



**MEMORANDUM CONCERNING**

**RECOVERY STRATEGY FOR CALIFORNIA COHO SALMON (CDFG, 2003)**

**WITH REGARD TO COASTAL STREAMS SOUTH OF SAN FRANCISCO**

**Submitted to the California Fish and Game Commission  
December 18, 2003**

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# TABLE OF CONTENTS

## MEMORANDUM CONCERNING RECOVERY STRATEGY FOR CALIFORNIA COHO SALMON (CDFG, 2003) WITH REGARD TO COASTAL STREAMS SOUTH OF SAN FRANCISCO

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<b>SUMMARY</b> .....	<b>2</b>
<b>FACTS REGARDING COHO SOUTH OF SAN FRANCISCO</b> .....	<b>2</b>
<b>Research finds that coho are not native to the streams south of San Francisco</b> .....	<b>2</b>
<b>Scientific surveys in late 1800s find no coho south of San Francisco</b> .....	<b>3</b>
<b>1906 Introduction of coho south of San Francisco as a potential new recreational resource</b> ...	<b>4</b>
<b>First credible coho sighting in 1912</b> .....	<b>6</b>
<b>Results of the historical study</b> .....	<b>6</b>
<b>Archeologists find no salmon remains in the diet of people native to the Santa Cruz mountains prior to contact with Europeans</b> .....	<b>6</b>
<b>Physical reasons that the streams of the Santa Cruz Mountains do not support permanent coho populations</b> .....	<b>7</b>
<b>CRITICAL DISCOURSE ANALYSIS</b> .....	<b>9</b>
<b>Sources and flow of misinformation about the origin of coho salmon south of San Francisco</b> .....	<b>9</b>
<b>Table 1: Sources and types of misinformation regarding the native origin of coho salmon south of San Francisco that permeate the “Recovery Strategy” (CDFG, 2003)</b> .....	<b>10</b>
<b>Figure 1: The invalid citations<sup>6</sup> (red dashed lines) and citations of erroneous information<sup>7</sup> (blue solid lines) used to substantiate the misperception that coho are native south of San Francisco</b> .....	<b>11</b>
<b>Figure 2: Legitimate citations used to substantiate the nonnative origin of coho salmon in streams south of San Francisco</b> .....	<b>12</b>
<b>INVALID POPULATION FIGURES WERE USED IN COHO LISTING DECISION</b> .....	<b>12</b>
<b>1800s</b> .....	<b>13</b>
<b>1930s</b> .....	<b>13</b>
<b>1990s</b> .....	<b>13</b>
<b>Population Trends</b> .....	<b>13</b>
<b>IMPACT OF MANAGEMENT EFFORTS</b> .....	<b>13</b>
<b>Unnecessary listing wastes scarce public resources</b> .....	<b>13</b>
<b>Unnecessary listing of coho inhibits research and stream management</b> .....	<b>14</b>
<b>Current restrictions inflict unnecessary burden on citizens</b> .....	<b>14</b>
<b>Exotic coho harm native species</b> .....	<b>14</b>
<b>Options for future management</b> .....	<b>15</b>
<b>LEGAL ASPECTS OF PRIVATE PROPERTY TAKING</b> .....	<b>15</b>
<b>CONCLUSION</b> .....	<b>16</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>16</b>
<b>REFERENCES CITED</b> .....	<b>17</b>

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**AS REGARDS COASTAL STREAMS SOUTH OF SAN FRANCISCO**

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**SUMMARY**

On December 31, 1995, the California State Fish and Game Commission listed coho salmon as endangered from San Francisco Bay southward to Aptos Creek in Santa Cruz County (CCR, 1995). California State law defines endangered species as:

“‘Endangered species’ means a ***native*** species or subspecies of bird, mammal, fish, amphibian, reptile or plant...[Emphasis added]” (FGC, 1985).

Historic research conclusively shows that coho salmon are not native and were not present in the streams south of San Francisco prior to their introduction from Baker Lake, Washington in 1906 by Frank Shebley, Superintendent of the Santa Cruz County Brookdale Fish Hatchery. Fish census studies as far back as 1879 by the eminently qualified Stanford ichthyologists David Starr Jordan and Charles Gilbert recorded coho habitat range as including no streams south of San Francisco. No valid scientific reports of coho in the streams south of San Francisco predate the 1906 introduction of coho as a new angling resource.

This irrefutable history concerning the nonnative origin of coho in the streams of the Santa Cruz Mountains is reinforced by the absence in archeological excavations of coho remains in the refuse, hence the diet, of the native people. It is also consistent with climatologic and geomorphologic observations on the unsuitability of these streams as coho habitat.

The results of recent intensive scientific and historical research reveal that coho are not native to the streams south of San Francisco, and therefore were incorrectly listed as endangered by the Fish and Game Commission in 1995. Since the basis for deeming these fish to be a native population in danger of extinction is false, the inappropriate listing has created unnecessary confiscatory restrictions on those of us who live and work on this land. I request that the California State Fish and Game Commission reject those provisions of the “Recovery Strategy” that unnecessarily restrict the use of land, water or other natural and human resources in the Santa Cruz Mountains area.

In the near future, a petition will be submitted to the California Fish and Game Commission to delist coho in the south of San Francisco on the grounds that they are not native and cannot survive in these streams without continuous hatchery intervention regardless of stream habitat condition.

**FACTS REGARDING COHO SOUTH OF SAN FRANCISCO**

**Research finds that coho are not native to the streams south of San Francisco**

The early studies of David Starr Jordan, Charles Gilbert and others establish that coho were not present in the streams south of San Francisco prior to 1906 (Brogan et al., 1996; Jordan, 1892a; Jordan, 1892b; Jordan, 1894; Jordan, 1904a; Jordan, 1904b; Jordan, 1907; Jordan and Evermann, 1896; Jordan and Evermann, 1902; Jordan and Evermann, 1905; Jordan and Gilbert, 1876-1919; Jordan et al., 1882).

United States Bureau of Fisheries documents and numerous local newspaper and popular magazine articles confirm the introduction of coho salmon as a new game fish resource to Santa Cruz Mountain streams early in the 20<sup>th</sup> century (B., 1909; Bowers, 1906; Bowers, 1907; Bowers, 1908; Bowers, 1909; Bowers, 1910; Bowers, 1911; Leinald, 1906; Staff, 1905a; Staff, 1905b; Staff, 1906a; Staff, 1906b; Staff, 1907). There are no scientifically valid observations of coho in these streams before that event (Alvarado, 2003). Nearly a century of artificial stream stocking (Shebley, 1922; Shebley and Gillis, 1911; Streig, 1991; Van Sicklen et al., 1910)<sup>1</sup> overlaid with politically motivated rhetoric and the unscientific, unsubstantiated folklore of generations of anglers has since obscured any realistic population estimates. Thus, for the purpose of evaluating the need to list and protect southern coho, their abundance south of San Francisco is irrelevant since the legal definition of endangered species applies only to:

“a ***native*** species or subspecies of bird, mammal, fish, amphibian, reptile or plant... [Emphasis added]” (FGC, 1985).

