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November 6, 2003

Mr. Rodney McInnis
Acting Regional Administrator
NOAA Fisheries, Southwest Region
501 W. Ocean Blvd., Suite 4200
Long Beach, CA 90802-4213

Subject: Petition to redefine the southern extent of the Central California Coho ESU

Dear Mr. McInnis,

I respectfully submit the enclosed petition to redefine the southern boundary of the California Central Coast Coho ESU.

My credentials and those of my family in conservation of our natural environment are well established. I am a fourth generation resident, forestland owner and forest products business manager in the coastal range of northern Santa Cruz County. My family and I pioneered some of the earliest work in sustainable redwood forest management practices in Central California and our interest in the natural history of this area goes back several generations. For example, in his 1910 diary my maternal grandfather, Vid Trumbo, recounts his work with Stanford University scientist Dr. Charles Gilbert on some of the earliest academic salmonid studies in this area. Later, my father, Frank McCrary Sr., assisted in the 1927, construction and operation of the State fish hatchery on Big Creek, a tributary to Scotts Creek, near my boyhood home. This facility operated until 1940 and my family now provides the same land to the Monterey Bay Salmon and Trout Project, fish hatchery. In addition, we are presently sponsoring several independent, professional studies on local, natural history issues.

I, along with other long-time, local residents, have come to the realization that coho salmon are most likely exotic to these streams. This belief is confirmed by a recent, intensive, five month long review of the history of California fish culture and further supported by many years of archeological geologic and climatologic study, that present a coherent scenario of the hatchery origin and maintenance of Santa Cruz Mountains coho.

I find that Coho south of San Francisco do not meet the NOAA criteria to be protected as threatened under the federal Endangered Species Act. Hence, with the legal help and advice of the Pacific Legal Foundation, I have stated our scientific, historic and legal position in the enclosed petition.

I look forward to your response to this petition within the next 90 days.

Sincerely,

Homer T. McCrary
Santa Cruz Mountains Forestland Owner

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310 Swanton Road, Davenport, CA 95017
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6 November 2003

PETITION TO REDEFINE THE SOUTHERN EXTENT OF THE CENTRAL CALIFORNIA COHO ESU

CONTENTS

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6 November 2003

Mr. Rodney McInnis
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***RE*: PETITION TO REDEFINE THE SOUTHERN EXTENT OF THE CENTRAL CALIFORNIA COHO ESU**

Dear Mr. McInnis,

Pursuant to 5 U.S.C. § 553(e); 16 U.S.C. § 1533(b)(3)(A); and 50 C.F.R. § 424.11, I, (Homer T. McCrary) as a forestland and forest-products business owner in the Santa Cruz Mountains, hereby petition NOAA-Fisheries (National Marine Fisheries Service, NMFS) to redefine the southern boundary of the Central California Coho ESU [Federal Register 61, 56138, Oct. 31, 1996 and Federal Register 62, 1296-7, Jan. 9, 1997] so as to exclude that portion of the ESU south of San Francisco Bay. A comprehensive investigation exploring a diversity of historic records of California fisheries has determined that coho salmon were not present in streams south of San Francisco Bay prior to their artificial introduction in 1906 from Baker Lake, Washington by Frank Shebley, superintendent of the Santa Cruz County, Brookdale Fish Hatchery. Although highly publicized at that time, this project to create a new sport fishing opportunity for the enjoyment of anglers has faded from public memory.

The conclusive history concerning the non-native origin of the coho of the Santa Cruz Mountains is supported 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. Coho salmon are not native and were not introduced to the streams south of San Francisco prior to 1906. The transplanted, artificially maintained coho populations in these streams could not constitute *an important component in the evolutionary legacy of the species*, (56 FR 58612, Nov. 20, 1991) thereby invalidating any justification for listing them as a threatened species south of San Francisco Bay.[1]

NOAA-Fisheries is obligated by the Endangered Species Act (ESA) to list species pursuant to the legal requirements of the Act and "solely on the basis of the best scientific and commercial data available" 16 U.S.C. § 1533(b)(l)(A). Likewise, NOAA-Fisheries is obligated

[1] The ESA defines "species" to include "any subspecies of fish or wildlife or plants and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature" 16 U.S.C 1352(16). NOAA-Fisheries introduced the term evolutionarily significant unit or ESU to interpret the ESA's meaning of distinct population segment as it relates to Pacific Salmon in 56FR 58,613, Nov. 20, 1991. A stock must satisfy two criteria to be considered an ESU. First, it must be substantially reproductively isolated from other conspecific population units. Second, it must represent an important component in the evolutionary legacy of the species.

to review periodically such listings and remove any such species upon the determination that these legal and factual criteria are no longer met. 16 U.S.C. § 1533 (a)(l), (b)(7)(A), (b)(1)(B)(3), (c)(2), (b)(1); 50 C.F.R. § 424.11(d). Specifically, NOAA-Fisheries regulations state that the "factors considered in delisting a species are those in paragraph (c) of this section, as they relate to the definition of endangered or threatened species [emphasis added]. Such removal must be supported by the best scientific and commercial data available". A species ceases to be threatened or endangered if "subsequent investigations may show that the best scientific or commercial data available when the species was listed, or the interpretation of such data, were in error" 50 C.F.R. §424.1 l.

The scientific and historic research reported in this petition clearly shows that the basis for listing these coho is in error. The exotic coho that have been transplanted into this hostile environment may appear, to an uninformed observer, as a threatened, native species, but the facts presented here show this to be erroneous. Therefore, coho south of San Francisco must not be classified as threatened under the Endangered Species Act.

