October 11, 2012

Mr. Dan Wolford, Chair

Pacific Fishery Management Council
7700 Ambassador Place, Suite 200
Portland, Oregon 97220

Dear Mr. Wolford,

RE: November meeting agenda item F.4, Future Meeting Agenda and Workload Planning.

I am requesting that the Council place into the June 2013 agenda an item to address a potential recreational midwater fishery using the resulting data from the recent RFA Oregon yellowtail EFP fishery. It was suggested at the September Council meeting that there is potentially space available for this item in the June 2013 agenda.

Sincerely,

John Holloway, Co-Chair
Recreational Fishing Alliance, Oregon Chapter

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October 5, 2012

Dr. Donald McIsaac
Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

Mr. Rodney R. McInnis
Regional Administrator, SW Region
National Marine Fisheries Service
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802

RE: **Coastal Pelagic Species Management: Harvest Parameters Workshop**

Dear Dr. McIsaac and Mr. McInnis:

We understand on October 9 the Coastal Pelagic Species Management Team (CPSMT) is hosting a conference call to discuss the proposed CPS harvest parameters workshop. We expect this will be the foundation of a very important conversation at the Council and within the agency about the long-term conservation and management of Pacific sardine. We are unable to attend this initial meeting, but as you know, Oceana is greatly interested in the conservation and sustainable management of forage species like Pacific sardine. We are writing to request the harvest parameter workshop address the full scope of issues associated with the conservation and management of Pacific sardine including maximum sustainable yield (MSY), optimum yield (OY) and the various factors in the harvest control rule including FRACTION, DISTRIBUTION, MAXCAT, CUTOFF and MSST.

Forage species, including the species managed under the CPS Fishery Management Plan (FMP), play a vital ecological role in the California Current Large Marine Ecosystem as prey for other commercially and recreationally important fish species, marine mammals and seabirds. A recent study published in Fish and Fisheries found that forage fish in the Northern California Current ecosystem support the greatest production of predators out of 72 ecosystems evaluated around the planet.[1] It is imperative that CPS management complies with the requirements of the Magnuson-Steven Fishery Conservation and Management Act, national standard guidelines, and that we continue to improve the science, and harvest controls for stocks in the fishery.

For many years now, there has been broad agreement that the harvest control rules for Pacific sardine and Pacific mackerel are in need of formal review.[2] As stated in the 2008 CPS SAFE

[1] Pikitch, E. K., Rountos, K. J., Essington, T. E., Santora, C., Pauly, D., Watson, R., Sumaila, U. R., Boersma, P. D., Boyd, I. L., Conover, D. O., Cury, P., Heppell, S. S., Houde, E. D., Mangel, M., Plagányi, É., Sainsbury, K., Steneck, R. S., Geers, T. M., Gownaris, N. and Munch, S. B. (2012), The global contribution of forage fish to marine fisheries and ecosystems. Fish and Fisheries. doi: 10.1111/faf.12004

[2] See Research and Data needs, PFMC CPS SAFE. 2009, at 62. And, research and data needs in PFMC CPS SAFE. 2011., at 98. "Develop a formal review process for the harvest control rules for Pacific sardine and Pacific mackerel.

report, "…the harvest control rules in the CPS FMP are dated and in need of review and potential revision. Review of the harvest control rules in the CPS FMP has been repeatedly characterized as a high priority research and data need by the Council and its advisory bodies."[3] Importantly, in November 2011 the SSC recommended for Pacific sardine management,

> *that a workshop be convened within the next year to design a simulation analysis similar to Amendment 8 analysis but employs current modeling approaches provide estimates of F_{MSY} and updated parameters for the harvest control rule. The SSC further recommends that **a full management strategy evaluation be performed** for the northern subpopulation of Pacific sardine as soon as time and resources permit.*[4]

This recent push to review the harvest control rule is in part due to the findings in the McClatchie et al. study that demonstrated "the environmental proxy derived from SIO pier temperature, which has never affected the harvest guideline since its implementation, **no longer predicts recruitment of Pacific sardine, and should be removed from sardine management.**"[5] This fact has great ramifications for the harvest control rule, as the various performance metrics analyzed in Amendment 8 for the various control rules are dependent on this predictive relationship. In other words, if the temperature-recruitment relationship for Pacific sardine is removed, the various harvest control rules result in significantly different outcomes than those produced in Amendment 8 and Amendment 13. Therefore, the lack of a temperature-recruit relationship means that all aspects of the harvest control rule must be re-assessed. We are encouraged that the Council and NMFS will be working to address this issue.