Since coho are not native, all coho south of San Francisco are the result of transplants or possible strays from other locations. Our studies show that they soon disappear if continuous hatchery infusion is not maintained (Smith, 1994, pg. 1; Smith, 2001, pg. 6)

Coho salmon were not present in streams south of San Francisco Bay prior to their artificial introduction from Baker Lake, Washington in 1906 by Frank Shebley, superintendent of the Santa Cruz County, Brookdale Fish Hatchery. Although highly publicized at that time (B., 1909; Bowers, 1906; Bowers, 1907; Bowers, 1908; Bowers, 1909; Bowers, 1910; Bowers, 1911; Leinald, 1906; Staff, 1905a; Staff, 1905b; Staff, 1906a; Staff, 1906b; Staff, 1907), nearly a century of misinformation has obscured the truth about coho salmon in this locale. The authoritative early scientific record establishes that the natural coho habitat range extends from San Francisco northward (Alvarado, 2003; Brogan et al., 1996; Jordan, 1892a; Jordan, 1892b; Jordan, 1894; Jordan, 1904a; Jordan, 1904b; Jordan, 1907; Jordan and Evermann, 1896; Jordan and Evermann, 1902; Jordan and Evermann, 1905; Jordan and Gilbert, 1876-1919; Jordan et al., 1882). All valid coho sightings and reports in this area post-date the 1906 introduction of the species and can only be hatchery-planted fish, their descendents, or occasional strays.

### **Scientific surveys in late 1800s find no coho south of San Francisco**

The first scientific study addressing the extent of coho salmon habitat range in California was undertaken by the ichthyologists David Starr Jordan and Charles Henry Gilbert, two Stanford ichthyologists well acquainted with the streams of the Santa Cruz Mountains. In 1879, Spencer Fullerton Baird of the United States Fish Commission asked Jordan and Gilbert to undertake a survey of the fisheries of the Pacific Coast of the United States. Their one-year pioneering survey resulted in a carefully researched description of every known fish of the Pacific coast. This work laid the foundation for the next 50 years of study of Pacific fishes (Brogan et al., 1996). The study, published in a variety of forms over the course of three decades, unambiguously concludes that the natural coho habitat is from San Francisco northward. Here are a few quotations on coho salmon habitat range from some of the early scientific publications:

- “*Oncorhynchus kisutch* ... Sacramento river to Puget Sound and northward...” (Jordan and Gilbert, 1876-1919, pg. 39).

<sup>1</sup> The report (Streig 1991) is an unpublished compilation of California salmonid plantings that was not intended by its author, Dave Streig, as a scientific report. Although it has been cited frequently by others it is incomplete and contains some errors. It is useful, but not authoritative. Dave Streig is a fisheries biologist and manager of the MBS&T fish hatchery on Big Creek, a tributary to Scotts Creek.

- “O. kisutch ... Abundant from San Francisco northward” (Jordan et al., 1882, pg. 308).
- “All the species [*Oncorhynchus* spp.] have been seen by us in the Columbia and Fraser River... Only the king salmon [*Oncorhynchus tshawytscha*] has been noticed south of San Francisco” (Jordan, 1892a; Jordan, 1892b, pg. 10; Jordan, 1894, pg. 131).
- “This species [coho salmon, *Oncorhynchus kisutch*] is not common south of the Columbia, but it is sometimes taken in California” (Jordan, 1894, pg. 131).
- “Abundant from San Francisco northward, especially in Puget Sound and the Alaskan Fjords” (Jordan and Evermann, 1896).
- “[*Oncorhynchus kisutch*] is abundant from San Francisco northward” (Jordan, 1904a, pg. 154; Jordan and Evermann, 1905).
- “Only the quinnat [*Oncorhynchus tshawytscha*] and the dog salmon [*Oncorhynchus keta*] have been noticed south of San Francisco” (Jordan, 1904b; Jordan, 1907).
- “It is clear that the salmon of Monterey Bay are those which belong to the Sacramento or San Joaquin River group” (Smith, 1895, pg. 236).

The record plainly shows that world renown scientists, including David Starr Jordan, who was personally and professionally familiar with the Santa Cruz Mountains and streams, concluded that coho did not inhabit streams south of San Francisco in the last quarter of the 19<sup>th</sup> and early 20<sup>th</sup> century.

### **1906 Introduction of coho south of San Francisco as a potential new recreational resource**

Government at all levels (with enthusiastic popular support) has, until recently, energetically pursued the introduction of species throughout California by fish culturists as a valuable contribution to the public good. Indeed, during the first few years of its existence, the California Fish Commission concentrated on introducing about thirty new varieties of fish into the waters of the state (Shebley and Gillis, 1911, pg. 513). Later, the Commission focused its efforts on the most economically important fish at the time, Chinook salmon, while paying little attention to other species of salmon. In the first fifteen years of the Commission, the state hatched and planted just over 3 million trout, shad and whitefish, while distributing more than 70 million Chinook salmon throughout the state, fish which they received from the federal hatchery on the McCloud River (Shebley, 1922, pg. 96). The records of the California Department of Fish and Game show vast numbers of salmonid species of different origins being transplanted to and from Santa Cruz Mountain streams since 1909 (Streig, 1991; Van Sicklen et al., 1910, pg. 100).

In 1905 the County of Santa Cruz built the Brookdale Hatchery, primarily intended for hatching steelhead (Shebley, 1922, pg. 81). The county employed Frank A. Shebley as superintendent of the Brookdale Hatchery. He was a senior professional fish culturist, having been previously employed by the State Board of Fish Commissioners and was the son of W. H. Shebley, fish cultural pioneer and superintendent of all state fish hatcheries. In conducting this project, Shebley also maintained close contact with his colleague and personal friend, Stanford ichthyologist Charles H. Gilbert (Gilbert, 1880-1927). Gilbert assisted Shebley in the design of the hatchery and the selection of the site (Streig, 1991). Shebley was so successful in his first season of hatching steelhead at Brookdale that he decided to begin hatching chinook salmon that same fall. Thus, he arranged for a shipment of chinook salmon eggs from

the Sisson State Hatchery in Northern California. His continuing success in fish propagation led him to introduce coho salmon the following year. Although official records for the first few years of operations at the Brookdale Hatchery have not been found, U.S. Bureau of Fisheries reports shipments of silver (coho) salmon eggs to the Brookdale Hatchery from 1906 to 1910. The record shows that in 1906, 239,106 coho salmon eggs were shipped from the Birdsvew substation of the Baker Lake Hatchery in Washington State, of which 50,000 were sent to the Santa Cruz County Brookdale Fish Hatchery. Nevertheless, this project to create a new sport fishing resource for the enjoyment of anglers has since gradually faded from public memory and been replaced by the myth of coho salmon's native origin.

