

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

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CONSERVATION LAW FOUNDATION,)
et al.,)
Plaintiffs)
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) CIVIL ACTION NO. 00-1134
(GK))
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v.)
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)
DONALD L. EVANS, et al.,)
SECRETARY OF COMMERCE)
Defendants)
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SECOND DECLARATION OF MICHAEL P. SISSEWINE, Ph.D.

I, MICHAEL P. SISSEWINE, declare as follows:

1. I am Director of the Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, Massachusetts. I have more than twenty-five years of experience as a research scientist, research leader, and scientific advisor on marine stewardship issues. The declaration I executed 22 February 2002 (hereafter referred to as "my first declaration") gives additional information on my professional background.
2. The purpose of this declaration is to provide

comments on the (A) Plaintiffs' Combined Reply to Federal Defendants' Opposition to Plaintiffs' Request for Remedy and Opposition to Federal Defendants' Statement with Respect to Remedy (hereafter referred to as the "Plaintiffs' combined reply"); (B) declaration by Dr. Ellen K. Pikitch submitted to the Court along with the Plaintiffs' combined reply (hereafter referred to as the Pikitch's "second declaration") in the context of Dr. Pikitch's declaration executed 18 January 2002 (hereafter referred to as Pikitch's "first declaration"); and (C) declaration by Mr. David Lincoln executed 14 March 2002 on behalf of the Northeast Seafood Coalition, an intervener in this litigation. It is my scientific opinion that some parts of these three items are misleading and/or inaccurate.

(A) Plaintiffs' Combined Reply

3. Plaintiffs' combined reply wrongfully accuses NMFS of using scientific analyses as a "...smokescreen behind which it maneuvers to ensure that it avoids implementing Amendment 9..." The analyses referred to by the Plaintiffs have recently been conducted to estimate what scientists and fishery managers refer to as "MSY reference points" (which are the category of "biological reference points" related to Maximum Sustainable Yield) and to develop population

"production models," which are needed to predict if, and how fast, fish populations will grow under various fishery management alternatives. Estimates of MSY reference points and production models are used as scientific inputs to Fishery Management Plans which are implemented under the Sustainable Fisheries Act. As I explained in paragraph 5(a) of my first declaration, there were sound scientific reasons to update reference points and production models. I will elaborate further on the reasons in paragraph 4-9 of this declaration. In paragraph 6 of my first declaration, I described an expedited process that NMFS had already initiated to perform the updating. That process was completed as planned on 19 March. This was an extremely ambitious effort on the part of NMFS scientists to provide the most comprehensive, up-to-date, objective scientific information feasible, at this time.

4. Production models relate the rate of population growth in weight to population biomass. Population growth is: the weight gain of fish in the population plus the weight of fish added to the population as a result of reproduction (referred to as "recruits" or "recruitment") minus the weight of fish that die of natural causes, such as diseases, predation and starvation (i.e., referred to as "natural mortality"). Population growth is zero when biomass is zero

(i.e., there are no fish to grow or reproduce). As population size increases, production increases, until it reaches a maximum level. This level corresponds to the Maximum Sustainable Yield (MSY), and the population biomass where it occurs is referred to as the "biomass at MSY" or "Bmsy." As biomass increase beyond the Bmsy level, there is less production because of processes that limit population growth, such as competition for food.

5. The Overfishing Definitions Review Panel used a simple form of production models that lumped weight gain of fish, recruitment, and natural mortality together as production, rather than considering them as separate components. This simple form of model also ignores "age structure" (number of fish of each age). There are four important problems with these simple models.

6. The first problem with the simple models used by the Overfishing Definition Review Panel is, that it is my experience, that they have a tendency to estimate the biomass at MSY well within the observed range of estimates of the biomasses used in formulating the models. This is a problem for some New England multispecies groundfish stocks, because some stocks were heavily fished (probably overfished) before

the start of the available time series of biomass estimates.

The biomass may have been reduced below the MSY biomass level before the time series began, thus leading to a tendency to underestimate the biomass at MSY.

7. The second problem with the simple models used by the Overfishing Definition Review Panel is that they do not model time delays in production that are inherent in populations because of age structure. The models assume that the biomass has an instantaneous effect on production. However, there may be a time delay of many years between spawning and the time when recruitment contributes to population production. Thus simple models that ignore age structure have a tendency to be optimistic about how fast a population can rebuild.