To that end, Oceana has acquired both the original Amendment 8 simulation model as well as the updated simulation model as presented in Appendix 4 of the 2011 stock assessment. We are currently in the process of analyzing these models, and plan to share the results of our analysis with the CPSMT, SSC, PFMC, and NMFS in the context of Pacific sardine harvest specifications and the current revisions to the harvest control rule.

While McClatchie et al. 2011 are clear that SIO temperatures are not a useful predictor of future recruitment and scientists do not fully understand these relationships, it is clear from previous history that Pacific sardines do undergo prolonged periods of low and high productivity. We are concerned, however, that the revised simulation model with updated parameters as presented in Appendix 4 of the 2011 Stock Assessment removed any temperature-recruitment relationship, and hence the oscillatory (boom and bust) nature contained in the original model. Our preliminary analysis of this model suggests that the increase in F_{MSY} from the simulations (from 12% to 18%) is more related to the removal of the oscillatory productivity rather than the inclusion of more recent data. In addition, removal of the oscillatory productivity results in a

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Currently this review is not part of the stock assessment process." And "Evaluate the role of CPS resources in the ecosystem, the influence of climatic/oceanographic conditions on CPS, and define predatory-prey relationships."

[3] PMFC 2008. SAFE. June 2008, at 46. and see PFMC 2011. Status of the Pacific Coast Coastal Pelagic Species Fishery and Recommended Acceptable Biological Catches. Stock Assessment and Fishery Evaluation. June 2011, at 68.

[4] PFMC, November 2011. Agenda Item F.2.c Supplemental SSC Report

[5] McClatchie, S., Goericke, R., Auad, G., and Hill, K. 2010. Re-assessment of the Stock-Recruit and Temperature-Recruit Relationships for Pacific Sardine (*Sardinops sagax*). 2010. Canadian Journal of Fisheries and Aquatic Sciences 67:1782-1790

much different effect of the CUTOFF parameter with respect to various model outputs. This raises serious concerns about the use of the updated F_{MSY} in the context of management, and at the least, suggests that the original simulation model is more appropriate for determining F_{MSY} and other performance measures until a comprehensive revision of the simulation model occurs.

However, there is new best available science and information that indicates that the Pacific sardine harvest control rule and management framework need to be re-assessed and revised in its entirety at this time. We request the proposed harvest parameter workshop include a review of not only the temperature-recruit relationship and F_{MSY} but also optimum yield, the effective fishing rate, and the distribution, maximum catch and cutoff factors in the harvest control rule.

Optimum Yield

The MSA mandates that fisheries be managed to achieve OY, which reflects an effort to balance fisheries production with the need to take into account the protection of marine ecosystems.[6] Hence, OY is prescribed as MSY **as reduced** by any relevant economic, social, or ecological factors.[7] The NS1 regulations implementing the MSA repeatedly emphasize that OY and even MSY must account for ecological considerations.[8] This incorporation of ecological factors into the setting of catch levels is a required element of FMPs.[9] The ecological factors used in determining MSY and OY specifically include the benefits of protection afforded to marine ecosystems, such as "maintaining adequate forage for all components of the ecosystem."[10] The regulations implementing the MSA go beyond simply incorporating the impacts to forage species in setting catch levels, stating that "consideration should be given to managing forage stocks for higher biomass than B_{MSY} to enhance and protect the marine ecosystem."[11] In addition, the CPS FMP itself lists "provide adequate forage for dependent species" as a primary goal of the management of CPS fisheries, indicating that the role of CPS as forage is clearly a "relevant economic, social, or ecological factor".