Listing inflicts unnecessary harm on humans

Restrictive regulations consequent to their current improper listing are unnecessary. They create seriously disruptive, negative impacts on my family and all forestland owners, forest professionals, anglers, and others who use and enjoy these forests and streams. Small business owners, homeowners, farmers, foresters, forest landowners, and citizens 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 federal 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. A serious concern is that 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 fry 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. Dr. Jerry J. Smith 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 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 ESA to establish and sustain an alien species (coho) that clearly competes with and diminishes the survival of a native, listed species (steelhead).

HISTORICAL STUDIES SHOW THE SOUTHERN BOUNDARY OF THE CENTRAL CALIFORNIA COHO HABITAT RANGE TO BE AT, OR NORTH OF SAN FRANCISCO BAY

An intensive historic and scientific literature search of anadromous fish inhabiting the coastal streams of the Santa Cruz Mountains leaves little possibility that coho salmon were resident in any of these steams prior to the government program begun in 1906. This program sought to introduce coho in hopes of creating a new game fish stock for the benefit of sport anglers.

Nearly a century of artificial stream stocking overlaid with politically motivated rhetoric and the unscientific, unsubstantiated folklore of generations of anglers has obscured the truth about coho salmon in this locale. The hatchery coho from a multiplicity of genetic stocks persist only because of continuous restocking. These fish do not and could not comprise *an important component in the evolutionary legacy of the species*.

Historic evidence overwhelmingly demonstrates that coho are not native to streams south of San Francisco Bay

No valid historic or scientific source has ever been cited showing the existence of coho south of San Francisco prior to 1912, for the simple reason that they are not native and were not introduced to the area until 1906. All valid scientific studies done prior to 1906 unequivocally attest to the absence of coho salmon south of San Francisco (Jordan and Gilbert, 1876; Jordan, Gilbert and Hubbs, 1882; Jordan, 1892a; Jordan, 1892b; Jordan, 1894; Jordan, Evermann and Museum, 1896; Jordan and Evermann, 1902; Jordan, 1904; Jordan, 1904a; Jordan and Evermann, 1905; Brogan, et al., 1996; Alvarado, 2003). United States Bureau of Fisheries documents and numerous local newspaper and popular magazine articles confirm the introduction of coho salmon to Santa Cruz Mountain streams in 1906 (Staff, 1905g; Staff, 1905h; Bowers, 1906; Leinald, 1906; Smith, 1895; Staff, 1906b; Staff, 1906c; Staff, 1906d; Bowers, 1907; Staff, 1907; Jordan, 1907a; Bowers, 1908; Bowers, 1909; Bowers, 1910; Van Sicklen, et al., 1910; Bowers, 1911). Frequent hatchery stocking has since obscured any realistic coho population estimates (Shebley, 1922; Streig, 1991). The subject has occasionally been obfuscated by erroneous, unsubstantiated, or scientifically unsound reports. These reports were given credence at the time they were published, in the absence of any critical analysis. Unfortunately they have since been casually referenced in a few subsequent publications (see Appendix D).

The first scientific study addressing the extent of coho salmon habitat range in California was undertaken by the preeminent biologists, 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 to undertake a survey of the fisheries of the Pacific Coast of the United States. Their one-year pioneering survey resulted in a scrupulously researched description of every known fish of the Pacific coast, a monumental work that 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, substantiating scientific publications:

> "Oncorhynchus kisutch… Sacramento river to Puget Sound and northward…" (Jordan and Gilbert, 1876, pg. 39).

"O. kisutch… Abundant from San Francisco northward" (Jordan, Gilbert and Hubbs, 1882, pg. 308).

"All the species [*Oncorhynchus spp.*] have been seen by us in the Columbia and Fraser River… Only the king salmon [*Oncorhynchus tschawytscha*] 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, Evermann and Museum, 1896).

"[*Oncorhynchus kitsch*] is abundant from San Francisco northward" (Jordan, 1904a, pg. 154; Jordan and Evermann, 1905).

"Only the quinnat [*Oncorhynchus tschawytscha*] and the dog salmon [*Oncorhynchus keta*] have been noticed south of San Francisco" (Jordan, 1904; Jordan, 1907a).

"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).

Clearly, world renown scientists, including David Starr Jordan (noted ichthyologist and president of Stanford University; see Appendix F), who were thoroughly familiar with the Santa Cruz Mountains found no coho south of San Francisco prior to their introduction in 1906.

Introduction of coho south of San Francisco in 1906

Introduction of species by fish culturists has, until recently, been energetically promoted by government at all levels (with enthusiastic popular support) 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, 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 large numbers of salmonid species of different origins being transplanted to and from Santa Cruz Mountain streams since 1909 (Van Sicklen, et al., 1910, pg. 100; Streig, 1991).

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 very experienced fish culturist, having been previously employed by the state fish commission and was the son of W. H. Shebley, fish cultural pioneer and superintendent of all state hatcheries. F. A. Shebley also kept in close contact and was good friends with ichthyologist Charles H. Gilbert (Gilbert, 1880-1927). 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 were not found, U.S. Bureau of Fisheries reported shipments of silver (coho) salmon eggs to the Brookdale Hatchery from 1906 to 1910 (See Appendix A). The record (Bowers, 1906) shows that in 1906, 239,106 coho salmon eggs were shipped from the Birdsview substation of the Baker Lake Hatchery in Washington State, of which 50,000 were sent to the Santa Cruz County Brookdale Fish Hatchery.

The accounts of some of the world's leading ichthyologists prior to the establishment of the Brookdale Hatchery show that coho salmon were not present. They were introduced to coastal streams South of San Francisco in 1906. 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 introducing a new species to this area:

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, 1905h).

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, 1906d).

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 confirms that those involved in hatching, raising and planting these fish in the streams of the Santa Cruz Mountains understood (as did David Starr Jordan, Charles H. 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.

(Additional newspaper and magazine accounts are presented in Appendix B.)

