

HONORABLE MICHELLE L. PETERSON

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

WILD FISH CONSERVANCY,

Plaintiff,

v.

BARRY THOM, in his official capacity as
Regional Administrator for the National
Marine Fisheries Service, *et al.*,

Defendants,

and

ALASKA TROLLERS ASSOCIATION, and
STATE OF ALASKA,

Defendant-Intervenors.

Case No. 2:20-cv-00417-RAJ-MLP

**THIRD DECLARATION OF DR.
ROBERT LACY, Ph.D.**

I, Robert Lacy, state and declare as follows;

1. I am over eighteen years of age. I have personal knowledge of the facts contained in this declaration and am otherwise competent to testify to the matters in this declaration.

2. I previously prepared a declaration that was submitted in this matter on April 16, 2020—Declaration of Dr. Robert Lacy, Ph.D, Dkt. No. 14-3 (“First Lacy Declaration”). I also previously prepared a declaration that was submitted in this matter on May 5, 2021—Second

1 Declaration of Dr. Robert Lacy, Ph.D, Dkt. No. 91-4 (“Second Lacy Declaration”). The First
2 Lacy Declaration and Second Lacy Declaration described my professional qualifications and the
3 work that I had performed and opinions that I had developed in this matter up to that point. I do
4 not repeat those efforts here, but instead incorporate them with this reference.

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6 3. In preparing this Third Lacy Declaration, I have considered the following
7 additional materials not addressed in the First Lacy Declaration and Second Lacy Declaration:

- 8 a. 2021 demographic data provided by Wild Orca on births, deaths, and current age
9 structure (as of 1 March 2022) of the Southern Resident Killer Whale population;
- 10 b. A published report that documents further the dependency of the Southern
11 Resident Killer Whales on Chinook salmon prey for individual health and
12 survival of the whales (Stewart, J. D., J. W. Durban, H. Fearnbach, L. G. Barrett-
13 Lennard, P. K. Casler, E. J. Ward, and D. R. Dapp. 2021. Survival of the fattest:
14 linking body condition to prey availability and survivorship of killer whales.
15 Ecosphere 12(8):e03660);
- 16
17 c. The 2020 annual report of the Pacific Salmon Commission that provides estimates
18 of the numbers of Chinook harvested from Southeastern Alaska (SEAK) waters
19 due to each component of the SEAK fisheries (Pacific Salmon Commission Joint
20 Chinook Technical Committee Report, Annual Report of Catch and Escapement
21 for 2020. Report TCCHINOOK (21)-03).

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23 4. Since the First Lacy Declaration and Second Lacy Declaration, I have conducted
24 further modeling efforts that use the most recent Southern Resident Killer Whale demographic
25 data and that look at the predicted impact to Southern Resident Killer Whales from removing
commercial troll fisheries in Southeast Alaska. This declaration is intended to supplement the

1 opinions expressed in the First Lacy Declaration and Second Lacy Declaration to describe those
2 new efforts. Except as expressly stated herein, I continue to hold the opinions described in the
3 First Lacy Declaration and Second Lacy Declaration.

4 5. In the 12 months since the Second Lacy Declaration, there have been 3 deaths and
5 no live births in the population. The last birth occurred in early 2021. The additional year of data
6 were added to the data on births and deaths since 1976 to update estimates of mean birth and
7 death rates over the past 46 years. Population projections with current demographic rates and
8 assuming that Chinook availability remains as it has been on average over recent decades now
9 show a marginally worse projection than what I estimated a year ago – with a projected mean
10 decline of 0.5% per year compared to the 0.4% decline per year that was reported in the Second
11 Lacy Declaration. This slightly faster decline is due to the lack of successful reproduction in the
12 past 12 months (thereby pulling down the long-term average by a little), an aging population
13 (mean age = 21.8 years compared to 21.4 years a year ago), and a smaller current population size
14 (now down to N = 72). I now project a 28% probability of decline below N = 30 during the next
15 100 years, vs the 21% that was estimated in the Second Lacy Declaration. Thus, the somewhat
16 better demographic performance of the population that was observed in 2020 was reversed in
17 2021, as might be expected with year-to-year fluctuations in individual fates and population
18 consequences. The long-term population trend continues to be a slide toward extinction.

