

State of California  
The Resources Agency  
DEPARTMENT OF FISH AND GAME

ADDENDUM NO. 1 TO THE  
BEAR CREEK (SAN BERNARDINO COUNTY)  
WILD TROUT MANAGEMENT PLAN

by

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and

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## INTRODUCTION

This addendum has been written to update the "Bear Creek (San Bernardino County) Wild Trout Management Plan" published by the California Department of Fish and Game in February 1989 (Hoover and Deinstadt). The addendum has been divided into three sections:

1. Results from projects outlined in the 1989 "Program Implementation Schedule".
2. Updating the "Environmental Problems and Issues" section of the plan.
3. Updating the "Management Program" section of the plan including a new 5-year program implementation schedule.

The "Resource Status" section of the 1989 plan, comprising 15 of the document's 24 pages, has not been updated. The maps and figures, with the exception of those covering trout populations in Bear Creek, are still up-to-date. With the exception of the fishery, the history, background and description of the physical and biological characteristics of the resource are not considered out-of-date enough to warrant publication of a new plan. An updated description of the fishery, including tables and figures, is presented in this addendum.

Text from the 1989 plan used to provide background information in this addendum is presented in **bold text**.

## RESULTS OF PROJECTS SCHEDULED IN THE PLAN

Results of projects outlined in the "Program Implementation Schedule" are presented in the order shown in the 1989 schedule (Table 1).

### Fishery Management

#### Fish Population Surveys

The present program of collecting baseline fish population data near the lower end of the Glory Ridge Trail and in the Slide Creek area of Bear Creek will be expanded to include both riffle-run and pool habitat. Trends in abundance and the age and size structure of the trout populations will be monitored annually for 3 years at these locations. After this time, two long-term monitoring sections will be selected and sampled at 3-year intervals. Assistance in conducting population monitoring will be sought, as needed, from angling clubs in southern California (page 22).

Baseline fish population surveys were completed. Long-term monitoring of two baseline sections was to begin in 1993, but due

Table 1. Program Implementation Schedule from the 1989 Bear Creek Wild Trout Management Plan.

Task	Department section or agency responsible	Implementation date
<b>A. Fishery Management</b>		
1. Slide Creek, and Glory Ridge population transect surveys:		
a. Continue baseline surveys	Region 5-IFD	Summer 1988, 1989 and 1990
b. Periodic monitoring	Region 5	1993, 1996, etc.
2. Age and growth studies:		
a. Complete reading fish scale collections from surveys prior to 1988	Region 5-IFD	1988
3. Conduct angler questionnaire survey	Region 5	1988-1990
4. Evaluation of angler regulations	Region 5-IFD	1990
<b>B. Habitat Studies</b>		
1. Record water temperatures, measure streamflows and obtain samples for water quality analysis	Region 5	Summer and fall 1988-1990
2. Evaluate need for stream habitat improvements	Region 5/USFS	As needed
<b>C. Wild Trout Stream Designation</b>		
1. Coordinate with U.S. Forest Service and interested groups	Region 5-IFD	February-March 1988
2. Recommend to Commission	Region 5-IFD	April 1988
<b>D. Land Use Planning</b>		
1. Coordinate implementation of the management program	Region 5/USFS	Continuing
2. Seek improved water flows	Region 5	1988-1993
3. Coordinate efforts to minimize sedimentation from Highway 18 maintenance operations	Region 5/USFS	Continuing

to a pending water rights hearing, the survey schedule was moved up one year. Four sections, rather than two, were sampled. The following update on the status of trout populations in Bear Creek is from a file report (Deinstadt, 1992), written after the 1992 survey.

Four sample sections were surveyed three times each between 1987 and 1990. The sections were selected to be representative of predominately riffle/run or pool habitat in the upper reach of stream near the base of the Glory Ridge Trail and the lower reach of stream above Slide Creek (Figure 1).

Trout distribution and relative abundance by species in the 1992 survey were similar to those observed during the 1987 through 1990 surveys. Brown trout were the only salmonids sampled in the upper sections (Figure 2). Downstream, rainbow trout were present, but accounted for only 3% to 8% of the estimated population. During the baseline surveys, rainbow trout in the lower two sections averaged 6% of the population.

Trout densities for all four sections combined during the three baseline survey years averaged 4,187 fish/mile (Figure 2). In 1992, trout densities in the four sections averaged 3,632 fish/mile. The greatest changes in densities occurred in the upper riffle/run and lower pool sections. In the upper riffle/run section, the density increased from a 1988 to 1990 average of 1,809 to 3,062 trout/mile. In the lower pool section, the density decreased from an average of 5,891 to 3,872 trout/mile. Trout densities in the upper pool decreased from an average 2,350 to 1,707 mile. While the trout population in the lower riffle/run section decreased from an average 740f 6,697 to 5,889 fish/mile, the estimated 1992 population was similar to that present in 1988 and 1989.

Changes in the estimated trout biomass of the four sample sections generally paralleled the changes in trout densities. The greatest change occurred in the upper riffle/run section where the biomass increased from a 1988 to 1990 average of 126.5 lb/acre to 242.8 lb/acre (Figure 3). Biomass in the lower pool section decreased from an average of 268.6 to 201.2 lb/acre. The magnitude of the decrease in the biomass of the upper pool section was greater than that of density--from a 1987 to 1989 average of 187.5 lb/acre down to 117.8 lb/acre. The smallest change occurred in the lower riffle/run section, a decrease from an average of 161.3 lb/acre to 149.4 lb/acre.

