

State of California  
The Resources Agency  
Department of Fish and Game

UPPER KLAMATH RIVER WILD TROUT AREA  
FISHERIES MANAGEMENT PLAN  
2005 through 2009

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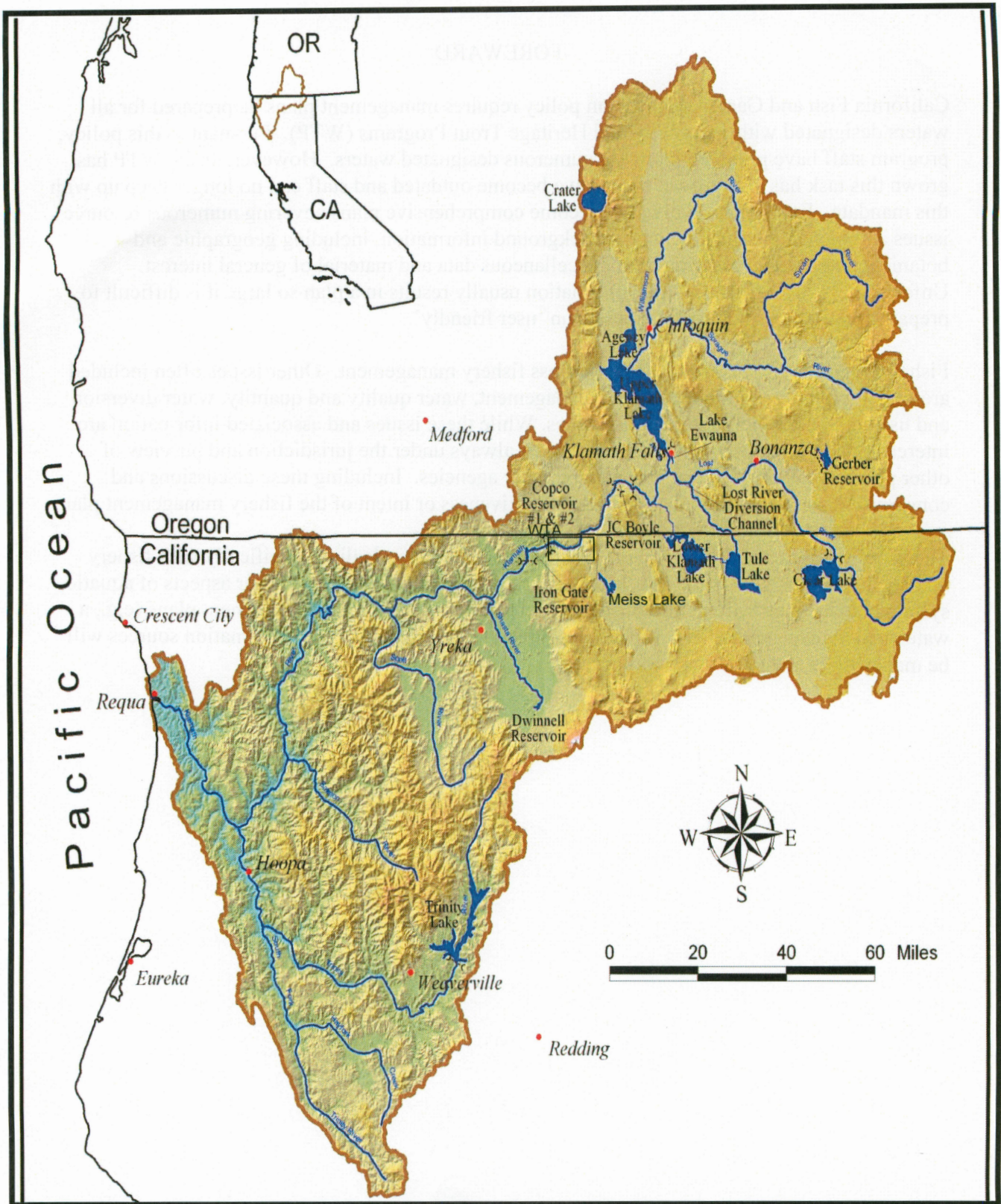
## FOREWARD

California Fish and Game Commission policy requires management plans be prepared for all waters designated within the Wild and Heritage Trout Programs (WTP). Pursuant to this policy, program staff have prepared plans for numerous designated waters. However, as the WTP has grown this task has also grown, plans have become outdated and staff can no longer keep up with this mandate. Early plans evolved to become comprehensive plans covering numerous resource issues and included large amounts of background information, including geographic and botanical data, and an assortment of miscellaneous data and material of general interest. Unfortunately, the volume of this information usually results in a plan so large it is difficult to prepare and update, and one often less than 'user friendly'.

Fishery management plans need only address fishery management. Other issues often included are directly related to timber and land management, water quality and quantity, water diversion and use, and non-fishery recreational issues. While these issues and associated information are interesting and often pertinent, they are almost always under the jurisdiction and purview of other programs within the Department and other agencies. Including these discussions and concerns does not significantly add to the effectiveness or intent of the fishery management plan.

