

**CALIFORNIA FISH AND GAME COMMISSION
NOTICE OF FINDING, FINDING, AND STATEMENT OF REASONS**

(Denying Petition to Delist Coho Salmon South of San Francisco)

NOTICE IS HEREBY GIVEN that, pursuant to the provisions of Section 2074.2 of the California Fish and Game Code, the California Fish and Game Commission ("Commission"), at its March 1, 2007, meeting in Arcata, rejected the petition ("Petition 2004") filed by Messrs. Homer T. McCrary and Fabian Alvarado of Big Creek Lumber Company and Mr. Robert O. Briggs of Central Coast Forest Association to remove coho salmon (*Oncorynchus kisutch*) south of San Francisco from the list of endangered species. This rejection is based on a finding that the petition did not provide sufficient information to indicate that the petitioned action may be warranted. At that meeting, the Commission also announced its intention to adopt this Statement of Reasons at its April 2007 meeting in Bodega Bay.

NOTICE IS ALSO GIVEN that, at its April 12, 2007 meeting in Bodega Bay, the Commission adopted the following formal statement of reasons (findings of fact and law) outlining the basis for rejection of the petition.

BACKGROUND

February 24, 1993. The Commission received a petition from the Santa Cruz County Fish and Game Advisory Commission to list as endangered under the California Endangered Species Act ("CESA") coho salmon in Scott and Waddell Creeks.

March 2, 1993. The Commission referred the petition to the Department of Fish and Game ("Department") to review and recommend whether the petition contained sufficient information to warrant its acceptance by the Commission. The Department recommended the petition be rejected because it believed it was inappropriate to limit the listing to two populations of a species that was experiencing severe decline over a large portion of its range.

October 7, 1993. The petition was withdrawn with the stated intent of submitting a new petition covering all streams south of San Francisco.

December 16, 1993. The Commission received an expanded petition to list as threatened coho salmon south of San Francisco. Thereafter, the Department reviewed the petition and recommended it be accepted.

April 7, 1994. The Commission found that the petition contained sufficient information to indicate that the petitioned action may be warranted and accepted the petition. Coho salmon south of San Francisco became a "candidate" species.

March 1995. The Department completed its status review of coho salmon south of San Francisco, and recommended the coho salmon south of San Francisco be listed as endangered, rather than threatened as petitioned.

December 31, 1995. The Commission listed, as endangered, coho salmon south of San Francisco under CESA.

1996. The Commission's regulations are amended to include and identify coho salmon south of San Francisco as "Endangered". (Cal.Code Regs. tit. 14, §670.5 or 3670.5)

July 28, 2000. The Commission received a petition from the Salmon and Steelhead Recovery Coalition to list coho salmon north of San Francisco under CESA. (Coho salmon populations south of San Francisco were already listed as endangered under CESA.)

August 7, 2000. The Commission forwarded the petition to the Department to review and recommend whether the petition contained sufficient information to indicate that the petitioned action may be warranted.

February 2, 2001. The Department presented its findings to the Commission that the petition provided sufficient information and recommended to the Commission that it accept the petition to list coho salmon north of San Francisco for consideration. The Commission did not take any action due to lack of quorum.

April 5, 2001. The Commission accepted the petition to list coho salmon north of San Francisco for consideration after receiving public testimony thereby making coho a "candidate species".

May 28, 2002. The Department transmitted to the Commission its April, 2002, status review report regarding coho salmon north of San Francisco (as required by Fish and Game Code section 2074.6) recommending that it list coho salmon north of Punta Gorda (Humboldt Co.) as a threatened species and coho salmon south of Punta Gorda (Humboldt Co.), (which includes coho salmon south of San Francisco), as an endangered species in the Commission's regulations (Cal.Code Reg., tit. 14, §670.5).

August 30, 2002. The Commission made a finding that coho salmon north of Punta Gorda and coho salmon south of Punta Gorda warrant listing as a threatened and an endangered species, respectively.

Pursuant to Fish and Game code section 2114 (recovery strategy), the Commission delayed the required rulemaking to add coho to the threatened and endangered species list in the Commission's regulations for one year while the Department prepared a recovery strategy.

August 28, 2003. The Department presented its draft recovery strategy to the Commission; and the Commission granted a 6 months extension on the recovery strategy.

February 4, 2004. The Department presented its recovery strategy to the Commission. The Commission authorized its staff to publish a Notice of Intent (NOI) to amend CCR, tit. 14, sec. 670.5 to add all California coho to the threatened and endangered species lists.

February 25, 2004. Commission staff issued the Notice of Intent to amend CCR, tit. 14, sec. 670.5. Issuance of the NOI begins the rulemaking process to add coho salmon north of Punta Gorda and coho salmon south of Punta Gorda to the list of threatened and endangered species.

June 17, 2004. The Commission received a petition from the Central Coast Forest Association and Big Creek Lumber Company to redefine the southern boundary of the coho regulatory listing to exclude or delist coho salmon south of San Francisco.

August 5, 2004. The Commission voted to adopt the rulemaking package to add coho salmon north of Punta Gorda to the list of threatened species and to add all coho salmon south of Punta Gorda to the list of endangered species.

December 31, 2004. The Department provided the Commission with its written evaluation of the petition to delist coho salmon south of San Francisco.

January 26, 2005. Petitioners provided comments to the Commission on the Department's written evaluation of the petition to delist coho salmon south of San Francisco.

March 17, 2005. The Commission rejected the petition to delist coho salmon south of San Francisco.

March 30, 2005. The California Endangered Species Act list (14 C.C.R. 670.5) was amended to add coho salmon north of Punta Gorda as "threatened" and to add all coho salmon south of Punta Gorda as "endangered". The separate listing for coho salmon "south of San Francisco" was removed.

November 16, 2005. Petitioners filed a petition for writ of mandate in Sacramento County Superior Court challenging the Commission's rejection of the petition to delist coho salmon south of San Francisco.

September 22, 2006. The Sacramento County Superior Court issued an order setting aside the Commission's March 17, 2005 decision to reject the petition to delist coho salmon south of San Francisco.

October 6, 2006. The Sacramento County Superior Court clarified its September 22, 2006 order.

January 25, 2007. The Commission is served with the Judgment and Notice of Entry.