The following excerpts from two local Santa Cruz County newspapers and a popular outdoor journal chronicle this historic, yet almost forgotten event and confirm that those involved knew that they were intentionally introducing a new species to this area in order to expand recreational resources:

**THE SANTA CRUZ MORNING SENTINEL: DECEMBER 20, 1905**

Superintendent Frank A. Shebley expects several hundred thousand more king [Chinook] salmon eggs from Sisson in the near future. Also a nearly equal lot of silver [coho] salmon eggs from the U. S. Government hatchery in the state of Washington. These are natives of the waters from Puget Sound northward and run up the smaller streams of those waters like the steel heads do in this county. **It is believed if raised and planted here they will frequent our streams and thus give us another valuable game fish.** [emphasis added]  
The experiment is now soon to be tried on an extensive scale at the hatchery.

(Staff, 1905a)

**THE MOUNTAIN ECHO: MARCH 24, 1906**

It is probably no news to state that our County Fish Hatchery at Brookdale is in a flourishing condition. It is, however, interesting to note progress there once in a while. The incubation of steel-head trout is now in full swing and no less than 1,200,000 are in process and some of which are already coming from the eggs. One million salmon eggs from the McCloud River Hatchery have been incubated this winter, the first half of these being placed in the streams of this county some time since and the last half are now in process of being planted – some in the San Lorenzo, some in Soquel and in other streams that empty into Monterey Bay. Superintendent Shebley also has in process of hatching 50,000 silver [coho] salmon eggs from the Baker Lake Hatchery in the state of Washington. These fish, in their native waters farther north, run up the smaller streams like the steel-heads do in this country and **if they thrive here as hoped they will prove a valuable addition to the piscatorial tribe of our Santa Cruz waters.** [emphasis added]

(Staff, 1906b)

**FOREST AND STREAM, 1909**

The silverside [coho] salmon have been hatched at the Brookdale hatchery and much is expected from this fine fish. The first planting in this State was made in the San Lorenzo River and a number have been taken this fall making a run up that stream.

(B., 1909)

The information conveyed to these newspapers by Shebley demonstrates that those involved in hatching, raising and planting these fish in the streams of the Santa Cruz Mountains believed (as did David Starr Jordan, Charles Gilbert and other scientific observers) that coho were not native to this locale,

but were a new, previously absent species being introduced for the first time with the intent of offering a new type of game fish for local sportsmen.

### **First credible coho sighting in 1912**

The first credible mention in scientific literature of coho in the streams south of San Francisco is a secondhand account by ichthyologist John Otterbein Snyder (a student of David Starr Jordan) of an anonymous sighting in the San Lorenzo River in 1912. Although this sighting does not meet the standards of a scientific observation, it is probably valid since we know that, starting in 1906, the program of hatchery plantings in the streams of the Santa Cruz Mountains was well under way.

At the time of the report, Snyder was conducting a survey of fish inhabiting streams tributary to Monterey Bay. His one-sentence comment on the coho sighting states:

“Silver [coho] Salmon were said to have been observed in the San Lorenzo River at Santa Cruz” (Snyder, 1914, pg. 70).

This does not appear to be the result of personal observations and does not mention the artificial stocking beginning in 1906. Nonetheless, this terse reference may have laid the foundation for the erroneous chain of assumptions that persists to the present day.

### **Results of the historical study**

The study of the historic record of coho south of San Francisco reported herein has established three noteworthy facts:

- Coho salmon did not inhabit streams south of San Francisco prior to the early 1900s.
- Coho salmon were introduced into the streams of the Santa Cruz Mountains in 1906 by the Santa Cruz County government for the purpose of providing a new type of game fish for the enjoyment of sport anglers.
- Since the initial planting in 1906, the streams of the Santa Cruz Mountains have been frequently re-supplied with hatchery-produced coho from various origins.

### **Archeologists find no salmon remains in the diet of people native to the Santa Cruz mountains prior to contact with Europeans**

The historic record is supported by extensive archeological work that has found no trace of coho remains in the refuse of the prehistoric native people south of San Francisco Bay. Notably, these same archaeological sites provide ample evidence of other fish remains.

Several peer-reviewed reports of archeological excavations of ancient Native American middens on the central California coast (a clear window to the native peoples' diet prior to European contact) are consistent with the absence of any salmon south of San Francisco Bay and demonstrate their presence from there northward. By contrast, these studies confirm the habitat range of steelhead as far south as the Santa Margarita River in San Diego County lending credibility to the methods and assumptions used in the studies (Gobalet, 1990; Gobalet, 2000; Gobalet and Jones, 1995; Gobalet et al., 2003).

The most recent and exhaustive of the four studies, “Archeological Perspectives on Native American Fisheries of Central California with Emphasis on Steelhead and Salmon” (Gobalet et al., 2003) examined over 117,000 fish remains from middens south of San Francisco. Although steelhead remains were present, no other salmonid remains were found.

Another significant study encompassing the southern portion of Central Coast Coho ESU identified over 80 species of ocean and fresh-water fish from among 77,000 fish remains recovered from

51 central coastal middens from San Mateo County to San Luis Obispo County. The study examined remains deposited from 6200 B. C. to 1830 A. D. (Gobalet and Jones, 1995). The other two papers report similar studies of nine middens in Contra Costa County (Gobalet, 1990) and a single midden in Berkeley (Follett, 1975). Species mixes differed with location and time of deposit. In instances where the relationships have been studied, the mix was consistent with species' prevalence, food value and convenience of catch.

Of the 6,993 elements identified from the Contra Costa middens, 1,135 were salmon, chinook or coho, demonstrating two important facts: 1) salmonid skeletal signatures remain stable and identifiable over the time span of the deposits; 2) where they were available, salmonids were caught and consumed by the coastal native people.