8. The third problem with the simple models used by the Overfishing Definition Review Panel also relates to the fact that the models ignore age structure. Without age structure, the models cannot take account of the fact that young fish have a higher percentage growth rate than old fish. Thus, the production of a population at a particular biomass is sensitive to the age composition of the population. This problem could result in models being either optimistic or pessimistic about how fast a population can rebuild.

9. The fourth problem with the simple models used by the Overfishing Definition Review Panel concerns fishing mortality rates. Fishing mortality rates are key parameters used in fishery management decisions. Fishing mortality is a measure of the fraction of the fish (in numbers) removed from a population by fishing. NMFS uses assessment models with age structure to estimate the current fishing mortality rates. The Overfishing Definition Review Panel used the same simple models it developed to model production, to estimate the fishing mortality rates that corresponds to MSY. However, because it used models that lacked age structure, its estimates of fishing mortality rates were, by necessity, a measure of the fraction of population biomass (not number of fish) removed by fishing. Fishing mortality rates based on numbers of fish are not directly comparable to fishing mortality rates based on biomass. The relationship between the two depends on age structure, which is dynamic. This lack of comparability between estimates of the fishing mortality that corresponds to MSY and current estimates of fishing mortality rates has turned out to be confusing and misleading.

10. Plaintiffs quote me as telling the NEFMC that the scientific updating process was geared to supporting the

Council in its development of Amendment 13, presumably to infer that the updating was not needed to calculate the TACs that correspond to Amendment 9. Providing scientific information to Fishery Management Councils established by the Magnuson-Stevens Fishery Conservation and Management Act, is an ongoing responsibility of NMFS scientists. The same type of scientific information is needed to calculate TACs in accordance with Amendment 9. The fact that NMFS scientists had not discussed the implications of their scientific updating process (relative of Amendment 9), as of 27 February (as indicated in the Plaintiffs' submission), does not negate the importance of the scientific updating process relative to Amendment 9. The updating needed to be conducted before the results could be used to make calculations in accordance with Amendment 9. The implications of the results relative to Amendment 9 are now being considered, as indicated in the second declarations prepared by Dr. Steven Murawski.

11. The Interim Action, based on draft Framework 36, is not based on updated MSY reference points and production models. The goal of the Interim Action is to substantially reduce the fishing mortality rate on some multispecies groundfish stocks pending completion of an SFA-compliant rebuilding program. It is not to achieve MSY reference points

or any specific rate of rebuilding. Thus, the results of the scientific updating process were not needed in order to design and analyze the proposed Interim Action.

(B) Declaration by Dr. Ellen K. Pikitch

12. Dr. Pikitch's current declaration states that "No credible scientist could rule out the possibility that irreparable harm (in the sense of a severe and prolonged population collapse) might occur in a situation where populations are brought to, and kept at, extremely low levels." To the best of my knowledge, no NMFS scientist has made a statement ruling out the possibility of irreparable harm, in the sense described by Dr. Pikitch. Even for populations that are not at extremely low levels, there is some risk of irreparable harm. In fact, there is some finite risk that all populations will eventually go extinct. At issue, is the magnitude of the risk over a specified period of time.

13. Dr. Steven Murawski's declaration executed 15 March 2002, considers the most recent stock assessments and abundance data, likely projected biomass levels, and expected progression of year classes for New England multispecies

groundfish stocks. He concludes that rebuilding of the resource as a whole should continue for at least the next year under targets and measures established under Amendment 7 and subsequent framework actions. The fact that, in general, one cannot rule out the possibility of irreparable harm over an unspecified period of time, is not inconsistent with Dr. Murawski's short-term conclusions based on scientific information about the status of specific stocks. While one cannot rule out the possibility of irreparable harm in general, it is my professional opinion that no objective scientist would state that irreparable harm is likely in the short term (i.e., before summer 2003) without considering current stock specific information.

14. In paragraphs 8-10 of Dr. Pikitch's current declaration, she defends the statement she made in her first declaration, about the minimum level of observer coverage that should be used in the New England multispecies groundfish fishery. In her current declaration, she states that "... the best estimate of what might be the minimum satisfactory level would be 10%..." However, she provides no scientific rationale for her conclusion. Her rationale seems to be what she refers to as her "intuition" and an inference from the 10% coverage level used for the Pacific groundfish fishery. She

describes the Pacific groundfish fishery as being "fairly similar to the New England groundfish fishery (though of course, there are a number of important differences)." In fact, there are large differences that are directly relevant to the appropriate percent observer coverage. There are about 8 times as many vessels and 4 times as many annual fishing trips for the New England multispecies groundfish fishery. In light of these differences between the fisheries, I would expect a similar level of precision for the New England groundfish fishery, as for the Pacific groundfish fishery, with a much lower percentage observer coverage in New England. My expectation is based on well known methods of estimation from a statistical sample. I will elaborate in Paragraphs 15-16.