19 6. The small changes in mean demographic rates and current population size do not
20 measurably affect my prediction in the Second Lacy Declaration that Chinook prey availability
21 would need to increase by about 5% in order to stop the decline of Southern Resident Killer
22 Whales, with much greater increases in prey availability or the addition of other protective
23 measures (such as reductions in noise disturbance) required to achieve good population growth
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25

1 toward recovery.

2 7. My statements in the Second Lacy Declaration remain valid that if the strength of
3 the relationship between Chinook prey and Southern Killer Whale survival and reproduction has
4 been overestimated or is decreasing, then greater increases in Chinook or other conservation
5 measures would be required to stop the decline of Southern Resident Killer Whales. A recent
6 publication by researchers working for NOAA and colleagues (Stewart et al., 2021) provides
7 further evidence of the importance of Chinook prey availability to the Southern Resident Killer
8 Whales, but sample sizes were not adequate to provide the direct quantitative relationship
9 between prey availability and demographic rates that would be needed for updated population
10 projections. I am aware of ongoing studies by other researchers who are seeking to refine and
11 update the estimates of the relationship between Chinook prey stocks and the survival and
12 reproduction of Southern Resident Killer Whales. Until those studies are completed and
13 published, I continue to rely on the same earlier published estimates that I used in the earlier
14 analyses.
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17 8. I was asked by the Wild Fish Conservancy to calculate the expected effect on
18 Southern Resident Killer Whale population stability and growth if the commercial troll
19 component of the SEAK Chinook fishery was removed from the current levels of harvest of
20 Chinook. As in the First and Second Lacy Declarations, based on data provided in the NMFS
21 2019 Biological Opinion (“2019 SEAK BiOp”), we can estimate that there is about a 6%
22 reduction in prey available to the Southern Resident Killer Whales caused by the Southeast
23 Alaska fishery as a whole (the 6% being an approximate middle value from the many estimates
24 made in the 2019 SEAK BiOp), but with considerable uncertainty around this number. The
25 Pacific Salmon Commission Annual Report of Catch and Escapement for 2020 provides data

1 showing that 80.8% of the overall PST Treaty catch of Chinook from 2009 to 2020 was taken by
2 the commercial troll fishery (PSC Report, Table A1). Thus, we can estimate that closing of the
3 SEAK commercial troll fishery would result in an increase of $80.8\% \times 6\% = 4.848\%$ in Chinook
4 availability to the Southern Resident Killer Whales.

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6 9. Applying the above estimates to the current population model results in a
7 projection that closing the SEAK commercial troll fishery of Chinook would provide just enough
8 benefit to the Southern Resident Killer Whales to allow the population to stabilize – that is, the
9 projected long-term mean population growth rate would be 0.00%.

10 10. Given the uncertainty in the impact of the current SEAK fisheries on the
11 availability of Chinook to the Southern Resident Killer Whales, I tested also the benefit if the
12 Chinook availability were only half or were double the 6% estimate. If the SEAK fisheries
13 currently reduce Chinook availability by 3%, then I estimate that the decline of the Southern
14 Resident Killer Whale population would be slowed to -0.3% per year if the commercial troll was
15 closed. If the SEAK fisheries currently reduce Chinook availability by 12%, then I estimate that
16 the Southern Resident Killer Whale population could start to recover at a mean rate of +0.4% per
17 year following a closure of the commercial troll fishery.

