[1988]
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ATTITUDES AND PREFERENCES OF INLAND ANGLERS IN THE STATE OF CALIFORNIA

Final Report

Conducted February 21 - March 21, 1988

by

The Survey Research Center
University Foundation
California State University, Chico

for

Department of Fish and Game
State of California
Sacramento, California

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EXECUTIVE SUMMARY

This report presents the results of a telephone survey of 1,526 California inland anglers. Study objectives included the identification and description of angler preferences for types of fish, methods of take, and fishing trips; attitudes toward the California Department of Fish and Game and its current fishing programs; attitudes toward future fishing management options; sources of information on angling; levels of satisfaction with recreational fishing; membership in angler organizations; and, reasons for dropping angling as a recreation activity. The survey was conducted between February 21 and March 21, 1988 by the Survey Research Center at California State University, Chico for the California Department of Fish and Game.

Survey results indicate that trout is the most popular type of fish sought by California inland anglers, while black bass are the second most popular type. Results also show that anglers who seek each of these two types of fish differ in terms of the baits and techniques used, seasons fished, and characteristics of typical fishing trips.

The survey revealed that only 8.0% of California inland anglers are members of sport fishing organizations and that anglers who are members of organizations often have different preferences for management activities by the California Department of Fish and Game than anglers who are not members of these organizations.

Based on the survey findings, there seems to be an underrepresentation of anglers in the 18 to 24 year old age

group. Anglers in this age group who have recently dropped angling as an activity report that loss of interest is the number one reason for their decision. However, anglers in other age groups reported that not having enough time and good fishing spots being located too far from home as the two major reasons for dropping angling as an activity.

Most anglers (70%) travel 100 miles or less on a typical fishing trip and usually spend between 4 and 8 hours fishing on a typical fishing day. Therefore, fishing sites near population centers will receive the heaviest use by inland anglers, though more remote sites may provide better fishing opportunities in terms of beauty of the surroundings and number, type and size of fish available.

When inland anglers were asked how satisfied they were with their most recent inland angling experience, only 29.3% were very satisfied and 37.8% were somewhat satisfied. Anglers in Region 3 of the California Department of Fish and Game administrative regions indicated that they were the least satisfied.

Most inland anglers get information about inland fishing from friends and other anglers, and from bait, tackle and sporting goods stores. If the California Department of Fish and Game wants to distribute information to inland anglers, stores which provide goods and services to anglers can be a very effective outlet.

When asked about the management activities of the California Department of Fish and Game, about three-fourths of all inland anglers surveyed stated that Fish and Game should be doing more

to improve fish habitat in lakes, streams and reservoirs. Another 64.2% indicated that Fish and Game should be raising and planting more catchable trout.

At the end of the telephone interview, inland anglers who had fished during the past year were asked if they had purchased a California fishing license. A total of 87.0% indicated that they had, while 13.0% said that they had not purchased a license.

TABLE 30

FAVORITE TYPE OF FISH SOUGHT BY CALIFORNIA INLAND ANGLERS

Type of Fish	Number of Anglers	Percent
Trout	752	59.8%
Black Bass	157	12.5%
Striped Bass	96	7.6%
Catfish	91	7.2%
Steelhead	24	1.9%
Salmon	20	1.6%
Panfish	19	1.5%
Sturgeon	8	.6%
Corvina	4	.3%
Tilapia	2	.2%
Shad	1	.1%
Croaker	1	.1%
Other	19	1.5%
No Favorite Fish Type	64	5.1%
TOTAL	1526	100.0%

TABLE 32

TYPES OF BAIT USED BY TYPE OF FISH SOUGHT

Type of Bait Used	Trout	Black Bass
Live Bait		
FREQUENTLY	176 (23.4%)	37 (23.6%)
OCCASIONALLY	227 (30.2%)	54 (34.4%)
NEVER	348 (46.3%)	66 (42.0%)
Dead Bait, Roe, or Cut Bait		
FREQUENTLY	122 (16.3%)	8 (5.1%)
OCCASIONALLY	235 (31.3%)	31 (19.9%)
NEVER	393 (52.4%)	117 (75.0%)
Flies		
FREQUENTLY	134 (17.8%)	12 (7.6%)
OCCASIONALLY	238 (31.7%)	39 (24.8%)
NEVER	379 (50.5%)	106 (67.5%)
Artificial Lures with Bait		
FREQUENTLY	141 (18.8%)	40 (25.5%)
OCCASIONALLY	242 (32.2%)	30 (19.1%)
NEVER	368 (49.0%)	87 (55.4%)
Artificial Lures Only		
FREQUENTLY	252 (33.6%)	97 (61.8%)
OCCASIONALLY	280 (37.4%)	37 (23.6%)
NEVER	217 (29.0%)	23 (14.6%)

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July 29, 1996

Mr. John Mumma
Director
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Denver CO 80216

Dear John:

Thank you for the copy of -- An Assessment of Fishery Management and Fish Production Alternatives----with the request that comments be sent to Jim Bennett. I will send a copy of this letter to Mr. Bennett, but my comments concerning alternatives and redirection in relation to the catchable trout program should be brought to your attention.

The assumption that recreational days of angling are directly related to the numbers of catchable trout stocked requires much more in-depth analysis and thought than is evident in the report. It is unstated, but probably also assumed that angler days are directly related to license sales. That is, a 30% or 40% reduction in numbers of catchable stocked (in state or by region) will translate into 30% or 40% less angling licenses sold.

Last sentence on bottom p. 17, to top of p.18, reads: ". . .we assume there is a direct and equal correlation between the number of fish stocked and the number of recreational days generated." Since only the number of catchable trout will be reduced in 1997, "fish stocked" means catchable trout.

There is abundant data to dispute this assumption, much of it in DOW studies. For example, Mary McAfee conducted Federal Aid Project 7-59," Coldwater Lakes and Reservoirs" (I have a copy of the 1991 report). A few highlights from Mary's studies pertinent to any evaluation of DOW's catchable program are: Will anglers who fish in waters stocked with catchables continue to fish these waters if no catchables are stocked (only nonsalmonid fishes could be caught)? Anglers were interviewed in many "intensive use" waters of Denver, Grand Junction, Rifle, Craig, and Georgetown. From 88% to 97% of those anglers said they would continue to fish these waters (for nonsalmonid fishes) if catchable trout stocking ceased.

In regards to avoiding wasteful stocking and get the best mileage from catchable trout, her data from Rifle Gap Reservoir and Bear Lake are instructive. In 1984, 16,500 catchables were stocked in Rifle Gap and 58,000 angling hours (about 20,000 angler days) were "generated." In 1987, 61,500 catchable trout were stocked and 61,000 angler hours (ca.21,000 angler days) were "generated." In relation to the assumption of "a direct and

equal correlation between the number of fish stocked and recreational days generated," it can be seen that an increase of 45,000 catchable trout stocked, "generated" and additional 1,000 recreational days, with 45 additional catchable trout correlated to each additional recreational day, it is obvious such a "direct and equal correlation" assumption is wrong, and it can be very wasteful and costly.

In Bear Lake, 100 catchable trout per surface acre were stocked for four years and 400 per acre were stocked for three years. There was a "correlation" between angler days and numbers of catchables stocked, but it was not "direct and equal." An angler day was "generated" by 1.5 catchables with an annual stocking of 100 per acre. At a stocking rate of 400 per acre, seven catchable trout were necessary to "generate" an angler day.

