



CALIFORNIA WETFISH PRODUCERS ASSOCIATION

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August 8, 2016

Mr. Herb Pollard, Chair
And Members of the Pacific Fishery Management Council
7700 NE Ambassador Place #200
Portland OR 97220-1384

RE: Agenda Item E.2. Stock Assessment Workshop Report

Dear Mr. Pollard and Council members,

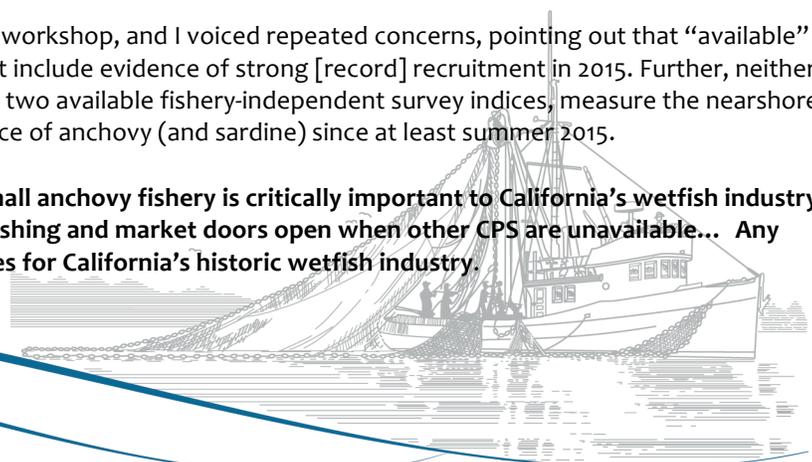
As Executive Director of the California Wetfish Producers Association (CWPA), representing the majority of coastal pelagic species 'wetfish' fishermen and processors in California, I thank you for considering the following points regarding anchovy assessment and management. These comments pertain to the Stock Assessment Workshop Report and SSC statement (Agenda Item F.2), and highlight key points from an open letter to the SSC that I submitted for their June meeting and review of the workshop report.

Dear Will and SSC members,

I attended the recent CPS workshop as CPSAS advisor. Dr. Richard Parrish, who has had 50 years of experience with anchovy research/management, also was invited to participate, but was unable to attend. However, he did submit comments for the group's consideration, in follow-up to the comment he submitted last November to the PFMC, re: "... Collapse of Northern Anchovy off California, MacCall et al (2015)". The MacCall et al paper was cited by a number of ENGOs in their campaign to curtail California's small but important anchovy fishery. Dr. Parrish recommended several ways that the MacCall paper could be improved, noting "***The analysis shows that the biomass of the central stock of northern anchovy is extremely variable and that this variability occurs with and without a significant fishery on the stock.***" He stated in conclusion, "*The biomass estimates in the MacCall et al paper cannot be used to estimate the 2016 biomass of the northern stock of anchovy. The paper clearly shows that the population can increase, or decrease, an order of magnitude in two years. The last year of the biomass time series is 2011 and the last year-class in this estimate was the 2010 year-class. Essentially the entire spawning population of 2011 is now dead. Clearly with northern anchovy a 5 year old biomass estimate is not significantly better at estimating current biomass than a 25 year old biomass estimate.*"

Egg-larval analysis methods were discussed during the workshop, and I voiced repeated concerns, pointing out that "available" egg-larval data, now updated to spring 2015, still do not include evidence of strong [record] recruitment in 2015. Further, neither CalCOFI egg-larval surveys nor Acoustic Trawl (AT), the two available fishery-independent survey indices, measure the nearshore, where fishermen have been reporting a large abundance of anchovy (and sardine) since at least summer 2015.

I also pointed out at the workshop that California's small anchovy fishery is critically important to California's wetfish industry, as a fishery of "last resort" – a lifeline to keep boats fishing and market doors open when other CPS are unavailable... Any move to curtail this fishery will have dire consequences for California's historic wetfish industry.



A synopsis of our concerns, and Dr. Parrish's truncated comments on the MacCall et al egg-larval analysis, appear in the workshop report under Advisory Subpanel comments, section 7.1, page 22, and Appendix E, beginning on page 35. Although the workshop report (thankfully) acknowledges the need to expand surveys to account for the nearshore area for DEPM and both nearshore and upper water column for Acoustic Trawl (AT) indices as part of a full assessment, the Panel also identified options for a short-term approach to provide some "preliminary information" on the status of the [central subpopulation of anchovy] at the November 2016 Council meeting." These include using a DEPM light approach to construct an (**negatively biased**) index of abundance and provide an estimate of **absolute biomass**, and using AT survey results for 2015 to provide a (**negatively biased**) estimate of **absolute abundance** for the survey area if catchability (q) is assumed to be 1. (**However, in reality catchability is not 1.**)

In essence, this approach would use two survey indices earlier deemed to be inappropriate to measure anchovy abundance, in part due to their omission of the nearshore and upper water column – and both of which now also exclude recent evidence of huge anchovy recruitment – to produce a point estimate of absolute abundance that is bound to be inaccurate and seriously underestimated.