February 7, 2007. The Commission issued a notice of reconsideration of the petition to delist coho salmon south of San Francisco.

March 1, 2007. The Commission reconsidered the petition to delist coho salmon south of San Francisco and received additional written and oral comment from the petitioners, the Department, and the public. At this meeting the Commission rejected the petition, finding that the petition did not contain sufficient information to indicate the petitioned action may be warranted. Staff was directed to prepare a draft statement of reasons (pursuant to Fish & Game Code § 2074.2) for consideration at the Commission's April 12-13, 2007 meeting.

STATUTORY REQUIREMENTS

A species is endangered under California Endangered Species Act, Fish and Game Code Section 2050 et seq. (CESA), if it "is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, over exploitation, predation, competition, or disease." (Fish & G. Code, § 2062.) The responsibility for deciding whether a species should be removed from the endangered species list, otherwise known as delisting, rests with the Commission. (Fish & G. Code, § 2070.)

To be accepted by the Commission, a petition to remove a species from the endangered species list must include sufficient scientific information that the delisting may be warranted. (Fish & G. Code, § 2072.3, Cal. Code Regs., tit. 14, § 670.1, subs. (d) and (e).) The petition must include information regarding the species' population trend, range, distribution, abundance and life history; factors affecting the species' ability to survive and reproduce; the degree and immediacy of the threat to the species; the availability and sources of information about the species; information about the kind of habitat necessary for survival of the species; and a detailed distribution map. (Fish & G. Code, § 2072.3, Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) In deciding whether it has sufficient information to indicate the petitioned action may be warranted, the Commission is required to consider the petition itself, the Department's written evaluation report, and comments received about the petitioned action. (Fish & G. Code, § 2074.2.)

The requisite standard of proof to be used by the Commission in deciding whether the petitioned action may be warranted (i.e. whether to accept or reject a petition) was described in *Natural Resources Defense Council v. Fish and Game Commission* (1994) 28 Cal.App. 4th 1104 [hereinafter *NRDC*]. In *NRDC*, a case where the petitioned action was listing of a species, the court determined that "the section 2074.2 phrase 'petition provides sufficient information to indicate that the petitioned action may be warranted' means that the amount of information, when considered in light of the Department's written report and the comments received, that would lead a reasonable person to conclude there is a substantial possibility the requested listing could occur . . ." (*NRDC, supra*, 28 Cal.App. 4th at page 1125.) This "substantial possibility" standard is more demanding than the low "reasonable possibility" or "fair argument" standard found in the

California Environmental Quality Act, but is lower than the legal standard for a preliminary injunction, which would require the Commission to determine that a listing is “more likely than not” to occur. (*Ibid.*)

The *NRDC* court noted that this “substantial possibility” standard involves an exercise of the Commission’s discretion and a weighing of evidence for and against the petitioned action in contrast to the “fair argument” standard that examines evidence on only one side of the issue. (*NRDC, supra*, 28 Cal.App. 4th at page 1125.) As the court concluded, the decision-making process involves:

. . . a taking of evidence for and against listing in a public quasi-adjudicatory setting, a weighing of that evidence, and a Commission discretion to determine essentially a question of fact based on that evidence. This process, in other words, contemplates a meaningful opportunity to present evidence contrary to the petition and a meaningful consideration of that evidence.” (*Id.* at 1126.)

Therefore, in determining whether the petitioned action “may be warranted,” the Commission must consider not only the petition and the evaluation report prepared on the petition by the Department, but other evidence introduced in the proceedings. The Commission must decide this question in light of the entire record.

REASONS FOR FINDING

This statement of reasons for the finding sets forth an explanation of the basis for the Commission’s finding and its rejection of the petition to remove coho salmon south of San Francisco from the endangered species list. It is not a comprehensive review of all information considered by the Commission and for the most part does not address evidence that, while relevant to the petitioned action, was not at issue in the Commission’s decision.

In order to accept this petition, the Commission is required to determine that it has information to persuade a reasonable person that there is a substantial possibility that coho salmon south of San Francisco could be removed from the endangered species list. As the decision in *NRDC* makes clear, the Commission must critically evaluate and weigh all evidence, and this process does not allow the Commission to resolve all uncertainties in favor of either the proponents or opponents of the petitioned action. The Commission may deal with data gaps by drawing inferences based on available information or by relying on expert opinion that the Commission finds persuasive, but in the end the petition and other information presented to the Commission must affirmatively demonstrate the species no longer meets the criteria for protection as an endangered species.

As was previously mentioned, Fish and Game Code section 2072.3 provides that certain sufficient scientific information must be included in a petition in order for it to be accepted. (e.g., species' population trends, range, distribution, abundance and life history; factors affecting the species' ability to survive and reproduce; the degree and immediacy of the threat to the species; the impact of existing management efforts; suggestions for future management of the species; the availability and sources of information about the species; information about the kind of habitat necessary for survival of the species; and a detailed distribution map.) The petition includes some of this information but much is missing or mischaracterized.

A. Continuing Threatened Status of Coho Salmon South of San Francisco

One of the most obvious omissions in the petition is a failure to include specific information that the species in question is “no longer threatened by any one or any combination of the [following] factors:

1. Present or threatened modification or destruction of its habitat;
2. Overpopulation;
3. Predation;
4. Competition;
5. Disease; or
6. Other natural occurrences or human-related activities.”

(Cal.Code Regs., tit. 14, § 670.1, subd. (i)(1)(B).)

In the petition and supplemental materials submitted by petitioners, little credible evidence is provided regarding the continuing status of coho salmon south of San Francisco and no credible evidence is provided that the coho salmon populations south of San Francisco are “no longer threatened.” Instead testimony by fisheries biologists from the Department, during the 2004-2005 proceeding, clearly establish that:

- Coho salmon south of San Francisco may be doing better now than they were ten years ago, but populations are still quite depressed and restricted, and are still vulnerable to extinction.
- In 1995, coho salmon were found in Waddell and Scott Creeks and the San Lorenzo River.
- In 2003, only Scott Creek contained all three brood years, and Waddell Creek contained only two of three brood years, one of which contained less than 20 adults.