The ratio of young-of-the-year (YOY) to age 1 and older trout in 1992 was relatively unchanged from the baseline years (Figure 4). YOY were most abundant in the lower sections. Here, as might be



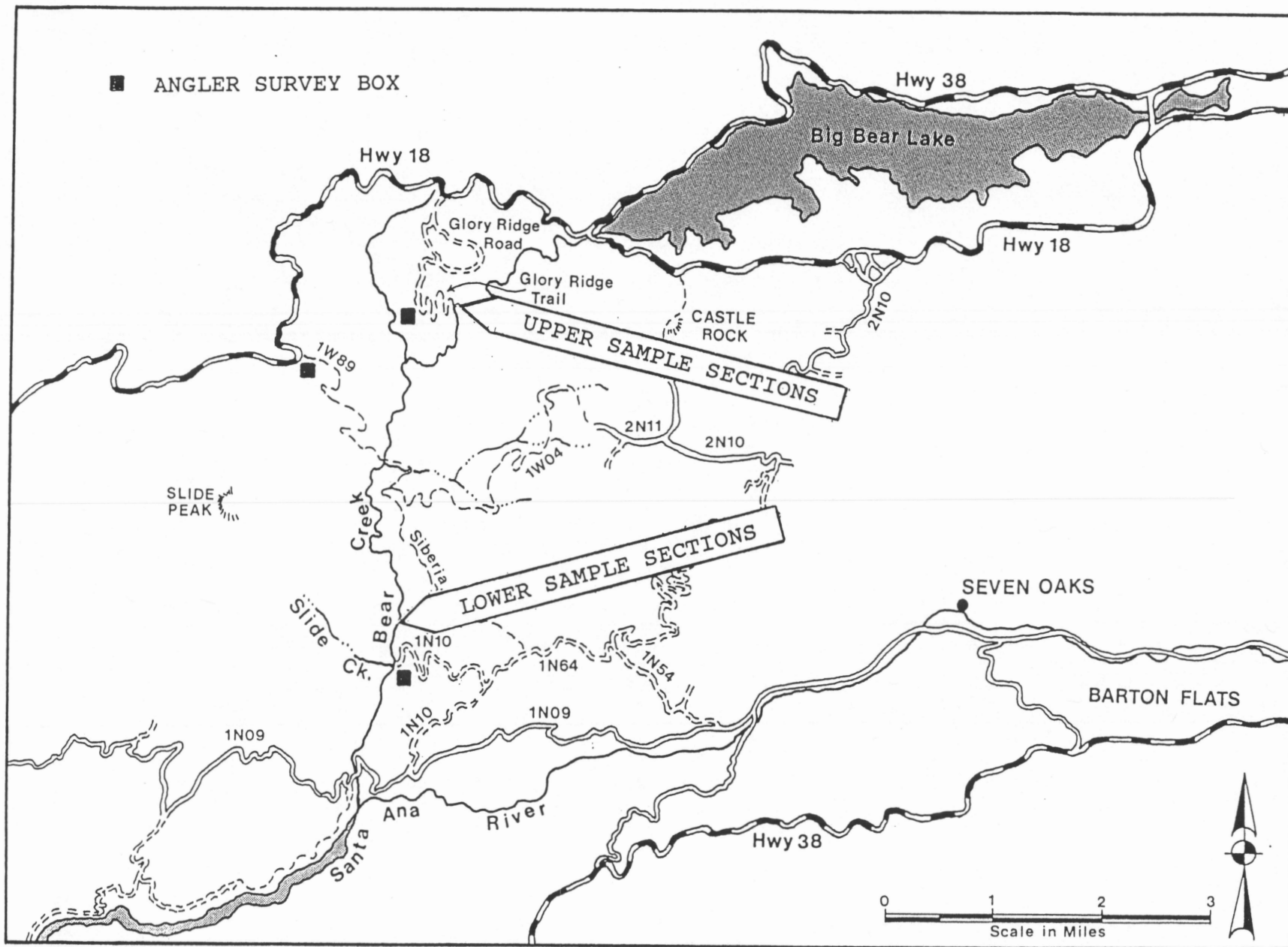


FIGURE 1. Locations of the upper and lower trout population sampling sections and angler survey boxes on Bear Creek.

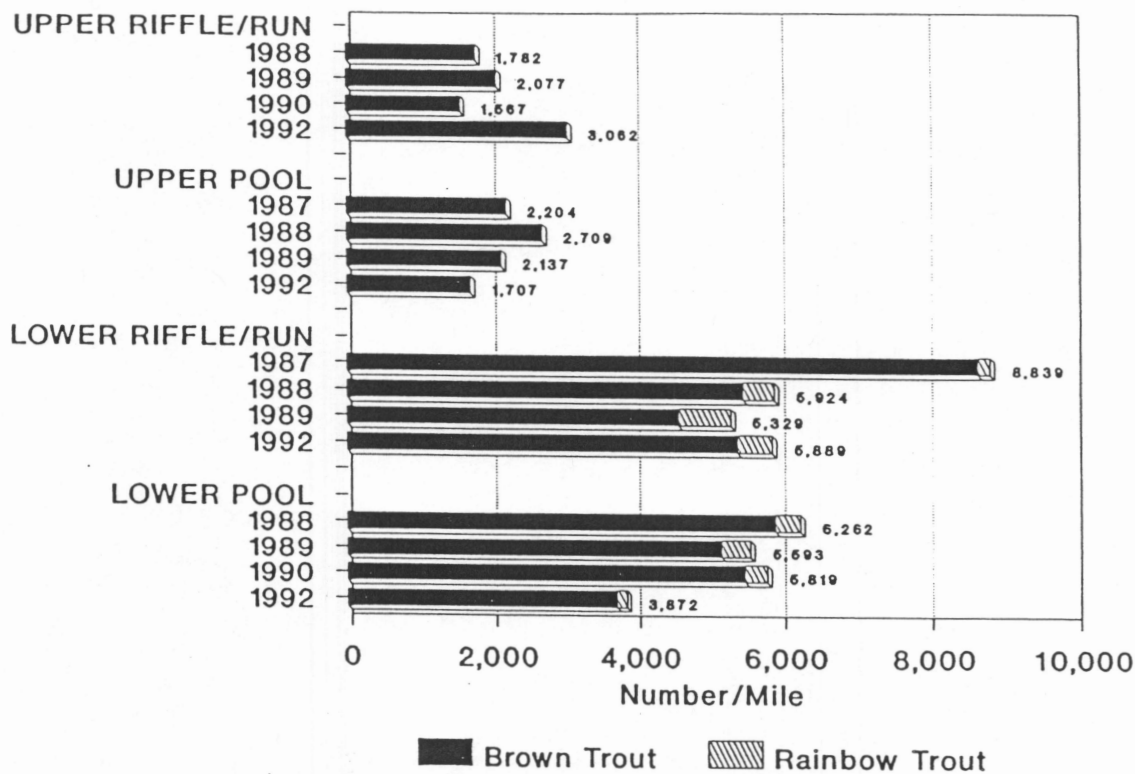


FIGURE 2. Trout densities in four sections of Bear Creek sampled between 1987 and 1990 and again in 1992.