15. As I stated in my previous declaration, the precision of estimates is more sensitive to the sample size, than to the sampling fraction. The importance of sample size (rather than sampling fraction) is the reason that, contrary to many people's intuition, pollsters can predict the outcome of elections, or the popularity of television programs, from surveys that sample much less than 1% of voters or television viewers. This conclusion is consistent with Professor William G. Cochran's widely used text book on sampling techniques,

which points out that the precision of results from sampling surveys is not very sensitive to the sampling fraction (the equivalent of percent observer coverage) when it is less than 5%, and for many purposes even when it is as high as 10%.

16. Since sample size is particularly important in determining precision, and the number of trips in the New England groundfish fishery is about 4 times the number of trips in the Pacific groundfish fishery, 2.5% coverage of the New England groundfish fishery might be expected to give similar precision to 10% coverage of the Pacific groundfish fishery (since the sample sizes would be about the same). The number of observer days planned for 2002 should be enough to provide about 2% coverage of the New England multispecies groundfish fishery if there are the same number of fishing trips in 2002 as occurred in 2000. However, there will probably be additional restrictions on fishing in 2002, which will result in less fishing trips.

17. In my previous declaration I stated that analyses were being conducted to determine the precision of estimates that will result from NMFS' proposed observer coverage. These analyses are partially complete. NMFS now has relative precision estimates for discards of 13 multispecies groundfish

stocks for the year 2000. NMFS plans to approximately double the number of observed fishing trips in 2002 relative to 2000.

According to well known statistical theory, the resultant relative precision of discard estimates should be reduced by about 30% when sample size is about doubled.

18. The table below gives the relative precision of discard estimates for 2000 and the expected relative precision for 2002. Relative precision is a measure of how close a discard estimate is to the actual amount of discards. For example, a relative precision of 0.2 means that there is about a two out of three chance that the actual amount of discards is between roughly 80% and 120% of the estimate.

Species/Stock	Relative Precision	
	2002	2002
Gulf of Maine Cod	0.175	0.124
Georges Bank Cod	0.253	0.179
Gulf of Maine Haddock	0.258	0.182
GB Haddock	0.188	0.133
Cape Cod Yellowtail Fl.	0.351	0.248
Georges Bank Yellowtail Fl.	0.454	0.321
Gulf of Maine Winter Fl.	0.280	0.198
Georges Bank Winter Fl.	0.342	0.242

Southern NE Winter Fl.	1.249	0.883
Witch Flounder	0.158	0.112
American Plaice	0.170	0.120
Redfish	0.251	0.178
White Hake	0.246	0.174

19. Since the relative precision values in Paragraph 18 are derived using ratio estimators, they are known to be biased low. The bias is inversely proportional to the sample size. This means the bias is probably important (more than 10%) for some components of the fishery, but it is probably unimportant for overall species/stock estimates of discards.

20. Based on the results above, I conclude that the planned observer coverage for 2002 will produce useful estimates of discards for several species/stocks of the New England multispecies groundfish fishery. The relative precision of the discard estimates is expected to be similar to the relative precision of other information used as a basis of fishery management decisions. It is similar to the relative precision of relative abundance estimates from trawl surveys. Both discard estimates and trawl survey relative abundance estimates are inputs to stock assessments, which makes it desirable for them to have about the same precision.

The precision for estimates for some species/stocks could be poor. It could be improved by a more optimal allocation of sampling effort, which has not been considered in deriving these estimates. It will be considered in the actual allocation of samples.

21. Paragraph 12 of Dr. Pikitch's second declaration incorrectly characterizes what she said in her first declaration and my response to her statement. She states that I disputed her contention that effort controls alone "may be insufficient" to limit fishing mortality to intended levels. In fact, Dr. Pikitch said in her first declaration that she believes effort controls alone "are insufficient." In response to her previous definitive statement I stated that there is "no scientific basis for concluding that effort controls, in general, are insufficient." I stand by my statement. I agree that effort controls may be insufficient, as indicated in my first declaration, which gave examples where this was the case.