- Currently, it appears that all three brood years are present in both Scott and Waddell Creeks, and possibly San Vicente Creek, but at far fewer numbers than Scott and Waddell Creeks. Gazos Creek appears to have only two brood years with very low numbers.

(See also written testimony of Jerry Smith, Ph.D., regarding recent research at Gazos, Waddell and Scott Creeks; February 10, 2007.)

Rather than address the continuing status of coho salmon south of San Francisco, the bulk of the petition and supplemental petition materials argue that the original 1995 listing of coho salmon south of San Francisco was unfounded or in error because coho salmon are not native to streams south of San Francisco. While this argument misunderstands CESA and its application to all populations of native species within California, the Commission finds that each of the arguments presented by petitioners on this issue are unsupported by evidence in the record and, in fact, again reflect numerous mischaracterizations of evidence, numerous misstatement of facts, and a strong reliance on speculation and innuendo rather than rational scientific analysis. The petition's arguments regarding the coho salmon's non-native status can be consolidated into six independent arguments and each will be addressed in this Commission statement of reasons.

B. Coho Salmon South of San Francisco Are Not Native

1. Archeological Data

Petitioners, the petition, and the supplemental materials submitted by petitioners (including a recent article by Kaczynski and Alvarado in *Fisheries*) argue that an absence of coho salmon remains in the archaeological records available for areas south of San Francisco establish that coho salmon did not historically exist within this area. In support of this premise petitioners cite to the research and survey work of Kenneth Gobalet, Ph.D., published in 2004 in which Dr. Gobalet, surveying Native American middens south of San Francisco, had yet to find the remains of any coho salmon. In a clear effort to mischaracterize Dr. Gobalet's work petitioners omitted a clear qualification in Dr. Gobalet's published article.

“Because of this paucity of materials, far more sampling is required to use the archaeological record as definitive evidence for the absence of coho salmon from this section of coast. This is particularly important to acknowledge, because there is no question that coho salmon were native to San Mateo and Santa Cruz counties (Behnke 2002; P.B. Moyle personal communication). Specimens dating from 1895 that were collected by Cloudsley Rutter in streams south of San Francisco are in the collection of the California Academy of Sciences (D. Catania, CAS, personnel communication). If coho salmon exist in the archaeological records of San Mateo County and Santa Cruz County coast at the

same frequency as in the San Francisco Bay area (14 of 105,000 elements), then at least 7,506 elements would have to be recovered before a single coho salmon could be expected.”

(“Archaeological perspectives on Native American fisheries of California with emphasis on steelhead and salmon.” Transactions of the American Fisheries Society 133(4): 801-833, 825.; as of 2004, only 1,156 fish bones had been analyzed from San Mateo and Santa Cruz sites.)

In that same article Dr. Gobalet goes on to note that the low number of salmonid remains discovered to date is likely due to the fact that salmonid bones do not preserve well due to higher porosity and are generally thinner than other bony fish. (Gobalet, et al. 2004) In fact, coho salmon have rarely been documented at archaeological excavation within their known range in California and only documented at archaeological sites in the eastern San Francisco Bay area and Del Norte County, despite the fact that the species is known to be native to streams in Marin, Sonoma, Mendocino, and Humboldt Counties. (Gobalet, et al. 2004; see also NOAA Notice of 90-day Petition Finding, Federal Register, Vol. 71, No. 56, March 23, 2006, page 14685.)

Dr. Gobalet did appear at the Commission’s March 1, 2007 hearing and did testify orally as well as provide a written statement. Dr. Gobalet emphasized in his testimony the qualifying statement made in his published work and noted that “the failure to find remains of these fishes at archaeological sites does not mean they were not present in coastal waters.” Dr. Gobalet went on to further testify, however, that such archaeological remains of coho salmon have recently been discovered and positively identified at a site in Año Nuevo State Reserve (San Mateo County) confirming the historical existence of coho salmon south of San Francisco. “The parsimonious explanation for the presence of coho salmon in Año Nuevo State Reserve prehistorically is that native salmon were captured from local streams (e.g. Waddell Creek) by the local indians. . .” this new find and testimony positively refutes petitioners’ arguments that archaeological remains of coho salmon have never been found south of San Francisco.

2. Early Scientific Accounts

The Petition also asserts that there is no valid historic (including accounts from local newspapers) or scientific source which documents the presence of coho salmon south of San Francisco prior to 1906. Because the scientific documentation published prior to 1906, primarily by early ichthyologist David Starr Jordan (Jordan, 1892; Jordan and Gilbert, 1876-1919; Jordan, Gilbert, and Hubbs, 1882; Jordan and Everman, 1902; Jordan, 1904a; Jordan 1904b; etc.), referenced coho salmon as occurring north of San Francisco, the petitioners conclude coho salmon were absent south of San Francisco. The Commission disagrees with the petitioners’ claim. Jordan was describing the North American distribution of coho salmon in a general ichthyofaunal reference, and his use of commonly used phraseology that a species is abundant up to, or from, a geographical landmark does not mean that the species was absent in areas beyond the referenced landmark. Jordan also wrote, “This species (coho salmon) is not common south of the Columbia, but is sometimes taken in California” (Jordan, 1894). Coho

salmon were more abundant in Oregon and California than indicated by this statement, further highlighting the problematic nature of relying on general ichthyofaunal references for precise species distribution information. Regarding the various excerpts from early newspaper articles, the Commission views these as non-scientific reports of already depressed salmonid populations rather than as definitive scientific proof that these fishes were unquestionably absent from the area.

Early scientific collection efforts also stand as clear evidence of historic coho salmon populations south of San Francisco. In fact, coho salmon specimens collected from San Mateo and Santa Cruz county streams in 1895 and currently held in the California Academy of Science's (CAS) Ichthyological Collection (CAS, 2004) represent clear evidence that coho salmon were native to, and present in, streams south of San Francisco Bay prior to 1906. The CAS maintains four samples (jars) of specimens that authenticate the collection of 11 native coho salmon from Waddell Creek and four from Scott Creek in Santa Cruz County on June 5, 1895, by the party of Rutter, Scofield, Seale, and Pierson (CAS, 2004). Also, two coho salmon specimens were collected from San Vicente Creek in Santa Cruz County and one from Gazos Creek in San Mateo County by the same party of investigators. Although the collection of these latter specimens is not dated, they can reasonably be assumed to have been collected during the same period. Coho salmon continue to persist in these four streams today.