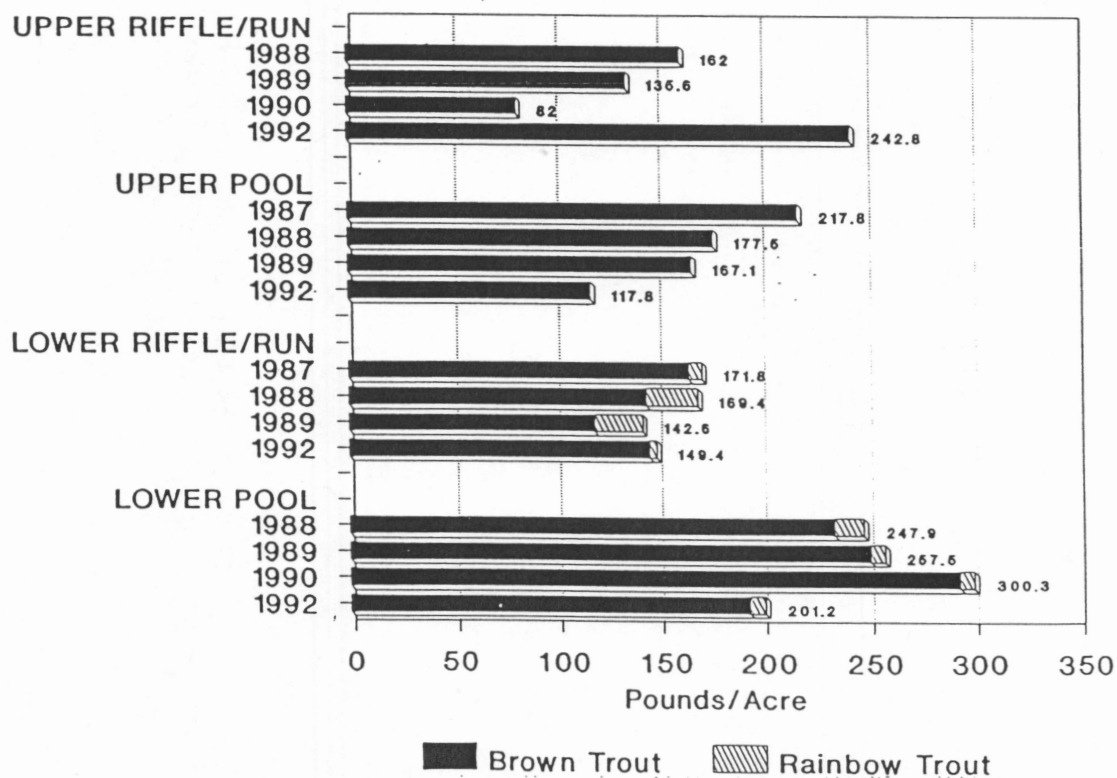


FIGURE 3. Biomass of trout in four sections of Bear Creek sampled between 1987 and 1990 and again in 1992.

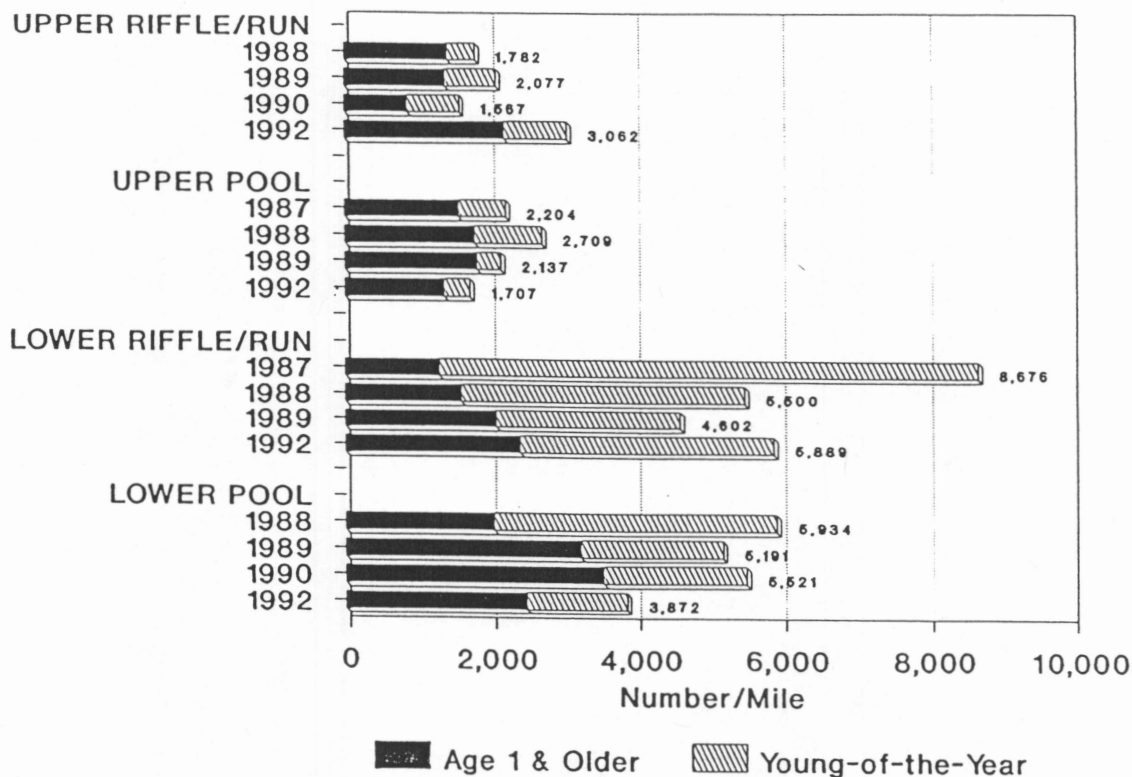


FIGURE 4. Densities of young-of-the-year and age 1 and older trout in four sections of Bear Creek sampled between 1987 and 1990 and again in 1992.

