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**BY E-MAIL**

Re: *Petition to Redefine Southern Boundary of  
Central California Coho ESU*

Dear Mr. Strach:

While we appreciated the time NOAA made available to listen to our concerns, it seems that NOAA still does not fully understand the nature of those concerns. We also wanted to make sure those concerns were fully and completely expressed in the Administrative Record, and thus request that you incorporate this letter and the Streig letter (additional copy enclosed) into that Record. We also request that you advise us at your earliest convenience when NOAA will be making a final determination on the petition.

### **Historical Abundance and Future Prospects**

From our perspective, NOAA's scientists attempt to refute the "non-native" hypothesis with some specimens with a significant probability of being spurious and some 1909 collections fully explained by multiple documentary records corroborating the shipment and the plantings in 1906. All other circumstantial evidence, ranging from archeology to the common perceptions of a fishing community, points to the 1906 introduction of coho south of San Francisco as a *new species*.

One hundred years later, the government and academia-based communities of fisheries biologists share the opposite impression, based on a chain of references in the literature largely rooted in a single master's thesis of artistic improvisation. It must be remembered that the current consensus view impression arose long before anyone knew of possible early coho specimens. The consensus view was entirely the product of error. Now, it stands on the idea that Stanford's scientists erred in identifying the fish in 1895. These are slender reeds.

We are troubled by Dr. Adams' reiteration of what he calls the scientific consensus to reject our petition. *Science* consists of testing hypotheses against data, not against how many times misconceptions are repeated in literature reviews. It is a matter of looking at what may truly be inferred from the available data, not counting "votes" of scientists. The truth of the matter was that the leading experts were wrong about the

ability of the Santa Cruz coast to sustain coho a hundred years ago when they recommended the introduction, and NOAA's experts are wrong today to the extent they insist upon repeating the same failed experiment.

Tracing the roots of the "IP-km" approach NOAA advances to suggest that the Santa Cruz habitat can support coho produces the same result as tracing proclamations of the "nativeness" of the coho in the scientific literature: the devil is in the details, and the details of the model don't even address the factors like droughts, bars and the frequency of scouring floods that make the Santa Cruz habitat unsuitable. And, to respond to Dr. Adams, if those conditions are present for some other populations on the California coast, maybe NOAA should be considering leaving those populations out of the ESU too, but two wrongs don't make a right.

Dr. Adams places great weight on the notion that the south of San Francisco populations are "embedded" in an ESU containing the northern populations. That is only because NOAA, the California Department of Fish & Game, and private hatcheries have put them there. The petition seeks to redefine the ESU to exclude them. We ask NOAA to follow the policy set forth in NOAA Technical Memorandum NMFS F/NWC-194 (Waples (1991)) and the ESU Federal Register Policy Notice (56 FR 58612) to analyze, on a population-by-population basis as required by the Policy, the two Policy factors: (1) reproductive isolation and (2) whether the population at issue represents "an important component in the evolutionary legacy of the species".

In particular, we ask NOAA to consider what Waples (1991) regarded as the "key question": "How can evolutionarily important units be protected without running the risk of artificially maintaining units that might naturally undergo episodes of extinction/recolonization on something short of evolutionary time scales?" The answer, of course, is to exclude such ephemeral, "sink" populations from the ESU.