In correspondence the petitioners submitted to the Commission, the petitioners questioned the validity of these coho salmon specimens based on an assumption these were lapses in their chain of custody.

The information the petitioners provide, however, is pure speculation and does not indicate the specimens are in any way unreliable. In fact, David Catania, Ichthyology Collections Manager for the California Academy of Science believes the 1895 collections are reliable, are coho, and are from south of San Francisco. In a written statement provided to the Commission on February 12, 2007, Mr. Catania states:

“Housed in the California Academy of Sciences (CAS) fish collection are four cataloged lots with 18 individuals collected during the 1895 Carmel River Expedition of Stanford University. These specimens came from Scotts, Waddell, San Vicente, and Gazos Creeks in Santa Cruz County. In their petition, F. Alvarado and V.W. Kaczynski call into question the validity of these specimens with two main concerns: 1) changes in the identification of the specimens over time, and 2) the effects of the 1906 earthquake on the Stanford University (SU) fish collection now at the CAS. I will comment on each.

Attaching undue importance to these changes in identification, suggests a limited understanding of specimen-based collections.

What is significant is that we have the specimens as vouchers and that they can be examined at any time, not that they may have been misidentified fifty or a hundred years ago. Within the last few years, these specimens have been examined by three experts who have positively identified 17 of the individuals as coho (one specimen is chinook). Previous misidentifications do not change what the specimens are.

Alvarado and Kaczynski cite J. Böhlke's account of the 1906 earthquake and its effects on the Stanford University fish collection (Stan.Ich.Bull. v. 5, pg. 3, 31 July 1953) but are selective in their interpretation. The 1906 earthquake broke fewer than 25% of the bottles. The ichthyologists used their expertise to salvage specimens and the corresponding data from jars that had broken. Unless they were relatively certain, the specimens were discarded. Although one cannot completely rule out the possibility, **there is no indication that any of the four bottles containing these 17 coho was ever broken.**

In my opinion, the chances are negligible that the data associated with these 17 coho were compromised.

(emphasis added.)

Both the Department's biologists (in their supplemental materials) and the National Marine Fisheries Service (see, NOAA *Notice, supra*, Federal Register, page 14685) agree with Mr. Catania's assessment of the CAS specimens. Dr. Gobalet, commenting on these same allegations by petitioners states that "Kaczynski and Alvarado (2006) [authors of additional petition material] disrespect over a century of credible science with improbable scenarios." "There is no evidence that the [specimen] jars containing coho salmon were broken during the [1906] earthquake and to intimate otherwise is to denigrate the work of meticulous collection custodians at Stanford and the CAS." The Commission agrees. The petitioners provide no evidence to support their contention that the 1906 earthquake compromised the integrity of the CAS coho collection, only speculation that it could have occurred. This speculation is not evidence that any reasonable person would rely upon in assessing the petition.

3. Climate Differences

The petition asserts that "extreme weather events [are] the principal reason that coho colonies are unsustainable in streams south of the Santa Cruz Mountains." In supplemental materials submitted in support of the petition by Mr. Robert Briggs (Central Coast Forest Association), Mr. Briggs suggests that information in the Department's and NOAA Fisheries' joint report titled Action Plans for Monitoring California's Coastal Anadromous Salmonids

(“Action Plan”) (Boydston and McDonald 2005), supports petitioners’ weather assertions. Mr. Briggs includes in his September 30, 2006 letter to the Commission an excerpt from the Action Plan that he believes supports their assertion:

“Compared to the northern California coast and the Pacific Northwest, the southern region has fewer rainy days during the winter (Figure 3A), although the rainy days that do occur tend to have precipitation comparable to areas further north (Figure 3B). The consequences is that the discharge of southern California streams is more episodic than northern streams (Figure 3C). Note that winter discharge for Sespe Creek, depicted for the years 1991 and 1995 in Figure 3C may increase by two to four orders of magnitude over the few days following a major storm event, while the more northerly streams increase by about one order of magnitude” (Boydston and McDonald 2005).

Mr. Briggs mischaracterizes the excerpt he cites from the Action Plan which he claims “explicitly confirms the findings of our petition . . .” (climatic conditions north of San Francisco Bay are substantially different from those south of San Francisco Bay) by incorrectly assuming that the Action Plan is comparing rainfall and discharge north of San Francisco Bay to that in Santa Cruz County. In reality, the Action Plan is comparing rainfall and discharge in the “Northern Monitoring Area” with that of the “Southern Monitoring Area”, with the boundary between the two areas located at the Pajaro River (the Santa Cruz/Monterey county line). It is important to note the Northern Monitoring Area includes the coho streams south of San Francisco that are in dispute by the petitioners and Mr. Briggs. The excerpt Mr. Briggs references is comparing the Northern Monitoring Area (which supports all runs of coho salmon) to the Southern Monitoring Area (which supports only steelhead), not the area north of San Francisco to coho habitat south of San Francisco, as Mr. Briggs implies.

Furthermore, the graphs from the Action Plan referenced by Mr. Briggs provide even more evidence to support the Department’s findings that coho habitat north of San Francisco is not substantially different from coho habitat south of San Francisco. As the graphs clearly show, percentage of wet days and amount of precipitation per wet day in Santa Cruz and San Mateo counties are essentially identical to those of Marin County and areas farther north along the central and north coast. These figures support the Department’s conclusions that coastal areas of Santa Cruz and San Mateo counties have similar climate to areas of northern California where the native status of coho is not in dispute.

The Department also testified to a publication by NOAA Fisheries Southwest Fisheries Science Center (Spence et al. 2005) that supports the fact that coho are native south of San Francisco. Spence et al. (2005) constructed a model based on several geomorphic and

hydrologic characteristics that estimates the historical potential for a particular stream to be suitable for coho salmon. This modeling shows that coastal Marin County streams are ecologically similar to Santa Cruz County streams of equivalent watershed size.