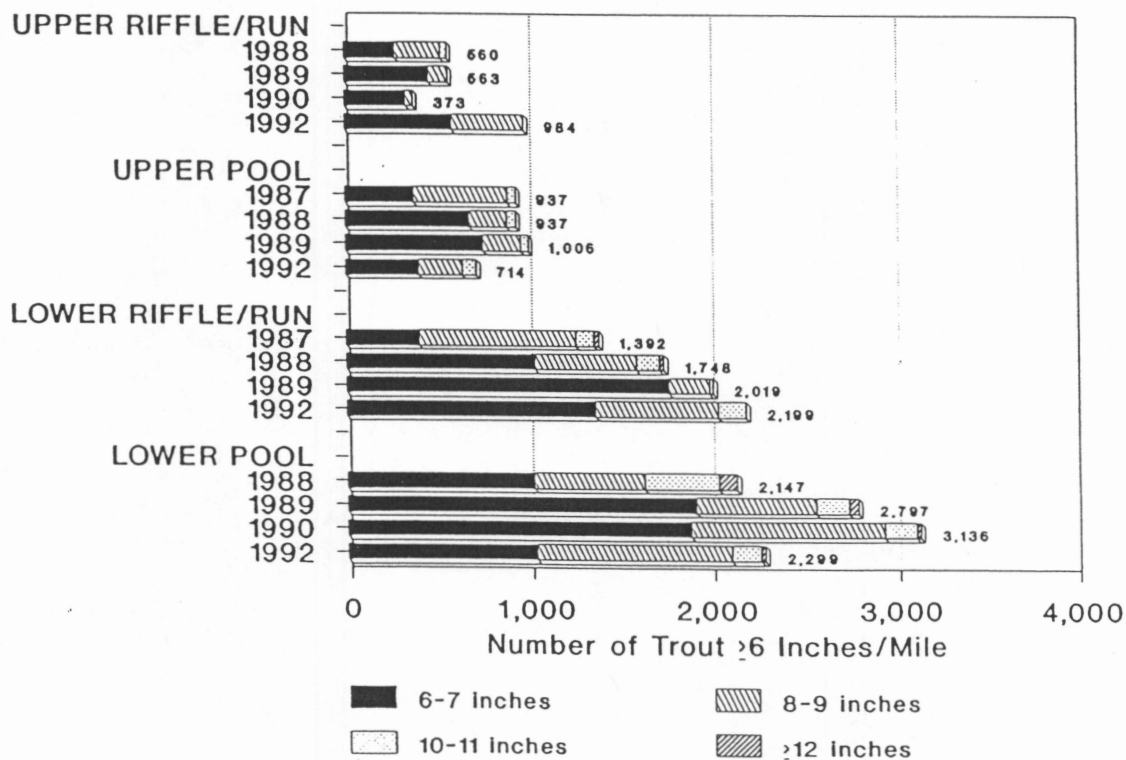


FIGURE 5. Densities by length of trout  $\geq 6$  inches sampled in four sections of Bear Creek between 1987 and 1990 and again in 1992.

expected, the riffle/run section contained the highest YOY density--3,495/mile. YOY densities in the lower pool, upper riffle/run, and upper pool were 1,388, 875, and 357 per mile, respectively.

The size structure of the trout population  $\geq 6$  inches in 1992 was generally similar to that present during the baseline years. In 1992, the number of 6-7, 8-9, 10-11, and  $\geq 12$ -inch trout in the four sample sections averaged 851, 598, 99, and 6 per mile, respectively (Figure 5). As in the past, trout  $\geq 12$  inches were only sampled in the lower reaches. Currently, the number of trout in this size range remains low.

In 1992, two additional sections were electrofished downstream of the confluence of West Cub Creek, an area a few miles upstream of the Glory Ridge area. These contiguous sections consist of one 40-ft circular pool and one 66-ft mixed riffle-run. Both YOY and older brown trout were captured. Brown trout densities were 3,564 fish/mile and 189.6 pounds/acre in the pool section, and 2,160 fish/mile in the riffle-run. The percent YOY in the pool sample was 52%, whereas the riffle-run sample contained 92% YOY. The riffle-run section appears to have a lower density of adult trout, and greater relative frequency of YOY, than has been recorded in any other section or sample year for Bear Creek. Interpretation of these limited observations will require additional sampling in future years.

#### Age and Growth Studies

Brown trout were aged using scale samples collected from the Glory Ridge and Slide Creek reaches of Bear Creek in 1987 and 1988 (Table 2). Fork lengths of brown trout sampled in 1987 and 1988 averaged 4.8 inches at age 1, 7.5 inches at age 2, and 9.4 inches at age 3. Growth rates of trout sampled in the higher and colder Glory Ridge reach of stream, as might be expected, were slower than those sampled downstream near Slide Creek.

TABLE 2. Age and Growth of Brown Trout in Two Reaches of Bear Creek

	Average fork length at annuli (inches)		
	Age 1	Age 2	Age 3
Glory Ridge			
1987	4.5	7.5	8.9
1988	4.2	6.6	9.0
Slide Creek			
1987	4.9	7.4	---
1988	5.7	8.5	10.4

#### Angler Questionnaire Survey

To monitor angler use and success, a program of soliciting and collecting voluntarily returned angler surveys at three or four

locations along the stream will be pursued. The implementation of this program will be conditioned upon the participation of interested angling groups and the approval of the Forest Service (page 22).