Although more than 80 species, including nearly every variety of fish that would likely have been present, were consumed by the native people along the coast south of San Francisco, *salmon were not found to be part of these peoples' comprehensive diet*. Steelhead were found in all three studies from Contra Costa to San Luis Obispo Counties, reinforcing the opinion that, if salmon had ever been consumed by these natives, their remains would have also been found in the southern locations. Gobalet and Jones make this comment:

“The lack of salmon at any of our sites is consistent with their absence from Central Coast<sup>[2]</sup> drainages...” (Gobalet and Jones, 1995, pg. 821).

This statement supports the historic data presented herein finding that coho salmon did not populate the streams of the Santa Cruz Mountains until artificial stocking was initiated on behalf of sport fishermen beginning in 1906.

### **Physical reasons that the streams of the Santa Cruz mountains do not support permanent coho populations**

The historic and archaeological record recounted herein demonstrates that coho were not present in the streams of the Santa Cruz Mountains prior to their artificial introduction in 1906. People who have lived and observed the area for many decades have witnessed the impact of extreme weather, seismic and geologic events. In contrast with the streams and rivers to the north of San Francisco, the relatively short, steep, “flashy” streams of the Santa Cruz Mountains (in a setting with widely fluctuating precipitation, a highly erodable mudstone, sandstone, and weathered granitic substrate, and ongoing tectonic uplift) are subject to frequent weather and geologic events that impact coho habitats.

“Without erosion and landsliding, portions of the Santa Cruz Mountains would be twice the height of Mt. Everest, taller than any range known to have existed during Earth's history” (Spittler, 1998).

The dynamic nature of these watersheds cannot be overstated. For example, a January 3, 1982 storm delivered ten inches of water in 24 hours to the (already saturated) Waddell Creek watershed, and the floodwaters in the creek reached 11,000 cubic feet per second. By contrast, on August 20, 1977, following a two-year drought, a discharge of 0.17 cfs was recorded. The 1982 flood left the streambed scoured and bare of vegetation and the 1977 drought resulted in intermittent flow along its course. Neither of these events is unique or unusual (Briggs, 1999).

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<sup>2</sup> Central Coast is defined by the Gobalet and Jones as the area from San Louis Obispo to (but not including) San Francisco (Gobalet and Jones, 1995). Northern California is defined as the area from San Francisco to the Oregon border.

This discharge range of 65,000 : 1 makes survival of coho quite difficult. Floods at inopportune times in the coho life cycle, capable of washing out redds<sup>3</sup> or newly emerged fish, occur frequently in these watersheds. Droughts are also common and can prevent coho smolt migration or the return of adults to the spawning streams, either of which can extirpate a generation of coho. In such an easily eroded terrain, storms, landslides and earthquakes also tend to transport large amounts of sediment to the streams, smothering redds (Baker et al., 1998; Davis and Smith, 1993; Smith, 1992; Smith, 1994; Smith, 1996; Smith, 1998; Smith et al., 1997).

The difficulty of coho survival in the presence of these catastrophic events is illustrated by a few excerpts from recent reports of coho surveys on Waddell and Scotts Creeks.

- “A dominant factor in the decline of coho in Waddell and Scott creeks ... appears to be stochastic events (floods and droughts) which weaken or eliminate individual year classes. Since coho females are almost always 3 year olds, weakened year classes have a poor chance of recovery and extirpation is likely, **even if spawning and rearing habitat are sufficient to support a viable coho population**. Since 1988, one year class (1991, 1994, ...) on Scott Creek has been severely reduced, and the same year class on Waddell Creek has apparently been lost, due to drought impacts ... The 1992 year classes on Scott and Waddell creeks were also apparently seriously reduced by a February flood. At the present time only 2 out of 3 coho year classes (1992, 1993) in Scott Creek appear viable, and most of the 1992 year class coho smolts were hatchery-reared. For Waddell Creek one year class (1994) is apparently gone and only one (1993), hatchery-augmented, year class remains viable. **Maintenance and restoration of coho populations will require rebuilding weak or lost year classes, through transplants and/or hatcheries, not just through habitat conservation and restoration** [emphasis added]” (Smith, 1994, pg. 1).
- “...restricted spawning period, single spawning attempt, and rigid ages of smolting and spawning (Shapovalov and Taft 1954) make them [coho] susceptible to drought, floods or other “disasters” within small watersheds...” (Smith, 1996, pg. 1).
- “Floods, which destroy nests, and droughts, which may block adult or smolt migrations, have been **more important than rearing habitat in controlling recent coho abundance** [emphasis added]” (Smith et al., 1997, pg. 14).
- “Spawning coho were abundant on at least Waddell and Scott creeks, but the severe winter storms apparently destroyed most redds” (Smith, 1998, pg. 1).

The coho life cycle is quite thoroughly documented since the landmark study in the 1930s by Shapovalov and Taft (1954) and numerous subsequent studies. The attribute of the coho life cycle that prevents their establishment of permanent populations in this location with its frequent, catastrophic floods, droughts etc., is their very limited range of survival options due to the reproductive isolation of the three brood years. Unlike steelhead, female coho spawn on a rigid three-year cycle and die immediately thereafter. A missing generation leaves one of the three-year classes vacant. A year class can remain

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<sup>3</sup> A redd is “a type of nest in which a shallow depression is scooped out of coarse gravel into which eggs are deposited, and is subsequently filled back in. Redds are made by certain fishes that spawn in streams where currents are sufficient to bring oxygenated water to the somewhat buried eggs” (Jackson, 2001).

vacant for many years or permanently unless reintroduced by strays from another location or by human intervention.

By contrast, a lost year class of steelhead can be naturally reestablished since their life cycle is quite flexible. They can remain at sea for a variable number of years, spawn many times during their life or remain permanently in fresh water. Thus, steelhead naturally flourish in the streams of the Santa Cruz Mountains and coho, for the reasons cited, do not.

Coho colonies that may have occasionally been started by strays<sup>4</sup> (Shapovalov and Taft, 1954) or human intervention could flourish for a number of years, but would inevitably succumb to one of these natural stochastic events<sup>5</sup>. However, there is no scientific evidence that indicates even ephemeral populations existed at any time prior to stocking.

### CRITICAL DISCOURSE ANALYSIS

#### **Sources and flow of misinformation about the origin of coho salmon south of San Francisco**

The historic and scientific evidence shows that coho salmon were not resident south of San Francisco prior to their artificial introduction by the Brookdale Fish Hatchery in 1906. Still, the prevailing belief is that they are native. Unfortunately, in the forum of public discourse, it is easy for casual observations, hearsay, and misunderstood or misstated facts to take on the aura of truth. Confusion is created by the overuse of *gray material* in lieu of valid citations. Soft sources such as anecdotal stories, hearsay and personal communications, are sometimes considered reasonable in matters of stated speculation or when used to add support to hard, properly cited data. Many scholars and scientists consider the use of this material unacceptable under any circumstances, because it has not been peer-reviewed and may contain erroneous information. Once researchers introduce aberrations into the literature of public or scientific discourse, peers are free to cite it in subsequent publications strengthening the appearance of hard fact with each iteration. As the chain of misstatements grows, it can be very difficult to find the original distortion and even harder to correct the record.