First valid local coho sighted in 1912

The first credible scientific mention of coho salmon south of San Francisco appears in the 1912 bulletin of the U.S. Bureau of Fisheries. Ichthyologist John Otterbein Snyder, a student of David Starr Jordan's, performed a survey of the fish inhabiting the streams tributary to the Monterey Bay (Snyder, 1914). Snyder (not surprisingly) reported a secondhand sighting of coho in the San Lorenzo river which was a predictable result of the Brookdale, 1906 and subsequent hatchery plantings.

Snyder's one-sentence treatment of the species 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 his direct observations and does not mention the artificial stocking beginning in 1906. Nonetheless, this terse reference has been used as proof of native origin, thereby laying the foundation for an erroneous chain of assumptions that persists to the present day (see Appendix D).

Snyder's findings from this study are summarized in a table taken from his report and presented in Appendix C.

Results of historic study

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

- The best scientific and commercial data available show that 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.

ARCHEOLOGISTS FIND NO COHO SALMON REMAINS IN THE DIET OF PEOPLE NATIVE TO THE SANTA CRUZ MOUNTAINS PRIOR TO CONTACT WITH EUROPEANS

The consistent historic account is compellingly 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 steelhead and 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 tell of 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 and Jones, 1995; Gobalet, 2000; 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 the Central Coast Coho ESU identified over 80 species of ocean and fresh water fish from among 77,000 fish remains recovered from 51 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 natives along the central coast south of San Francisco, *salmon were not found to be part of these people's 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[2] 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.

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[2] 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.

PHYSICAL REASONS THAT THE STREAMS OF THE SANTA CRUZ MOUNTAINS DO NOT SUPPORT PERMANENT COHO POPULATIONS

The historic record recounted herein demonstrates that coho were not present in the streams of the Santa Cruz Mountains prior to their artificial introduction in 1906. This comes as no surprise to people who have lived and observed the area for many decades and 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, weathered granitic substrate, and ongoing tectonic uplift) are subject to frequent weather and geologic events that impact coho habitats.

> "Without erosion and landsliding [sic], 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 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, 1999b).

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[3] 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, 1995; Smith, et al., 1997; Smith, 1998; see Appendix E).

Since coho spawn on a rigid three-year lifecycle and die immediately thereafter, a missing generation leaves one of the three-year classes vacant. It can remain 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 easily 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. On the contrary, the rigid coho life cycle allows them only one chance to reproduce and thus, prevents nearly all interbreeding between generations, severely limiting their ability to reestablish a lost year class. Thus, steelhead naturally flourish in the streams of the Santa Cruz Mountains and coho, for the reasons cited, do not (Baker, et al. 1998; Jordan and Gilbert, 1876; Jordan, Gilbert and Hubbs, 1882; Jordan, 1892a; Jordan, 1892b; Jordan, 1894; Jordan, Evermann and Museum, 1896; Jordan and Evermann, 1902; Jordan, 1904; Jordan, 1904a; Jordan and Evermann, 1905; Shapovalov and Taft, 1954; Davis and Smith, 1993; Smith, 1992; Smith, 1994; Smith, 1995; Smith, et al., 1997; Smith, 1998; Smith, 2000; see Appendix E).

[3] 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).

A year class of coho which may have occasionally been started by strays[4] (Shapovalov and Taft, 1954) or human intervention could flourish for a few years, but would inevitably succumb to one of these natural stochastic events[5]. Thus, prior to the practice of frequent stocking, beginning in 1906, these streams could possibly have sustained ephemeral, but not permanent coho populations. However, there is absolutely no scientific evidence that indicates even ephemeral populations existed at any time prior to stocking.

INTERPRETATION OF NOAA POLICY ON PROTECTION OF AN EXOTIC FISH POPULATION TRANSPLANTED INTO A HOSTILE, NON-NATIVE HABITAT

The historic and scientific facts presented herein demonstrate that coho salmon were not present in the streams south of San Francisco prior to transplantation from Baker Lake, Washington in 1906 and from many other sources at frequent intervals since. In this hostile environment, a year class of transplanted coho is frequently extirpated by stochastic events such as floods, droughts, etc. (Baker, et al. 1998; Davis and Smith, 1993; Smith, 1992; Smith, 1994; Smith, 1995; Smith, et al., 1997; Smith, 1998; see Appendix E). The artificial replenishment of fish in these streams gives the illusion of a native species struggling to persist. This misapprehension does not justify threatened listing.

NOAA Technical Memorandum NMFS F/NWC-194, Definition of "Species" Under the Endangered Species Act: Application to Pacific Salmon (Waples, 1991) provides guidelines and rules to clarify the meaning of *species* and evolutionary significant units (ESU) as applied to the federal Endangered Species Act of 1973. It examines a range of situations but is manifestly not intended to protect nonnative fish in unsuitable habitats that have never hosted a natural population, such as the exotic coho that have been transplanted to the streams south of San Francisco. The listing of coho salmon south of San Francisco as threatened is contrary in several respects with NOAA policy (Waples, 1991).

The evolutionary legacy criterion

The population of coho in streams south of San Francisco does not meet the second of the two NOAA Fisheries criteria for listing a species:

> "It must represent an important component in the evolutionary legacy of the species" (Waples, 1991, summary)

Since no coho populated these streams prior to 1906, and any and all coho now present in streams south of San Francisco are either exotic fish or the recent descendants of exotic fish, they do not possess or carry an evolutionary legacy, and thus, do not qualify for federal listing.

Would genetic diversity suffer from extinction [extirpation] of this population?

The NOAA policy (Waples, 1991) poses the following question to help determine if a population needs federal protection:

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[4] 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.

[5] 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).