Questionnaires voluntarily completed by anglers were distributed and collected through the use of angler survey boxes. Boxes were installed in 1989 at the top of the Glory Ridge Trail (upper canyon), Camp Creek Trail (middle canyon), and near the canyon mouth (on the alluvial wash) (Figure 1). The lower box was not maintained in 1991 and through at least part of 1992. Results of the survey from 1989 through 1991 are being published in a Department administrative report (Deinstadt, Lentz, Sibbald, and Murphy, 1993). The following summary of results and management implications together with the table and figures are from that report.

Results. Combined catch rates during the three survey years were similar, averaging 1.91 trout/hour (Table 3). An average of 9% of the trout caught over the 3-year period were kept. The canyon mouth reach produced the highest percentages of trout  $\geq 10$  inches (Figures 6, 7, and 8). Twenty-eight percent of the anglers fishing this reach in 1989 and 32% in 1990 caught  $>10$  trout/day (Figure 9). The trout caught by anglers in this category accounted for 837 out of 1,183 trout caught in the canyon mouth reach in 1989-90.

Table 3. Angling Success in Three Reaches of Bear Creek in 1989, 1990, and 1991.

	Canyon Mouth		Camp Creek			Glory Ridge			Combined		
	1989	1990	1989	1990	1991	1989	1990	1991	1989	1990	1991*
Surveys received	39	84	12	4	15	17	22	21	68	110	36
Hours fished	162.50	346.50	41.00	14.00	43.00	61.25	76.50	70.50	264.75	437	113.50
Brown trout kept	11	15	16	1	12	4	21	8	31	37	20
Brown trout released	350	687	18	15	97	20	24	66	388	726	163
Total brown trout	361	702	34	16	109	24	45	74	419	763	183
Rainbow trout kept	9	1	10	0	4	1	2	0	20	3	4
Rainbow trout released	26	84	6	31	22	7	2	5	39	117	27
Total rainbow trout	35	85	16	31	26	8	4	5	59	120	31
Overall catch/hour	2.44	2.27	1.22	3.36	3.14	0.52	0.64	1.12	1.81	2.02	1.89
Mean trout/angler	10.2	9.4	4.2	11.8	9.0	1.9	2.2	3.8	7.0	8.0	5.9

\* No data from the canyon mouth survey box.

Management Implications. Despite the low flows, especially during the drought, the canyon mouth reach of stream produced high catch rates and, for southern California, good numbers of trout  $\geq 10$  inches. It also appears, based on the number of forms received, that the canyon mouth reach received the highest angler use. Lower catch rates in the uppermost area may be related to the trout populations present, angling conditions, or other factors as yet not identified.

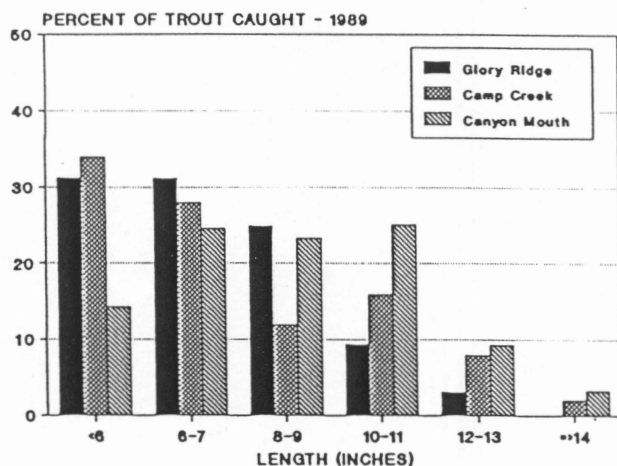


FIGURE 6. Comparison of the lengths of trout anglers reported catching in three reaches of Bear Creek in 1989.

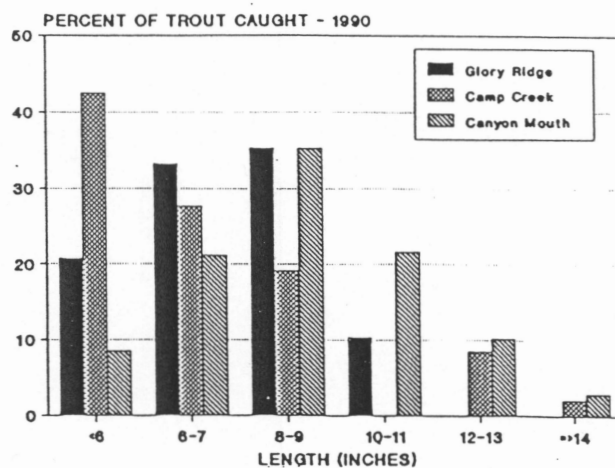


FIGURE 7. Comparison of the lengths of trout anglers reported catching in the three reaches of Bear Creek in 1990.

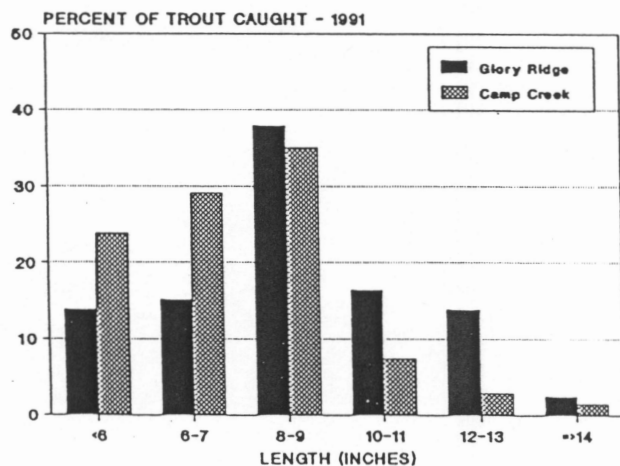


FIGURE 8. Comparison of the lengths of trout anglers reported catching in the upper two reaches of Bear Creek in 1991.