Mary also compiled data pertinent to how hatchery trout stocked for "put and grow" fisheries can be more effective. She tested four "strains", two typical domesticated hatchery-selected strains of rainbow trout and two less domesticated strains, the Eagle Lake rainbow and Snake River cutthroat. Fingerlings of all four strains were stocked into Stillwater Lake and Bear Lake. Two years or more after stocking, survival of the less domesticated strains was 24:1 to 60:1 better than the domestic strains. When Mary requested increased production of Eagle Lake rainbows by DOW hatcheries, she was informed that there was no space; all facilities were geared to maximum production of catchable trout (which, in recent years has made up 90% to 94% of total hatchery production by weight).

I see no mention of Mary McAfee's work in the assessment report. Are the author's unaware of this DOW data which bears directly on "direct and equal correlation between fish stocked and recreational days generated"? I assume Mary still works at the Grand Junction office. Was her input requested for the assessment report?

Table 9 in the report provides supporting evidence to the effect that the "direct and equal correlation" assumption is false. About 20-25 years ago, perhaps 40% of all catchable trout were stocked in streams (vs. lakes and reservoirs). The report mentions this ratio declined to 19% by 1992 and to 5% in 1996. There has been a steady decline in numbers of catchable stocked in streams. Therefore, we should expect a steady decline in anglers fishing streams. Table 9, shows no such decline. Consistently, 33% - 36% of statewide angler use occurred in coldwater streams from 1982 to 1994. Increased license sales during this period means that the actual numbers of anglers fishing coldwater streams increased during this period of continuing decrease in numbers of catchable trout stocked. Table 9 also indicates why there is no "equal and direct correlation" between angler use and number of catchables stocked in coldwater streams. Two figures of 11% and 12% are given for anglers "desiring" catchable trout. Two figures are also given for anglers "desiring" wild trout, 18% in 1982, 70% in 1994--times and desires are changing.

Table 9 also has a column, a very misleading column, percent of people fishing "put-and-take" waters, which is 78% for 1994. This is readily explained by the change to stocking most catchables in lakes and reservoirs; therefore, anglers fishing for bass or walleye in most Colorado lakes and reservoirs are fishing in "put-and-take" waters.

I would also point out that in California, which leads the nation in numbers of catchable trout stocked (Colorado leads nation in number per licensed angler), the sales of fishing licenses declined from 10% to 5% of the state's population during the 1980's. During this period of decline, catchable trout production remained stable or increased. It was obviously not a determining factor governing license sales.

Pennsylvania has stocked about the same number of catchable trout as Colorado during the past 10 years. There is considerably greater fishing pressure directed toward trout in Pennsylvania than in Colorado although the state has only 790 miles of class A streams (support 27 pounds per acre of brook trout or 36 pounds per acre of brown trout) for wild trout fishing. Pennsylvania has only 23,000 surface acres of lakes and reservoirs suitable for salmonid fish stocking. That is, Colorado has about five times more stream miles and lake and reservoir area for wild trout or put-and-grow type fisheries (non put-take catchable fisheries). Yet angler satisfaction in Pennsylvania is high. Data available in: 1991 Trout Angler Survey, and Management of Trout Fisheries in Pennsylvania (1987), published by Penn. Fish Comm.

I assume the Penn. Fish Comm. sends their publications to DOW library. They are highly pertinent for a new and improved DOW assessment report.

When I read, on p. 16, of the assessment report that. . ." DOW biologists estimate that 85% of the recreational days (of "intensive" use category) depend on catchable trout stocking," I must ask who are these biologists? On what basis do they make this estimate? Are they familiar with the facts and figures I cite above from other states and from DOW data? It comes down to a matter of credibility. The assessments and assumptions regarding catchable trout in the assessment report are not credible.

Sincerely,

Robert J. Behnke
Professor

RJB:dm

cc: Dr. James Bennett
Colorado Division of Wildlife
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[353] Indiana Fishing: Results of a 1994 Statewide Angler Survey

Stuart Shipman (Indiana Department of Natural Resources, 5570 N. Hatchery Rd., Columbia City, IN 46725; 219/691-3181; FAX 219/691-3494)

A 1994 Indiana resident angler survey led to greater understanding of where Hoosier anglers fished, what species they fished for, their attitudes toward regulations and management, and motivations for fishing. Data collected from the mail survey indicated Hoosier anglers most preferred and most often fished for largemouth and smallmouth bass, bluegill, crappie, catfish and walleye. They most often fished on ponds, small streams and northeast Indiana's natural lakes. Walleye, channel catfish and striped bass were the most important species for stocking. Anglers generally supported size and catch limits especially for predators, although they opposed closed seasons and limited access fisheries. The importance of free public access and control of speedboat operations were verified. Anglers made a strong association between pollution concerns, water quality, and fishing quality. Motives for fishing were segmented into four groups representing outdoor, social, general fishing, and specific fishing. The outdoor group exhibited the most important motives for fishing including enjoying nature, relaxation, and peace and solitude. The specific fishing motives of catching a trophy, catching a limit, and competition were the least important motives. Findings for this survey will be used to measure the effectiveness of our management and in the formulation of new strategic plan objectives during 1996.

[354] Angler Benefit and License Pricing for New Mexico Sportfisheries

Richard A. Cole* (Department of Fishery and Wildlife Sciences, New Mexico State University, Las Cruces, NM 88003; 505/646-1346; rcole@nmsu.edu)

Frank A. Ward (Department of Agricultural Economics and Business, New Mexico State University, Las Cruces, NM 88003; 505/646-1220; fward@nmsu.edu)

Lacking accurate estimates of economic benefit and more thorough understanding of factors determining management effectiveness, many states price licenses for warmwater and coldwater (typically a trout stamp) sportfishing based on mean management costs. We used a recently completed statewide model to assess resident angler benefits in New Mexico based on coldwater and warmwater fishing-site attributes and travel-cost methods, then compared benefit to license fees. Angler-benefit foregone by site closure exceeds $50 million per year statewide. Nearly 90% of the benefit is derived from large reservoirs (> 250 hectares), where benefit per captured fish was relatively high. Small reservoirs and streams are least cost-effectively managed, because of reliance on stocking catchable trout. Management of large coldwater sites, relying on salmonid fingerling stocking, is intermediately cost-effective. Large warm-water fisheries are the most cost-effectively managed. Revenues gained from large warmwater sites subsidize anglers who fish at small sites stocked with catchable trout, where benefits per management dollar are about 5% of the warmwater return. A user-pay policy would decrease license fees for warmwater fishing at large reservoirs and increase fees for trout fishing at small reservoirs and streams. Similar subsidy may exist wherever similar fishery conditions exist.

[355] Steelhead Management in Minnesota: What Path Do We Take?

Donald R. Schreiner* (Lake Superior Fisheries, Minnesota Department of Natural Resources, 5351 North Shore Drive, Duluth, MN 55804; 218/723-4785; FAX 218/725-7738)

Thomas S. Jones (Lake Superior Fisheries, Minnesota Department of Natural Resources, 5351 North Shore Drive, Duluth, MN 55804; 218/723-4785; FAX 218/725-7738)

Steelhead abundance in the Minnesota waters of Lake Superior has declined sharply since the 1960s. In response, the Minnesota Department of Natural Resources is attempting to reverse the steelhead decline, with minimal hatchery influence. However, many anglers feel the only chance to reestablish a viable steelhead fishery is through intensive smolt stocking. This conflict prompted us to examine the biological, economic and social aspects of stocking steelhead. Rainbow trout recently stocked include fry and smolts of Lake Superior strain steelhead, and domesticated Kamloops smolts. Studies of genetic variability of wild steelhead in Minnesota indicate that discrete stocks still exist, and stocking could reduce the fitness of wild steelhead. Assessment information suggests that the return rate to the French River Trap of smolts generated from fry stocking was 8%, while return rates for hatchery-reared smolts were 0.6% for steelhead and 1.1% for Kamloops. Cost per adult returning to the French River trap was $60.00 for fry-stocked steelhead, $390.00 for hatchery-reared steelhead, and $90.00

* Designates person presenting the paper or poster

SAVING CALIFORNIA STEELHEAD

Herb Joseph, M.D.