### **Reproductive Isolation**

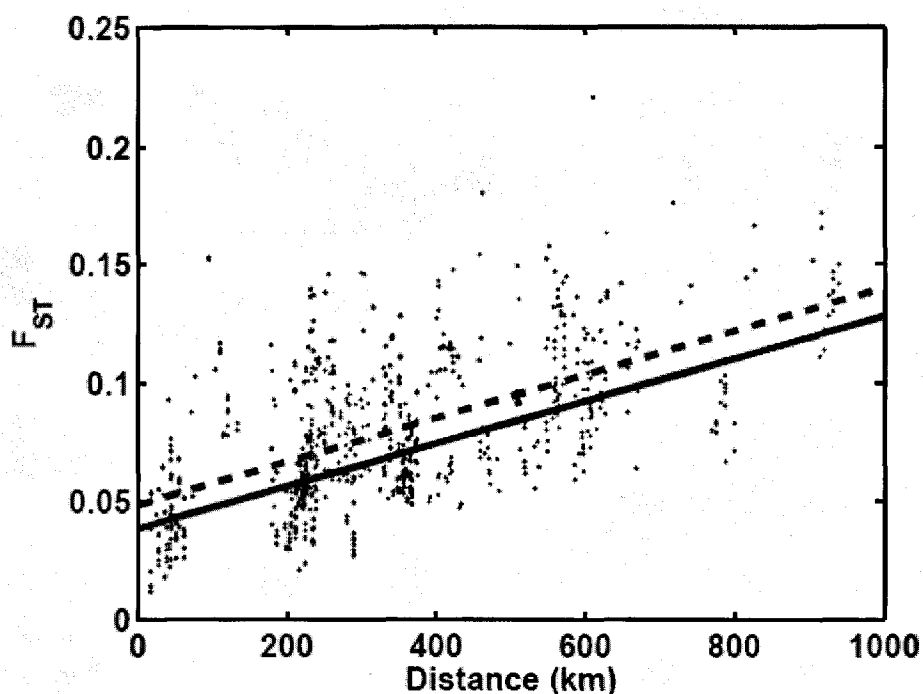
Of course the south of San Francisco populations are closely related to north of San Francisco populations. All salmon populations up and down the coast are closely related. They are all the same species. We can draw one big genetic tree for all of them—or we could if Oregon had not refused to share its data with Dr. Garza to draw those bigger trees. The resulting effort would probably assist NOAA in understanding that all coho populations up and down the West Coast lie on a relatively smooth cline of genetic diversity, with stochastic variation induced by migrants and plantings.

As a practical matter, given the migration corridor of the ocean, reproductive isolation is entirely a function of straying (or out-of-basin plantings). Interestingly, Dr. Garza said we know almost nothing about straying rates. But in terms of dividing up the broader "species" into "distinct population segments" or ESUs, we do know that the first

and obvious way to draw the line is between rivers. Everything else is of much, much less importance with respect to reproductive isolation.

We do understand that big rivers with arguably “reproductively isolated” populations in the tributaries may call for further analysis under the ESU policy. Indeed, they were the sole example of “groups of populations” that might properly be considered a single ESU by Waples (1991). However, that problem is not pertinent for the petition. It may be pertinent in litigation, for the statutory language does not permit NOAA to consider “groups of populations” under statutory authority to list “distinct population segments”, insofar as we doubt a Court will find that Congress intended through the words “distinct population segment” to denote a “group of populations”.

Against the obvious river-by-river division along the California coast, stands the genetic evidence, here NOAA’s chart of  $F_{ST}$  vs. distance, which was curiously not included in Dr. Adam’s presentation:



Nothing about this data tells NOAA to include any particular distance range along the coast in an ESU. The areas that might be characterized as more reproductively isolated as a practical matter are the clouds of dark dots, largely representing rivers. They are the molecular reflection of the basic truth that most salmon return to spawn *by river*. Any decision to aggregate two, three, four, or thirty-four such rivers by picking an ESU based on a range along the x-axis is inherently arbitrary, at least with respect to the “reproductive isolation” prong of the ESU policy

And Dr. Garza's other tree contains an "SONCC/CCC" line as an ESU dividing line that could have been drawn in many different places on the tree insofar as reproductive isolation is concerned. And, of course, if one plugged in the coastwide data and drew a bigger tree, it would be even harder to draw the lines. Genetics is not telling us where to draw the line, because the genetics is not picking up sharp dividing lines between groups of populations. It is confirming a general correspondence between geographic distance and genetic distance.