The report states (page 20): "The SSC will need provide a recommendation to the Council about how the "DEPM light" approach could be used. Potentially, It might be used either to 1) make a decision whether a point of concern exists (as described in the CPS FMP), 2) establish a new ABC and OFL for anchovy as a monitored species, or 3) establish a new ABC and OFL for anchovy as actively managed species. "

I'm writing this letter to the SSC [and sharing highlights with Council members] to reiterate industry concerns, particularly in California, with special reference to the possibility that the SSC might recommend an interim approach based on an assumed (albeit negatively weighted) absolute biomass estimate generated from "available" data derived from either the 2015 AT survey or DEPM index, both of which exclude strong evidence of recruitment as well as the current abundance of anchovy nearshore, extending from north of San Francisco to southern California.

...

To begin, I encourage your consideration of Dr. Parrish's comments regarding the MacCall analysis of egg/larval abundance in CalCOFI surveys. Both the Parrish comment to the PFMC (*Agenda Item H.3.b, Supplemental Comment 4, Nov 2015*). and further comments submitted to the workshop (posted on ftp Assessment workshop under public comment) outlined issues with the MacCall et al analysis of egg-larval data. A three-page synopsis of key issues also appears in Appendix E of the Workshop Report, pages 35-38.

Below are key excerpts from both Dr. Parrish's written and email correspondence regarding anchovy; his statements are presented in *italics*.

May 1 email

If the SWFSC redoes Alec's work they need to do it both with the nearshore stations and without the nearshore stations to see what it does to the analysis.

May 10

*One way to check both the CalCOFI data for calculating anchovy biomass would be to **repeat Alec's analysis using February and March (the peak of spawning)** instead of January and April (the tails).*

Also someone needs to look at the depths of the standard stations to see how many stations there are at less than 50 fathoms. It is possible that some of the most inshore stations are deeper than 50 fathoms.

Workshop report Appendix E - page 36 - summarized Dr. Parrish's comments on Nearshore-Offshore Age Composition

*Parrish et al (1985) showed that **young northern anchovies (ages 0 and 1) are concentrated in areas where the water is less than 50 fathoms in depth** and that older anchovies (ages 2-6) are concentrated in areas that are deeper than 500 fathoms (Figure 6 in Assessment Report Appendix E, page 36 (IRI_SUP_REVISED_CPS_DataPoorMethods_WorkshopRpt_ElectricOnly_JUN2016BB).*

...

When the egg and larval abundances are used with the stratified areas used by MacCall et al (2015), the assumption that average daily egg production is the same in all areas is a questionable assumption as it has been shown that the age composition of anchovies sampled in shallower areas (i.e. nearshore) is dominated by young anchovies where as deeper areas (i.e. offshore) is dominated by older mature anchovies.

The conversion of egg and larval abundance to spawning biomass is dependent on the daily egg production that is highly age-dependent and therefore area-dependent in northern anchovy.

From Supplemental Comment 4, Nov. 2015)

It should also be noted that the offshore areas in the egg and larvae sampling grid have fewer eggs than the nearshore areas **even when the biomass is high.** This is particularly true in central California.

A point of consideration, and in our opinion, concern : **MacCall et al (2015) intentionally omitted nearshore egg-larval data from analysis.**

Seasonality of Spawning:

From Supplemental Comment 4, Nov. 2015)

The seasonality of spawning and fecundity was examined by Parrish et al. (1985) using the maturity stages of central stock northern anchovy taken in mid-water trawls by the Sea Survey Program and the California purse seine fishery during the high abundance period (1966-80) and histological information for the gonads of females taken during the months of February-April from 1977-1984. ... The maturity stages, spawning incidence and fecundity information derived from these data shows that **egg production peaks in March and is highest from February to April**; very few anchovies are spawning in January (Figure 10 and Table 3). **This makes the January data in the MacCall et al paper somewhat suspect.** Note that one-year-old anchovies have peak spawning in February, that age 2 and older anchovy have peak spawning in March and that there is a high percentage of 3 year and older anchovy with a high egg production in April. **Neither February nor March were used in the MacCall et al paper.**

The April time series implies a very strong biomass peak in 2005; however, the January time series completely misses the 2004-6 biomass peak and it implies a collapsed biomass in 2005.