*Herb Joseph first wrote in these pages in January 1992 (Issue No. 14). At that time he had been "(chasing) steelhead from California to Alaska for 40 years." A retired dermatologist, Herb was a founding governor of Cal Trout and chairman of that organization's steelhead committee. In this (his third) article Herb continues his vigorous crusade to contest his state's prioritizing of money and manpower to steelhead habitat restoration at the expense of developing baseline data for existing wild populations and conserving what already is working. Readers can refer to California F & G biologist Dennis McEwan (*The Osprey, *Issue No. 28, November 1996) to see how these two authorities differ in their approaches to saving California steelhead.*

"**There are hundreds** of fishery and watershed restoration projects either completed or now underway in California. In fact, the State of California expended over $60 million for stream and fishery restoration from 1981 to 1996. Recent legislation, SB 271, allocates an additional $43 million over a six year period. Additionally, the Governor's 98-99 budget proposes significant bond funds to support watershed efforts State-wide." So states The California Department of Fish and Game in its February 4, 1998 Strategic Plan for Management of Northern California Steelhead Trout.

What have the $60 million done, over those 15 years, for steelhead and coho? After an extended search, not a single stream restoration project has been discovered from which it can be conclusively documented that a substantial, sustained wild (naturally spawned) steelhead run has been restored. No previous runs have been re-established or shown to return as a result of one of these projects. This observation has been verified by distinguished fishery biology professors from two universities.

Since 1981, California's coho have become practically extinct.

In response to a letter of inquiry to the chief of DF&G's Inland Fishery Division, he writes, on December 5, 1997, "It is not possible to state the overall effect, or even the specific individual restoration projects on steelhead populations given currently available information and staffing levels. Many factors affect steelhead populations, both in fresh water and in the ocean. There is no simple answer, much as we might wish it. We continue to believe that restoration of instream habitats and watersheds cannot but help to restore steelhead numbers."

Coho salmon, since 1981 and under DF&G management, for all practical purposes have disappeared from California. Are the Golden State's wild steelhead headed in the same direction? Without adequate data it is not possible to know. Many of us believe they are, but steelhead differ from coho in many ways. Coho were subjected to intense commercial harvesting in addition to severe habitat losses. Coho are more vulnerable and sensitive, die after spawning, and have a different life cycle. Steelhead are tough, resilient, tolerate harsher conditions, do not all die after spawning, and have not been subjected to widespread commercial fishing. Repeat spawning and straying helps preserve steelhead runs which otherwise would be lost. Straying averts inbreeding, which, if prolonged, weakens the stock.

"Every possible effort must be made to avoid further habitat loss."

In his article on Kamchatka steelhead (Issue 31 of *The Osprey*, March 1998) Mark Chilcote emphasized the importance of repeat spawners. More than twenty years ago 38 percent of Gualala steelhead were found to be repeat spawners — a much higher percentage than usual. These numbers were obtained by scale readings from large fish, and it is noteworthy that the large, early run Gualala steelhead now appear to have been lost. Many other steelhead runs have been lost as their gene pools disappear.

Here, at the southern extreme of their range, as with their Kamchatka cousins, repeat spawners are important for preserving gene pools under difficult conditions. Some California steelhead still manage to survive extremely harsh, inhospitable environments. Magically, their existence hangs by a thread.

Ocean commercial harvesting was a factor in the coho's demise. Steelhead also are commercially harvested at sea, but the numbers are not known. However, there are recent reports that El Nino depleted the food chain from plankton upward through anchovies and sardines, so a negative impact can be expected on anadromous salmonids, including steelhead.

Why are the coho gone? Destruction of gene pools of individual stocks and sub-stocks is the basic reason. After at least one completely non-productive life cycle (average 4 years for steelhead, 3 for coho) a stock or sub-stock is extinct. Each spawning pair must produce another pair in order for that run to remain viable. During the recent seven-year drought, in addition to habitat losses from logging, water diversions and development, many runs of steelhead were lost, and it is not surprising that coho are practically gone. Wild steelhead are an indicator species for the health of an ecosystem encompassing both sea and land. The prognosis is not good.

Restoring habitat has not been shown to restore wild steelhead that previously utilized the habitat. Once its gene pools are destroyed, that stock of fish is extinct and cannot be brought back. This principle applies to all species.

What are the solutions? For starters:

1. Stream-by-stream, tributary-by-tributary, baseline inventories of fish populations and habitat: There must be *identification* of each stream's several genetically diverse stock and sub-stocks with acknowledgment of the special, genetic basis of spawning behavior such as timing and the selection of each special spawning habitat. Modern technologic methods for accurate determination of fish populations and genetic variations are readily available. Populations can be calculated from direct and underwater observations, tagging and recapture, creel census, punch cards, redd counts, electrofishing, weirs and electronic devices. Genetic varieties can be separated by combinations of physical characteristics, behavior patterns (e.g. repeat spawning), and by laboratory procedures such as DNA testing, electrophoresis, and chromosome studies.

2. Focus on conservation of existing, established, viable runs of wild steelhead and of their identified habitat: Restoration projects have failed, and time is running out on remaining runs of wild steelhead. Known spawning and rearing habitat can be improved, but first pre- and post-project population counts will be needed. Every possible effort must be made to avoid further habitat

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Comments on Strategic Plan

About three years ago, a draft environmental assessment report was prepared on CFG hatcheries. I was asked to comment on the report at that time. Enclosed is copy of my review. Note my final comment about critical analysis, moving CFG and its hatcheries into next century and the need to address the right questions. The "right question" concerns the most proper role of catchable trout in the overall fishery program. I was hopeful that the strategic plan would address the "right questions", but this didn't occur. Same old body dressed in new verbiage.

Bottom p. 11 re. future hatchery demands, invokes the simplistic "Fish Pro" report of 1994--"angler demand will require a 300 percent increase of catchable trout by the year 2010" (300 percent quadruples, not triples the "current amount").

Who are the people who wrote the strategic plan? What is their range and depth of knowledge? Do they disagree with my assessment that catchable trout costs are more than 30% of the total inland fisheries budget while providing less than 10% of the angler days (and low value angler days), and that there is no correlation between numbers of catchable trout stocked and license sales? If so, please provide any facts and figures for refutation.

Also enclosed is a recent article discussing the need for new ways of thinking to address old problems, using catchable trout as an example. Do you have copies of the Trout Unlimited reports mentioned? Have they been studied by people preparing the strategic plan? They demonstrate that in Colorado, as in California, there is no correlation between license sales and numbers of catchables stocked and that anglers fishing for catchable trout are not willing to pay what a catchable trout costs.

How can "new thinking" be effected in the strategic plan? As an outside reviewer, I have no influence to effect change, my input can simply be ignored. Will there be an appendix with reviewers comments to at least provide a record of comments?

The last column accompanying my trout magazine article is a continuation of an article by Ralph Cutter, discussing the Little Truckee River fishery below Stampede Reservoir (CFG is mistaken to be Nevada F and G because of typo, to be corrected in next issue). I assume this is a wild trout fishery supplemented with catchable trout. When someone like Mr. Cutter raises an issue such as this (he claims to have "dialogue" for 15 years on management of Little Truckee), how is it responded to? Are there facts, figures, and data in support of present regulations? How does the strategic plan apply to this particular situation?