> "If the population became extinct, would this represent a significant loss to the ecological/genetic diversity of the species?" (Waples, 1991, summary)

As applied to coho salmon south of San Francisco, the answer to this question is unequivocally no. Since all coho in these streams are of recent, exotic origin, they do not carry any unique genetic heritage.

The NOAA policy does not protect exotic fish in habitats that do not naturally support them

The NOAA policy (Waples, 1991) is clear that the act is not intended to conserve nonnative fish in unnatural habitats.

> "…fish hatcheries do not provide a substitute for natural ecosystems that the Act mandates the Department to conserve. The role of artificial propagation under the Act is to restore populations in natural habitats to the point where they can be removed from formal ESA protection" (Waples, 1991, section III D)

Since these steams are not *natural habitat* for coho and all coho in these streams are of exotic origin, dependent on hatchery plantings, restoration is meaningless. Thus, there is no basis for federal listing according to this policy statement.

CONCLUSION

The historic literature cited herein presents a clear timeline of coho presence in the streams south of San Francisco. It shows that there were no coho present prior to their introduction as a game stock in 1906. Frequent subsequent hatchery infusions have resulted in intermittent populations of multi-origin, nonnative fish in some streams. Archeological research is consistent with the historic timeline, finding no coho salmon in the native people's diet during the 8,000 years prior to 1830 A. D. Both the historic and archeological information are consistent with the physical and climatologic character of the streams of the Santa Cruz Mountains (extremely volatile conditions that are hostile to permanent coho habitation).

In 1906, Shebley's introduction of coho to these streams followed by the subsequent hatchery maintenance of coho stocks served a prevailing public policy to provide ample numbers of a wide variety of game fish for the enjoyment of sport fishermen. This course was followed until the recently intensified concern with genetic preservation of native species. A policy change emphasizing genetic conservation and the unfortunate mistaking of these exotic coho for a natural population led to their listing as threatened under the federal ESA.

The current public policy is to preserve populations in natural habitats that are an important component in the evolutionary legacy of a species, and therefore to protect them from exotic incursions, listing and protecting exotic coho in this unnatural habitat is not appropriate. Should public policy change such that maintaining a permanent exotic coho population is desired, it could be accomplished without federal protection, by continuous hatchery infusions, but that is not consistent with our understanding of the present public policy or current federal law.

As set forth herein, coho salmon in streams south of San Francisco fail to meet the NOAA requirements for federal protection under the ESA. (56 FR 58612) (F/NWC-194). The

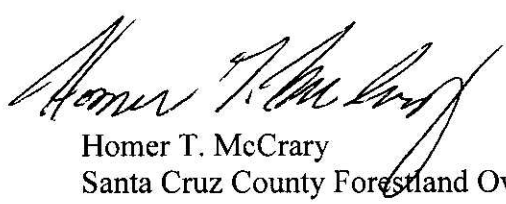
multi-origin, transplanted coho stocks in the streams south of San Francisco Bay are not natural or permanent populations *nor an important component of the evolutionary legacy of the species* and fail to meet NOAA Fisheries criteria for federal protection.

PETITION

For the reasons set forth herein, I (Homer T. McCrary) hereby petition NOAA-Fisheries to correct the southern boundary of the Central California Coho ESU to exclude coastal waterways south of San Francisco Bay (The Santa Cruz Mountains area) from this ESU since the best available historic and scientific information clearly demonstrates that it has never naturally supported and is incapable of naturally supporting a population of coho salmon and the exotic, hatchery coho that are or have been present could not comprise *an important component in the evolutionary legacy of the species*.

Pursuant to 5 U.S.C. § 553(e) and 16 U.S.C. § 1533(b)(3)(A), interested parties have the right to petition NOAA-Fisheries to reconsider listing actions. NOAA-Fisheries must then, to the maximum extent practicable, within 90 days of receipt of said petition, make a finding as to whether the petition merits review. 16 U.S.C. § 1533(b)(3)(A). If so, NOAA-Fisheries must review the petition and make a decision thereon within 12 months of receipt of the original petition. I look forward to your response to this petition within ninety days of its receipt.

Sincerely,



Homer T. McCrary
Santa Cruz County Forestland Owner

APPENDICES

To The November 6, 2003
Petition to Redefine The Southern Extent of the Central California Coho ESU

APPENDIX A: **U. S. Bureau of Fisheries Records of the Distribution of Fish Eggs Produced By Their Hatcheries Circa Their Introduction to the Coastal Streams South of San Francisco in 1906**

APPENDIX B: **Some News Reports of the Advent of Coho Salmon South of San Francisco**

APPENDIX C: **John Snyder's Table Indicating the Observation of Coho Salmon in the San Lorenzo River**

APPENDIX D: **Some Causes of the Prevalent Misunderstandings Regarding the Exotic Origin of Coho Salmon South of San Francisco**

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APPENDIX F: **Short Biography of David Starr Jordan**

Appendix A

U. S. Bureau of Fisheries Records of the Distribution of Fish Eggs Produced By Their Hatcheries Circa Their Introduction to the Coastal Streams South of San Francisco in 1906

In 1906, 239,106 coho salmon eggs were shipped out of the Birdsview substation of the Baker Lake Hatchery in Washington State. No other coho salmon eggs were shipped out of any U.S. Bureau of Fisheries station for that year. That same year, the Santa Cruz County Brookdale Fish Hatchery received 50,000 coho salmon eggs from the U.S. Bureau of Fisheries. No other location in California received coho salmon eggs from the U.S. Bureau of Fisheries that year (Figure 2) and the California Fish Commission had not yet begun to distribute coho salmon eggs (Shebley, 1922, pg. 96). Therefore, we can confidently conclude that the coho salmon eggs received at the Brookdale Hatchery came from the Baker Lake Hatchery.