Petitioners rely upon the Kaczynski and Alvarado article in *Fisheries* to state that Santa Cruz is significantly more likely to receive four inches of rain in a single day than Marin County throughout the winter and spring. However, this doesn't prove that Santa Cruz County is unsuitable for coho salmon. In order to demonstrate that, one would have to look at the range of precipitation patterns over the entire range of coho salmon. For example, if one were to compare the precipitation patterns of Marin County to Del Norte County or Jefferson County in Washington (all within the natural range of coho) it is likely that there would be a much more significant difference than that shown by Kaczynski and Alvarado (2006) for Marin and Santa Cruz counties. In order to make determinations about habitat suitability, one would need to examine the habitat characteristics along the entire range of coho, not just one small area, and not just one habitat variable.

The Kaczynski and Alvarado (2006) article identifies late or nonexistent seasonal rains, stream flows that are not sufficient to open sand bars, and devastating floods as reasons why they believe coho salmon could not have persisted in Santa Cruz County streams. These conditions are natural for this area, as they are in streams immediately north of San Francisco. Smith (2006) points out that these conditions have produced the same year class effects (as identified by Kaczynski and Alvarado 2006) in Redwood Creek in Marin County as they have south of there. Further, Smith (2006) indicates that regardless of these conditions coho have still maintained runs in those streams.

The geological processes also described in the Kaczynski and Alvarado (2006) article apply throughout the California coastal mountain range and are not unique to the Santa Cruz Mountains. The coastal geology and active geologic processes that purportedly result in a "...marginal, harsh, and extreme..." environment unsuitable for coho salmon in Santa Cruz Range streams (Kaczynski and Alvarado 2006) are not unique to this locale. Rather, the rocks and active geologic processes of the Mendocino Range (i.e., north of San Francisco Bay) closely resemble those of the Santa Cruz Range to the south (Norris and Webb, 1990).

While some localized habitat differences may exist between watersheds north and south of San Francisco Bay, the Commission is unaware of any conclusive scientific evidence, and the petition does not offer any, that would lead one to conclude that these habitat differences are significant enough to preclude coho salmon presence south of San Francisco. While climatic conditions, erosive geology, and variable hydrology can be detrimental to coho salmon, these conditions are not unique to the area south of San Francisco but also occur in other portions of the central California coast where coho salmon are acknowledged to be native and persistent.

4. Ocean Conditions

The petitioners assert that poor ocean conditions due to decadal scale regime changes experienced over the last several decades would have caused the extinction of coho populations south of San Francisco but for artificial hatchery support. In support of this argument Petitioners offer the *Fisheries* article by Kaczynski and Alvarado which contains a simple static cohort replacement rate (CRR) calculation that the petitioners claim proves that ocean conditions in the region are so unsuitable for coho salmon that they could not exist there naturally.

First, the Commission believes that the Department is correct in stating that the static CRR calculation is much too simplistic to accurately model replacement rate dynamics in these fish. Predicting population persistence over time is much more complicated than the petitioners' simple calculations suggest (see McElhenny et al. 2000, Spencer 1999, Morris et al. 1999). Furthermore, the simplistic calculation is misleading because it suggests that no female could possibly produce enough offspring to replace herself due to poor habitat conditions, and that cohort replacement rates below one lead to immediate extinction. However, the method they use does not accurately model the way that populations truly behave, nor does it properly characterize the meaning of CRR in terms of population persistence. In reality, there is no single value of freshwater survival, ocean survival, or fecundity that can be applied to every fish. Rather, these values are different for each fish, leading to difference in each parent's representation in the next generation. The petitioners' results depend heavily on their choice of environmental and reproductive parameters, applying estimates of average survival to all individuals in a population, and ignoring the effects of initial populations size and metapopulation exchange. Also, a CRR less than one indicates that a population, in the three year time period under consideration, has fewer individuals in it than three years previous. If CRR remains less than one over a period of time, the probability of extinction does increase because, given past performance, we would project that the population will continue to get smaller. The projected time to extinction depends on the rate of decrease in population size and the size of the population. However, low CRR does not mean that the population is extinct.

The accuracy of the petitioners' results is totally dependent, and sensitive to, the data used to generate them. Even if the petitioners' methods were valid for predicting when a population went extinct (which they are not), real empirical data – specifically freshwater and ocean survival estimates from the region – are largely lacking. Hence, any such analysis will likely be so inaccurate as to be useless for predicting time to extinction. As the Department correctly points out the only estimate of freshwater survival in this region comes from Shapovalov and Taft (1954). In a 4-year study in Waddell Creek, they estimated that average egg to smolt survival was 1.43%. Using the simple static CRR model used by the petitioners, and applying this value of freshwater survival, ocean survival would have to be around 6% in order to return one female per spawning female, not 8.6% as stated by the petitioners. Slight increases or decreases to the freshwater survival estimate or to the number of eggs per female used in the calculation greatly affect the result. In actuality, individual female coho salmon may produce between 1,983 and 4,706 eggs (Groot and Margolis 1991). This illustrates just one of the problems with using

fixed values in these simplistic calculations – they do not take individual and environmental variation into account, and so are very unlikely to give accurate predictions. In fact, coho salmon across their range have experienced periods of poor ocean conditions over the past few decades, and coho populations have likely declined as a result. However, all coho populations did not go extinct during these periods even though calculations like those used by the petitioners could be used to predict that they did.

The Department and its biologists properly note that a more dynamic simulation that incorporates Oregon Population Area Index survival rates and estimates of spawner-recruit relationships was carried out by Botsford et al. (2005). Spawner numbers declined at both the high and low ends of the range of spawner-recruit values, and were especially low at the low end. While this does suggest that coho salmon experienced very bad conditions between 1980 and 2000, it cannot be interpreted to mean that they suffered extinction.

The Commission is persuaded by substantial and credible evidence that the south of San Francisco coho salmon populations are part of a larger metapopulation that includes populations to the north of them. This structure complicates the assumptions of static survival estimates because these populations are connected by exchange. The three year spawning cycle of coho also acts as an extinction buffer by retaining a stock of fish in the ocean. Their three-year life history, along with exchange among populations, significantly improve the chances that coho salmon could persist in the face of periodic poor ocean and freshwater conditions. (See Department supplemental materials and the NOAA Notification, Federal Register, *supra* at 14687.)