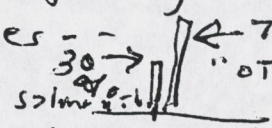
I note that California still requires barbless hooks for special regulation fisheries. Also enclosed is title page that thoroughly and convincingly demonstrates no difference in mortality between fish caught and released on barbed hooks vs. barbless hooks. In Idaho and Oregon a barbless hook regulation resulted in the most frequent violation of fisheries law--and virtually all of the violations were accidental. Otherwise, law-abiding anglers forgot to pinch down barb when changing flies. Last year Oregon did away with barbless hook regulation, but "strongly recommend" they be used (much less trauma in hooking and releasing humans). What is the "scientific" basis for California's barbless hook regulation? Should it be addressed in strategic plan?

On p.2 it is stated that: "Steelhead are genetically identical to resident rainbow trout". If true, the two life history forms are completely interchangeable. There could be no basis for listing certain steelhead populations for protection under the Endangered Species Act (Steelhead are also "identical" to catchable rainbow trout by this line of reasoning). They are genetically similar; resident rainbows and steelhead of same river are more closely related to each other than to comparable life history forms of another river, but they are "genetically identical" only by genetic analysis of the products of 10-20 gene loci or 100-200 base pairs of DNA. The rainbow trout genome contains about two billion base pairs of DNA, enough for about 100,000 genes. Somewhere in the unsampled genome lies codes for migratory behavior and site-specific adaptions evolved over thousand of years. It is important to have an in-depth understanding on such matters for any strategic plan that is to "chart a course for the future".

Sincerely,

Robert Behnke
Professor

(1) Problem of fishing vs. wishing ("prefer") The data published by Lee 1995 (in citation) has a figure that depicts "% of Calif. inland anglers fishing for native (salmonids) and nonnative (other) species - -



text clearly states: "The contribution of nonnative salmonids is unknown because they are not distinguished from native species in the survey!" - I pointed this out To Mr. Hapelain - now read again his reply - Incredible someone so dense is in charge of the strategic plan -- but not really if your objective is to defend and maintain status quo.

(2) - What % of angler days supported by catchable Trout? He sent me data from 1996 National survey of fishing & hunting (compiled by USFWS) for Calif. -- shows: - Total no. resident & nonresident anglers: 2,175,000; 1,526,000 of them fish for "trout" (at some time -- even if bass fishing in Irvine L. in winter is only trout fishing) - This 71% figure (2175÷1,526) obviously is the figure C F & G used to claim that 71% of license sales are "attributable" to Trout. -- In "Days of Fishing" in 1996 in Calif., following figures given: total for all fish: 28,987,000 angler days; of which 16,292,000 are for "trout" -- Note by this figure, "trout" ≈ 56% of total angler days -- not 71%! - Now, in 1996, catchable trout production had been cut back from ca. 10 million to about 8 million - but let's use 10 million catchables with 60% return = 6 million catchables caught. "Official" figure is for catchable trout fisheries, average catch is 3 per day - this "produces" 2 million angler days "attributable or supported" by catchable trout back to (2)

(2) cont. --- Thus, for 29 million total angler days in 1996, 2 million (or 6.9%) were "dependent" on catchable trout, for only "trout" angler days (16,292,000), or 10.2% due to catchables.

I have a C70 report from 1991 "Sport fishing for trout" - Using some USFWS data for 1985 - Total number of resident + nonresident anglers 3,060,700 (vs. 2,175,000 for 1996) - Something wrong here, but let's go on with 1985 figures. - Total angler days for all fish: 43,855,300 (vs. 29,987,000, 1996) Anglers fishing for trout: 2,108,900 (69% of total in 1985 vs. 71% in 1996) -- Angler days for trout: 22,282,100 (52% in 1985; 56% 1996). If stocking of 10 million catchables resulted in catch of 6 million fish and 2 million angler days in 1985, according to these figures, 4.5% of total angler days (2 mil. ÷ 44 million) were due to catchables, and 8.7% of the "Trout" angler days were due to catchables. — Obviously there are problems with accuracy of "survey data", but I look for patterns that are relatively consistent.

(3) "Scientific management" by popular vote -- these people have no real basis for such "prefernce" if they knew more, were better informed, "stock more and bigger trout" would no longer be most popular choice - like treatment of patients in hospital, doctors follow "popular" vote. See enclosure re. Colo. legislature and whirling dis.

CONNECTICUT (1997)

License holders 174,602
Fishery budget . . . . $2,292,000 (37% license, 46% fed. aid, 17% general fund)
Total hatchery production .. 334,000 lbs.
Catchable trout 321,000 lbs. (96% of Total)
No. catchable trout 669,000 (2.1/lb.)
No. catchable trout / license = 3.8 and 2 lb./angler
% licenses "attributable to trout" = 69%
% of budget for hatcheries = 25%! (66% "research")
25% of $2,292,000 (Total budget) = $573,000.
A cost of $573,000 to produce a total of 334,000 lbs. of all hatchery fish = cost/lb. of $1.72. Subtracting the 4% (13,000 lbs) of noncatchables at $10/lb. gives cost per pound of catchable trout of $1.38! No way!

Compared to New Hampshire, Conn. stocks fewer catchable trout per angler (3.8 vs. 5.6) although N.H. has considerably more water per angler to fish for wild trout and other fishes, but the cost per pound of hatchery fish between these two states, according to the cited data, differs drastically .. $1.72/lb. vs. $6.37/lb. for all hatchery fish, and $1.38/lb. vs. $6.25/lb. for catchable trout. Obviously, this is due to methods of cost accounting and not to comparative efficiencies of hatcheries. Conn. hatchery costs (true costs) need to be reassessed before any "standard" comparisons are possible.

Problems are readily apparent for standardized comparisons between CT and NH. Questions include: CT has more license holders--175,000 vs. 167,000 (rounded figures)--yet N.H. has significantly higher fishery budget (gross cost to anglers-US FWS)--$2.29 mil. vs. $3.57 mil., and contribution of license fees as proportion to budget and contribution of an individual license holder; NH = 56% and $11.98 per angler vs. CT = 37% and $4.85/angler. Fed. Aid is 44% ($1.57 mil) for N.H. budget and 46% ($1.05 mil.) of CT budget. How can these substantial discrepencies be explained. Why is the contribution per license holder ($4.85) so low in CT budget? Where does rest of license fees go? Despite great underestimate (by more than 2X) of cost of CT catchable trout, CT, ~~stocks~~ only 3.8 trout per angler (5.6 N.H, 10-18/angler NV, 4.7 CO, and 3.2 CA). Considering the density of anglers per unit of fishable waters, amount of water per anglen for wild trout, put-and-grow fisheries, and for other fishes, for CT as contrasted with the other mentioned states, CT might be considered a good example of holding the line on catchable trout production. This, however, is more likely a reflection on the total fishery budget ($2.29 mil.). Why does CT have such a low budget (only $4.85/angler contribution) in light of 175,000 licensed anglers?

1998

Role of Hatchery Reared Trout in California

(Developed for discussion by strategic planning focus group)

Trout culture in a public owned hatchery and the distribution of trout into waters throughout the State began in California in 1870, although at least one private hatchery was in existence prior to this date [1/]. The prevailing management philosophy during the late 1800's and early 1900's was to augment California's trout streams with cultured fingerling trout and to introduce trout into suitable barren waters. In its first biennial report to the Governor the Commissioners [2/] stated their mission as ". . . members of the Board (serve for) the satisfaction of doing something towards the preservation of the fish in our waters and adding to the food supply of the people by the introduction of new varieties (species) . . ." [3/]. During these early years many people depended upon the harvest of natural resources for subsistence and it is clear that one of the chief roles of early fish culture in California (and probably most other states) was the augmentation of the food supply for the people of the State. Since World War II the principal role of State operated fish hatcheries has been to provide recreational angling opportunities, although some anglers apparently still have the notion that hatcheries are producing trout primarily for its food value.