In order to determine the validity of a particular document, the assumptions must be drawn out through a deconstructive process that traces every relevant declaration to its source. By isolating all occurrences of a specific conjecture, it is possible to map the causal vector to its origin.

“Discourse Analysis will, thus, not provide absolute answers to a specific problem, but enable us to understand the conditions behind a specific ‘problem’ and make us realize that the essence of that ‘problem’, and its resolution, lie in its assumptions; the very assumptions that enable the existence of that ‘problem’” (Palmquist, 2001).

In the present study, only a surface deconstruction is necessary to reveal the morass of assumptions. Indeed, in the case of coho salmon south of San Francisco, the disclosure of just one basic erroneous assumption (the native origin of coho south of S. F.) negates the entire question of recovery.

**Table 1** traces the sources and paths of the misinformation regarding the native origin of coho salmon south of San Francisco, which has obfuscated the science of coho salmon in these streams. These sources are the basis of the assumption that coho are native south of San Francisco. The

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<sup>4</sup> All salmonids occasionally return to a stream other than that of their origin. Shapovalov and Taft (1954) report normal straying of a few percent of returning coho, usually to very nearby streams.

<sup>5</sup> Salmonid decline also coincides with and can be further exacerbated by a drop in the ocean survival of all West Coast salmonids that is attributed to a number of causes including climate shift (Coronado and Hilborn, 1998; Magnusson, 2002), increases in predation by exploding pinniped populations (NMFS, 1999) and possibly over-fishing (Briggs, 1999a).

recommendations in the “Recovery Strategy” (CDFG, 2003) related to streams south of San Francisco are founded on this assumption.

Document	Statements Made With No Reference Cited	Personal Observations or Communications	Invalid Citations <sup>6</sup>	Citations of Erroneous Information <sup>7</sup>	Legitimate Citations
Recovery Strategy for California Coho Salmon (CDFG, 2003)	X	-	-	X	-
Status Review of California Coho Salmon North of San Francisco (CDFG, 2002)	-	-	X	X	-
A Status Review of Coho Salmon ( <i>Oncorhynchus kisutch</i> ) in California South of San Francisco Bay (Anderson, 1995)	X	X	-	X	-
Historical Decline and Current Status of Coho Salmon in California (Brown et al., 1994)	X	-	X	-	-
Status Review of Coho Salmon Populations in Scott and Waddell Creeks, Santa Cruz County, California (Bryant, 1994)	X	X	X	X	-
Petition to List Coho Salmon South of San Francisco Bay as a Threatened Species (Hope, 1993)	X	X	X	X	-
History of Fish Cultural Activities in Santa Cruz County with Reference to Scotts and Waddell Creeks (Streig, 1991)	X	-	X	-	-
Status of Coho Salmon in California (Brown and Moyle, 1991)	-	-	X	X	-
Distribution of Coho Salmon in California (Hassler et al., 1991)	X	-	-	X	-
Distribution of Coho Salmon in California (Hassler et al., 1988)	X	-	-	X	-
Anadromous Salmonid Genetic Resources (Berger, 1982)	X	-	-	X	-
The Distribution of Six Selected Species from the Genera <i>Oncorhynchus</i> , <i>Salmo</i> , and <i>Salvelinus</i> in California (Lucoff, 1980)	-	-	X	-	-
Hereditary and Environmental Factors Affecting Certain Salmonid Populations (Ricker, 1972)	-	-	X	-	-

**Table 1: Sources and types of misinformation regarding the native origin of coho salmon south of San Francisco that permeate the “Recovery Strategy” (CDFG, 2003).**

**Figure 1** (below) presents the invalid citations<sup>6</sup> and citations of erroneous information<sup>7</sup> used to substantiate the misperception that coho are native south of San Francisco. The circles represent literature of current public or scientific discourse that incorrectly alleges that the historical<sup>8</sup> southern extent of coho salmon spawning range is south of San Francisco. The arrows indicate the material referenced to substantiate these claims. In addition to these references, all the documents presented here also cite personal communications and/or make unreferenced claims. For more details see **Table 1**.

<sup>6</sup> These are instances where the source does not support the cited assertion concerning the native origin of coho south of San Francisco.

<sup>7</sup> These are indirectly invalid citations, or instances where the source cited appears to substantiate the assertion concerning the native origin of coho south of San Francisco, yet, when traced to its origin, the claim has no basis.

<sup>8</sup> For the purposes of this discourse analysis, “historical” can be defined as predating 100 years. It should be noted that other authors have not been clear with their use of this word.

**Figure 1: The invalid citations<sup>6</sup> (red dashed lines) and citations of erroneous information<sup>7</sup> (blue solid lines) used to substantiate the misperception that coho are native south of San Francisco.**

CDFG cite Snyder (1931) and Fry (1973). Snyder (1931) does not discuss the southern extent of coho salmon, while Fry (1973) only describes the distribution of coho salmon in 1973, not historically. CDFG (2002) also cite Sandercock (1991) for a map they title "Native range of coho salmon" whereas Sandercock's (1991, Figure 1, pg. 398) caption reads, "Figure 1 Coastal and spawning distribution of coho salmon". He states, "Endemic populations of coho are found throughout the North Pacific basin (Figure 1)..." The resolution and scale of the original map is such that the southern range boundary is unclear in detail, but it appears to end at San Francisco Bay. Further, Sandercock (1991) gives no source, reference, nor citation for this statement and he does not discuss the historical distribution of coho.

Brown, et al. cite Snyder (1908). Snyder's 1908 document titled "The Fishes of the Coastal Streams of Oregon and northern California" does not concern anything south of the Sacramento River and makes no mention of any fish anywhere south of San Francisco.