5. Hatchery Planting

The petitioners' central argument in all of this discussion about “non-native coho salmon” is that coho salmon were historically absent from the region south of San Francisco prior to hatchery importation and planting there, and that all of the coho salmon in the region, both historically and today, are derived from out of basin hatchery plantings. The statement in Alvarado et al. (2005) (cited by petitioners) is clear regarding their assertion “. . . *we very clearly asserted that there have never been any native coho in streams south of San Francisco.*” The Commission can find no scientifically credible data that this assertion is true. In place of data, and either ignoring or attacking all of the positive information presented by the Department and others, the petitioners submit an argumentative narrative from which they conclude nothing more than that their hypothesis “could be true.” What the petitioners call “evidence” is actually persuasive writing, not valid scientific evidence, and should be recognized as such.

The following statements from Alvarado et al. (2005) illustrate the lack of a scientific evidence standard used by the petitioners to assert their claims:

“As stated above, by 1870 the California Acclimitization Society was operating a fish hatchery in San Francisco (Leitritz 1970) and

*there is **no reason to assume they did not plant** any fish just south of there.”* (Alvarado et al. 2005, p. 18; emphasis added.)

The petitioners do not provide evidence of any kind that coho salmon were raised by this hatchery, or that, if they were raised at the hatchery, coho were planted south of San Francisco by this hatchery operation. The petitioners’ confuse the possibility that coho could have been planted with positive evidence that they were, and present that possibility as evidence.

“Certainly, we know the Santa Cruz Organization for the Propagation and Protection of Fish was planting exotic fish into Santa Cruz County streams prior to 1900 (Santa Cruz Morning Sentinel 1878). Also, in the 1880s a private fish farm on Butano Creek, just north of Santa Cruz County, was raising native and exotic fish (ESA 2004).” (Alvarado et al. 2005, p. 23.)

There is no evidence in the above documents that the “exotic fish” referred to are coho salmon. The petitioners here confuse the mere suggestion that “exotic fish” means that out of basin coho were raised by these facilities and somehow made their way to south of San Francisco streams. This is not scientific or historical evidence of anything, much less evidence that the petitioners’ assertions are true.

*“Although, the extent and description of private fish cultural activities in California before 1900 is not well documented **we know** there was considerable fish cultural activity prior to 1900 **that cannot be ruled out.**”* (Alvarado et al. 2005, p. 23.)

Here, while admitting that the historical record is not well documented, the petitioners again mistake what is merely possible with what can be established with scientific evidence. The authors here provide no evidence of the extent or intensity of fish culture activity specific to coho salmon in streams south of San Francisco prior to 1900. Instead, they simply state that they “know” that it was “considerable.” Of course, this neither confirms their assertion that fish cultural activity was “considerable,” nor does it show that hatchery activity is the sole reason for coho presence south of San Francisco.

The Department’s response to the original petition contained the following, which is reprinted and rebutted in Alvarado et al. (2005). The Department said:

“The petitioners do not provide any evidence that supports their assertion that coho salmon have been maintained in streams south of San Francisco by hatchery input.” (CDFG 2004a, p.7 as cited in Alvarado et al. 2005, p. 24.)

Essentially, the Department asked that the petitioners provide scientifically credible support for their assertion concerning hatchery maintenance of coho in south of San Francisco streams. Here is how the petitioners responded:

This is categorically false. The majority of the following information was presented in our petition (Alvarado et al. 2004, pg. 49) and is given here nearly verbatim:

*The **most likely times** since their introduction for coho salmon to have succumbed to stochastic extirpation would have been during one of the two most sever California droughts of the last century. These droughts occurred in the early 1930s and mid 1970s. It is estimated that both of these droughts were severe enough to have a recurrence interval of over 100 years (Paulson et al. 1990). Although, they were mild in comparison to prehistoric droughts, without anthropogenic intervention **they would probably** have been capable of stressing local coho populations to the point of extirpation. Coincidentally, during the 1928-34 drought coho salmon were heavily planted in Santa Cruz County (Anderson 1995; Bryant 1994; Streig 1991, 1993). The 1970s drought **nearly** extirpated all coho south of San Francisco and led to the creation of the Monterey Bay Salmon and Trout Project (discussed above). Similarly, prior to recent years, residents and anglers took it upon themselves to manually open the sandbars at the mouths of our creeks to allow returning anadromous fish to spawn. This action is now strictly prohibited by the CDFG. (Alvarado et al. 2005, p. 24; emphasis added.)*

Petitioners' response does not provide any evidence in the form of population size estimates or estimates of the ratio of hatchery to natural coho to support their claims. Instead it resorts to pure speculation. The petitioners persistently mistake "possibility" for evidence.

Essentially, favorable ocean conditions in addition to human intervention (intentional and inadvertent) compensated for at least two major stochastic circumstances that would otherwise have extirpated introduce coho populations within the last century. (Alvarado et al. 2005, p. 24.)

This is pure conjecture. The petitioners provide no evidence that these events either would have caused coho to become extinct, or that hatcheries were the key element that avoided extinction. In order to know for sure what happened and what role hatcheries had, the Commission needs more than just an argument.

The Department has evaluated the available stocking data, which, notwithstanding the petitioners' comments, is the best available scientific information. The best scientific data available paints a very different picture from that of the petitioners' argument. The best available science and by far the more credible evidence leads the Commission to conclude that coho salmon hatchery operations in the region were relatively small, with limited, scattered production over an extended time scale, and that these relatively primitive hatchery operations relied on large proportions of early stage plants that possess notoriously poor survival prospects. The fact that hatchery stocks were imported to the region cannot be interpreted to mean that there were no native fish there at the time. There are no anomalous genetic patterns that suggest that coho runs south of San Francisco were established by any hatchery. In fact, the most recent genetic data strongly indicate otherwise. The petitioners' hypothesis that all historical and present day south of San Francisco coho populations are due to hatchery plants remain pure speculation unsupported by credible scientific evidence.