The purpose of this note is to define the modern role of hatchery-produced trout in California with regard to overall trout management. As we embark on the development of a statewide strategic plan for the future management of trout resources in California, the wise and efficient use of various hatchery products is central to many management strategies. The California Department of Fish and Game (DFG) has been criticized by various individuals and groups, from both ends of the anti- and pro-hatchery spectrum, for how it uses its trout hatchery products. Now seems the appropriate time to pause and consider the important aspects of our trout hatcheries, including over 125 years of learning experiences, new scientific evidence regarding genetics, changing angler attitudes and philosophies, and fiscal priorities. We must address the question, "What should be the role of hatchery-produced trout in California's trout resource management?".

Hatcheries are vital to managing recreational trout angling in California. Hatchery products are used in varying degrees in the majority of trout management strategies implemented by DFG. These products include one-half-pound trout for put-and-take (catchable) fisheries, wild and semi-wild fingerlings for put-and-grow fisheries, and wild-native trout for enhancing threatened populations.

1/ E. Leitritz. 1970. A history of California's fish hatcheries, 1870-1960. Calif. Dept. of Fish and Game, Fish Bulletin 150.

2/ The California State Legislature formally initiated trout resource management in 1870 when it appointed the three-member Board of Commissioners of Fisheries. This board governed resource management until 1927 when the Department of Natural Resources was created along with a Division of Fish and Game. A new Fish and Game Commission was also created to administer the Division.

3/ _____. 1933. Report of Commissioners of Fisheries of the State of California for the years 1870 and 1871. Calif. Fish and Game, 19(1): 41-56.

The catchable product is the most well known to the general public, it is very popular among anglers, and is the cause for considerable controversy. The principal issues or concerns regarding the role of hatchery trout in California include:

a. The catchable program has created a dependency or unrealistic expectation among many anglers for catching a limit of trout on every fishing trip.

b. The catchable program promotes consumption instead of promoting resource appreciation.

c. Hatchery fish transmit disease to wild trout populations.

d. Fish introduced into historically fishless waters create negative impacts on natural biodiversity.

e. There are potential negative genetic interactions between wild-native and cultured trout.

f. Catchables are not being used effectively to benefit the maximum number of anglers.

g. Catch-rates and angler success are not being monitored and evaluated in most waters managed with hatchery trout.

h. The hatchery program is allotted a disproportionately large amount of funds relative to other trout resource programs (e.g., wild or native trout).

None of these issues or criticisms suggest eliminating hatcheries from the trout management equation, but they express concerns about how the hatchery product has been used and promoted. These issues also demand that we consider more carefully the scope of interactions between hatchery trout and native species within the aquatic ecosystem.

The principal role of hatchery-reared trout in DFG trout management is to provide recreational angling opportunities for the citizens of the State. Angling opportunities are enhanced by placing catchable-size trout into roadside or easily accessible waters where angling pressure is intense and where habitat does not support self-sustaining populations. Also, juvenile or sub-catchable size trout are placed in waters where trout populations currently exist, but where limited reproductive habitat prevents the population from being self-sustaining.

Hatchery reared trout are generally not produced to provide direct benefits to self-sustaining populations. The exception is the culture of juveniles originating from wild, native parents that were in danger of being extirpated, or rearing wild natives for re-introduction back into their historic range. All other hatchery products are produced for the sole purpose of enhancing recreational angling opportunities. Consumption of hatchery trout provides a bonus to the recreational angler, however, supplementing the State's food supply has not been an explicit goal of hatchery trout production since the about the 1930's.

Through the enhancement of fishing opportunities we hope to increase the awareness and appreciation for recreational trout fishing. With proper education and promotion this appreciation can expand to a broader scope of awareness for natural resources and fish habitat. A public aware of various human-related interactions within an ecosystem is more likely to have a desire to support activities that prevent adverse impacts. The irony of this approach is that we are attempting to instill interest in and appreciation of a natural resource by creating artificial situations. Creating "trout fishing parks" with catchable trout is a fine recreational idea but fishery managers have the responsibility to teach the public that these artificial situations are not a replacement for the "real thing". Promotional material should inform the public (and ourselves) that the role of hatchery-produced trout is solely to provide recreation and education; hatchery-produced trout, particulary catchable trout, have little to do with natural resource management.

While the principal role of hatchery trout is to provide recreational angling, the primary mission of the DFG is to protect and maintain native species and their habitats. In this regard the use of hatchery trout should be guided by the goal of preventing or minimizing adverse effects to native trout species, and more generally, minimizing adverse effects to the natural biodiversity of aquatic communities.

Guidelines that designate the use of hatchery trout by fishery managers should include the following topics:

1. Maintain existing hatchery production levels. Hatchery production will not be increased unless existing production is being effectively utilized, angler demand justifies an increase, and appropriate waters meeting stocking criteria are available.

2. Review all existing waters that are stocked with catchable trout and develop a planting priority based on providing maximum angler use. This may require eliminating lightly used and/or more remote waters. It also may require increasing planting frequency in heavily used waters.

3. Develop a policy requiring waters stocked with catchables to be surveyed for angler use and angler catch at regular intervals that will be useful in determining stocking allotments. (This policy will require a budget change proposal - BCP).

4. Develop a policy requiring a systematic survey of put-and-grow managed waters to determine survival, growth, and population dynamics. Planting allotments will be based on these data. (This policy will require a BCP).

5. Do not expand the fish stocking program into any new waters without adequate data to justify stocking.

6. Develop a stream and lake classification system that designates the type of fishery management strategy appropriate for each stream reach or lake/reservoir identified. A system of this type will identify specific waters where hatchery products may or may not be used.

Implicit in several of the above guideline topics is the overall policy of systematically monitoring waters where hatchery fish are used. For many years the success of an individual hatchery has largely been based upon the quantity and quality of trout produced. Once the fish leave the hatchery DFG biologists in recent years have not monitored the amount of angler days generated or number of trout caught in most hatchery-stocked waters throughout the State. Monitoring of fish harvest, survival and growth after they leave the hatchery should be a policy founded on fundamental fishery management principles, good business practices, and common sense. In this regard, a biologist should be assigned to each hatchery or a series of hatcheries to coordinate angler surveys and other resource assessment investigations of waters where hatchery trout are used. These biologist positions would be in addition to existing district or regional fishery biologist positions. The evaluation of a hatchery's success would be based, in part, on survey data measuring the effectiveness of the hatchery-produced trout at providing angling recreation.

Future trout management programs should recognize the valuable educational potential of our hatcheries and the products they produce. By effectively utilizing the charisma of the live fish that are easily visible in our hatcheries, and increasing the opportunities for the public to appreciate the value and enjoyment of recreational angling, we have the potential of stimulating interest in learning about natural resource related issues. When promoting the role and value of hatchery reared trout, the public should be made aware that catchable trout do not benefit wild self-sustaining trout populations. In fact, if used improperly domesticated trout have the potential of causing harm to native trout populations by genetic hybridization or introgression, or by competition for food and shelter. DFG needs to strengthen existing public education programs that define the concept and importance of fishery resource protection and management, and the difference between resource management and recreation management. We need to make it clear to everyone that the majority of hatchery trout are being produced solely for the purpose of providing recreational and educational opportunities.

Hatchery catchable-size trout should be regarded with the similar value to society as animals in a zoo or an animal park. The public is afforded the opportunity to observe, learn about, interact with, and appreciate these animals in an environment that is not necessarily their native or optimum habitat but often may closely resemble that habitat. Domestic strains of hatchery trout are genetically similar to the species they originated from in the wild but they tend to not survive for an extended period in natural environments. For those anglers who are unable to access habitats containing wild trout or lack the skill or desire to catch a naturally produced wild trout, the catchable-size hatchery trout represents an excellent opportunity to experience trout fishing. In other words, catchable trout management plays a vital role in providing anglers with a trout fishing experience when this opportunity would otherwise not be available.