> *So far, however, the opportunity cost of sardines as prey for other fish and animals has not been explicitly considered in setting catch quotas for sardines…. The main conclusion is that taking the opportunity cost of sardines as forage fish into consideration could quite possibly mean closing down the sardine fishery altogether, and at the very least would have an appreciable impact on how much of sardines should be caught in any particular year. (Hannesson and Herrick 2010)*

Ultimately the choice of harvest control rule through which ACLs and ACTs are set must achieve OY. We remain concerned that the FMP does not include an assessment and specification of OY for stocks in the fishery, including sardine, and we hope to see the Council and National Marine Fisheries Service begin to remedy this by including an assessment of OY as

[6] 16 U.S.C. 1851 § 301(a)(1); *see also* 16 U.S.C. 1802 § 3(33).
[7] 16 U.S.C. 1802 § 3(33)(B). Emphasis added.
[8] *See, e.g.,* 50 C.F.R. § 600.310(e)(1)(iv) and (e)(3)(ii).
[9] 50 C.F.R. § 600.310(e)(3)(iv)(C).
[10] 50 C.F.R. § 600.310(e)(3)(iii)(C).
[11] 50 C.F.R. § 600.310(e)(3)(iv)(C).

a specific part of this workshop. Importantly we request that there be consideration of bio-economic models that have been developed to evaluate the role of sardine as forage, and the economic value of sardine as prey to other managed fisheries.[12] In determining which harvest control rule achieves the overall greatest benefit to the Nation, NMFS and the PFMC must explicitly incorporate the supportive roles of CPS to the ecosystem and to other sectors, in addition to considering the effects of alternative harvest rates on the wetfish industry itself.

Ultimately, for naturally fluctuating forage fish stocks such as Pacific sardine, there are important trade-offs across multiple management objectives. While there are many objectives at play, we recognize three general objectives at the heart of sardine management, which can be assessed in different ways:

1. Account for the ecological services provided as forage, as part of the overall forage base, to specialist predators, and various sectors;
2. Consider cumulative or average long-term catch;
3. Consider variance, or stability in the catch (e.g., % of years with a significant fishery).

Clearly, all of the parameters in the current harvest rule (DISTRIBUTION, FRACTION, CUTOFF, and MAXCAT) affect the performance of the fishery across the various performance measures, as has been demonstrated in the original Amendment 8 analysis. Based on this and the wealth of new best available information, we request that any undertaking of revisions to the current harvest control rule address all of the following parameters.

1. Exploitation Rate (FRACTION)

The Lenfest Forage Fish Task Force conducted the most comprehensive analysis of harvest control rules for forage fish stocks to date. The unanimous recommendations are that for forage fish stocks for which a medium level of information exists (arguably the situation for Pacific sardine), harvest rates should include a cutoff of at least 40% of the long-term mean unfished biomass, and be less than one half of the F_{MSY} rate. They argue that following these recommendation results in low probability of collapse for forage species, lower declines in dependent species, and ultimately a more stable fishery.[13] Similar, Smith et al. (2011) recommended "Halving exploitation rates" from traditional MSY rates, which "would result in much lower impacts on marine ecosystems, while still achieving 80% of MSY."[14] We request that model evaluations of Pacific sardine consider a range of alternative FRACTION parameters in combination with other parameters, including alternatives where the catch levels would be set no higher than half of F_{MSY}.

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[12] See: Hannesson, R. S.H. Herrick, and J. Field. 2009. Ecological and economic considerations in the conservation and management of the Pacific sardine (*Sardinops sagax*). Can. J. Fish. Aquat. Sci. 66: 859-868 and Hannesson, R. and S.F. Herrick. 2010. The value of Pacific sardine as forage fish. Marine Policy (34) 935–942
942.

[13] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. 2012. Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

[14] Smith et al. 2011. Impacts of Fishing Low-Trophic Level Species on Marine Ecosystems. Science. www.sciencemag.org July 21, 2011.

2. Distribution

In the Pacific sardine harvest control rule, the DISTRIBUTION parameter is intended to reflect the average proportion of Pacific sardine biomass in U.S. waters, versus other nations (Mexico and Canada), with the inherent assumption that each nation is entitled to catch that proportion out of the overall coastwide harvest guideline as determined by the harvest control rule. The simulation model used in Amendment 8 included the entire Pacific sardine stock across Mexico, the U.S., and Canada, and was based on coastwide landings, not U.S. landings alone. Ultimately, the model simulations and various outcomes of any given harvest rule as described in Amendment 8 assume that the harvest guidelines are not being exceeded on a coastwide basis. The DISTRIBUTION factor was based on summer-fall fish spotter surveys conducted two decades ago during a period of low sardine abundance and has been used to justify the assumption that 87% of the stock is in U.S. waters, 13% of the stock is in Mexico waters and 0% is found off Canada.[15] This results in a much greater estimate of the proportion of Pacific sardine in U.S. waters than the current proportions of the total catch landed in recent years by each country.