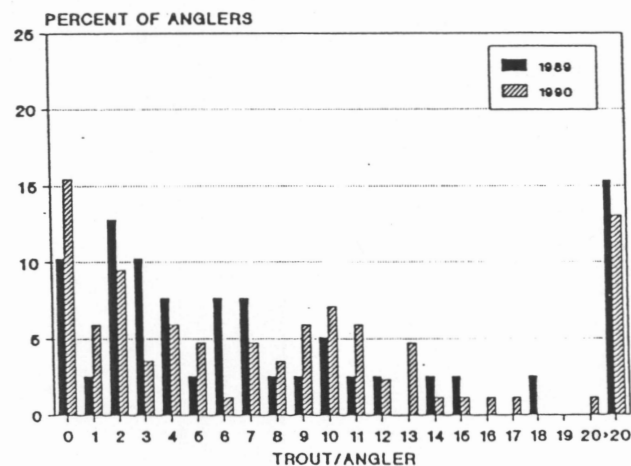


FIGURE 9. Percent of anglers reporting catches of zero to >20 trout per day in the canyon mouth reach of Bear Creek in 1989 and 1990.

The type of angler survey boxes first experimentally used on Bear Creek in 1989 are now used on about 40 wild trout waters statewide. The original boxes were designed and built by Mr. Don Stehsel, a long-time Bear and Deep creek angler.

#### Evaluation of Angling Regulations

The combination of trout population sampling and angler surveys will provide a basis for determining if fisheries management goal #2 (as stated on page 21) is being achieved. If this goal is not being met, consideration will be given to implementing remedial measures, such as changing angling regulations (page 22).

The goals of wild trout management for Bear Creek are:

2. To provide self-sustaining populations of wild trout which offer the opportunity to: (a) catch trout 10 inches and larger, and (b) catch trout at rates of two fish or more per hour (page 21).

The original 10- to two-trout reduction in the bag limit on Bear Creek occurred in 1986 when the Department recommended that the stream be managed as a catch-and-release fishery. At that time, 6-inch minimum size and artificial lure only restrictions were also approved for the stream. Anglers familiar with Bear Creek felt the 6-inch minimum size limit was too low. Upon completion of the age and growth study, the Department concurred, and the minimum size limit was increased to 8 inches. The size limit is not intended to protect fish until they mature, but to help maintain an abundant population.

Currently, results from the fish population surveys conducted from 1987 through 1990 and again in 1992 show that an abundant self-sustaining population of primarily brown trout was present in the lower sample transects. Lower density brown trout populations were present in the upper transects (Figure 2). Young-of-the-year (YOY), primarily brown trout, were abundant in the lower transects, but their densities were less than expected in the upper transects (Figure 4). The estimated numbers of YOY in the upper transects appears too low to sustain the populations of age 1 and older fish present. This suggests that the upper transects may not, in regards to YOY, be representative of that reach of stream. Fish population surveys show that the lower two transects and the upper pool transect continue to sustain  $\geq 10$ -inch trout (Figure 5).

Results from the angler box surveys at the canyon mouth in 1989 and 1990 indicate the goal of offering anglers the opportunity to catch two trout or more per hour was met in that reach of stream (Table 3). The small sample of survey forms from Camp Creek suggest that the average catch rate in the middle reach of the canyon was also acceptable. Surveys received from those hiking to the stream via the Glory Ridge Trail indicate



that the average catch rate in the upper canyon is less than the goal set in the management plan. Based on the angler box surveys, anglers in all three reaches of stream have had an opportunity to catch trout  $\geq 10$  inches. As the data available show, the management goals for trout populations and angling are being met in the majority of the stream including the more accessible canyon mouth reach of Bear Creek. Therefore, the Department does not plan to recommend more restrictive regulations during the upcoming fall 1993 Commission hearings.

#### Habitat Studies

Baseline information which accurately describe basic instream habitat parameters (water temperature, streamflow, water quality and sedimentation) are not available for Bear Creek. Flows immediately below Bear Valley Dam are being monitored; however, flows in the middle and lower portions of the creek are not being measured. Sedimentation, though potentially impacting trout production, is not being measured and is considered too complex and time consuming for the Department to monitor at this time. Alternative methods of measuring Bear Creek sedimentation rates and sediment budget will be explored. The Department will begin to record water temperatures through the summer period, measure flows once at the beginning of the summer and once in early fall, and, at the same time, take samples for water quality measurements in the Slide Creek area. Baseline data have been collected on macroinvertebrate species present in Bear Creek (Hafele, 1988). The goal of this field collection program is to describe present environmental conditions and to determine the impact of possible future developments. Also, information collected will assist in evaluating desirability and feasibility of habitat improvement projects (page 22).

The combination of water temperature, streamflow, and water quality data were collected in 1989. In 1991, a thermograph was installed, but was subsequently stolen or lost as a result of unexpected summer storm run-off. A second water quality sample was obtained and analyzed in 1991. The habitat survey program was expanded in 1991 to include a series of photo stations along the stream to document conditions at various flows. Most phases of the survey program need be continued for at least two more summer/fall periods to achieve the program's original goals.

#### Evaluate the Need for Stream Habitat Improvements

Given the trout densities present near the canyon mouth, habitat improvement projects in that reach of Bear Creek have thus far seemed unnecessary. Upstream, given an adequate flow, the physical characteristics of the channel provide a variety of habitat types. Here, again, no improvement projects appear to be needed.



### Wild trout Stream Designation

Bear Creek is considered to be an excellent wild trout fishery resource which has exceptional value due to its proximity to the State's largest metropolitan area. Studies have shown that trout production and the angling opportunity offered by the trout resource are comparable to other officially designated, semi-remote streams. Wild trout designation will encourage recognition of the value of this resource as a part of California's program to maintain and manage the best of the State's remaining wild trout waters. The proposed designation has been coordinated with the Forest Service and is now ready for Commission consideration. The Department will propose that the entire length of Bear Creek from Bear Valley Dam to its confluence with the Santa Ana River (8.75 miles) be designated by the Commission as a Wild Trout Stream (page 23).