In summary, development of future strategies for utilizing hatchery trout in California's trout fisheries should include: a) large doses of education and promotion regarding the purpose of hatchery-produced trout, b) a systematic program of monitoring and evaluating stocked waters, and c) increased awareness among trout managers and the public regarding potential adverse effects of trout stocking on natural biodiversity and species interactions within the aquatic ecosystem.

Prepared by: James Hopelain, Fisheries Programs Branch (11/16/98)

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, *Governor*

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
P.O. BOX 944209
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December 2, 1998

Dr. Robert Behnke
Colorado State University
Department of Fishery and Wildlife Biology
Fort Collins, Colorado 80523-1474

Dr. Behnke:

This is an update on the progress of California Department of Fish and Game's (DFG) strategic plan for trout management (Plan). Thank you for your prompt response to the first draft. Mr. Almo Cordone has provided me with a copy of your analysis of DFG's hatchery program (three- page hand written). Included are comments regarding the Plan's progress and your analysis.

The second draft of the Plan is currently being written. The first draft was an effort to identify issues and stimulate thought regarding trout management in California. Contrary to some of your comments, that draft Plan did not contain any proposals to expand the DFG trout hatchery program. However, it did identify a document (Fish Pro) that many hatchery supporters often cite. We are well aware of the limitations of the Fish Pro report but felt it fair game to be referenced in our effort to stimulate discussion. It indeed stimulated a good deal of discussion.

After the Plan's comment period expired we formed a 15-member focus group consisting of DFG biologists and hatchery managers, USFS personnel, two retired DFG trout managers, and representatives from Trout Unlimited, California Trout, and Federation of Fly Fishers. The group considered the comments received and discussed the direction for the second draft. A product of this group was a draft of "The Role of Hatchery Trout in California" (see enclosed). Group members are still commenting on this draft. We intend for the final form of these ideas and philosophy to be further developed in the strategic plan.

Regarding your comments about costs of catchable trout, our 14 inland trout hatcheries and facilities have an annual personnel and operating budget of about $7 million, not $17.9 million. The total annual hatchery personnel and operating budget (1998-99) for both anadromous and resident trout hatcheries was about $11.4 million (budget summary enclosed). According to the most recent angler survey (Fletcher and King, 1988) about 60 percent of licensed anglers prefer trout fishing (reference and excerpts enclosed), not 30 percent cited from Lee (1995, AFS Symp., 15: 16-20). Lee (pers. comm.) agrees with the estimate of 60 percent of California anglers preferring trout.

James S. Hopelain Telephone: (916) 653-7584 Fax: (916) 653-8256 E-mail: jhopelai@hq.dfg.ca.gov

Your comments about trout management in California are appreciated and welcomed. I expect the next draft of the strategic plan will be available for review in January 1999. I hope you will continue to participate in our planning process.

Sincerely,

James Hopelain
Senior Fishery Biologist

Enclosures

cc: Mr. Almo Cordone, Sacramento
Mr. D. P. Lee, CDFG, Sacramento

James S. Hopelain Telephone: (916) 653-7584 Fax: (916) 653-8256 E-mail: jhopelai@hq.dfg.ca.gov

DFG Hatchery budget allocations for FY 1998-1999

Trout Hatcheries	Amount
Crystal Lake	$596,696
Darrah Springs	$677,283
Mt. Shasta	$359,403
Siverado Base	$257,247
American River	$574,361
Kern River Planting Base	$53,149
Moccasin Creek	$508,048
San Joaquin	$591,396
Filmore	$675,362
Fish Springs	$591,165
Hot Creek	$701,821
Mojave River	$695,603
Mt. Whitney (includes Black Rock)	$573,027
SUBTOTAL Trout Hatcheries	$6,854,561

Anadromous Hatcheries	Amount
Iron Gate	$451,654
Mad River	$389,189
Trinity River	$431,588
Feather River	$1,005,902
Mokelumne River	$591,296
Nimbus	$722,965
Warm Springs	$560,000
Coyote Facility	$278,611
Merced River	$135,266
SUBTOTAL Anadromous Hatcheries	$4,566,471

TOTAL All Hatcheries	$11,421,032

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December 16, 1998

Mr James Hopelain
California Department of Fish and Game
PO Box 944209
Sacramento, CA 94244-2090

Dear Mr. Hopelain:

Thank you for an update on the strategic plan. My main issue of concern is the role of catchable trout (as part of the "role of hatchery trout in California"). It's obvious that some points of contention require clarification, better precision of meaning, or correction.

You cite an angling survey to the effect that: "about 60 percent of licensed anglers prefer trout fishing, not 30% cited from Lee". Enclosed (exhibit A) is fig. 2 from Lee (1995) depicting "percentages of inland anglers fishing for salmonids and other species". This figure clearly shows about 70% of anglers are "fishing" for nonsalmonid fishes--even if they might "prefer" trout. They may "prefer" a Rolls Royce but they drive a Ford. Would you agree that actual "fishing (recreational use generated by different fisheries) is the more meaningful term than "preference" for assessing the importance of different types of fisheries?

As I pointed out in my critique, this figure of 70% of California anglers fishing for nonsalmonids contradicts the claim that 77% of license sales in California are "attributable to trout". What is the basis for such an attribution? The only "hard" data I find is that 70% of anglers use is for nonsalmonids.

Concerning costs of catchable trout. You cite the budgets for 14 inland trout hatcheries of about $7 million. Exhibits B and C are pages from the 1995 hatchery evaluation report. In 1992-93, the total inland fisheries budget was about $48 million, 40% (ca. $19 million) was for "hatcheries". The 1996-97 total budget was smaller but the 40% for hatcheries remained constant (= $17.9 million). How do you explain the difference between the 40% of budget devoted to "hatcheries" (18-19 million $) and the $7 million used to operate the 14 hatcheries? Exhibit C increases the cost of catchable trout by about 50% by figuring in costs that are not typically included, but this still falls far short of bridging the gap between $7 million and $18 million.

The most significant issue for future planning concerns the "need" for catchable trout. Until now, the catchable trout program has been (and continues to be) a "basic core" program--the single most important program of CF&G. What

drives the catchable trout program? The enormous capital investment in hatcheries and a large (majority?) of C.F.&G. employees whose jobs depend on fish culture act to maintain the status quo, to continue on in the same direction, strongly resistant to change. This can explain why the catchable trout program remains as the basic core program, but does not address the question on the "need", the relative importance of catchable trout in relation to all inland fisheries--what proportion of the total inland fisheries budget should be devoted to catchable trout?

The 1995 hatchery evaluation report calculated that about 8% of angler days in California were generated by stocking catchable trout (compared to ca. 30% of total inland fisheries budget to produce catchable trout). The Butler-Borgerson study showed that more than 50% of all catchable trout caught in California were taken by less than 10% of the anglers fishing for them. Considering these points, one could assume that catchable trout are not an important program in relation to angler use or license sales. In fact, if a correlation is made between license sales and number of catchable trout stocked during the 1980s into 1990s, the relationship is negative. Will such critical analysis be seriously considered in your strategic plan?

In relation to the mission of a natural resource-conservation agency, words such as protect, preserve, enhance, etc. imply investing in the future--long term gains rather than short term "fixes". I would ask the question: What long term benefits were derived from the stocking of more than 10 million catchable trout, weighing more than 5 million pounds (costing ca. $15 million) in 1990? Could some of the funds expended in 1990 be better used for long-term investment?

In my handwritten critique, I attached an article on California steelhead by Herb Joseph. Mr. Joseph inquired with Tim Farley if the expenditures of $60 million in state funds over 15 years on stream and fisheries improvement had done any good? He was told that no one really knew because of "staffing levels" (limited funding). To be in conformance with the agency's "mission", should long-term investing for developing expertise in anadromous fish restoration have a higher priority than investing in more catchable trout?