According to this distribution estimate there should be no portion of the coastwide Pacific sardine stock in Canada at all. Canadian landings data demonstrate that the current HCR uses the one value for Pacific sardine biomass in Canadian waters that we know is incorrect – zero percent. It is the *least* rational assumption available as the basis for the distribution parameter, and using it places the Pacific sardine stock at increased risk for international overfishing, and exceeding the harvest guidelines identified in the Amendment 8 simulations.

The October 2011 Pacific Sardine STAR Panel report explains that "[t]he current Canadian harvest control rule is based on the U.S. assessment of coastwide adult biomass and the migration rate of sardines into Canadian waters."[16] The report upon which this summary is based reveals that **Canada assumes a distribution of 27.2%** to calculate their catch level. *Evaluation of Pacific sardine stock assessment and harvest guidelines in British Columbia* (http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2011/2011_016-eng.pdf) DFO 2011).[17] We request that alternatives to the current distribution factor be considered based on more recent data, including one that assumes the distribution factor recognized by Canada equal to 27.2% and recent catch in Mexico. Other data also exist, including the recent acoustic trawl estimates of sardine biomass of the U.S. and Canada.[18]

3. Cutoff and MSST

[15] CPS FMP Amendment 8, Appendix B, p. B-87-88.
[16] PFMC. 2011, Agenda Item F.2.b Attachment 5, at 22
[17] DFO. 2011. Evaluation of Pacific sardine (*Sardinops sagax*) stock assessment and harvest guidelines in British Columbia. DFO Can. Sci. Advis. Sec. Science Advisory Report. 2011/016.
[18] Zwolinski, J. D.A. Demer, B.J. Macewicz, G.R. Cutter, K.A. Byers, J.S. Renfree and T.S. Sessions. 2012. Acoustic-trawl estimates of sardine biomass off the west coast of the United States and Canada during summer 2012. NMFS. In Appendix B to the Assessment of the Pacific Sardine Resource in 2012 for U.S. Management in 2013. Draft Summary Report. September 8, 2012

The CUTOFF parameter in the Pacific sardine harvest control rule plays a critical role in maintaining stock biomass, providing forage to dependent predators, preventing stock collapse, and promoting timely recovery of the Pacific sardine population following natural declines. A recent scientific paper by NMFS SW Fisheries Science Center researchers (Zwolinski and Demer 2012) published in the Proceedings of the National Academy of Sciences finds that the Pacific sardine biomass has "declined precipitously in the California Current" (see: http://www.pnas.org/content/early/2012/02/24/1113806109.full.pdf) As if that is not enough to warrant concern, the authors found, "Also alarming is the repetition of the fishery's response to a declining sardine stock – progressively higher exploitation rates targeting the oldest, largest, and most fecund fish."[19]

> *"Currently, the exploitation of sardine off the west coast of North America is at the highest possible rate within the management framework, and the largest, most fecund fish have been targeted increasingly despite clear indicators of their depletion." (Zwolinski and Demer 2012)*

Zwolinski and Demer (2012) identify a "critical biomass" of approximately 750,000 metric tons, below which the Pacific sardine stock is at grave risk of stock collapse. The clear implication of this threshold is that the current cutoff and minimum stock size threshold (MSST) should be greater than 750,000 mt. In the report "*little fish BIG IMPACT*", (available at: http://www.oceanconservationscience.org/foragefish/) the Lenfest Forage Fish Task Force recommends that fishing stop for forage fish when the biomass reaches at least 40% of the unfished biomass. Dr. Hill's updated simulation model estimates the average unfished biomass of Pacific sardine at approximately 2,225,000 metric tons.[20] Applying the Lenfest Forage Fish Task Force recommendations to Pacific sardine would then require a cutoff of approximately 900,000 metric tons, or six times higher than the current 150,000 metric ton cutoff. Another study published in the journal Science looked at the impacts of fishing forage species on seabird predators, and concluded that forage fish populations should be kept above one third of historic maximum levels, which would mean a Pacific sardine cutoff of well over one million metric tons.[21]