When a draft management plan for Bear Creek was completed, the Department recommended that the stream be designated a wild trout water. The Commission accepted the recommendation in June 1989.

### Land Use Planning

#### Coordinate Implementation of the Management Program

Department personnel and, in turn, the US Forest Service personnel, have kept each other updated on fish population surveys and other pertinent activities.

#### Seek Improved Water Flows

The Department's activities in this area will be discussed under the topic "Environmental Problems and Issues".

#### Coordinate Efforts to Minimize Sedimentation from Highway 18 Maintenance Operations

This subject, too, will be covered under the topic of "Environmental Problems and Issues".

### ENVIRONMENTAL PROBLEMS AND ISSUES

The primary environmental issue continues to be the small flow release into Bear Creek from Bear Valley Dam. "Sedimentation" and a new problem with recreational use deserve some discussion. Cattle grazing, timber harvest, and mining, covered by a sentence or two in the original plan, have not emerged as problems which impact either trout habitat or the natural stream setting experienced by anglers.

### Flows from Bear Valley Dam

The State Water Resources Control Board (Board) is investigating a complaint from California Trout, Inc. against the Big Bear Municipal Water District (District), stating that bypass flows from Bear Valley Dam are insufficient to maintain fish in good condition. Lack of adequate flows from the dam restrict fish populations and habitat, but conclusive data with which to recommend an appropriate permanent release schedule are lacking. The Department has recommended that the matter be considered in a Board hearing or other appropriate forum.

An interim bypass flow should be released from Bear Valley Dam to begin restoration of fish, wildlife, and riparian habitats. The magnitude of this flow could be estimated by the Tennant method, which recommends percentages of the mean annual flow for aquatic resource maintenance, or could be based on observed flows which support trout populations elsewhere in Bear Creek. It is possible that such releases could lower water levels in Big Bear Lake. However, the extent to which water requirements for reservoir and Bear Creek would conflict is unknown. A predictive model to estimate reservoir level based on evaporation, precipitation and release rate would facilitate an informed and effective resolution to any conflicts. The Board and the District should be encouraged to undertake such an analysis in consultation with the Department.

Determination of permanent flows should be based upon analysis using the Instream Flow Incremental Methodology (IFIM). The parties should design and implement studies in consultation with the Department of Fish and Game, to assure that acceptable decision making tools result. The studies should encompass both the impacted reach below the dam, and downstream areas which might be affected by increased flow. A long-term trout population monitoring program should be included. Cooperation by the Department of Fish and Game in the needed studies could take the form of technical consultation and funding or in-kind services.

During some years, short-term flow releases much higher than the usual 0.1 cfs are made from Bear Valley Dam. There is currently no agreement with the Big Bear Municipal Water District regarding how these releases are made. The rate of change in dam outflow should be regulated under a "ramping schedule" to avoid undue impacts to fish and fish habitat below the dam.

### Sedimentation

Small-scale landslides frequently occur on Highway 18 above Bear Creek. The California Department of Transportation maintains this road. They normally place the dirt and debris resulting from landslides in designated dumps; however, under emergency conditions, the material is side-cast off the roadway onto the

slope draining into the North Fork of Bear Creek. The Forest Service has evidence that this material not only reaches the North Fork of Bear Creek, but also the mainstem of Bear Creek. Bear Creek is particularly susceptible to the influence of sedimentation because the regular occurrence of flushing flows is blocked by Bear Valley Dam. The Forest Service is working with the Department of Transportation to establish designated dump areas and encourage their use whenever feasible to dispose of slide material (page 20).

The Forest Service is continuing to work with CalTrans to limit the detrimental impacts of side-casting in the upper Bear Creek drainage.

### Recreation

Recreation is rather limited along Bear Creek due to limited access. A group camp exists where the Siberia Creek Trail crosses Bear Creek, but it is rather lightly used. Most recreation occurs at the lower portion of the stream where there is access via roadways. Due to the rocky nature of the canyon bottom there is little off-highway vehicle (OHV) use there and the impact of OHV use on aquatic habitat is considered to be very limited. Much of the recreation probably consists of partying and picnicking (page 20).

Fishing is considered the primary recreational activity along Bear Creek. The heaviest use is assumed to occur from the end of Road 1N10 upstream to the area near the mouth of the canyon. The stream sections near the Siberia Creek and Glory Ridge trails are considered areas of moderate use. Areas of the stream in the canyon remote from these access points are very lightly fished (page 21).

As stated above, no serious conflicts between anglers and other recreationalists were known to exist on Bear Creek at the time the original plan was written. However, during the past year the Department has received calls from anglers concerned about what they consider to be a reckless use of firearms in the upper alluvial fan area. Though this is the most accessible and productive reach of Bear Creek, some anglers are beginning to believe that it is no longer safe to fish there. As evidence of the problem, the angler survey box in that location is the only one out of about 70 statewide that has been used as a target. During the first 2 years, the bullets fired did not penetrate the 1/2-inch steel of which the box is constructed. Last year, some of the bullets went through both sides of the box (one inch of steel). After the box was shot up, someone set fire to it and a large metal/plexiglass-covered angling regulation sign.

The suggestion by some anglers that a firearms closure be sought for the area has been discussed with the Region 5 Wildlife Protection Branch personnel. In their opinion, a closure would prevent hunters, most of whom use their firearms in a responsible

way, from continuing to use the area. Those who are reckless and violate the law by destroying public property may continue to do so. It was also recognized that the long-drive into the area over USFS roads, at least one hour round-trip, would make enforcement of a closure difficult. At this time, no acceptable solution to the problem has been identified.

## MANAGEMENT PROGRAM

### Management Goals

The goals of wild trout management for Bear Creek are:

1. To protect, maintain, and enhance where possible the aquatic environment of Bear Creek and its tributaries.
2. To provide self-sustaining populations of wild trout which offer the opportunity to: (a) catch trout 10 inches and larger, and (b) catch trout at rates of two fish or more per hour.
3. To maintain an attractive streamside environment featuring more remote, secluded angling in the upper canyon reach and quality angling in both the upper canyon reach and the more accessible lower reach (page 21).