Bryant changes Streig's words giving the false impressions that the Scott Creek egg taking station was established in 1905 to collect coho eggs, and that it was ever the goal to produce 3 million coho eggs. Neither is the case, which is evident in several California Fish and Game Commission Biennial Reports: (Newbert et al., 1918; Newbert et al., 1923; Newbert et al., 1913; Van Sicklen et al., 1910)

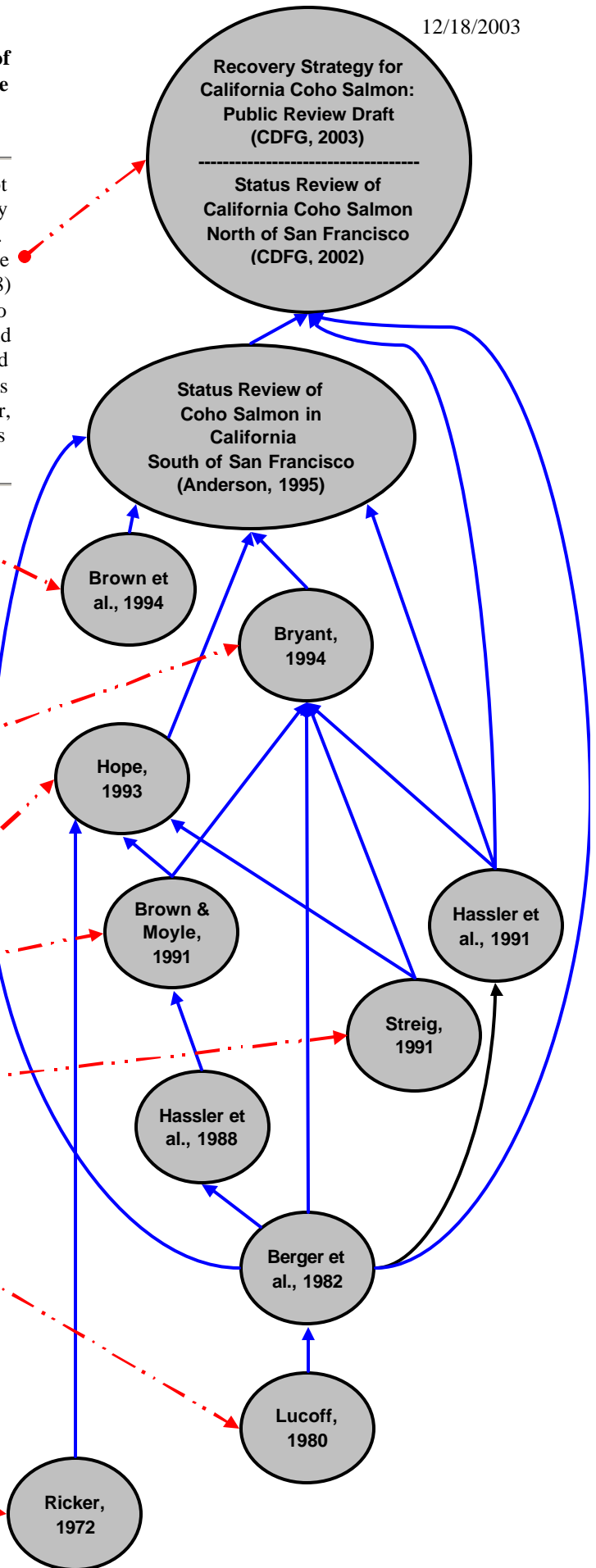
Hope cites Waples (1991). Waples (1991) does not comment on the coho south of San Francisco.

For the San Lorenzo River, Brown and Moyle cite a CDFG report (Johansen, 1975). This report contains only census figures for the early 1970s and does not comment on the native origin of any fish.

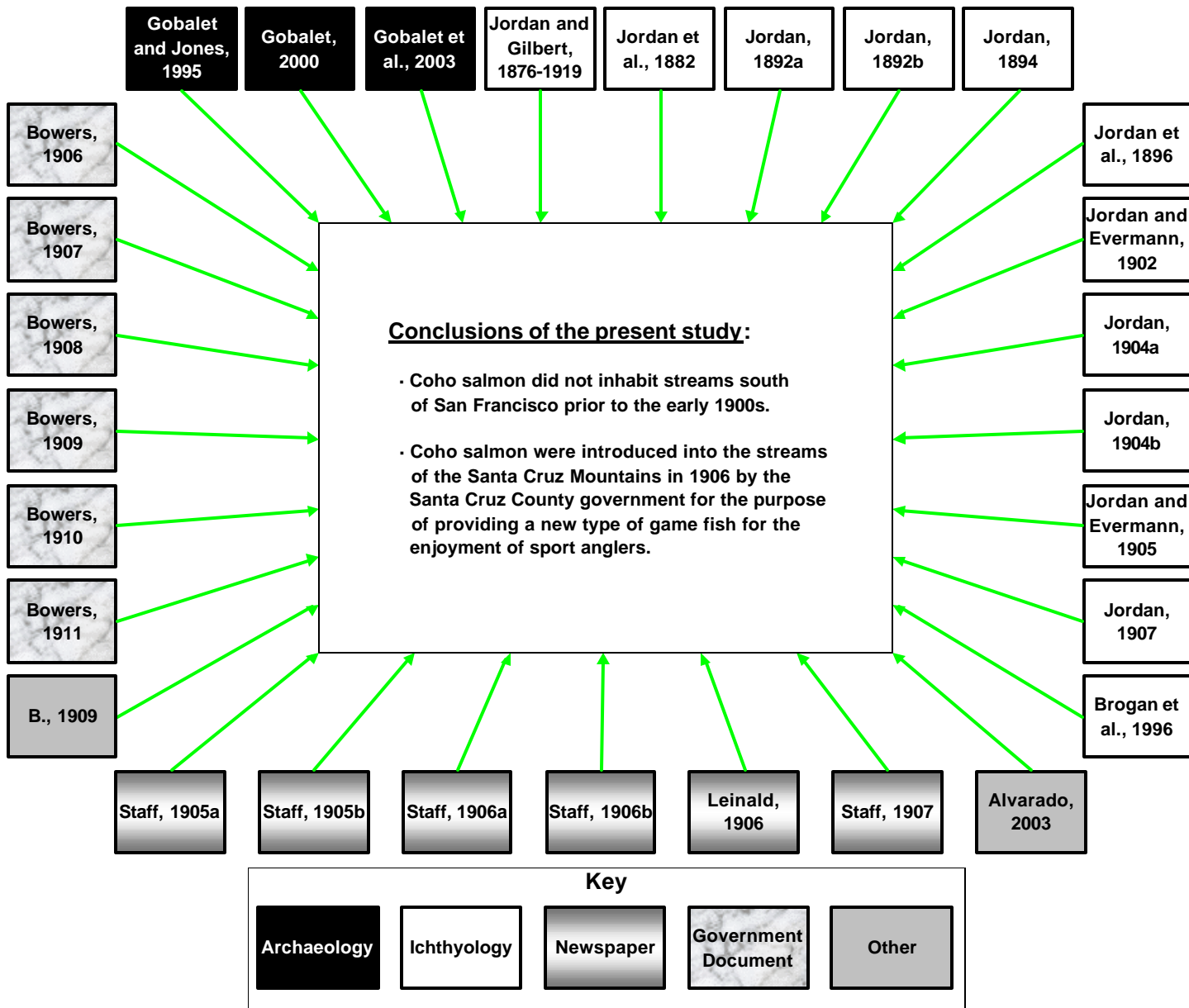
Streig cites only Shapovalov and Taft (1954). Shapovalov and Taft (1954) do not discuss the native origin of coho or steelhead in Scott and Waddell Creeks.