### **Importance to the Evolutionary Legacy of the Species**

The other relevant factor under NOAA's ESU policy, and the most important one here, is the requirement that the listed population be an important component in the evolutionary legacy of the overall species. Again, the genetic data do not tell us about importance in any way shape or form. Indeed, I believe Dr. Garza would confirm *that the microsatellite technique even assumes that the measured microsatellites are of no evolutionary importance*. In this particular case, the genetics only tell us about relationship or parentage, not importance, which is why the Population Structure Memo (NOAA-TM-NMFS-SWFSC-382) expressly eschews any reliance on genetics with respect to the coho south of San Francisco.

NOAA has offered no rationale, in terms of evolutionary significance, for drawing a line that includes south of San Francisco coho. Dr. Adams did mention that the coho were significant because they are at the southernmost tip of the range, but they are not evolutionarily significant because sink populations are by definition not evolutionarily significant. As Waples (1991) observed, "[i]n general, populations resulting from the introduction of fish into a local area not occupied by the biological species (particularly if the area is outside the historic range of the species) are probably not ESUs . . .".

It is true that Waples declared that "ESUs should correspond to more comprehensive units unless there is clear evidence that evolutionarily important differences exist between the smaller population segments". While we think that the "clear evidence" suggestion is patently inconsistent with the Congressional directive that DPS authority be used "sparingly", there is a very important "evolutionarily significant" difference between the populations north and south of San Francisco. The northern populations are sources and the southern ones are sinks. This is the most fundamental difference that there is from the standpoint of evolution. Sink populations, by definition, contribute nothing.

Even if a handful of specimens were collected in 1895, as Waples points out, "[t]he fact that small spawning aggregations are regularly observed may reflect a dynamic process of extinction, straying, and recolonization. Such populations are unlikely to be ESUs, although a collection of them might be". Where the entire

collection is a sink, however, even that collection clearly cannot meet the second factor of the Policy even when aggregated.

In short, if NOAA would merely apply its ESU policy, NOAA would exclude these populations from the overall CCC ESU because they are not of evolutionary significance to the species; NOAA has already determined that the rest of the ESU is of evolutionary significance, and we do not ask NOAA to revisit that finding. NOAA could also revise the policy into congruence with law, and stop clumping large numbers of rivers together, but that is not what we have asked for in this petition. What we have asked for is that NOAA reconsider the southern boundary of the ESU in light of the scientific data presented and its policies, and de-list the coho south of San Francisco.

It is not even clear that we have a genuine difference of opinion with some of the NOAA scientists as to whether the southern populations are of evolutionary importance. Their focus on genetic relationships, which Dr. Grimes deemed themselves sufficient to refute our petition, suggests that they have failed to adequately consider the second prong of the ESU policy. Sound management requires that NOAA require its scientists to address the factors made relevant by the Policy, and acceptance of the petition is the first step toward securing an appropriate Policy application. I understand the difficulties of confining scientists to the Policy factors rather than the factors they may deem relevant under NOAA's management structure, but NOAA is legally required to do so by adopting a Policy so deeply embedded in the science.

Finally, your counsel's suggestion that the Hogan decision requires NOAA to list the entire ESU misses the point. We are not asking NOAA to exclude the south of San Francisco populations from listing protections while retaining them in the ESU (the situation observed by Judge Hogan); we are asking NOAA to redefine the ESU consistent with the Congressional directive that it exercise such power "sparingly". To insist that evanescent populations at the extreme southern end of a species' range are "an important component in the evolutionary legacy of the species" in the absence of *any* unique phenotypic traits and life history traits is arbitrary, capricious and contrary to law.

Sincerely,

James L. Buchal

P.S. We did have one additional question. Does NOAA have some sort of information about additional specimens associated with Snyder's expedition(s) at the Smithsonian Institution?

cc: Clients  
Deanna Harwood  
Churchill Grimes  
Pete Adams  
John Carlos Garza  
Eric Anderson  
Scott Hill  
Craig Wingert  
Julia Caracoza