14 DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1906.

12 with Pacific salmons, and 29 with rainbow trout, blackspotted trout, brook trout, grayling, black bass, crappie, sunfish, etc.:

STATIONS OF THE BUREAU OF FISHERIES AND THE OUTPUT OF EACH IN THE FISCAL YEAR 1906.

Stations.	Species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Baird, Cal.	Chinook salmon	25,743,770	3,488,552	
	Rainbow trout	19,500	7,715	138
Battle Creek substation	Chinook salmon	49,032,375		
Mill Creek substation	Chinook salmon	33,110,800		
Baker Lake, Wash.	Chinook salmon		44,953	
	Blueback salmon	122,500	3,285,130	
	Silver salmon		4,427,145	
Birdsview substation[a]	Chinook salmon		83,437	
	Blueback salmon			9,500
	Silver salmon	239,180	2,018,429	14,840
	Humpback salmon	2,000	969,990	
	Steelhead trout	103,000	540,000	

20 DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1906.

DETAILS OF DISTRIBUTION OF FISH AND EGGS DURING THE FISCAL YEAR 1906—Con.

SILVER SALMON.

California:			
Brookdale, Santa Cruz County Hatchery	50,000		
Maine:			
East Orland, Alamoosook Lake			3,000
Craig Pond			1,000
Heart Pond			1,000
Toddy Pond			3,000
Michigan:			
Detroit, Belle Isle Aquarium	10,000		
New Hampshire:			
Laconia, New Hampshire Fish Commission	90,000		
Oregon:			
Clackamas, Clackamas River			300
Washington:			
Baker Lake Station, Lower Baker River		4,427,145	
Birdsview, Grandy Creek		900,000	14,840
Phinney Creek		1,118,429	
Argentina:			
Buenos Aires, Argentine Government	89,180		
Total	239,180	6,445,574	23,140

Figure 2: U.S. Bureau of Fisheries distribution of fish and eggs during the fiscal year 1906 (Bowers, 1906, pg. 14 & 20).

The following year the Brookdale Hatchery received 100,000 coho salmon eggs and was again the only recipient in California of U.S. Bureau of Fisheries coho salmon eggs (Figure 3).

DETAILS OF DISTRIBUTION OF FISH AND EGGS—Continued.

SILVER SALMON.

California:			Washington—Continued.		
Brookdale, Santa Cruz County hatchery	100,000		Baker Lake station, Baker River		60,000
Michigan:			Baker Lake station, Lower Baker River		678,352
Detroit, Belle Isle aquarium	10,000		Birdsview, Grandy Creek		2,493,600
New Hampshire:			Birdsview, Phinney Creek		145,000
Laconia, New Hampshire Fish Commission	50,000		Total	160,000	3,636,952
Washington:					
Baker Lake station, Baker Lake		260,000			

Figure 3: U.S. Bureau of Fisheries distribution of fish and eggs during the fiscal year 1907 (Bowers, 1907, pg. 19).

The same situation occurred in 1908 and 1909, except that in 1909 Brookdale received only 50,000 coho salmon eggs (Figures 4 and 5). In 1910 the Brookdale Hatchery supposedly received 200,000 coho salmon eggs, although it appears from the redundancy in the report that there was a clerical error and they actually received only 100,000 (Figure 6).

DETAILS OF DISTRIBUTION—Continued.

SILVER SALMON.

California:			
Brookdale, Santa Cruz County Hatchery	100,000		
Oregon:			
Clackamas, Clackamas River			57,932
Findley Eddy Station, Limpey Creek		85,000	
Rogue River Station, Elk Creek		68,000	
Wilderville, Applegate River		5,000	
Pennsylvania:			
Pleasant Mount, Pennsylvania Fish Commission	100,000		
Washington:			
Baker Lake Station, Baker Lake		9,681,000	
Lower Baker River		800,000	
Birdsview, Baker River		35,000	
Skagit River		2,686,714	
Grandy Creek		20,000	
Jackman Creek		40,000	
Argentina:			
Buenos Aires, Argentine Government	96,000		
Total	296,000	13,420,714	57,932

Figure 4: U.S. Bureau of Fisheries distribution of fish and eggs during the fiscal year 1908 (Bowers, 1908, pg. 23).

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SILVER SALMON.

Disposition.	Eggs.	Fry.	Disposition.	Eggs.	Fry.
Alaska:			Oregon—Continued.		
Yes Bay, Yes Lake		9,900	Wilderness, Applegate River		10,500
California:			Wilderville, Applegate River		6,000
Brookdale, Santa Cruz County Hatchery	50,000		Pennsylvania:		
New Hampshire:			Pleasant Mount, Pennsylvania Fish Commission	75,000	
Laconia, New Hampshire Fish Commission	50,000		Washington:		
New York:			Baker, Baker Lake		5,867,460
New York, New York Aquarium	5,000		Birdsview, Day Creek		73,695
Oregon:			Grandy Creek		1,289,955
Cazadero Clackamas River		1,156,915	Grandy Lake		250,000
Medford, Bear Creek		4,500	Phinney Creek		180,000
Rogue River—			Argentina:		
Elk Creek, West Branch		104,000	Argentine Government, Buenos Aires	92,000	
R[illegible] River		347,000			
Trail Creek		40,000	Total	272,000	9,470,925
Trail, Rogue River		131,000			

Figure 5: U.S. Bureau of Fisheries distribution of fish and eggs during the fiscal year 1909 (Bowers, 1909, pg. 22).

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SILVER SALMON.

California:			Washington:		
Brookdale, San Lorenzo River	100,000	.....	Baker, Baker Lake	.....	5,308,848
			Lower Baker River	.....	500,000
Santa Cruz County Hatchery	100,000	.....	Birdsview, Grandy Creek	.....	5,079,177
Pennsylvania:			Argentina:		
Pleasant Mount, State Fish Commission	75,000	.....	Buenos Aires, Argentine Government	100,000	.....
			Total	375,000	10,888,025

Figure 6: U.S. Bureau of Fisheries distribution of fish and eggs during the fiscal year 1910 (Bowers, 1910, pg. 29).