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19 11. The above projections are illustrated in the following graph. The bottom (blue)
20 line shows the projection under current conditions. The other lines show the projections expected
21 if the SEAK commercial troll fisheries were closed under various estimates of the proportion of
22 prey available to Southern Resident Killer Whales harvested by SEAK fisheries as follows:

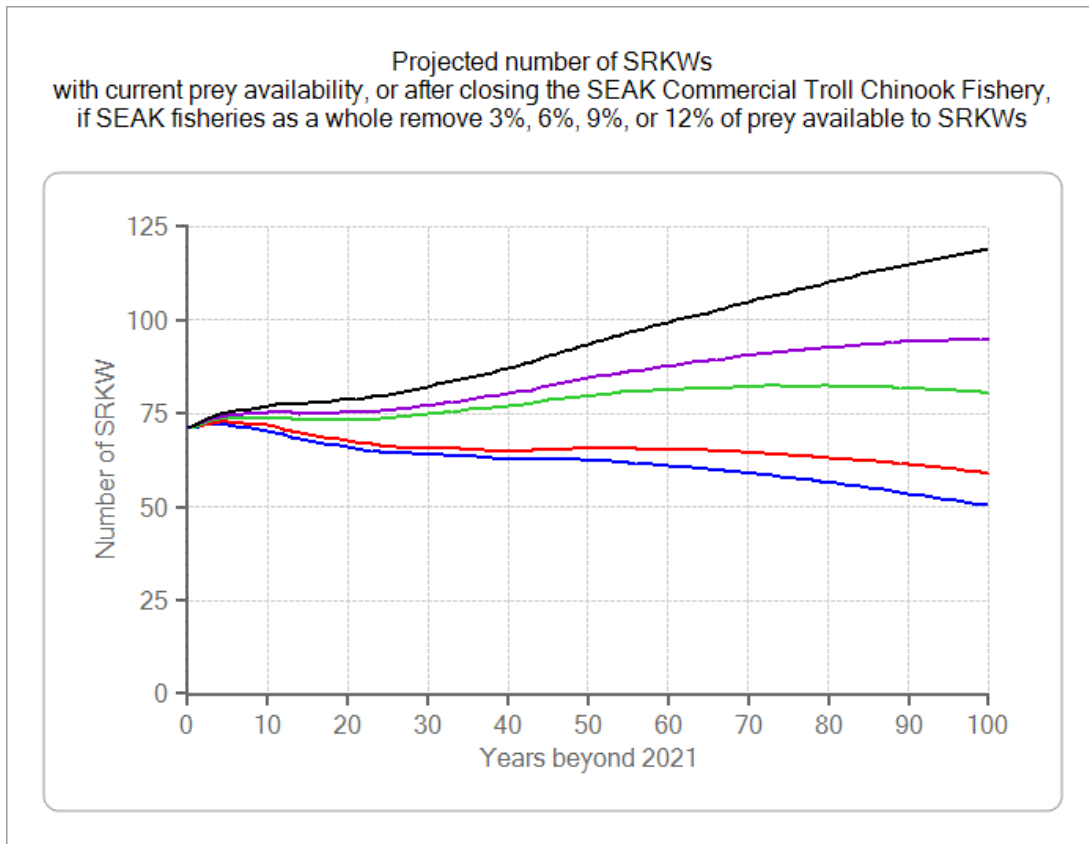
- 23
24 a. the black line shows the projection if the SEAK fisheries currently reduce
25 Chinook availability by 12%;
- b. the purple line shows the projection if the SEAK fisheries currently reduce

1 Chinook availability by 9%;

2 c. the green line shows the projection if the SEAK fisheries currently reduce

3 Chinook availability by 6%; and

4 d. the red line shows the projection if the SEAK fisheries currently reduce Chinook
5 availability by 3%;
6



21 12. The changing growth rate shown in the graph in the first few decades is due to the
22 currently aging population with few recent births. The expected long-term trends are better
23 reflected in the later decades of the model projection.

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25 I declare under penalty of perjury under the laws of the United States of America that the
foregoing is true and accurate.

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Executed this 24th day of March 2022.



Robert Lacy, Ph.D.