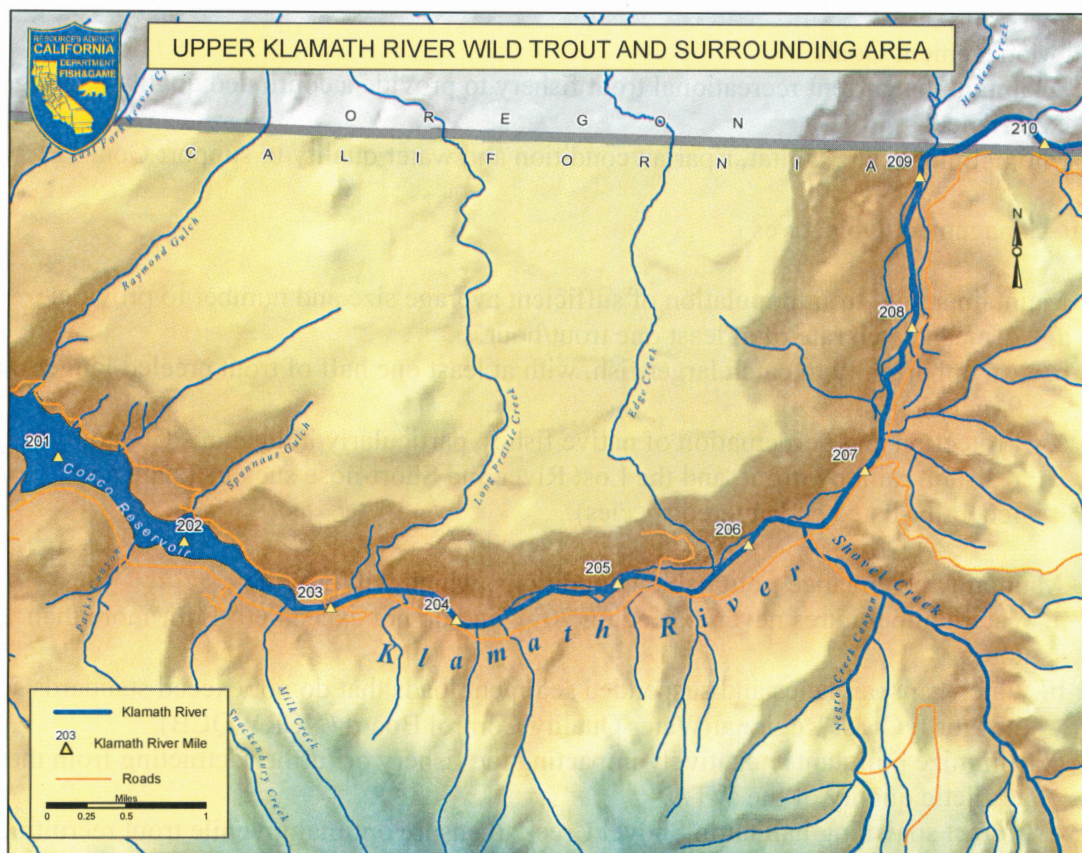
Therefore we are establishing a shorter, more concise format dealing specifically with fishery management. This plan is the first in this effort. Information relating to other aspects of aquatic system management will be minimized and left to more appropriate management plans (e.g., a watershed management plan). References directing the reader to other information sources will be made where available and appropriate.





**Figure 1.** Klamath River basin: Wild Trout Area ( WTA: shown in the small box near the Oregon border) extends from the Oregon border 6.2 miles downstream to Copco Reservoir (see Figure 2).





**Figure 2.** Map of Upper Klamath River Wild Trout Area; 6.2 miles from the Oregon border downstream to Copco Reservoir. Shovel Creek, at lower right is the only significant tributary in this reach.

### BACKGROUND

In response to recommendations by the California Department of Fish and Game (CDFG) in the California Fish and Wildlife Plan and concerns expressed by the angling public, the California Fish and Game Commission (FGC) established the California Wild Trout Program (WTP) in 1971 (Fish and Game Code; Wild Trout Policy). The primary purpose of the WTP is to maintain natural and attractive trout fisheries where perpetuation of wild strains of trout is given major emphasis in contrast to planting domesticated catchable-sized trout on a "put-and-take" basis. The WTP also provides diversity in angling opportunities. Designated Wild Trout Waters or Areas (WTW or WTA) receive greater attention than they might otherwise, if threatened by diversion, channelization, inundation, pollution or other incompatible development. The opportunity to test and institute various types of fisheries and habitat management, such as population manipulation, special regulations and innovative restoration techniques are important elements of the program. In 1974, a 6-mile reach of the Klamath River, from Copco Lake (Siskiyou County) upstream to the Oregon border, was designated as WT water and is currently managed under the WTP. As of January 2005, the FGC has designated 37 stream segments (1,014.5 miles) and three lakes as WTW.



## MANAGEMENT SUMMARY

### General Management Goals

1. Maintain the current recreational trout fishery to provide a continued quality angling experience.
2. Maintain instream habitat, riparian condition and water quality to support Goal #1.