In 1912 operations at the Brookdale Hatchery were taken over by the California Fish Commission. Although the U.S. Bureau of Fisheries did not report the details of distribution for that year, the report shows that the California Fish Commission received 2,289,900 coho salmon eggs (Figure 7).

Of these distributions 550,470,414 eggs, 1,029,800 fry, and 1,060 larger fish were delivered to various State fish commissions, and 86,000 eggs, 6,000,000 fry, and 2,050 older fish were furnished for shipment to foreign countries. These transactions are shown in detail in the accompanying statements:

ALLOTMENTS OF FISH AND EGGS TO STATE FISH COMMISSIONS, FISCAL YEAR 1911.

States and species.	Eggs.	Fry.	Fingerlings.
California:			
Chinook salmon	32,952,514	.....	.....
Silver salmon	2,289,900	.....	.....
Colorado:			
Blackspotted trout	200,000	.....	.....
Connecticut:			
Yellow perch	5,200,000	.....	.....
White perch	15,000,000	.....	.....
Pike perch	2,000,000	.....	.....
Illinois:			
[illegible]	8,000,000	.....	.....

Figure 7: U.S. Bureau of Fisheries distribution of fish and eggs during the fiscal year 1911 (Bowers, 1911, pg. 7).

Appendix B

Some News Reports of the Advent of Coho Salmon South of San Francisco

Below are a few of the numerous reports from local newspapers documenting the enthusiastic debut of the (previously nonexistent) coho salmon colonies in local streams by the Santa Cruz County Brookdale Hatchery.

THE MOUNTAIN ECHO: DECEMBER 16, 1905

Superintendent Frank A. Shebley showed us over the plant and explained the work done and in contemplation, like the practical enthusiast that he is. He informed us that he expects to receive 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 last named fish are native of the more northern waters from Puget Sound northward and run up the smaller streams of those waters like the steelheads 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, 1905g)

The Mountain Echo: January 27, 1906

Frank A. Shebley, A. H. Breed, and Judge J. H. Logan were up from Brookdale Friday afternoon, in company with Dr. Foster, Secretary of the State Board of Health.

Superintendent Shebley, of the Brookdale fish hatchery, has received word that a half million silver [coho] **salmon eggs will be shipped to him about the 1st of February from the Government Hatchery in the state of Washington.** [emphasis added]

(Staff, 1906b).

The Santa Cruz Morning Sentinel: March 7, 1906

Mr. Shebley has 50,000 silver [coho] **salmon eggs from Baker Lake, Wash., which will be hatched out in a short while.** [emphasis added] Half a million King and Quinaiutt Lake salmon [sic] are ready for distribution, together with three quarters of a million steelhead.

(Staff, 1906c).

The Santa Cruz Morning Sentinel: March 28, 1906

Disciples of Izaak Walton are pouring into **Boulder Creek – streams stocked with fish.** [emphasis added]

The difficulties attending the work were many and the proper distribution was only accomplished in the face of many obstacles. In one case a stream long since depleted was stocked by means of a 5-gallon oil can filled with fish and attached to a rope, by means of which they were raised over a falls 50 feet high and safely planted in their future home. Eight thousand fry were by this means planted in a little stream that used to be a favorite fishing grounds for the old residents, who tell some wonderful stories of reputed catches in its waters.

… **Waddell and headwaters of the San Vicente are all within easy striking distance, heavily stocked with fry and promise full creels.**" [emphasis added]

(Leinald, 1906).

THE MOUNTAIN ECHO: NOVEMBER 2, 1907

Superintendent Shebley expects shipments of salmon eggs next week from the McCloud river hatchery, and from Baker Lake, Wash. [emphasis added] The salmon hatching season will soon be under way.

(Staff, 1907).

Appendix C

John Snyder's Table Indicating the Observation of Coho Salmon in the San Lorenzo River

Although Snyder's survey extended as far south as the Salinas basin, interestingly, no coho salmon were observed in any other streams, further verifying their absence south of the San Lorenzo River.

TABLE SHOWING DISTRIBUTION OF SPECIES IN THE PAJARO SYSTEM.