NMFS has suggested that the current cutoff is conservative simply because it is three times the minimum stock size threshold (MSST), yet the sardine MSST and the cutoff are not even consistent with national standard one guidelines that state MSST should be at least one-half of

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[19] Zwolinski, J. and D.A. Demer. 2012. A cold oceanographic regime with high exploitation rates in the Northeast Pacific forecasts a collapse of the sardine stock. Proceedings of the National Academy of Sciences (PNAS) 109 (11) 4175-4180 (attached).

[20] See figure 5. Hill, K.T. 2011. Re-evaluation of F_{MSY} for Pacific sardine in the absence of an environmental covariate. In, Pacific Fishery Management Council Agenda Item F.2.b Supplemental Attachment 8. Pacific Sardine Assessment Report. November 2011.

[21] Curry, P.M., I.L. Boyd, S. Bonhommeau, T. Anker-Nilssen, R.J.M. Crawford, R.W. Furness, J.A. Mills, E.J. Murphy, H. Österblom, M. Paleczny, J.F. Piatt, J.P. Roux, L. Shannon, and W.J. Sydeman. 2011. Global Seabird Response to Forage Fish Depletion – One-Third for the Birds. Science (334)6063 1703-1706.

the MSY stock size.[22] For Pacific sardine, one-half the MSY stock size as determined in CPS FMP Amendment 8 is 704,000 metric tons.[23] This is based on the constant harvest strategy of F_{MSY} = 12% (stochastic F_{MSY}), resulting in a long-term mean biomass of 1,408,000 metric tons of age 1+ sardine. This is coincidentally close to the critical biomass threshold Zwolinski and Demer identified of 750,000 mt. Even under Dr. Hill's updated simulation model in Appendix 4, the MSY stock size is approximately one million mt, so one-half the MSY stock size would be 500,000 mt, which is 10 times greater than the current MSST. The main point here is that the message coming from multiple scientific publications and the national guidelines is that the Pacific sardine cutoff is far too low and we recommend that both CUTOFF and MSST be reviewed with different alternatives including those presented in these scientific publications.

4. Maximum Catch

The MAXCAT parameter in the harvest control rule serves several functions, including increased stability for the fishery, preventing overcapitalization, and a buffer against uncertainty. The level of MAXCAT interacts in several important ways with the other parameters of the harvest control rule. For example, the role and relative importance of MAXCAT in various model outputs depends largely on the other parameters. Therefore, any revisions to the harvest rule should re-evaluate the MAXCAT in combination with other parameters in assessing the extent to which any given harvest control rule achieves Optimum Yield.

In conclusion, we appreciate this opportunity to comment on the CPS harvest parameters workshop. There is a tremendous amount of new information on the distribution of the Pacific sardine stock, changes to the simulation model used in Amendment 8, our understanding of the temperature-recruit relationship, and our ability to incorporate the opportunity cost of sardines as forage. We look forward to sharing the results of our analysis of the existing simulation models, and helping define the appropriate scope of revisions to the Pacific sardine harvest control rule.

We hope you will give these comments your full consideration and that you will work with your management teams and scientists to undertake a rigorous and complete evaluation of OY and all parameters of the harvest control rule. Thank you for your time and attention to this issue.

Sincerely,

Ben Enticknap
Pacific Project Manager

cc. Dr. Owen Hamel, Chair, PFMC Scientific and Statistical Committee
Dr. Robert Emmett, Chair, PFMC Coastal Pelagic Species Management Team

[22] 50 CFR § 600.310 (e)(2)(ii)(B) (MSSTs must be expressed in terms of spawning biomass or other measure of reproductive potential and should equal whichever is greater: one-half the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years.)
[23] PFMC and NMFS 2011. Amendment 13 to the Coastal Pelagic Species Fishery Management Plan. Draft Environmental Assessment and Regulatory Impact Review, at 57 .Option L, Stochastic F_{MSY}.