

Written testimony of

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“Warming Seas, Cooling Economy: How the climate crisis threatens ocean industries”
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I want to start by thanking Chairman Whitehouse, Ranking Member Grassley, and committee members for inviting me to speak today. It is a privilege and honor.

My name is Dr. Rashid Sumaila, and I am a University Killam Professor and Canada Research Chair in Interdisciplinary Ocean and Fisheries Economics at the University of British Columbia.

I have a few points that I would like to share with the Committee:

1. All Americans should care about the ocean and the life it holds, even people who don't live near the coast

Our lives are intricately connected to the ocean, as it provides us with invaluable resources. It is foundation of the blue economy, i.e. all economic activities taking place on, below and/or adjacent to ocean ecosystems. The blue economy is projected by the Organization for Economic Cooperation and Development (OECD) to grow faster than the global economy in the coming decades, reaching \$3 trillion by 2030¹.

More specifically, the ocean contributes significantly to our global food supply. Through international trade, it enables people all over America to access the incredible nutritional benefits of seafood, including essential proteins and vital micronutrients. Globally commercial ocean fishers catch 120 million tonnes of fish a year². These fisheries generate about \$240 billion in worldwide revenue for fishers each year, which translates into an economy-wide impact of about \$600 billion annually³. The ocean provides job security, generating income for an estimated 260 million people globally⁴. Note that this does not count contributions from recreational fisheries.

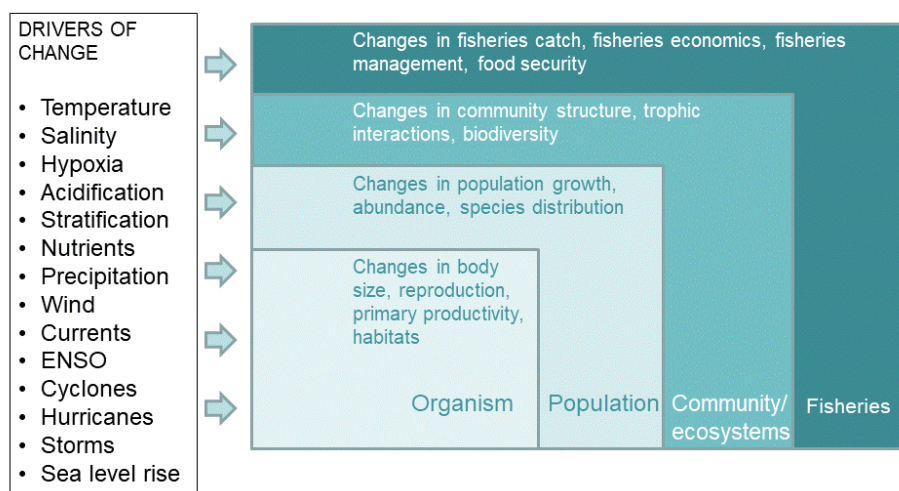
In the U.S. in 2020, commercial and recreational saltwater fishing alone generated \$253 billion in sales impacts, which describes the total economic impact of a fish as it changes hands through the supply chain, as well as hotels and restaurants in the case of recreational fisheries. Fishing also contributed

\$117 billion to U.S. gross domestic product (GDP) and supported 1.7 million jobs in the U.S. marine fishing sector and across the broader economy⁵.

2. America's waters and fisheries are under threat from climate change

Climate change is impacting the biophysics of the ocean in a number of ways: including rising sea surface temperature, oceans becoming more acidic, decreasing oxygen content and sea level rise – a deadly quartet. Anything that changes the physics, chemistry and biophysics of the ocean will affect life in the ocean and consequently would affect fisheries and the economic benefits we derive from them. Figure 1 below shows the mechanism through which this happens:

Climate change & fisheries



Sumaila *et al.* (2011): *Nature Climate Change*

Figure 1: Shows how the impacts generated by climate change are transmitted via changes to the biophysics of the ocean (Left hand side of figure) through ocean organisms, to populations of marine animals to community structure to fisheries, and ultimately, ocean economics⁶.