This document is a geography Master's thesis written by Lucoff (1980) at CSUH. He avers that Hallock ("1877, pp. 976, 756-57") mentioned silver salmon fishing in the Santa Maria River in Santa Barbara County and cites this as his source for a map showing the distribution of coho in 1900. Hallock (1877) does not contain a page 757. Furthermore, Hallock (1877) does not mention silver salmon fishing nor the Santa Maria River. Hallock does state the following: "Their [all known varieties of pacific salmon] range is from Sacramento northward..." (Hallock, 1877, pg. 365). Lucoff's map also shows coho as far south as the Santa Ynez River, for which he has no source, reference, citation, or other justification.

Ricker cites Shapovalov and Taft (1954). Shapovalov and Taft (1954) do not discuss the native origin of coho or steelhead in Scott and Waddell Creeks.



**Figure 2** (below) shows the sources used in this study to substantiate the nonnative origin of coho salmon in streams south of San Francisco. Although there are many more sources that add credibility to our conclusions, only primary references or references correctly citing primary references are shown here.



**Figure 2:** Legitimate citations used to substantiate the nonnative origin of coho salmon in streams south of San Francisco.

**INVALID POPULATION FIGURES WERE USED IN COHO LISTING DECISION**

The listing of coho south of San Francisco as an endangered species was the result of a petition by Hope (1993). The information on species census in the Hope (1993) petition is invalid. Hope cites numbers for current populations as well as populations during the 1930s and the 1800s, yet none of these figures satisfy the criteria for scientific conclusions.

The petitioner’s assertion of declines from 95% to 98% relative to estimated runs in the 1800s is baseless. He cites no sources except his own speculation to justify the 1800s figures.

All scientific evidence affirms that no coho salmon inhabited the streams south of San Francisco prior to 1906. Since their artificial introduction, all coho in the streams of the Santa Cruz Mountains are

the product of multiple plantings of exotic fish. Therefore, the population of native coho salmon south of San Francisco is and always has been zero.

### **1800s**

David Starr Jordan and other scientists of the late 1800s report that no native coho salmon existed south of San Francisco and this is substantiated by recent archeological investigations of the period from 6200 B.C. to 1830 A.D. Hope's (1993) population estimates are based on inaccuracies such as the assumption that the population during the 1800s equaled full utilization of all coho stream habitat south of San Francisco. His estimates are scientifically groundless, based on no data, and are in direct conflict with the personal contemporaneous observations of noted ichthyologist David Starr Jordan.

### **1930s**

Shapovalov and Taft (1954) count all spawning coho in Waddell Creek without concern or comment about their exotic origin or recent and current stocking. Thus, these data do not speak to the issue of the native origin or population trends of native coho.

### **1990s**

Since the Shapovalov and Taft study during the 1930s, there have been no facilities or programs in existence to determine a census of adult coho on any stream south of San Francisco<sup>9</sup>. The petition (Hope, 1993) mistakes reports of partial counts during a fraction of the spawning runs for total populations and cites anecdotal reports by anglers.

Population trends cited to justify listing ignore the history and assume, without any evidence, that coho in these streams are of native origin. The erroneous presumptions that natural coho populations ever existed south of San Francisco, that their populations are declining, and that hatchery coho die out quickly leaving only native fish, have led to gravely flawed management and public policy decisions.

### **Population Trends**

Of the known 3,669,134 coho salmon planted in Santa Cruz County since 1906 (Anderson, 1995; Bowers, 1906; Bowers, 1907; Bowers, 1908; Bowers, 1909; Bowers, 1910; Gordon et al., 1958), the majority (2,041,442) are of known exotic origin. Given the scientific record prior to 1906, the remaining 1,627,692 can only be introduced fish or their descendents. Genetically, these coho are, with a high certainty, all exotic regardless of where the eggs were taken.

## **IMPACT OF MANAGEMENT EFFORTS**

The erroneous listing of coho south of San Francisco is contrary to the Endangered Species Act and results in extensive negative impacts. A few examples follow.

### **Unnecessary listing wastes scarce public resources**

Considering the condition of the California State treasury, any expenditure to protect a nonexistent "endangered species" seems unnecessarily wasteful. During the past five years, California's expenditures have exceeded revenues by 18% and in November of this year the governor was recalled, in part because of public distaste for the government's fiscal irresponsibility. Within the past week, the State's bond rating has once again been downgraded to *Baa 1* (only 2 steps above *non-investment grade*), reducing borrowing capacity and further increasing the interest burden on the State's growing debt (Gigot, 2003).

<sup>9</sup> A new research weir was completed on Scotts Creek in October of this year by Sean Hayes of NOAA-Fisheries that is capable of obtaining fish census data similar to that of Shapovalov and Taft on Waddell Creek. Since the Scotts Creek sand bar is still closed at the time of this writing, the facility is untested, but new insight on local anadromous fish is anticipated.

Between 1981 and 2001, the California Department of Fish and Game Grants Program funded 2,803 coho habitat restoration projects costing the State taxpayers a total of \$82,955,592. This figure covers only grants to organizations outside the California Department of Fish and Game and does not include the money spent directly by State and local governments or private entities (CDFG, 2002). These enormous costs are dwarfed by the projected “Recovery Strategy” price tag for the Big Basin Hydrologic Unit (a delineation for the watersheds of coastal streams in Santa Cruz County) that exceeds a *quarter of a billion dollars* (CDFG, 2003, pg. 11-19).

This sum to “restore” the habitat of the nonnative coho salmon in these streams is incomprehensible, particularly by the State of California as it sags under its unprecedented debt. I will withhold comment on the astounding statewide “restoration” figure (a staggering \$5,061,514,739) except to observe that it seems totally unrealistic (CDFG, 2003, pg. 11-11).