### General Management Objectives

1. Maintain a wild trout population of sufficient average size and number to provide:
  - a. A mean catch rate of at least one trout/hour.
  - b. An opportunity to catch larger fish, with at least one half of trout creel length longer than 9 in. (TL).
  - c. Protection and perpetuation of native fishes, particularly indigenous *Ceratomyxa* resistant rainbow trout, and the Lost River and Short-nose suckers (state and federally-listed endangered species).
2. Maintain and enhance trout habitat conditions, which will provide:
  - a. Water temperatures never exceeding 70° F and do not exceed 60° F for more than 12 hours.
  - b. Water transparencies and suspended sediment loads that do not exceed standards set by the North Coast Regional Water Quality Control Board (NCRWQCB).
  - c. Minimize pollutants negatively impacting the fishery or further detracting from the aesthetic quality of the WTA.
  - d. Protect spawning habitat in Shovel Creek to ensure optimal juvenile trout recruitment to the wild trout fishery. This includes maintenance of existing cattle exclusion fencing and gravel monitoring.
  - e. Flows should be maintained at a level sufficient to support the fishery at existing or greater levels.
  - f. Peaking flows should be minimized and ramped appropriately to minimize stranding and other negative effects to the fishery.
3. Provide adequate angler access along the river throughout the Klamath River WTA. This includes keeping the existing access points open and encouraging a one-way drift fishery.
4. Preserve the aesthetic character of the stream and adjoining streamside habitat in at least its present condition.

### Shovel Creek Spawning Habitat

Fence Maintenance. The present CDFG fence maintenance program should be continued (Screen Shop personnel).

Spawning Gravel Maintenance. Redd counts should be conducted when possible to determine what proportion of spawning occurs on natural and artificially-added gravels.

Fish Screen Installation/Maintenance. The current screen installation and maintenance program is conducted by CDFG Screen Shop personnel.

Streambank Stabilization. If eroding streambanks become a major source of sediment and substantially reduce necessary trout cover, additional streambank stabilization projects should be considered.

#### Review of Environmental Issues

Proposed Hydroelectric Projects. The CDFG's Northern California and North Coast Region (NCNCR) Environmental Services (ES) personnel will continue to take the lead in assessing the potential impact of any proposed upper Klamath River hydroelectric project.

Other Potential Environmental Problems. NCNCR fisheries and ES personnel will coordinate to assess other environmental problems potentially impacting the upper Klamath River WTA. The NCRWQCB will be notified and included as necessary.

#### Management Coordination

PacifiCorp. The Yreka area fisheries biologist will continue to maintain communication with appropriate personnel of PC. After any major study, this biologist will share CDFG's findings with PC.

U.S. Forest Service. Communications with the U.S. Forest Service (USFS) regarding the WTA are primarily concerned with habitat conditions in the upper Shovel Creek drainage. Given the importance of Shovel Creek, the Yreka area fisheries biologist should seek a joint reconnaissance of condition in the upper drainage at least once every five years. As appropriate and necessary, the CDFG should support efforts to restore damaged instream or streamside habitat in the upper drainage.

Oregon Department of Fish and Wildlife. The Oregon Department of Fish and Wildlife (ODFW) is managing the adjoining upstream section of the Klamath River as a wild trout fishery. An effort should be made to exchange fishery data and maintain discussions on management strategies with ODFW fisheries biologists.

#### Updating Management Plan

This Plan will be updated by the CDFG in 2010.



## RESOURCE STATUS

### Area Description and General Status

The Klamath River WTA is located in northern Siskiyou County, California, about 25 miles northeast of Yreka, near the Oregon border. In 1974, the FGC designated the 6.2 miles of the Klamath River from Copco Reservoir upstream to the California-Oregon state line as a wild trout stream, and public access was opened in the lower half. The remainder of the stream was opened to the public in 1977.

The Klamath River, second largest river in California, originates from the waters of Lake Ewauana near Klamath Falls, Klamath County, Oregon (Figure 1). En route to California, the river drains over 5,000 sq miles of Oregon watershed. Prior to 1987, the Klamath River occasionally received water pumped from Meiss Lake, California (Figure 1), when adjacent farmlands began to flood during major storm runoff events. This problem was eliminated with the development of additional wetland acreage capable of utilizing floodwaters in newly acquired land adjacent to the CDFG's Butte Valley Wildlife Area. The principle industries in this watershed are timber, agriculture and livestock production.

The Klamath River enters California in northern Siskiyou County and flows generally westward to Humboldt and Del Norte counties, and the Pacific Ocean. Copco #1 and #2 and Iron Gate dams are the only fish barriers in California on the river's main stem. Only one substantial tributary, Shovel Creek, enters the WTA (Figure 2). The lower 2 miles of this creek are important spawning areas for upper Klamath River wild trout.

Stream habitat within the WTA is characterized by runs and a few shallow riffles. Few pools and other low-velocity areas exist in this reach. Stream elevation drops from 2,735 ft at the State line to 2,600 ft at Copco Lake. Stream depth varies, with a maximum of about 10 ft, and the width is nearly constant at 110 ft. The streambed is mostly large cobble and boulders. Rooted, submerged vegetation is abundant and cattails and bulrush line much of the shoreline.

Water temperatures from May 1976 through April 1977 ranged from 36 to 73° F, with a maximum diurnal fluctuation of seven degrees during the summer and a minimum of 0.5 degrees in the winter. Five-year averages of mean monthly flows from 1904 through 1983 ranged from 453 to 7,475 cubic feet per second (cfs).

Flows through the WTA are controlled by numerous upstream reservoirs and diversions. Prior to 1960 and completion of Keno Reservoir, the average June, July and August flows at Keno, Oregon were 1,612, 1,255 and 1,204 cfs, respectively. After 1960, these flows were reduced by an average of 749, 496 and 318 cfs. Flows for other months are near historical levels.

