2	1.0
2/2/2011	SB	na	na	0	0	0	0	0	0	0.8	0.0
2/2/2011	MC	na	na	0	0	0	0	0	0	0.2	0.0
2/2/2011	SP	RT	Y	0	0	0	1**	0	1	0.8	1.3

* adfluvial fish (anchor worms, lamprey scars)

** fish length/ weight was 410 mm/ 680 gms. Condition factor was 0.98.

2011 – 2012

Only one hook and line survey was conducted during the 2011-2012 proposed winter angling season. To make a comparison between the two survey methods, angling was conducted in the same survey sections as the previous day's snorkel surveys and as close to the snorkel survey date as possible (Sections 3 and 7) on February 24, 2012.

In section 3, two surveyors fished for a combined total of 4.5 hours and did not catch any fish. In section 7, four surveyors fished for a combined total of 12 hours and did not catch any fish (Table 7). During the previous day's snorkel survey, 20 fish total were observed in section 3 and no fish were observed in section 7 (Table 3).

Table 7. Angling survey results during the proposed winter angling season, 2011 - 2012.

2011-2012 Upper Trinity River Angling Survey CPUE												
Date	Angler	Section	Species	Wild (Y/N)	YOY	0-5.9 in	6-11.9 in	12-17.9 in	≥18 in	Total	Effort (hours)	CPUE
02/24/2012	SP	3			0	0	0	0	0	0	2.5	0
02/24/2012	MD	3			0	0	0	0	0	0	2.0	0
02/24/2012	PD	7			0	0	0	0	0	0	2.5	0
02/24/2012	SD	7			0	0	0	0	0	0	2.5	0
02/24/2012	MC	7			0	0	0	0	0	0	3.5	0
02/24/2012	SB	7			0	0	0	0	0	0	3.5	0

Hydrograph Analysis

The hydrograph for the UTR was analyzed for the proposed winter angling season. The flow data came from CDEC, Trinity River above Coffee Creek (TRC) gauging station (<http://cdec.water.ca.gov/river/rivcond.html>). The results are shown in Appendix A.

Flow/ Fish-ability Observations

Flow observations were made throughout the proposed winter angling season in order to determine the flows at which the river is deemed fishable. These observations were subjective and based upon professional and angling experience. The fish-ability was based upon two criteria:

- 1) Fish holding habitat/habitat dynamics including eddies, side water, back water, pocket water, pools riffles and runs.
- 2) Wadeability/accessibility including maneuverability, riparian zone, and water accessibility.

Based upon the observations at different flows throughout the season, the flows at which the river becomes unfishable was determined to be >800 cfs, and is broken down into the following classifications; 0-149 cfs = all habitats are fishable; 150-299 cfs = optimum angling conditions; and 300-799 cfs = is below optimum angling conditions (Table 8).

Analyzing the winter hydrograph from year 2000 through 2012, and using the upper flow determination of 800 cfs, we estimate that the river is fishable throughout the majority of the proposed winter angling season. The lowest percentage of fishable days was 66% during 2002 - 2003, and the highest was 96% during 2007 – 2008 (Table 9). Flow graphs were also composed using CDEC data for the proposed winter angling season months of November through April for the years 2001 through 2012 and are shown in Appendix B.

Table 8. River flow and fish-ability observations, 2010 - 2011.

2010-2011 Upper Trinity River Flow Observations/ Fishability					
Fishability Criteria (0-10)*					
Date	Flow (cfs)	Fishable holding habitat	Wadability/Access	Overall Fishable	Angling conducted (Y/N)
09/23/2010	50	10	10	10	N
10/01/2010	40	10	10	10	Y
11/02/2010	300	8	6	7	N
11/30/2010	140	10	10	10	Y
01/25/2011	660	2	1	1.5	N
02/02/2011	395	4	4	4	Y
02/10/2011	350	5	5	5	N
02/24/2012	325	6	6	6	Y

*0=None, 5=Average, 10= Excellent

Table 9. Percent fishable days during the proposed winter angling seasons, 2000-2012.

	Proposed Winter Season Angling Fish-ability											
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Total Days	163	162	161	160	165	164	163	162	160	159	165	156
Flow Available	152	148	152	140	165	163	146	161	158	159	165	156
Days >800 cfs	19	35	52	35	23	49	17	6	15	14	45	22
% Fishable Days	88	76	66	75	86	70	88	96	91	91	73	86

Altogether, very few fish were observed during the direct observation and hook and line surveys that were conducted in 2010-2011 and 2011-2012 during the proposed winter angling season. During both survey years, and also during the summer of 2012, section 5 produced the most number of fish observed. The majority of fish that were observed and/or caught were small in size and resembled

resident/fluvial morphology. Overall fish densities in the UTR (trout per mile) are much lower than fish densities observed (summer and winter) in other northern California trout waters following identical direct observation sampling techniques. For example, the upper Sacramento River (open to winter angling) supports a fish density of approximately 3000 fish/mile.

RECOMMENDATIONS

The objective of this study was to monitor the fishery throughout the proposed winter angling season between November through April using direct observation (mask and snorkel) and hook and line survey methods, and to determine if this portion of the UTR could support a year-round fishery. Special emphasis was placed upon the detection and run timing of adfluvial fish.

In comparison with other northern California trout fisheries, the UTR fish observed (trout per mile) was relatively low. Although the sampling techniques were strategically chosen to best sample the river with available resources, it is uncertain whether the frequency of sampling (limited due to environmental conditions and staffing) was able to detect the adfluvial component of this fishery or migratory movement of resident fish.

The mainstem Trinity River is known for its runs of salmon and steelhead, but the UTR is located above two major reservoirs (Lewiston and Trinity Dams). Both reservoirs are stocked annually with trout and provide a successful recreational trout fishery. The UTR flows into Trinity Lake and is currently stocked (including the study area) with catchable rainbow trout throughout the general fishing season. The impacts of stocking rainbow trout on wild populations appears to be minimal, as a majority of our surveys did not observe stocked trout¹ indicating a short resident time in the river (study area).

The number of anglers that may take advantage of recreational angling opportunities in the UTR during an open winter season is unknown, but because of its relative remoteness, distance from major living areas, seasonality of adfluvial fish, and low densities of fish altogether, angling pressure would most likely be marginal. Considering the study results, the Department finds no biological reason to not open the UTR for winter angling opportunities. If the winter season and regulation change is adopted by the Commission, the Department recommends special fishing regulations to be open during November 16 through the last Friday in April, and would include zero (0) take and artificial lures with barbless hooks only. In addition, opening up a winter fishery to provide recreational angling where there would be no conflicts with native species, falls under the principal mission of the Department's Strategic Plan for Trout Management, especially where the waters have not been historically fishless (Hopelain, 2003).

Furthermore, a resource monitoring plan that would include a creel survey and/or strategically placed angler survey boxes during the proposed winter fishery season should be implemented to assess if management objectives are being met. Winter trout fishing has proved to be successful in the Upper Sacramento River and also other states and opens up economic opportunities for local businesses and is worthy to be considered here.

1. Identified by experienced divers using size and physical characteristics.

REFERENCES

California Department of Water Resources. California Data Exchange Center (CDEC). Trinity River above Coffee Creek flow gauge (TRC); <http://cdec.water.ca.gov/river/rivcond.html>

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.

Hopelain, J.S. 2003. Strategic Plan for Trout Management. A plan for 2004 and Beyond. Department of Fish and Game Report.