Another point for pondering on "need" for catchable trout is the number of anglers per unit area of fishable waters. California has about 18,000 miles of coldwater streams, probably more than 500,000 surface acres of lakes and reservoirs stocked with salmonid fishes (put-grow fisheries) and has stocked four to six catchable trout per licensed angler during the past 10 years. Massachusetts and Connecticut have averaged three to four catchables per angler per year.

Sincerely,

R. Behnke

Robert Behnke
Professor

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February 5, 1999

Mr. James Hopelain
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Dear Mr. Hopelain:

Your letter of January 11 again questioned the figure in Lee (1995) that only 30% of inland angling in California is for trout (or salmonid fishes). You assumed that nonnative species (brown trout, brook trout, kokanee) were not included in the 30% estimate. I will again enclose p. 18 from Lee (1995) and call your attention to the text: "The contribution of nonnative salmonids is unknown because they are not distinguished from native species in the surveys."

You sent USFWS data for California inland angling for 1996. It can be noted that 71% of all anglers fished for trout (at least once during the year) and 56% of all angler days were for trout. I'll enclose similar statistics for 1985 when 69% of all anglers fished for trout and 52% of all angler days were for trout, according to a phone survey. There are various methods to obtain estimates of fisheries use — phone, mail, creel census. All methods have large inherent errors inversely related to sample size. Other estimates over the past 40 years give different results (30%-50% of angler days due to "trout"). Although the data are imprecise, they can be used to estimate the number of angler days generated by stocking catchable trout. There are obvious problems with the accuracy of the data, but in 1985, about 44 million angler days were estimated, and about 29 million in 1996. If there is a "standard" catch for an angler day, say 2.5 fish, then 40 million angler days catch 100 million fishes. If 50% of the angler days are for trout, then 50 million "trout" are required to average 2.5 per day. A 60% return of 10 million catchable trout yields a total catch of 6 million. That would provide 6% of the catch of all anglers or 12% of the catch of "trout" anglers. In enclosure with 1985 data I show another method that estimates 8.7% of all "trout" angler days and 4.5% of total angler days were generated by stocking 10 million catchable trout. No matter how calculations are made, it is apparent that California's catchable trout program

makes an insignificant contribution to inland angling. This is especially true in relation to costs of the program (that are yet to be accurately figured).

Also enclosed is a draft of my column for the spring issue of *Trout* magazine. You may note that in other states such as Nevada and Idaho, the catchable trout program is more out of control than in California.

It is true, of course, that most activities of a state conservation agency (to protect, enhance, restore) could not be turned over to private enterprise, but, having a complete monopoly encourages insularity and severely restricts any meaningful change coming from within an agency. Can you imagine a strategic plan for the future prepared by General Motors, Ford, or Chrysler that endorses an outdated product that costs 25%-30% of the budget but generates less than 10% of sales? In the 1920s, because of a dominant position, Henry Ford could claim that there was a "preference" for black model T's.

Sincerely,

Robert J. Behnke
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Mr. James Hopelain
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Comments on Strategic Plan

About three years ago, a draft environmental assessment report was prepared on CFG hatcheries. I was asked to comment on the report at that time. Enclosed is copy of my review. Note my final comment about critical analysis, moving CFG and its hatcheries into next century and the need to address the right questions. The "right question" concerns the most proper role of catchable trout in the overall fishery program. I was hopeful that the strategic plan would address the "right questions", but this didn't occur. Same old body dressed in new verbiage.

Bottom p. 11 re. future hatchery demands, invokes the simplistic "Fish Pro" report of 1994--"angler demand will require a 300 percent increase of catchable trout by the year 2010" (300 percent quadruples, not triples the "current amount").

Who are the people who wrote the strategic plan? What is their range and depth of knowledge? Do they disagree with my assessment that catchable trout costs are more than 30% of the total inland fisheries budget while providing less than 10% of the angler days (and low value angler days), and that there is no correlation between numbers of catchable trout stocked and license sales? If so, please provide any facts and figures for refutation.

Also enclosed is a recent article discussing the need for new ways of thinking to address old problems, using catchable trout as an example. Do you have copies of the Trout Unlimited reports mentioned? Have they been studied by people preparing the strategic plan? They demonstrate that in Colorado, as in California, there is no correlation between license sales and numbers of catchables stocked and that anglers fishing for catchable trout are not willing to pay what a catchable trout costs.

How can "new thinking" be effected in the strategic plan? As an outside reviewer, I have no influence to effect change, my input can simply be ignored. Will there be an appendix with reviewers comments to at least provide a record of comments?

The last column accompanying my trout magazine article is a continuation of an article by Ralph Cutter, discussing the Little Truckee River fishery below Stampede Reservoir (CFG is mistaken to be Nevada F and G because of typo, to be corrected in next issue). I assume this is a wild trout fishery supplemented with catchable trout. When someone like Mr. Cutter raises an issue such as this (he claims to have "dialogue" for 15 years on management of Little Truckee), how is it responded to? Are there facts, figures, and data in support of present regulations? How does the strategic plan apply to this particular situation?

I note that California still requires barbless hooks for special regulation fisheries. Also enclosed is title page that thoroughly and convincingly demonstrates no difference in mortality between fish caught and released on barbed hooks vs. barbless hooks. In Idaho and Oregon a barbless hook regulation resulted in the most frequent violation of fisheries law--and virtually all of the violations were accidental. Otherwise, law-abiding anglers forgot to pinch down barb when changing flies. Last year Oregon did away with barbless hook regulation, but "strongly recommend" they be used (much less trauma in hooking and releasing humans). What is the "scientific" basis for California's barbless hook regulation? Should it be addressed in strategic plan?

On p.2 it is stated that: "Steelhead are genetically identical to resident rainbow trout". If true, the two life history forms are completely interchangeable. There could be no basis for listing certain steelhead populations for protection under the Endangered Species Act (Steelhead are also "identical" to catchable rainbow trout by this line of reasoning). They are genetically similar; resident rainbows and steelhead of same river are more closely related to each other than to comparable life history forms of another river, but they are "genetically identical" only by genetic analysis of the products of 10-20 gene loci or 100-200 base pairs of DNA. The rainbow trout genome contains about two billion base pairs of DNA, enough for about 100,000 genes. Somewhere in the unsampled genome lies codes for migratory behavior and site-specific adaptions evolved over thousand of years. It is important to have an in-depth understanding on such matters for any strategic plan that is to "chart a course for the future".

Sincerely,

Robert Behnke
Professor

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December 16, 1998

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California Department of Fish and Game
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In my handwritten critique, I attached an article on California steelhead by Herb Joseph. Mr. Joseph inquired with Tim Farley if the expenditures of $60 million in state funds over 15 years on stream and fisheries improvement had done any good? He was told that no one really knew because of "staffing levels" (limited funding). To be in conformance with the agency's "mission", should long-term investing for developing expertise in anadromous fish restoration have a higher priority than investing in more catchable trout?

Another point for pondering on "need" for catchable trout is the number of anglers per unit area of fishable waters. California has about 18,000 miles of coldwater streams, probably more than 500,000 surface acres of lakes and reservoirs stocked with salmonid fishes (put-grow fisheries) and has stocked four to six catchable trout per licensed angler during the past 10 years. Massachusetts and Connecticut have averaged three to four catchables per angler per year.

Sincerely,

R. Behnke

Robert Behnke
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February 5, 1999

Mr. James Hopelain
California Department of Fish and Game
P.O. Box 944209
Sacramento, CA 94244-2090

Dear Mr. Hopelain:

Your letter of January 11 again questioned the figure in Lee (1995) that only 30% of inland angling in California is for trout (or salmonid fishes). You assumed that nonnative species (brown trout, brook trout, kokanee) were not included in the 30% estimate. I will again enclose p. 18 from Lee (1995) and call your attention to the text: "The contribution of nonnative salmonids is unknown because they are not distinguished from native species in the surveys."