### Land Ownership

The principal landowner within the WTA is PacifiCorp (PC), formerly Pacific Power and Light. There are also a few privately-owned, developed lots near Copco Lake and two parcels of Bureau of Land Management (BLM) land near the State line.

## Access

Highway and road access is good. Anglers can exit Interstate Highway 5 at either Yreka or Hornbrook onto paved county roads that converge east of Copco Lake at a highway bridge. From the bridge, an unpaved, and well-maintained county road runs the entire length of the WTA on the south side of the river (river left). Six public access points are maintained along this road. Overnight camping is not permitted in the WTA, except on an undeveloped BLM parcel near the California-Oregon border.

## Description of the Fishery

### Fishes Present

Fourteen species of fish are native to the upper Klamath River. Ten natives are still present: Pacific lamprey (landlocked form), rainbow trout, blue chub, Klamath tui chub, Klamath speckled dace, Lost River sucker, Short-nose sucker, Klamath smallscale sucker, Klamath largescale sucker and sculpin (Table 1). Green sturgeon were last reported in the area before the turn of the 20th century. Chinook salmon, coho salmon, steelhead trout and Pacific lamprey migrated into the area until 1917, when construction of Copco Dam blocked migration.

Two state and federally listed fish species exist within or adjacent to the Klamath River WTA. The Short-nose sucker is the most abundant, based on trapping efforts conducted by BEAK Consultants and the U.S. Fish and Wildlife Service. It is generally believed both sucker species became established from movement of fish downstream from Oregon where these fish have historically existed. Few Lost River suckers have been documented in Copco Lake, and none have been found in the Klamath River WTA.

Fishery and angler data are summarized in Tables 2, 3, 4 and 5. This information is presented to provide an historical perspective and for use in comparisons with more recent data.



TABLE 1. Fishes Present in the Upper Klamath River Wild Trout Area.

Family : Petromyzontidae	
Pacific lamprey	<i>Lampetra tridentatus</i>
Family : Salmonidae	
rainbow trout	<i>Oncorhynchus mykiss</i>
brown trout	<i>Salmo trutta</i> *
Family : Cyprinidae	
blue chub	<i>Gila coerulea</i>
fathead minnow	<i>Pimephales promelas</i> *
Klamath tui chub	<i>Gila bicolor</i>
Klamath speckled dace	<i>Rhinichthys osculus klamathensis</i>
Family : Catostomidae	
Klamath largescale sucker	<i>Catostomus snyderi</i>
Klamath smallscale sucker	<i>Catostomus rimiculus</i>
Lost River sucker	<i>Deltistes luxatus</i>
Short-nose sucker	<i>Chasmistes brevirostris</i>
Family : Ictaluridae	
brown bullhead	<i>Ictalurus nebulosus</i> *
channel catfish	<i>Ictalurus punctatus</i> *
Family : Cottidae	
sculpin	<i>Cottus</i> sp.
Family : Centrarchidae	
green sunfish	<i>Lepomis cyanellus</i> *
pumpkinseed	<i>Lepomis gibbosus</i> *
largemouth bass	<i>Micropterus salmoides</i> *
white crappie	<i>Pomoxis annularis</i> *
black crappie	<i>Pomoxis nigromaculatus</i> *
Family : Percidae	
yellow perch	<i>Perca flavescens</i> *

\* Introduced species.



TABLE 2. Summary of Rainbow Trout Catch Data from Creel Surveys on the Klamath River Wild Trout Area, Siskiyou County (1974-1996).

	<u>Survey year</u>								
	1974	1975	1976	1977	1978	1981	1982	1988	1996
# Days Surveyed	2	22	2	10	52	35	28	70	52
Anglers interviewed	40	135	57	165	826	282	255	594	178
Total hours recorded	79	400	138	349	1,463	889	752	1,465	424
Average angler day (h)	3.3	2.9	2.4	2.1	1.8	2.8	2.9	2.5	2.4
Fish caught	90	214	113	391	1,324	540	499	1,736	522
Fish released	23	63	9	234	681	146	204	968	344
Catch/hour	1.14	0.54	0.82	1.12	0.90	0.61	0.66	1.19	1.23

Excluding the 1988 survey, during which no aging was conducted, 38.7% of rainbow trout entering the creel were age 1+ (8.0 in. FL), 41.8% were age 2+ (10.5 in. FL), 14.3% were age 3+ (12.8 in. FL) and 5.1% were age 4+ (13.9 in. FL). Mean fork lengths of trout sampled from 1974 through 1988 ranged from 9.3 in. to 10.2 in. (Table 3). The largest trout observed in the creel was 17.1 in. long and weighed 2.5 pounds.

TABLE 3. Mean Fork Lengths (FL) of Angler-Caught Rainbow Trout, Klamath River Wild Trout Area, Siskiyou County (1974-1996).