3. Not addressing climate change will lead to economic consequences

In a recent paper⁵, we explored the effects of climate change on Atlantic cod, Yellowtail flounder and Pacific halibut – all are shared stocks that are managed jointly by Canada and the U.S. We found that:

- For Atlantic cod, as climate change intensifies, Canada's share of profit relative to the U.S. would likely increase from 39% initially to a high of up to 65%;
- For yellowtail flounder, the average proportion of profit to the U.S. and Canada shows a decrease in Canada's profitability initially but bounces back in favor of Canada. Initially, the U.S. to

Canada proportion of profits is 32% to 68% and this changes to 24% to 76% by end of century; and

- For Pacific halibut, the relative profitability of the two country's fishing fleets is likely to remain stable, a rare case where studies reveal fisheries where the impact of climate change appears neutral.

In another recent paper⁶, we explored the effects of a global average temperature increase of 3.5 versus 1.5 degrees Celsius on fish, fishers and seafood consumers worldwide. We estimate:

- The loss millions of metric tons in annual worldwide catch of the top 10 revenue-generating fish species, e.g. tuna, shrimp, salmon. In North America, the loss could be up to 17% greater under 3.5 degrees of warming versus 1.5 degrees;
- Commercial fisheries revenues could drop by billions of dollars annually. For North America, revenue losses could be up to 12.5% greater;
- Seafood workers' income, including those of crew, retailers, and restaurant staff, could drop significantly. For North America, worker income could drop by up to 13.8% more; and
- Consumers would likely face billions of dollars in increased household seafood expenditure. In North America, consumers could expect to pay up to 4.9% more because of the impacts of the deadly quartet on fish biomass.

I want to conclude by restating that the U.S. has a lot to lose if climate change continues at the current pace. Consumers and businesses will face financial losses if they want to continue to consume and provide the same quality and quantity of fish under escalating climate change. By reducing the effects of climate change, the U.S. would achieve what I denote as *Infinity Fish*, i.e., the possibility of Americans continuing to enjoy healthy nutritious seafood forever, thus achieving infinity benefits⁷.

I thank you again for the opportunity to testify and look forward to your questions.

References

1. OECD (2016). The ocean economy in 2030, OECD Publishing.
2. Pauly, D., & Zeller, D. (2016). Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. *Nature communications*, 7(1), 10244.
3. Based on multiplier numbers published in: Dyck, A. J., & Sumaila, U. R. (2010). Economic impact of ocean fish populations in the global fishery. *Journal of Bioeconomics*, 12, 227-243.
4. Teh, L. C. & Sumaila, U. R. (2013). Contribution of marine fisheries to worldwide employment. *Fish and Fisheries*, 14(1), 77-88.

5. NOAA (2020). Fisheries Economics of the United States, 2020 Report <https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-2020-report> (last accessed on Jan 19, 2024).
6. Sumaila, U. R., Cheung, W. W., Lam, V. W., Pauly, D., & Herrick, S. (2011). Climate change impacts on the biophysics and economics of world fisheries. *Nature climate change*, 1(9), 449-456.
7. Sumaila, U. R., Palacios-Abrantes, J., & Cheung, W. (2020). Climate change, shifting threat points, and the management of transboundary fish stocks. *Ecology and Society*, 25(4).
8. Sumaila, U. R., Tai, T. C., Lam, V. W., Cheung, W. W., Bailey, M., Cisneros-Montemayor, A. M., ... & Gulati, S. S. (2019). Benefits of the Paris Agreement to ocean life, economies, and people. *Science advances*, 5(2), eaau3855.
9. Sumaila, U. R. (2021). *Infinity fish: Economics and the future of fish and fisheries*. Academic Press., London, San Diego, 261 pp.