### **Unnecessary listing of coho inhibits research and stream management**

The effects of restrictions, regulations, permit protocols, accidental take constraints, etc., resulting from the listing of anadromous fish in this area under CESA hinders stream management, wildlife protection and research programs. For example, a logjam on Waddell Creek has prevented normal adult fish migration for several years and is a danger to both coho and steelhead (Smith, 2003). Numerous conferences, letters, permit applications and other efforts have failed to elicit California Department of Fish and Game permission for a privately funded project to open the logjam. Fish biologist Smith, who studies Waddell Creek salmonids, is concerned that without prompt action, irreparable damage to the only year class of coho remaining on Waddell Creek will result (Smith, 2002; Smith, 2003).

### **Current restrictions inflict unnecessary burden on citizens**

Restrictive regulations consequent to the current improper listing are unnecessary. They create seriously disruptive, negative impacts on my family. Forest landowners, forest professionals, anglers, and others who use and enjoy these forests and streams are also adversely affected. Small business owners, homeowners, farmers, foresters, forest landowners, and people seeking recreation are experiencing an unnecessary devaluation of property, loss of freedom and employment, and general deterioration of their quality of life. We live under the threat of government action for removing a tree, maintaining our roads and driveways, clearing our power line easements and many other normal activities attendant to rural property ownership and use, all unnecessarily resulting from the invalid coho listing.

### **Exotic coho harm native species**

In addition to its damage to human values, introducing and sustaining a nonnative species is detrimental to the natural ecology of the streams and is counter to the objectives of the Endangered Species Act. The presence of exotic coho deleteriously impacts steelhead, a native species occupying a similar ecological niche. During parts of their life cycle, these two species compete for a common, limited spawning bed as well as a common food supply.

Since coho spawn earlier and their eggs are larger than those of steelhead, coho fingerlings start life with a size advantage, giving them a competitive edge over steelhead in food foraging. This frequently results in significant depletion of steelhead populations as the introduced coho thrive, to the native steelhead’s disadvantage. Smith (2002) provides a quantitative example with the following comment in his annual report of salmonid census of Gazos, Waddell and Scott(s) Creeks:

“YOY [young of year] steelhead abundance on [sic] sampled habitats on Scott(s) Creek was less than half that of coho and was similar to the low abundance found for 1993 and 1996 year classes when coho were also abundant. **High coho abundance appears to suppress steelhead on Scott Creek** [emphasis added] except possibly in wet years (1999)” (Smith, 2002).

It is inconsistent with the intent of the CESA to establish and sustain an alien species (coho in streams south of San Francisco) that clearly competes with and diminishes the survival of a native, listed species (steelhead).

### **Options for future management**

Since all coho in the streams south of San Francisco are exotic hatchery fish or their descendents (not native), they fail to meet the requirement for State protection as a listed species. I recommend that in recognition of this, all rules, restrictions, projects, expenditures and efforts to “restore” this nonnative population be reevaluated.

Diligent hatchery spawning, rearing and implantation by the privately operated, non-profit, Big Creek Fish Hatchery has demonstrated that a fragile population of coho can be artificially maintained in Scotts and possibly Waddell Creek. However, without continuous replanting, these colonies are temporary:

- “Maintenance and restoration of coho populations will require rebuilding weak or lost year classes, through transplants and/or hatcheries, not just through habitat conservation and restoration” (Smith, 1994, pg. 1).
- “The role of hatchery rearing again appears crucial to rebuilding 3 viable year classes. Alternatively, if the single strong year class is crippled or eliminated by drought or flood in 2002, coho will be essentially extirpated south of San Francisco Bay. Summer rearing conditions for coho are suitable in the 3 streams [Gazos, Scotts, and Waddell Creeks], which have cool, flat habitat” (Smith, 2001, pg. 6).

It is possible (if desired) to continue maintaining coho populations in selected streams by continuous hatchery replacement. The desirability of doing this in view of their competition with other listed species and the cost to the State and the community should be carefully evaluated.

The most useful management program would be to continue to take annual juvenile census (Jerry J. Smith, San Jose State University) and use the recently completed NOAA-Fisheries weir on Scotts Creek to track adult fish. This weir, the only facility of its kind in this area since Shapovalov and Taft’s landmark study of the 1930s, provides an opportunity to remove much of the speculation concerning the Santa Cruz Mountains anadromous fish. It could provide a window for scientific observation of a supplemented coho colony in this hostile environment at a minimum cost to the State taxpayers.

Whether to artificially maintain exotic coho populations in nonnative habitats is a public policy decision. If it is the public will, it is possible to do so, but this should not be confused with *restoration* of a *native* population.

### **LEGAL ASPECTS OF PRIVATE PROPERTY TAKING**

The confiscatory actions on water rights proposed in the “Recovery Strategy” would be nothing short of devastating to the survival and livelihood of my family and neighbors who live and work in the coastal range of the Santa Cruz Mountains. Recommendation BB-DA-01 (which addresses stream flow bypass requirements) could threaten not only diversion of surface water, but also use of wells in the Waddell, Scotts and San Vicente watersheds (CDFG, 2003, pg. 8-60). Recommendation BB-DA-02 (which proposes to declare Scott and San Vicente Creeks fully appropriated during summer and fall months) could be interpreted in such a way as to prevent any beneficial use of water from Scotts and San Vicente Creeks (CDFG, 2003, pg. 8-60). These constraints would seriously impact residential, farming and most other economic activity in these watersheds and significantly diminish property values. This

taking of private property for public use without just compensation violates the Fifth Amendment of the United States Constitution and Article 1, section 19 of the California Constitution.

### CONCLUSION

I am dismayed at the numerous unsubstantiated anecdotes and opinions upon which much of the "Restoration Strategy" is founded. The Commission is obligated to be certain that the quality of "scientific" and "historic" information used to justify important policy decisions meets professional standards of accuracy and verifiability. A more professional system of peer review and quality control than is now evident for information underlying policy decisions is essential if the Fish and Game Commission is to answer to the public for its actions.

It is an inexcusable waste of public and private resources to impose onerous restrictions on lands and streams of the Santa Cruz Mountains to protect a non-existent "endangered species". It is expensive to this financially stressed State and has a huge impact on property owners, resource managers, researchers and the public. It can also be dangerous to other species whose native origin is not in question, such as steelhead. In the near future, a petition will be submitted to the California Fish and Game Commission to delist coho salmon south of San Francisco.

Until coho south of San Francisco are removed from the endangered list, I urge the Commission not to compound the problem by imposing the restrictive conditions recommended by the "Recovery Strategy for California Coho Salmon" and to find ways to reduce the unnecessary restrictions currently in force that interfere with stream and resource conservation, fisheries research and the productive use and enjoyment of private lands.

Respectfully submitted,



Homer T. McCrary  
Vice President  
Big Creek Lumber Co.

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H.T.M.

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