<u>Sample year</u>	<u>Sample size</u>	<u>Mean FL (in.)</u>	<u>Range of FL (in., measured)</u>
1974	90	10.2	4.8 - 14.6
1975	214	9.5	5.9 - 16.9
1976	113	9.4	6.8 - 13.1
1977	391	9.6	5.2 - 15.0
1978	1,324	8.8	5.2 - 17.1
1981	540	9.4	5.9 - 15.5
1982	499	9.5	5.6 - 16.5
1988	768	10.1	6.0 - 19.7
1996	103	10.7	7.0 - 18.2

In 1978, 1981, 1982 and 1988, estimates were made of trout harvest for the entire season (yield), effort (hours expended) and yield per hour. Yield per hour remained nearly constant, while the effort and harvest declined through 1982, then increased in 1988 (Table 4).

TABLE 4. Estimates of Total Yield, Total Hours Fished and Yield per Effort for Rainbow Trout, Klamath River Wild Trout Area, Siskiyou County (1978-1988).

	<u>Survey year</u>			
	1978	1981	1982	1988
Anglers interviewed	826	282	255	594
Hours fished	1,463	889	752	1,465
Fish caught	1,324	540	499	1,736
Fish released	681	146	204	968
Catch/hour	0.90	0.61	0.66	1.2
Estimated total hours fished	5,210	4,176	3,010	3,284
Estimated total yield (total catch less total released)	2,223	1,942	1,322	1,756
Estimated yield/hour	0.43	0.47	0.44	0.53

In every survey year, except 1976, angler interviews included questions regarding the terminal gear used. Bait was the most popular, followed by lures (excluding artificial flies), then artificial flies (Table 5). Only in 1977, a drought year when river conditions remained relatively clear and low, were all terminal gear types about equally represented in the sample. The most common bait used was worms, except in late May and early June, when native stoneflies were used.

TABLE 5. Terminal Gear Used by Anglers, Klamath River Wild Trout Area.

	<u>YEAR</u>						
	1974	1975	1977	1978	1981	1982	1988
Number of anglers interviewed	40	135	165	826	282	255	594
<u>Terminal gear used</u>	<u>Percent of anglers surveyed</u>						
Bait (%)	61.8	62.1	30.8	58.5	65.7	50.0	47.4
Lures (%, excluding flies)	26.4	28.4	33.3	30.7	30.3	32.3	41.5
Artificial flies (%)	11.8	9.5	35.9	10.7	4.0	17.7	11.1

## Shovel Creek

Habitat Typing Habitat typing of the lower 2.77 miles of Shovel Creek was completed by CDFG personnel (WTP) in June, 1991. This is essentially the entire length of Shovel Creek accessible to rainbow trout. Survey results indicate the uppermost unscreened diversion (lower diversion was screened), located approximately one mile upstream along the right bank, and the diversion dams associated with each diversion ditch, posed the biggest threat to immigrating, spawning adults, and juvenile and adult out migrants.

In response to these concerns, a screen and fish trap were installed in the upper diversion beginning in 1993 and both ranchers involved with the diversions were requested by the CDFG's local district biologist to leave a portion of the diversion dams open to allow free fish passage through the dam structures. Random inspections made from 1993 through 1995 by CDFG employees and Copco Lake Sportsmen's Club (CLSC) members indicated that compliance with the CDFG request was met.

The habitat typing survey report, which included results of a fish population inventory completed in September of 1992, indicated a healthy trout population exists in Shovel Creek (4,200 trout per mile). The report recommends the 82 ft high cascade barrier located at stream mile 2.77 be evaluated for modification or removal for the primary purpose of expanding spawning habitat for Klamath River WTA trout. A survey of stream conditions above this barrier should be conducted prior to any barrier removal consideration.

Angling Regulations Shovel Creek is the only documented spawning tributary in the WTA. To protect rainbow trout spawners as they congregate in the spring at the stream's mouth, and to protect spawners and juvenile trout in the stream, the following regulations are in place:

1. Shovel Creek from the mouth upstream to Panther Creek and tributaries are closed to fishing all year.
2. The Klamath River 250 ft upstream and downstream from the mouth of Shovel Creek is closed to fishing from November 16 through June 15.

## PAST FISHERY MANAGEMENT PROGRAM

### Shovel Creek

#### Bank/Channel Stabilization

All known unstable or eroded streambanks in the lower 3/4 mile of Shovel Creek have been repaired. In 1987, Northwest Biological Consulting (NBC), formerly Peak Northwest, received a fisheries grant funding to stabilize two major areas of streambank degradation and to provide spawning and rearing habitat in other areas of the stream. Several hundred feet of eroding streambank at two sites within the lower 1/3-1/2 mile of stream were armored using rip-rap and gabion baskets. One of the sites was a short distance above the mouth of Shovel Creek along the left bank (looking downstream). The other site was approximately 1/3 mile upstream along the right bank. This site required some channel realignment and modification to repair a severely braided channel condition. All the channel work completed by NBC has remained in place and is functioning as intended.



### Habitat Enhancement

Since the late 1980's, work in the upper meadow area of Shovel Creek was initiated to improve conditions in the stream and in the adjacent meadow. The upper mile of meadow area was fenced by the USFS to exclude cattle. Other stream improvements have included rip-rapping and tree planting of exposed raw streambanks and the installation of six log weirs. These measures are designed to slow and reverse head-cutting and add habitat diversity. Similar work needs to continue in the adjacent lower meadow area as well.

In 1984, the CDFG, with assistance from the California Conservation Corps, constructed a fence that protects the stream channel by excluding cattle from all but two designated cattle crossing/watering locations. The improvement of riparian conditions in the lower fenced area has improved stream-bank integrity and enhanced instream cover and shading.