Recent genetic evidence supports this point. Molecular genetic data assembled and analyzed by the Southwest Fisheries Science Center's Santa Cruz Laboratory indicate coho salmon south of San Francisco Bay represent a historic part of the Central Coast coho salmon population and are not the result of hatchery introductions (*NOAA Notification*, Federal Register, *supra* at 14686.) These data are from two studies of genetic variation for 18 microsatellite genes in coho salmon populations from the entire range of species in California. These two studies include genotypes from more than 5,500 fish, an examination of the genetics of fish from various life stages and brood years, and systematic sampling to remove temporal and age-class variations. The 18 microsatellite genes are highly variable, with a total of almost 500 alleles, and provide sufficient information content to detect isolation between populations and insight into biogeographic patterns at multiple scales. The studies found that all coho salmon populations south of San Francisco Bay are more closely related to each other than to any others, and their closest relatives are found in the populations just to the north of San Francisco Bay in Marin county. In some cases, alleles in coho salmon from San Mateo and Santa Cruz counties do not appear to be present in any other populations within the central coast area. More generally, genetic structure within the central coast coho salmon is one of isolation by distance, with genetic distance highly correlated with geographic distance. This is an equilibrium pattern that exists when populations are structured by adaptation-drift and distance-dependent migration acting together. The results are not consistent with the petitioners' claim that plantings replaced lineages in the southern part of the range, or that these populations are non-native introductions. (*Id.*)

These results suggest that, while coho salmon south of San Francisco have unique genetic characteristics, they nonetheless are clearly part of the central coast coho salmon population. These findings do not rule out the possibility that coho salmon populations in San Mateo and Santa Cruz counties may have received some genetic signals from the introduction of out-of-state or out-of-area fish; however, the number of unique alleles in the southern populations clearly demonstrates the genetic attributes of a native species at the edge of its range.

6. Ephemeral Populations

As a final, and only somewhat related, portion of their arguments about the “non-native” status of coho salmon south of San Francisco, petitioners suggest that these populations are simply “ephemeral”. The term ephemeral is not defined by the petitioners, but is commonly used to mean “lasting but a short time”. (The petitioners do not say what they consider to be a “short time.”) The implication of the petitioners’ argument is that if a population is ephemeral, then it is 1) not important to overall population viability, and 2) cannot be protected under CESA. The Commission believe this is wrong on both counts.

First, there is no significant or even credible evidence in the record to conclude that coho populations south of San Francisco are, in fact, ephemeral.

Second, in order to show that “ephemeral” populations are not important one would have to know a great deal about the populations relationship of south San Francisco coho with other nearby groups. Metapopulations are groups of populations characterized by multiple sub-populations that are connected to some degree by migration. NOAA Fisheries concluded that metapopulation dynamics is typical for coho salmon in California (NOAA Fisheries 2005, unpublished memorandum, as cited in *NOAA Notification*, Federal Register, *supra*.) Generally there is a dynamic relationship between localized extinction and recolonization of sub populations within the metapopulation, and in a healthy and viable metapopulation, one does not need to be overly concerned with localized natural extinction of some subpopulations. However, in potentially non-viable populations, such as the endangered central coast coho salmon, these subpopulations take on a much greater importance for persistence of the metapopulation in that they 1) add to the genetic diversity of the larger associated population, 2) provide a means of recolonization of habitat where they had previously become extirpated, 3) provide a “safety net” in case of other sub-populations are extirpated, and 4), lead to range expansion and ultimately the recovery of the species.

Neither petitioners nor other commentors have provided enough focused information about California coho metapopulation structure and dynamics to specifically describe them. However, credible scientific evidence has been produced sufficient to say that there is substantial gene flow between south of San Francisco coho and coho populations to the north, and that metapopulation processes may be very important to long term viability of coho salmon across their ranges. The fact of metapopulation exchange between southern and more northerly populations suggests that these southern populations are a functioning part of a larger metapopulation process that includes more northerly coho salmon groups. That, along with the potential importance of metapopulation structure to long term persistence, leads us to conclude that southern coho populations are important to overall California coho salmon viability.

On a time scale of decades or longer, extinction and re-colonization are likely to be important elements of population structuring as well as a mechanism of range expansion and contraction for salmonids. Because of this, what seems to be ephemeral populations today may

be essential to long-term viability of the species as a whole at some time in the future. If population turnover occurs over short times, ephemeral populations may be important contributors to the viability of a larger metapopulation (McElhany et al. 2000). There is no distinction in CESA that precludes listing “ephemeral” populations. If the Commission were to conclude that these populations are unimportant and remove CESA protections, this would eliminate an invaluable mechanism for recovery, thereby making recovery and delisting much more problematic.

C. The FISHERIES Article

One of the petitioners, Fabian Alvarado, and V.W. Kacyznski recently published an article in the American Fisheries Society (“AFS”) publication, *Fisheries* magazine entitled “Assessment of the southern range limit of North American coho salmon: difficulties in establishing natural range boundaries” (Kaczynski and Alvarado 2006). Petitioners offer this article as “proof” of the scientific validity of their petition. Unfortunately this article presents nothing more than the same information as the 2004 petition to the Commission, with some updated analyses.

A copy of this article was sent to the Commission attached to a letter from Mr. Robert Briggs of the Central Coast Forest Association (Briggs 2006). The letter contained several misleading statements:

- 1) “*The paper[‘s] endorsement by the American Fisheries Society ought to demonstrate that the petition meets the statutory test for full consideration*” (Briggs 2006)

First, publication of a paper in an American Fisheries Society publication does not constitute an endorsement of the findings and conclusions by AFS (Letter from B. Beard, Managing Editor, AFS *Fisheries* magazine). In fact, this article was published as a perspective piece, meaning it expresses a policy opinion of the authors backed up by science. More importantly, publication of the petition in *Fisheries* has no real bearing on the question of whether the petition contains sufficient information for consideration because it does not address the requirements or scope of CESA. A major flaw of the article is that it completely fails to assess the southern information range limit of coho salmon as the title of the article states (there is no analysis of information from north of San Francisco, except to compare precipitation patterns of Marin and Santa Cruz counties), but only recounts reasons why the southern limit is not in Santa Cruz County. The findings and conclusions in the article are so similar to the petition that it appears that the purpose of the article was to provide scientific legitimacy to the petition.