(C) Declaration by Mr. David Lincoln

22. I will only comment on two aspects of Mr. Lincoln's declaration. The first aspect concerns the status of New

England multispecies groundfish stocks. The second aspect concerns the Stock Assessment Review Committee's (SARC) recommended change in the biomass at MSY for Gulf of Maine cod.

23. Paragraphs 3-5 of Mr. Lincoln's declaration make the point that the status of New England groundfish stocks has improved in recent years. While I do not agree with all of the specific statements made by Mr. Lincoln, I agree that, in general, there has been improvement in the status of stocks, and that for some specific stocks, the improvement has been dramatic. This conclusion is consistent with the information presented by Dr. Steven Murawski in his declaration executed 15 March 2002. However, this conclusion should not be interpreted as meaning that New England groundfish stocks have rebuilt to biomass levels required under existing Fishery Management Plans and/or in order to comply with the Sustainable Fisheries Act.

24. In Mr. Lincoln's attempts to refute the SARC's recommended estimate of Bmsy of 90,300 metric tons (mt), he makes some incorrect statements. For example, it is incorrect to say that the validity of the model used to estimate the new Bmsy level "is entirely dependent on the quality and quantity

of port sampling." The estimate is dependent on many other factors, such as estimates of the growth rate of the cod, for which there are a large amount of high quality data. While it is true that the SARC identified problems with port sampling and the need for improvement, the SARC agreed on 90,300 mt as the best estimate based on the available information.

25. In paragraphs 12 and 16 of Mr. Lincoln's declaration he attempts to refute the new estimate of Bmsy for Gulf of Maine cod based on the catch history of the fishery. The estimate of MSY that corresponds to the new Bmsy level is 16,000 mt of catch annually. Mr. Lincoln contends that reported catch data over the past 100 years indicates that a catch of 16,000 mt is not sustainable. There are several possible explanations. One would not expect a catch of 16,000 mt to be sustainable if (a) the stock had already been reduced below the Bmsy level, (b) there are cycles in production of the population such that attempts to maintain a high catch on the downward part of the production cycle results in an unsustainable level of fishing mortality (sometimes referred to by scientists as the "ratchet effect"), (c) there is unreported catch and discards, and/or (d) there were more smaller fish in the catch than in recent years, which is likely to have been the case since a smaller mesh size was

used.

26. I understand that the Northeast Seafood Coalition, an intervener in this litigation, contends that NMFS deviated from Amendment 9 requirements by using the 90,300 metric tons (mt) as the estimate of Bmsy for Gulf of Maine cod, based on a recommendation by the SARC. The previous estimate of 33,000 mt was based on the type of simple production models used by the Overfishing Definitions Review Panel. The estimate suffered from the same technical limitations described in Paragraphs 5-9, which is why the SARC concluded that a better estimate was needed and possible based on available information. However, it is my understanding, that the Bmsy estimate of 90,300 mt has not yet been used as the basis of any fishery management measure, nor is it the basis of the Interim Action or the Secretarial Action included in NMFS's proposed remedy. It should be noted that the Bmsy estimate was revised slightly (by about 5%) during the updating process described in Paragraph 6 of my first Declaration, as a result of a minor technical change in methodology.

27. In Paragraph 16 of Mr. Lincoln's declaration, he argues that there is no need to reduce the fishing mortality rate for Gulf of Maine cod in order to reach the previously

estimated Bmsy level of 33,000 mt within the next few years. He bases his argument on projections conducted by the SARC. However, these projections used the model that the SARC adopted as the basis for its Bmsy estimate of 90,300 mt. It is illogical to argue that the model should not be used as the basis for a new estimate of Bmsy, but that it should be used as the basis for judging rebuilding relative to the previous estimate of Bmsy.

28. It should be noted that, for more than a decade, the SARC has been viewed by fisheries managers in the Northeast region as an authoritative source of scientific advice to support fisheries management decisions. In general, its conclusions have been supported by reviews conducted by Scientific and Statistical Committees of Fishery Management Councils, the US National Research Council, and other bodies.

I declare under penalty of perjury that the foregoing is true and correct.

Executed in Woods Hole, Massachusetts, on this first day of April 2002.

Michael P. Sissenwine, Ph.D.
Director
Northeast Fisheries Science Center