In 1985 and 1987, gabions were placed in several areas of severe streambank erosion. Also, four boulder-weirs were constructed in 1987 with spawning gravel placed behind each weir structure to improve spawning habitat conditions previously identified by Beyer (1984) as a limiting factor to rainbow trout production in the area. Two of the rock-weir/spawning-riffle combinations were constructed approximately 100 yards above the mouth of Shovel Creek. The other two spawning weir structures were placed approximately 500 yards upstream of the mouth. Additional large boulders were randomly scattered throughout the lower 1/3-mile of the stream to provide additional habitat complexity. During the following spring, three of the four boulder-weirs failed, when extremely high flows swept down Shovel Creek following a major storm event. Although the boulders forming the weirs remained in the stream, adding habitat complexity, their intended role and function to provide spawning habitat was diminished. However, the weirs continue to trap spawning gravels and are continuing to provide adequate spawning habitat and excellent rearing habitat for trout. There is a reluctance to re-enter the weir sites with heavy equipment to make repairs for fear of damaging excellent riparian cover established there.

Nearly one mile of meadow near the headwaters of Shovel Creek was fenced to prevent cattle damage. This work was completed under a CDFG administered contract with the USFS (Klamath National Forest) in 1988. Fencing was completed in association with streambank protection (bank armoring and riparian vegetation planting) and instream structure work (i.e. randomly placed boulders and six log weirs) done within the fenced stream area to prevent down-cutting and improve stream habitat complexity. Cattle are being excluded from this project area. Additionally, the remaining lower meadow area along Shovel Creek has been fenced, although the USFS is allowing some limited grazing to occur during a few weeks in late summer/early fall (Jim Stoudt, USFS, personal communication).

Meadow conditions along the upper Shovel Creek project area have improved and down-cutting appears to have been halted in some stream areas. Due to the short growing season and heavy snow loads in the area, riparian vegetation planted along upper Shovel Creek has been slow to respond.



Habitat projects, including improvement of spawning conditions with the addition of spawning gravels, installation of boulder weirs to collect natural gravels, screening of diversion ditches, and reduction of down-cutting and siltation from the upper headwaters, have improved trout production and survival in Shovel Creek.

### Monitoring the Shovel Creek Spawning Run

Based on extensive electrofishing during 1985 through 1990, at least 250-300 adult rainbow trout pairs are estimated to spawn annually in Shovel Creek. Adult males and females averaged 8.9 in. and 12 in. FL, respectively. These surveys should be repeated every two to three years.

### Angler Surveys

Efforts to collect baseline data for the wild trout fishery in the Upper Klamath River were completed by 1990. Angler surveys varying in length from two days to 52 days were conducted in the WTA during seven of nine seasons between 1974 and 1982. The CDFG monitored trends in sizes of trout caught, age and growth patterns, and angler use and satisfaction. These surveys indicated fishery management goals are being met, and may be repeated as necessary. Trout populations (inferred from catch rates) in the WTA were monitored by angler survey rather than by electrofishing because water depth, water clarity and velocities prohibit safe and effective use of electrofishing equipment.

In 1991, a less costly method of monitoring fishing success using angler-survey boxes was instituted on many wild trout waters throughout the state. Based on the initial success of this technique, survey boxes were installed at each of the six established access points in the Upper Klamath River WTA. Today, five angler survey boxes are maintained in the WTA and summaries of this data are available (see page 17).

### Angling Regulations

In the fall of 1991, the FGC approved reducing the daily bag limit in the upper reach of the WTA (Shovel Creek to Oregon border) from five to 2-trout, while maintaining the 5-trout limit downstream of Shovel Creek. The new regulations also included an artificial lure requirement. The intent of the regulation change was to increase the opportunity to catch trophy-size rainbow trout (>14 in.) by reducing harvest and increasing the survival of released fish. Studies upstream in Oregon show mean sizes of rainbow trout taken by anglers range from about 12 to 13.5 inches (TL). The change in California regulations became effective at the start of the 1992 season.

After a six-year angling regulation evaluation, no significant differences in trout size or catch-rate were observed between the two reaches. Consequently, in 1998 the CDFG recommended the FGC return to the previous 5-trout, no special gear regulations. This regulation became effective in the spring of 1999 and appears to be providing an excellent angling opportunity, with excellent catch rates and acceptable average trout size. Unless new data indicates otherwise, the CDFG intends to continue with this recommendation.

## FUTURE FISHERY MANAGEMENT PROGRAM (2004-2009)

### Management Goals

1. Maintain the current recreational trout fishery to provide a continued quality angling experience.
2. Maintain instream habitat, riparian condition and water quality to support Goal #1.