	Entosphenus tridentatus.	Catostomus santaluciæ.	Orthodon microlepidotus.	Lavinia arcticus.	Pycnichthys gracilis.	Hesperoleucus symmetricus.	Agosia carringtoni.	Salmo irideus.	Oncorhynchus tschawytscha.	Oncorhynchus kisutch.	Gasterosteus cataphractus.	Archoplites interruptus.	Hysterocarpus traski.	Cottus asper.	Cottus aleuticus.	Cottus gulosus.
San Lorenzo Basin:																
San Lorenzo junction, Kings Creek																
San Lorenzo junction, Boulder Creek	×							×								
San Lorenzo at Brookdale		×				×	×	×								
San Lorenzo near Felton		×				×	×	×						×		×
San Lorenzo near Big Trees		×				×		×							×	
San Lorenzo near Santa Cruz	×	×				×	×	×	×	×	×			×	×	
Soquel Creek								×			×			×		
Aptos Creek								×						×	×	
Pajaro Basin:																
San Felipe near San Felipe		×		×	×											
Pajaro between Sargent and San Felipe				×	×	×										
Pajaro at Sargent	×	×	×	×	×	×		×			×	×	×	×		
Pajaro above junction with San Benito			×	×	×											
Pajaro at junction with San Benito			×	×	×			×								
Pajaro below junction with San Benito				×	×											
Pajaro 3 miles above Watsonville	×			×	×			×					×			
Pajaro near Watsonville			×	×	×			×			×					
Pajaro at Watsonville				×	×		×		×				×	×		
Pajaro 1 mile below Watsonville				×	×						×			×		
Llagas Creek in mountains					×	×	×	×								×
Llagas Creek in mountains					×	×		×								×
Llagas Creek in mountains					×	×		×								×
Llagas Creek near mouth				×												
Uvas Creek in mountains					×	×		×								×
Uvas Creek in mountains					×	×		×								×
San Benito near San Benito		×				×	×									
San Benito near Erie		×				×										
San Benito near Hollister		×														
San Benito near mouth		×				×	×				×					
Tres Pinos Creek near Tres Pinos		×				×										
Tres Pinos Creek at Tres Pinos						×	×				×					
Salinas Basin:																
Salinas at San Miguel		×	×	×		×					×					
Salinas at Bradley		×				×	×				×					
Salinas at King		×														
Salinas between Soledad and King		×				×					×					
Salinas at Soledad		×					×	×						×		
Salinas at Gonzales		×		×		×					×					
Salinas near Spencers		×						×						×		
Salinas near Salinas	×	×		×		×	×	×			×					
Salinas near Spreckles		×		×		×	×						×			
Salinas near Blanco		×		×										×	×	
Nacimiento Creek in foothills						×		×					×			×
Nacimiento Creek in mountains	×	×					×	×								
Nacimiento Creek in mountains								×								
San Antonio Creek near Mission		×				×	×	×			×					
San Antonio in mountains		×						×								
Arroyo Seco 1 mile above mouth		×				×					×					
Arroyo Seco 3 miles above mouth						×										
Arroyo Seco 4 miles above mouth		×						×								
Arroyo Seco 6 miles above mouth		×				×	×	×			×					×

(Snyder, 1914, pg. 55)

Appendix D

Some Causes of the Prevalent Misunderstandings Regarding the Exotic Origin of Coho Salmon South of San Francisco

Since historic and scientific evidence demonstrates unequivocally that coho salmon were not resident south of San Francisco prior to their artificial introduction by the Brookdale Fish Hatchery under the supervision of Frank Shebley in 1906, one wonders why they have been assumed by the public and the scientific community to be native. Unfortunately, in the forum of public discourse, it is easy for casual observations and misunderstood or misstated facts to take on the aura of truth. Confusion is introduced by such common errors as misreporting the date of a scientific reference or neglecting a history of fish planting that distorts population census figures. Once one of these erroneous "truths" enters the public or scientific discourse, it is very difficult to correct the record. This appendix lists a few of the many sources of the misinformation that has obfuscated the science of coho salmon in these streams.

The Erroneous Assertions of Edgar Wakeman (Redding, Throckmorton and Farwell, 1872):

One of the earliest attempts to catalog the fish of San Francisco Bay and neighboring coastal streams was initiated in 1870 by the newly constituted California Fish Commission. The Commission engaged the services of a merchant seaman, Captain E. Wakeman, (a person with no professional credentials or known experience in fisheries) to report on the extent and condition of these fisheries. It is more than likely that the appointment was given gratuitously as a result of Wakeman's assistance with the illegal executions conducted earlier by a vigilante committee of San Francisco's elite merchant class (Alvarado, 2003). In his report, Wakeman frequently contradicts himself and it is not known how much of his survey was based on secondhand accounts. Unfortunately, a few investigators have since cited Wakeman's imaginative report as though it were an authentic, rigorous account (Alvarado, 2003).

Wakeman's report of vast numbers of coho salmon in San Gregorio and Pescadero Creeks contains obvious errors and contradictions, discrediting the entire account. Additionally, Wakeman convincingly demonstrates ignorance of ichthyology by stating that the silver (coho) salmon of San Gregorio and Pescadero Creeks return to sea after spawning. Certainly, it is an undisputed fact that, unlike steelhead, coho salmon always die immediately after spawning. A study of Wakeman's life and career is also illuminating, underscoring his lack of scientific qualifications (Alvarado, 2003).

The famous author, Mark Twain, who sailed with Wakeman in 1866, wrote of the captain:

> "I will do him the credit to say that he knows how to tell his stirring forecastle yarns…with his strong, cheery voice, animated continence, quaint phraseology, defiance of grammar and extraordinary vim in the matter of emphasis and gesture… He is a burly, hairy, sunburned, stormy-voiced old salt…and is tattooed from head to foot like a Feejee islander…" (Levy, 2003).

Elsewhere, Twain recounts one of Wakeman's improbable sea-stories about millions of monkeys swimming across a 2 mile channel, blocking passage of his ship. He claims to have personally counted 97 million monkeys (Schmidt, 1997).

Although Captain Wakeman would likely have been a most interesting person to know, his contribution to Central Coast coho salmon science deserves no credence. There is no logical reason to blindly accept the unprofessional report of a charismatic sailor with a reputation for telling tall tales – especially when it conflicts with *unequivocal* reports of the world's leading ichthyologists of the same era (see Appendix F).

The Erroneous Assertions of Larry Brown, Peter Moyle, and Ronald Yoshiyama (Brown, Moyle and Yoshiyama, 1994):

The authors cite a 1908 document (Snyder, 1908) when making the statement "The southernmost recorded [coho salmon] spawning stream is the San Lorenzo River, Santa Cruz County" (Brown, Moyle and Yoshiyama, 1994, pg. 239). 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. Indeed Snyder's treatment of coho salmon in this report is limited to the following statement:

> "Oncorhynchus kisutch (Walbaum). Said to be commonly found in the larger streams. Specimens were taken in Takenitch Creek, Butte Creek at Eagle Point, Oregon, and in Redwood Creek, near Orick, Cal." (Snyder, 1908, pg. 183).