You sent USFWS data for California inland angling for 1996. It can be noted that 71% of all anglers fished for trout (at least once during the year) and 56% of all angler days were for trout. I'll enclose similar statistics for 1985 when 69% of all anglers fished for trout and 52% of all angler days were for trout, according to a phone survey. There are various methods to obtain estimates of fisheries use — phone, mail, creel census. All methods have large inherent errors inversely related to sample size. Other estimates over the past 40 years give different results (30%-50% of angler days due to "trout"). Although the data are imprecise, they can be used to estimate the number of angler days generated by stocking catchable trout. There are obvious problems with the accuracy of the data, but in 1985, about 44 million angler days were estimated, and about 29 million in 1996. If there is a "standard" catch for an angler day, say 2.5 fish, then 40 million angler days catch 100 million fishes. If 50% of the angler days are for trout, then 50 million "trout" are required to average 2.5 per day. A 60% return of 10 million catchable trout yields a total catch of 6 million. That would provide 6% of the catch of all anglers or 12% of the catch of "trout" anglers. In enclosure with 1985 data I show another method that estimates 8.7% of all "trout" angler days and 4.5% of total angler days were generated by stocking 10 million catchable trout. No matter how calculations are made, it is apparent that California's catchable trout program

makes an insignificant contribution to inland angling. This is especially true in relation to costs of the program (that are yet to be accurately figured).

Also enclosed is a draft of my column for the spring issue of *Trout* magazine. You may note that in other states such as Nevada and Idaho, the catchable trout program is more out of control than in California.

It is true, of course, that most activities of a state conservation agency (to protect, enhance, restore) could not be turned over to private enterprise, but, having a complete monopoly encourages insularity and severely restricts any meaningful change coming from within an agency. Can you imagine a strategic plan for the future prepared by General Motors, Ford, or Chrysler that endorses an outdated product that costs 25%-30% of the budget but generates less than 10% of sales? In the 1920s, because of a dominant position, Henry Ford could claim that there was a "preference" for black model T's.

Sincerely,

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Comments on Strategic Plan

About three years ago, a draft environmental assessment report was prepared on CFG hatcheries. I was asked to comment on the report at that time. Enclosed is copy of my review. Note my final comment about critical analysis, moving CFG and its hatcheries into next century and the need to address the right questions. The "right question" concerns the most proper role of catchable trout in the overall fishery program. I was hopeful that the strategic plan would address the "right questions", but this didn't occur. Same old body dressed in new verbiage.

Bottom p. 11 re. future hatchery demands, invokes the simplistic "Fish Pro" report of 1994--"angler demand will require a 300 percent increase of catchable trout by the year 2010" (300 percent quadruples, not triples the "current amount").

Who are the people who wrote the strategic plan? What is their range and depth of knowledge? Do they disagree with my assessment that catchable trout costs are more than 30% of the total inland fisheries budget while providing less than 10% of the angler days (and low value angler days), and that there is no correlation between numbers of catchable trout stocked and license sales? If so, please provide any facts and figures for refutation.

Also enclosed is a recent article discussing the need for new ways of thinking to address old problems, using catchable trout as an example. Do you have copies of the Trout Unlimited reports mentioned? Have they been studied by people preparing the strategic plan? They demonstrate that in Colorado, as in California, there is no correlation between license sales and numbers of catchables stocked and that anglers fishing for catchable trout are not willing to pay what a catchable trout costs.

How can "new thinking" be effected in the strategic plan? As an outside reviewer, I have no influence to effect change, my input can simply be ignored. Will there be an appendix with reviewers comments to at least provide a record of comments?

The last column accompanying my trout magazine article is a continuation of an article by Ralph Cutter, discussing the Little Truckee River fishery below Stampede Reservoir (CFG is mistaken to be Nevada F and G because of typo, to be corrected in next issue). I assume this is a wild trout fishery supplemented with catchable trout. When someone like Mr. Cutter raises an issue such as this (he claims to have "dialogue" for 15 years on management of Little Truckee), how is it responded to? Are there facts, figures, and data in support of present regulations? How does the strategic plan apply to this particular situation?

I note that California still requires barbless hooks for special regulation fisheries. Also enclosed is title page that thoroughly and convincingly demonstrates no difference in mortality between fish caught and released on barbed hooks vs. barbless hooks. In Idaho and Oregon a barbless hook regulation resulted in the most frequent violation of fisheries law--and virtually all of the violations were accidental. Otherwise, law-abiding anglers forgot to pinch down barb when changing flies. Last year Oregon did away with barbless hook regulation, but "strongly recommend" they be used (much less trauma in hooking and releasing humans). What is the "scientific" basis for California's barbless hook regulation? Should it be addressed in strategic plan?

On p.2 it is stated that: "Steelhead are genetically identical to resident rainbow trout". If true, the two life history forms are completely interchangeable. There could be no basis for listing certain steelhead populations for protection under the Endangered Species Act (Steelhead are also "identical" to catchable rainbow trout by this line of reasoning). They are genetically similar; resident rainbows and steelhead of same river are more closely related to each other than to comparable life history forms of another river, but they are "genetically identical" only by genetic analysis of the products of 10-20 gene loci or 100-200 base pairs of DNA. The rainbow trout genome contains about two billion base pairs of DNA, enough for about 100,000 genes. Somewhere in the unsampled genome lies codes for migratory behavior and site-specific adaptions evolved over thousand of years. It is important to have an in-depth understanding on such matters for any strategic plan that is to "chart a course for the future".

Sincerely,

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December 16, 1998

Mr James Hopelain
California Department of Fish and Game
PO Box 944209
Sacramento, CA 94244-2090

Dear Mr. Hopelain:

Thank you for an update on the strategic plan. My main issue of concern is the role of catchable trout (as part of the "role of hatchery trout in California"). It's obvious that some points of contention require clarification, better precision of meaning, or correction.

You cite an angling survey to the effect that: "about 60 percent of licensed anglers prefer trout fishing, not 30% cited from Lee". Enclosed (exhibit A) is fig. 2 from Lee (1995) depicting "percentages of inland anglers fishing for salmonids and other species". This figure clearly shows about 70% of anglers are "fishing" for nonsalmonid fishes--even if they might "prefer" trout. They may "prefer" a Rolls Royce but they drive a Ford. Would you agree that actual "fishing (recreational use generated by different fisheries) is the more meaningful term than "preference" for assessing the importance of different types of fisheries?

As I pointed out in my critique, this figure of 70% of California anglers fishing for nonsalmonids contradicts the claim that 77% of license sales in California are "attributable to trout". What is the basis for such an attribution? The only "hard" data I find is that 70% of anglers use is for nonsalmonids.

Concerning costs of catchable trout. You cite the budgets for 14 inland trout hatcheries of about $7 million. Exhibits B and C are pages from the 1995 hatchery evaluation report. In 1992-93, the total inland fisheries budget was about $48 million, 40% (ca. $19 million) was for "hatcheries". The 1996-97 total budget was smaller but the 40% for hatcheries remained constant (= $17.9 million). How do you explain the difference between the 40% of budget devoted to "hatcheries" (18-19 million $) and the $7 million used to operate the 14 hatcheries? Exhibit C increases the cost of catchable trout by about 50% by figuring in costs that are not typically included, but this still falls far short of bridging the gap between $7 million and $18 million.

The most significant issue for future planning concerns the "need" for catchable trout. Until now, the catchable trout program has been (and continues to be) a "basic core" program--the single most important program of CF&G. What

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