### Management Objectives

1. Maintain a wild trout population of sufficient average size and number to provide:
  - a. A mean catch rate of at least one trout/hour.
  - b. An opportunity to catch larger fish, with at least one half of trout creel longer than 9 in. (TL).
  - c. Protection and perpetuation of native fishes, particularly indigenous *Ceratomyxa*-resistant rainbow trout, and the Lost River and Short-nose suckers (state and federally-listed endangered species).
2. Maintain and enhance trout habitat conditions, which will provide:
  - a. Water temperatures never exceeding 70° F and do not exceed 60° F for more than 12 hours.
  - b. Water transparencies and suspended sediment loads that do not exceed standards set by the NCRWQCB.
  - c. A river free of pollutants that could negatively impact the fishery or further detract from the aesthetic quality of the WTA.
  - d. Protect spawning habitat in Shovel Creek to ensure optimal recruitment to the wild trout fishery. This includes maintenance of existing cattle exclusion fencing and gravel monitoring.
  - e. Flows to be maintained at a level sufficient to support the fishery at existing or greater levels.
3. Provide adequate angler access along the river throughout the Klamath River WTA. This includes keeping the existing access points open and encouraging a one-way drift fishery.
4. Preserve the aesthetic character of the stream and adjoining streamside habitat in at least its present condition.

Objectives stated in "2a" through "2c" above continue to be accepted as appropriate standards for maintaining water quality. It is recognized that agricultural and other activities in the upper drainage have, for decades, increased turbidity and nutrient levels above those desired for a designated California Wild Trout Stream. These parameters should be monitored regularly to identify long-term trends in water quality conditions, and to alert fishery managers of potentially critical water quality conditions that could pose imminent danger to the fishery.

Objective "2d", while requiring some annual maintenance by CDFG personnel, the landowner and volunteers, has been largely accomplished.



Though objective "2e" is very difficult to assess, the CDFG will follow FGC policy for designated Wild Trout Streams, which states adverse development (potential future accelerated peaking operations) may be strongly opposed.

#### Monitoring the Shovel Creek Spawning Run

Reconnaissance of Spawning Habitat. Spawning habitat in Shovel Creek is subject to damage during high flows. Banks can be eroded and gravel washed out of either natural bars or artificial spawning riffles. To determine the condition of spawning habitat and the need for possible restoration work, a reconnaissance of the lower 2 miles of stream should be conducted annually after the spring run-off. If restoration work is needed, the project should be planned and work accomplished as soon as personnel and funding are available.

Redd Counts. Historically, assessment of the spring rainbow trout spawning run in Shovel Creek was conducted by trapping near the mouth and/or electrofishing. Redd (spawning site) counts offer an alternative assessment method less labor intensive and free of potential injury to spawning trout. This method is now considered the preferred method for monitoring the run. To be effective, redd counts must be done in a consistent manner. The spawning season should be divided into a minimum of three periods and counts be made in the middle of each period. To gain more detailed information, it is further recommended that the stream reach where the majority of spawning occurs be divided into no less than 10 segments and counts made within each segment at least bi-weekly. Artificial spawning riffles or natural gravel bars where redds are concentrated should be mapped individually.

Redd and spawner counts, if done methodically, can provide insight into trends in spawner abundance and show how the stream accommodates future runs. After one or two years of baseline data are established, annual counts may be reduced to counts every second or third spawning season.

#### Angler Surveys

Angler Survey Boxes Angler survey boxes (ASB) are now the primary method of monitoring wild trout fisheries statewide. The goal using this method is to obtain long-term trend data. It is recognized that data obtained with this method may not be as accurate as that collected through standard angler creel surveys, but it is much less costly. While available funding usually results in one or two creel surveys being conducted on wild trout waters statewide, the box method can be used to obtain data on all designated wild trout waters every year.

Data will continue to be collected by the Yreka area biologist, forwarded to the NCNCR wild trout biologist in Redding and compiled by members of the statewide WTP in Rancho Cordova. Graphic summaries will be generated at the end of each season and management implications discussed at the annual NCNCR WTP coordination meeting in Redding.

Summaries of the most recent ASB data are available from the CDFG regional office in Redding, CA at 601 Locust Street 96001 or by calling (530) 225-2300.

Creel Surveys. Season-long angler creel surveys can provide valuable estimates not obtainable from angler box surveys, such as total angler-use per season, total trout harvest and total number of trout released. Rather than angler-reported estimates of trout length, clerk based surveys provide the opportunity to measure trout in the creel, and, if needed, collect trout scales for further analysis.

Based on ASB data, there appears to be an increase in average size of trout caught in the last 10 years. In order to provide more precise data to assess this question, and to provide a baseline for comparison with ASB data, it is recommended a formal angler creel survey be conducted as soon as funding is available. Anglers should be encouraged to complete angler survey box forms as usual. This will allow for direct comparison of the two data collection techniques.

Since ASB's appear to be adequately monitoring trends in the fishery, especially catch rates and the proportion of trout kept and released, the every fifth year creel survey schedule can be modified to every 10 years, or when new management problems appear, requiring season-long estimates.

#### Evaluation of Angling Regulations

The current management program is designed to evaluate goals and objectives on an annual basis, using the angler survey box data as an indicator. If goals or objectives are not met, an angler creel survey should be scheduled to provide more precise estimates of the various parameters. If it is determined the numbers of large trout in the creel are substantially reduced by direct harvest, it may be necessary to consider a maximum size restriction (similar to Fall River or Hat Creek) and artificial lure regulations throughout the WTA. Survey data from 1988 and 1996 indicate this would be an unpopular change because bait angling was a popular fishing method (51% of anglers, 1988). Forty-four percent of anglers used lures and only 3% used flies. The number of fly anglers is increasing, and this demographic should be considered in any management decision. A reduced bag limit should be considered if catch rates drop below the stated objective for two consecutive seasons. However, considering the large size of the river, relatively limited angler use and access, and current high catch rates, the existing angling regulations appear to be appropriate.