Appendix E, page 37, summarizes Dr. Parrish's comments on Egg Production:

The Parrish et al study (1986 – Table 3) shows that the production of eggs/gm body weight is highly age-dependent in northern anchovy. Anchovies in their first spawning year produce only 43% of the eggs produced by those in their second spawning season and only 20% of those in their fourth, and later, spawning seasons. **This factor is not included in the MacCall et al (2015) analysis and it may greatly bias the estimates of biomass as eggs produced in the offshore stations (i.e. the majority of the stations) require a significantly smaller eggs to biomass conversion rate than those in the nearshore area. The eggs to biomass conversion rate for age 1 anchovies should be five times that of age 4+ anchovies.**

It is not explained why March the peak spawning month was excluded in the MacCall et al (2015) analysis.

Appendix E – page 37 – excerpted Dr. Parrish's comments on Age-Dependent Fecundity

Excerpts from Supplemental Comment 4, Nov. 2015

A related source of bias in the MacCall et al paper is caused by the fact that fecundity (i.e. eggs per gram body weight) is highly age-dependent. ... **It appears that the use of January data is questionable due to the very small proportion of spawning that occurs in this month, as small variations in the percent spawning will have relatively large proportional affects.** In addition, the choice of January, with very low spawning rates during the peak of the fishery prior to 1985, increases the potential of decadal and inter-annual bias in biomass estimates caused by alterations in the seasonal distribution of egg production.

The second potential source of bias associated with age-dependent egg production is that the egg and larval surveys have no way to distinguish between a spawning population composed primarily of age 1 anchovies vs. one composed primarily of age 3 and age 4+ anchovies. Biomass estimates are likely to be more than twice as high if the biomass is dominated by older anchovies than the situation that occurs when a super abundant year-class occurs during a period of low biomass. In addition if the biomass is smaller due to increased numbers of predators (i.e. California Sea Lions and/or albacore) the increased natural mortality will produce a younger age composition and the resultant biomass estimate would have a low bias due to the reduced egg production associated with a younger population.

From a May 3 email:

... Although I agree with [Ed] Weber about [not] using only CalCOFI data, especially the scaling problem, I think that the extreme changes seen in [Alec's] analysis are still very real and have great importance for any ecosystem-based analyses. ... Yes there is undoubtedly an underestimation of anchovy biomass due to absence of nearshore stations, and this probably is more important at low biomass than high biomass. The absolute values are a problem (i.e. the scaling problem), but the three orders of magnitude change in biomass (or eggs and larvae) are of great importance when/if people start trying to use ecosystem models for management. ...

Essentially the problem boils down to how many tons does each egg in the survey area count for. For example, the offshore stations should have a lower multiplier (conversion rate) than the nearshore stations because the older anchovy in the offshore area produce more eggs per ton of fish than the nearshore stations with young fish. It might be interesting to ask this question. Does one egg equal 10 mt, 100 mt or 1000 mt?

Dr. Parrish also made observations about the AT survey in relation to CalCOFI data analyzed by MacCall.

Excerpt from an email on May 10:

*I was just looking to see if I could find the depth of the inshore CalCOFI stations but was unable to find this information. However, I finally went to CalCOFI on Wikipedia and noted the Zwolinski et al (2011) paper in US Fish Bull 110: Very interesting. They had acoustic/trawl surveys in 2006, 2008, and 2010. Here is their analysis for anchovy (page 115) "Anchovy and herring occurred in isolation in coastal waters off Oregon and Washington, and anchovy were mapped north of Monterey Bay and in the SCB, indicating a higher geographical fidelity than the other species (Fig. 1). Both species were caught in a small number of samples and their catch biomasses were considerably lower than those for sardine and jack mackerel (Table 1), except in 2008, when two catches each yielded more than 500 kg of anchovy. **Their apparently low abundances and patchy distributions precluded accurate estimations of their distributions and abundances.**"*

In other words, the acoustic/trawl surveys completely missed the anchovy pulse [in 2006] described by [MacCall]. Eyeballing Alec's Figure 7 he gives about 1.3 MMT in 2006, about 0.2 MMT in 2008 and about 0.02 MMT in 2010.