Mr. Briggs’ letter goes on to assert that:

- 2) “*Fisheries [is] the premier North American ichthyologic journal.*” (Briggs 2006)

AFS publishes four scholarly journals: *Transactions of the American Fisheries Society*, *North American Journal of Fisheries Management*, *North American Journal of Aquaculture*, and the *Journal of Aquatic Animal Health*. These four journals are comprised of papers of original research, whereas *Fisheries* consists mostly of information of general interest to fisheries professionals (opinions, legislative updates, job listings, etc.) in addition to occasional technical papers of broad interest.

The Commission does not find that the Kaczynski and Alvarado article in *Fisheries* adds any more substance to the petition, nor any more credibility to the petition's factual assertions and arguments. Any alleged legitimacy of the proffered article as support for the petition is more than offset by the nature of the article and its limited review by the AFS as an "opinion" piece and by the specific errors, misrepresentations, and omissions already identified by the Commission within the underlying petition. The Commission further finds that the written and oral testimony of the Department and the Department fisheries biologists clearly identifies the errors within the petition that are reiterated in the *Fisheries* article. Written statements from Peter Moyle, Ph.D, an internationally respected authority on salmonid fish and fisheries (and on behalf of Peter Cedans, Ph.D. (NOAA Fisheries), Louis Botsford, Ph.D. (U.C. Davis), Kenneth Gobalet, Ph.D. (CSU Bakersfield), Robert Liedy, Ph.D. (U.S. EPA), Dennis McEwan, (Department of Fish and Game), Jerry Smith, Ph.D. (San Jose State Univ.), John Williams, Ph.D. (fisheries consultant), and Ronald Yoshiyoma, Ph.D. (U.C. Davis)) summarize the presentation of information contained in the Kaczynski and Alvarado article as "inaccurate and misleading and . . . their conclusions are fundamentally wrong." Dr. Moyle goes on to say that he believes "there is substantial evidence that coho salmon are native to the region south of San Francisco and [that he sees] no reason why they should be removed from the list of Endangered Species." (Peter Moyle letter, February 12, 2007.)

The Commission agrees with Dr. Moyle's assessment of the article and the underlying petition and does not find the article providing any new information, credible information, upon which a reasonable person would rely.

D. CESA Protection For Endangered Species Extends to All Members of the Listed Species

Petitioners continue to assert that coho salmon were never "native" south of San Francisco, and that all coho salmon there historically or presently are either derived from hatchery fish or they are the result of strays from more northern populations. The Commission does not agree with this assessment, as the Commission has outlined above and in the Commission's original findings on the 2004 petition. Furthermore, the Commission finds **no** support for petitioners' assertion that "native species", as addressed under CESA, are to be narrowly construed as only those species (1) with an uninterrupted presence throughout all of their California range, and (2) never the subject of artificial propagation or restoration efforts. CESA says no such thing. Both a plain language reading of the Act and an examination of species already protected under the Act reveals that the "native species" governed by the Act are

all species indigenous to California. CESA's protection extend to indigenous species wherever they occur in California – throughout all or a significant portion of their range. Nor does CESA discriminate between hatchery and naturally spawning populations.

If the current populations of coho salmon south of San Francisco are derived from hatchery planting, the genetic analysis indicates that they are native California fish. Recent Commission action to list coho salmon north of San Francisco under CESA included hatchery as well as naturally spawning population in the region.

Additionally, if a coho population is the result of “stray spawnings” of fish from north of San Francisco populations, as petitioners hypothesize, CESA does not exclude fish that are the result of straying (see above for the importance of “strays” and “ephemeral populations”). Even if the petitioners' assertions are correct, populations south of San Francisco would then represent a range expansion of the species in California and would be subject to provisions of CESA, regardless of how they got there. Genetic analysis indicates that coho salmon populations south of San Francisco are clearly part of the large salmonid resources of the State of California. As such, they continue to warrant listing under CESA.

E. The National Marine Fisheries Service Has Similarly Reviewed the Petition and Rejected It.

On November 12, 2003 the National Marine Fisheries Service (“NMFS”) received a petition from Homer McCrary (one of the petitioners herein) to redefine the southern extent of the federal endangered species protections for California coho salmon by excluding coho salmon populations occupying watersheds in Santa Cruz and coastal San Mateo Counties (south of San Francisco). (See, *NOAA Notification of Finding*, Federal Register, Vol. 71, No. 58, March 23, 2006, pg. 14683-14687.) The federal petition was in all relevant aspects identical to the petition before the Commission. (A copy of the federal petition is contained within the record before the Commission, and was provided during the Commission's consideration of coho salmon listing for populations north of San Francisco.) Section (4)(b)(3)(A) of the federal Endangered Species Act requires that, after receiving a petition for delisting, a finding of “whether the petition presents substantial scientific information indicating that the petitioned action may be warranted” must be made if the matter is to receive further consideration. After a thorough assessment of the federal petition, and substantial supplemental materials, NMFS resoundingly rejected the petition concluding the “petition does not present substantial scientific . . . information that the petitioned action may be warranted.” (*NOAA Notification*, Federal Register, *supra*, p. 14687.)

The Commission finds that the thorough assessment of the record performed by NMFS and its subsequent conclusion are significant additional evidence in support of the Commission's rejection of the petition. Furthermore, the NMFS evidentiary assessment provides further support for the Commission's assessment and conclusions regarding the credibility of the petitioners and petitioners' evidentiary statements.

FINAL DETERMINATION BY COMMISSION

The Commission has weighed all the scientific and general evidence in the administrative record, to include the petition, the supplemental materials provided by petitioner, the Department's initial written evaluation report, the statewide listing administrative record, (including the status review and recovery strategy), the recent federal reviews, the original listing administrative record, the Department's supplemental report and rebuttal, and oral presentation and comments, and other comments received from the public, and, based upon that weighing of the evidence, the Commission has determined that the petition does not provide sufficient evidence to persuade the Commission (**nor any reasonable person**) that the petitioned action may be warranted. (Fish & G. Code, § 2074.2). In making this determination the Commission could not reasonably conclude there is a substantial possibility that the listing of coho salmon south of San Francisco was unfounded or in error such that delisting could occur. Nor could the Commission reasonably conclude that there is substantial possibility that coho salmon south of San Francisco no longer meets the criteria for protection as an endangered species such that delisting could occur.

Dated:

4-26-07



For the California Fish and Game Commission