### MANAGEMENT DIRECTION (2004-2009)

The CDFG encourages PC, the primary landowner in the WTA, to:

1. Continue to provide and maintain angler access within the WTA.
2. Manage lands along the river to maintain the aesthetic quality of the rural setting.
3. Continue to cooperate with the CDFG in assessing the fishery and improving fish habitat.

These guidelines allow the public to enjoy the fishery and the CDFG to achieve its management goals. The cooperation received from PC is appreciated and no changes in these guidelines are needed.

To accomplish wild trout management goals the CDFG will:

1. Complete an angler creel survey every 10 years and use angler survey boxes annually to monitor the catch and determine fishery trends.
2. Promote cooperation between the angling public, PC and the ranchers along the river.
3. Complete the summer water temperature study in the Upper Klamath River within three years or until baseline data are established.

Because of serious environmental problems on Shovel Creek, efforts to protect and improve fishery habitat will be concentrated there. The CDFG recognizes the importance of monitoring the results of any work to improve rainbow trout spawning in Shovel Creek in order to determine its success. The CDFG will also continue to work closely with the CLSC to achieve the goals and objectives established for the Klamath River WTA, including Shovel Creek.

4. Protect and enhance Shovel Creek spawning by:
  - a. Monitoring the rainbow trout spawning run in Shovel Creek every five years by conducting redd surveys every other week from March to mid-May.
  - b. Maintaining cattle exclusion fencing along the lower one-mile of Shovel Creek.
  - c. Installing streambank stabilization structures along Shovel Creek, where needed.
  - d. Assessing and improving Shovel Creek spawning habitat, if needed.
  - e. Encouraging the USFS, Klamath National Forest, to improve streambank and watershed conditions in Shovel Creek.
  - f. Obtaining eggs (if necessary to boost juvenile recruitment or production) from Shovel Creek adult rainbow trout spawners following a major fish loss to accelerate recovery of the trout population. Eggs will be taken and fish reared and planted by the CLSC until the CDFG determines there is adequate wild trout spawning.
  - g. Recommending lower Shovel Creek and its tributaries downstream of Panther Creek remain closed to fishing, and the Klamath River 250 ft upstream and downstream from the mouth of Shovel Creek remain closed to fishing from Nov. 16 through June 15.

- h. Purchasing or encouraging other appropriate local, State or Federal agencies to acquire any private lands along the WTA riparian corridor to assure continued public access and habitat protection in future years.

## REFERENCES

Beyer, J. M. 1984. Rainbow trout fishery and spawning stock in the Upper Klamath River wild trout area, Copco, California. Masters Thesis. Humboldt State University, Arcata, California. 81 p.



## FISHERY MANAGEMENT IMPLEMENTATION SCHEDULE (2004-2009)

## A. Fishery Management

- |    |   |             |                   |
|----|---|-------------|-------------------|
| 1. | Monitoring Shovel Creek spawning run    |             |                   |
| a) | Evaluation of spawning habitat          | NCNCR       | Annually          |
| b) | Redd counts                             | NCNCR /CLSC | Annually          |
| 2. | Angler surveys                          |             |                   |
| a) | Collecting angler survey box data forms | NCNCR /CLSC | Monthly           |
| b) | Compiling and reviewing data            | NCNCR /FPB  | Annually          |
| c) | Creel Survey                            | NCNCR       | As needed         |
| d) | Evaluation of angling regulations       | NCNCR /FPB  | Every three years |

## B. Water Quality Monitoring

- |    |                           |                 |           |
|----|---------------------------|-----------------|-----------|
| 1. | Summer water temperatures | NCNCR / NCRWQCB | As needed |
| 2. | Transparency              | NCNCR / NCRWQCB | As needed |
| 3. | Chemical analysis         | NCNCR / NCRWQCB | As needed |

## C. Shovel Creek Spawning Habitat

- |    |                                      |       |           |
|----|--------------------------------------|-------|-----------|
| 1. | Fence maintenance                    | NCNCR | Annually  |
| 2. | Fish screen installation/maintenance | NCNCR | Annually  |
| 3. | Spawning gravel bed maintenance      | NCNCR | As needed |
| 4. | Streambank stabilization             | NCNCR | As needed |

## D. Review of Environmental Issues

- |    |  |                 |           |
|----|--|-----------------|-----------|
| 1. | Proposed hydroelectric projects        | NCNCR           | As needed |
| 2. | Other potential environmental problems | NCNCR / NCRWQCB | As needed |

## E. Management Coordination

- |    |                                  |       |           |
|----|----------------------------------|-------|-----------|
| 1. | PacifiCorp                       | NCNCR | As needed |
| 2. | U.S. Forest Service              | NCNCR | As needed |
| 3. | Oregon CDFG of Fish and Wildlife | NCNCR | As needed |

## F. Updating Fishery Management Plan

NCNCR / FPB	2010
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- Copco Lake Sportsmen's Club (CLSC)
- CDFG's Northern California North Coast Region (NCNCR)
- CDFG's Fisheries Programs Branch (FPB)
- Northern California Regional Water Quality Control Board (NCRWQCB).