Dr. Parrish also reviewed the draft workshop report at my request. His comments included the following:
Section 4.8, Conclusions arising from case studies (page 17):

“Survey indices are commonly well-behaved in other places. Across most of the examples presented to the workshop the surveys seemed to cover the area of the stock (inshore/offshore, and over the entire range) much better than do the surveys of U.S. west coast CPS.” [RP1]

[RP1] This is a major point and it alone may make CSNA stock assessments inaccurate, increase variance (i.e. different percentage in area surveyed) and introduce considerable negative bias to the assessments.

And under Section 6.1 Recommendations for CPS Assessments where “The Panel identified the following options for a short-term approach to provide some preliminary information of the status of the CSNA at the November 2016 Council meeting” (page 20):

[bullet 3] “... The ATM survey results for 2015 could be analyzed to provide a (negatively biased) estimate of absolute abundance of the CSNA for the surveyed area if catchability is assumed to be 1. [RP1] The estimates of absolute spawning biomass from the ichthyoplankton-based model should be compared to the estimate of biomass from the ATM survey, while realizing that both are expected to be underestimates.” [RP2]

[RP1]This is worse than no estimate at all. How can anyone assume a catchability of 1.0 when the 2006 ATM survey only had one positive trawl haul and [MacCall's] model shows an adult biomass of 1.3 MMT.

[RP2]That is what I have been saying. Why did no one show the comparison at the meeting?

I would like to share one more email comment from Dr. Parrish:

May 2

It has been several decades since a stock assessment of the central stock of northern anchovy has been made. ... The fact that the stock had remained in the 0.2 to 0.5 MMT range from 1990 to 2004, surged to over 2.0 MMT in just two years and then fell by more than an order of magnitude in the next couple of years does not appear to have been "monitored" or noticed.

The anchovy fishery showed no response to the increased population; apparently the low price for anchovy, the lack of canning and fishmeal processing equipment and the small market for fresh or frozen anchovy is what has limited California landings for the last couple of decades. Fishery management has had essentially no impact as the conservative annual quota was larger than the market.

...

...I will simply caution those doing the anchovy analyses that if they do not include the published information on age-dependent distribution, age-dependent egg production and geographically-dependent growth rates they are simply wasting their time. If the analysis is limited to only the egg and larvae data they will simply be adding a few years and a few bells and whistles to [MacCall's] analysis.

In conclusion, I point out that **this discussion revolves around updating a stock assessment for a highly dynamic resource that is driven by environmental factors unrelated to fishing.**

Anchovy are now lightly fished as "a last resort" by an historic industry that needs flexibility to move among fisheries in the CPS complex during their time of abundance. That flexibility is now hampered by ultra precautionary management policies. I agree with Dr. Parrish's assessment, "**the low price for anchovy, the lack of canning and fishmeal processing equipment and the small market for fresh or frozen anchovy is what has limited California landings for the last couple of decades.**" This situation will continue into the future.

Annual landings have averaged half of the already precautionary limit of 25,000 mt for the past two decades, and even though catches increased a bit in 2015, the total harvest was still several thousand metric tons below the current harvest limit. Landings increased because the sardine fishery is now closed, El Niño displaced squid, and few other CPS were available to harvest. Clearly, this small fishery, although very important to California's wetfish industry, does not warrant active management status, where the cost of annual or even more frequent surveys essential to assess resource dynamics accurately would exceed the value of the fishery.

In light of the extreme natural fluctuations exhibited in anchovy biomass and the small size of the fishery, we support the continuation of the fishery's "monitored" status and precautionary harvest limits based on a biomass level averaged over time – as the fishery is managed now. **The one change would be to collect periodic biological composition information to confirm published age and fecundity data.**

We also ask the SSC [and the Council] to consider recent evidence of anchovy abundance in your deliberations. Based on real evidence of recruitment observed in the 2015 juvenile rockfish survey, for one example, and nearshore abundance also testified to by fishermen on the grounds..., there is no anchovy "crisis". In our view, **there is no need precipitated by a conservation concern to produce a "hurry-up" interim point assessment based on incomplete data that could amp the politics to change the existing harvest control rule.**

We recommend that the Council approve:

- a thorough review of all available data, including recent evidence of “record” recruitment;
- data workshops as needed;
- evaluation of various assessment methods,
- with serious attention paid to comments and recommendations of Dr. Parrish regarding the importance of *including the published information on age-dependent distribution, age-dependent egg production and geographically-dependent growth rates* in egg-larval analyses.

We further recommend allowing the time required to “do it right.”

Please understand: the preservation of an historic industry is at stake.

Thank you for your consideration of these comments.

Best regards,



Diane Pleschner-Steele
Executive Director