### Assessment of General Management Goals

Goal #1: To our knowledge, no significant man-made losses in the aquatic habitat of either Bear Creek or its tributaries have occurred since the plan was published in February 1989. Enhancement through a potential increase in the flows released from Bear Valley Dam has not occurred.

Goal #2: This goal was assessed previously under the "Evaluation of Angling Regulations".

Goal #3: As with Goal #1, no significant man-made intrusions are known to have degraded either the remoteness or attractiveness of the canyon reach of stream.

For the 5-year period from 1993 through 1997, the general management goals for the aquatic environment, quality of the fishery, and the streamside environment of Bear Creek will remain the same.

### Management Direction

The Department of Fish and Game intends to pursue the following programs and policies in the management of Bear Creek's wild trout resources:

1. Continue to evaluate the wild trout fishery in Bear Creek by monitoring the trout populations and angler use and success.
2. Collect baseline instream habitat data from which to evaluate the impacts of present and potential land or water developments and land-use practices.
3. Preserve the natural integrity of Bear Creek and maintain or improve trout habitat.
4. Seek Bear Valley Dam water release practices which will benefit trout habitat and production.
5. Oppose land or water developments which would have significant deleterious impacts on the flows needed to maintain abundant self-sustaining wild trout populations in Bear Creek.
6. Encourage the California Department of Transportation to avoid, whenever possible, sidecasting landslide materials associated with maintaining Highway 18.
7. Recommend that Bear Creek be designated a Wild Trout Stream by the California Fish and Game Commission.
8. Coordinate implementation of the management plan with the U.S. Forest Service (page 21).

With the exception of item #7, which has been achieved, the programs and policies stated as management directions will continue to be pursued by the Department.

### Fishery Management: 1993-1997

Future trout population monitoring programs should continue to use the two survey sections established on Bear Creek above Slide Creek. The two Glory Ridge sections should also continue to be used; however, at least in 1993, seven other sections should be added to the fish population survey in the upper canyon. Two additional predominately riffle/run and two additional predominately pool sections should be sampled in the Glory Ridge area. The two sections surveyed just below West Cub Creek in 1992 should be sampled again together with one section upstream near Bear Valley Dam. The expanded survey may contribute to the Bear Creek management program in two ways. First, the four additional sections near the base of the Glory Ridge Trail and the three upstream should help establish whether the present sections are representative of this reach of stream. Second,

the additional sections will provide a broader baseline for evaluating changes in trout populations resulting from a potential increase in Bear Valley Dam flow releases. After the 1993 survey, and depending upon its results and whether there is an increase in flow releases, trends in trout populations should be monitored in 1995 and 1997. After that time, monitoring can probably be scheduled at 3-, 4-, or 5- year intervals.

The age structure and growth of brown trout in Bear Creek appear to be fairly stable. Consequently, the growth rates derived from scales collected in 1987 and 1988 should provide adequate data for future management. If, however, significant changes in the density or size structure of the brown trout population occur after a potential increase in flow releases, a second study may be warranted. This study, if conducted, should parallel the early one and include samples from both the Glory Ridge and Slide Creek reaches of the stream.

The angler box survey program has complemented the trout population monitoring program and should be continued until at least 1997. Arrangements have been made with the San Bernardino based Deep Creek Fly Fishers to maintain the boxes.

In 1995, and again in 1997, trout population and angler box survey data should be reviewed to determine if the goals stated for the wild trout fishery are being achieved. If not, appropriate changes in angling regulations or other conditions should be sought.

An implementation schedule for the management program discussed above is outlined in Table 4.



TABLE 4. Program Implementation Schedule for the Bear Creek Wild Trout Management Plan: 1993-97.

Task	Department section or agency responsible	Implementation date
<b>A. Fishery Management</b>		
1. Fish population surveys		
a. Slide Creek and expanded Glory Ridge survey (10 sections)		
1) Recon	Region 5	Summer 1993
2) Field surveys	Region 5-IFD	Summer 1993
3) Data compilation	IFD	Fall 1993
4) File report	Region 5-IFD	Winter 1994
b. Periodic monitoring		
1) Field surveys	Region 5-IFD	Summer 1995 and 1997
2) Data compilations	IFD	Fall 1995 and 1997
3) File reports	Region 5-IFD	Winter 1995 and 1997
2. Angler box survey		
a. Maintenance	Region 5-IFD and Deep Creek Fly Fishers	1993-1997
b. Data compilations	IFD	1993-1997
c. File reports	IFD	1993-1997
3. Evaluation of angling regulations	Region 5-IFD	1995 and 1997
<b>B. Habitat Studies</b>		
1. Record water temperatures, measure streamflow, obtain water quality sample, and photo habitat conditions		
a. Field surveys	Region 5	1993 and 1994
b. Data compilations	Region 5	1993 and 1994
c. File report	Region 5	Winter 1995
<b>C. Land Use Planning</b>		
1. Coordinate implementation of the management program	Region 5/USFS	Continuing
2. Seek improved flow releases from Bear Valley Dam		
a. Preparation for meetings and hearings	Region 5	1993 and later as needed
b. Meetings and hearings	Region 5	1993 and later as needed
3. Coordinate efforts to minimize sedimentation from Highway 18 maintenance operations	Region 5	Continuing

REFERENCES

- Deinstadt, J.M. 1992. Bear Creek fish population survey, July 1992. 12 p. (typewritten file rept.).
- Deinstadt, J.M., D.C. Lentz, G.F. Sibbald, and K.D. Murphy. 1993. Fishing success on California wild trout waters in 1990-91: reports from angler box surveys (Draft Calif. Dept. Fish and Game Admin. Rept. No. 93-1. 77 p.).
- Hafele, R.E. 1988. Bear Creek macroinvertebrate study: final report. 21 p. (plus appendices).
- Hoover, F.G., J.M. Deinstadt. 1989. Bear Creek (San Bernardino County) wild trout management plan. California Department of Fish and Game. 24 p.