Furthermore, Brown et al. make the claim that "coho salmon probably occurred in smaller streams flowing into Monterey Bay and perhaps as far south as the Big Sur River" (Brown, Moyle and Yoshiyama, 1994, pg. 239). Not surprisingly, this bold statement is not referenced or otherwise justified. Nonetheless, the California Department of Fish and Game and NOAA-Fisheries have cited Brown et al. (1994) as a major reference in support of the historical abundance of coho salmon south of San Francisco.

The Erroneous Assertions of Santa Cruz County representative Dave Hope, accepted by the California State Fish and Game Commission having achieved the status of "truth" in the public discourse:

Various people in environmental organizations, government agencies and elsewhere have achieved popular recognition as experts on coho salmon with little or no education, background or understanding of the species. This is dangerous since their unfounded pronouncements are frequently given credence and result in inappropriate government actions. Mr. Dave Hope, a psychologist employed by the Santa Cruz County government in various capacities is one of these.

Mr. Hope, representing Santa Cruz County at the April 7, 1994 hearing of the California State Fish and Game Commission, was the sole source of testimony advocating the need to list coho south of San Francisco as endangered (Hope, 1994). His testimony was a litany of errors and misstatements.

Hope testified that the number of coho in Waddell Creek is only 5% of the numbers in the 1940s and 1% of the populations in the early 1900s. There are not now nor, with the exception of the Shapovalov and Taft study in the 1930s (Shapovalov and Taft, 1954) were there ever any facilities or programs in place to count adult coho in Waddell Creek, thus Hope's figures for current coho populations were created to fit his agenda. He used the Shapovalov and Taft study as the basis for his 1930's figures even though he was aware that these coho

population figures are meaningless since the stream was heavily stocked with hatchery fish immediately before and during the course of the study.

There are no data to back Hope's claim of 100 times the present coho population in Waddell Creek during the early 1900s. The only valid ichthyologic studies at that time reported that coho are not resident south of San Francisco.

Unfortunately, no testimony to contradict Hope's claims was presented at this hearing and the Commission reluctantly agreed to accept the listing petition. This and other erroneous testimony, having been approved by the Commission, have become accepted as fact.

Appendix E

Physical characteristics of Santa Cruz Mountains and Streams and Their Effect on Coho Salmon

"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).

"…restricted spawning period, single spawning attempt, and rigid ages of smolting and spawning (Shapavalov and Taft 1954) make them susceptible to drought, floods or other "disasters" within small watersheds…" (Smith, 1996, pg. 1).

"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).

"Major landslides can deposit huge sediment loads over long periods into stream channels that can take decades or centuries to recover, with concomitant long-term detriment to salmon habitats. Floods can destroy or alter stream and lagoon habitats, accelerate erosion and sedimentation, and decimate eggs, fry and juvenile salmon populations, thus reducing or eliminating brood years … Droughts dessicate [sic] coho rearing and holding habitats, eliminate fish

populations and prevent or delay the opening of stream mouths and lagoons, thus preventing access into the streams by spawning adults … Low rainfall during the fall and early winter months coincident with the coho salmon spawning migration can prevent adult coho access into streams, leading to failed brood years even if later storms occur. Low flows during the spring months can landlock [sic] downstream migrant coho smolts by allowing the sandbar to reestablish, preventing entry to the ocean and consequently depressing or eliminating brood year recruitment.

"The inflexible 3-year maternal brood year lineage and early winter spawning traits of coho salmon south of San Francisco Bay place these stocks in high jeopardy from drought or flood events. Such events have cumulative and catastrophic consequences for the long-term viability of southern coho, and can result in the extirpation of brood years and broodstock [sic] lineages" (Baker, et al., 1998, pg. 39).

"The coho decline paralleled a general pattern of yearly increases in winter runoff and storm intensities … Coho spawn early in the winter, and spawning nests may be damaged by intense winter storms. The rigid life history of coho, which almost exclusively mature at 3 years of age and always die after maturation and spawning … makes it more likely that droughts or floods can impact runs. Coho cannot delay their spawning a year as steelhead can, and a single year of poor spawning (due to access or floods), rearing, or out-migration can result in the loss or severe reduction in one of the three year class sequences present in a watershed. The weak coho year class in Waddell Creek in 1988 may have been due to the residual effects of the 1976-77 drought or the January 1982 storm" (Smith, 1989).

"At least 5 probable coho redds identified in January [in Waddell Creek] were apparently destroyed by scour or fill associated with the February storm … As on Waddell Creek, it is likely that most of the Coho spawned prior to the February storm [in Scott Creek], and their redds were destroyed or damaged" (Smith, 1992, pg. 3-4).

"Spawning coho were abundant on at least Waddell and Scott creeks, but the severe winter storms apparently destroyed most redds" (Smith, 1998, pg. 1).

Appendix F

Short Biography of David Starr Jordan

David Starr Jordan served as President of Indiana University from 1885 to 1891. He later served as the first President of Stanford from 1891-1913 and chancellor of Stanford University from 1913-1916. He was also director of the World Peace Foundation (1910-14) and president of the World Peace Congress (1915), in addition to being one of the leading and most prolific ichthyologists of his time. His 645 writings on fishes that form the basis of modern understanding of these creatures are truly a pleasure to read because of their succinct elegant language and factual precision. His academic credentials include B. S. and M. S. from Cornell University, Doctor of Medicine from Indiana Medical College and Ph.D. from Northwestern Christian University. This intellectual giant is still frequently cited as the definitive authority on fishes of North America (LLC, 2003). He died in Palo Alto, California in 1931.

Dr. and Mrs. David Starr Jordan alongside Waddell Creek in 1920
(from Hulda Hoover McLean's Rancho del Oso private collection)

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