**Please note that this web explorer is still under development. Please contact Chris Free (cfree14@gmail.com) if you have any comments, questions, suggestions, or concerns. Thanks!**

**Introduction to this web explorer**

This web application is designed to help users explore (1) the importance of marine fisheries to human nutrition, (2) the projected impacts of climate change on the nutrient endowment of marine fisheries, and (3) the opportunities for fisheries management reforms to mitigate impacts of climate change on food and nutrition from marine seafood. Data are presented at the national scale to allow users to assess vulnerability, sensitivity, and adaptive capacity in their country.

The web application is organized into the following four panels:

1. **Fish nutrition data:** This page allows the user to explore the nutrient content of more than 7,500 finfish species using data from Vaitla et al. (2018). This allows the user to anticipate the nutritional outcomes of (1) losing or gaining access to a stock through shifts in productivity or distribution, (2) increasing long-term yields through management reforms, or (3) retaining the stock for domestic consumption rather than export.
2. **National nutrition data:** This page allows the user to assess the current and historical daily per capita intake of 23 nutrients in 173 countries and the contribution of marine fish and invertebrates to this intake using the [GENuS database](https://dataverse.harvard.edu/dataverse.xhtml?alias=GENuS) (Smith et al. 2016). By illustrating the current nutritional health of countries and their reliance on marine seafood as a source of nutrition, this page allows the user to anticipate the vulnerability or resilience of countries to climate-driven changes in marine fisheries. Importantly, it highlights nutritional gaps that might be worsened by climate change and must be closed through either focused fisheries reforms, the expansion of other food sectors, or trade.
3. **National fisheries and nutrition forecasts:** This page allows the user to explore the projected impacts of climate change on national fisheries with and without climate adaptive fisheries reforms and thus the consequences of climate change and fisheries adaptation on national nutrition endowments from marine fisheries. These projections are powered by combining the fisheries projections of Free et al. (2020) with the nutrient content estimates of Smith et al. (2016). This page allows the user to anticipate the extent to which fisheries reforms could be leveraged to fill nutritional gaps under climate change or the extent to which other food sectors, international trade, or food fortification will have to fill nutritional gaps widened or unfilled by declining fisheries.
4. **National report card:** This page presents a summary of the vulnerability of nutrient provisioning from a nation’s marine fisheries to climate change through an exposure, sensitivity, and adaptive capacity framework: (1) sensitivity is described by a country’s nutritional health and reliance on marine fisheries; (2) exposure is described by the projected rate of change in the nutrient endowment of marine fisheries; and (3) adaptive capacity is described by the degree to which these impacts could be offset through climate-adaptive fisheries reforms.

This web application is powered by data from the following three papers:

Smith MR, Micha R, Golden CD, Mozaffarian D, Myers SS (2016) Global Expanded Nutrient Supply (GENuS) model: a new method for estimating the global dietary supply of nutrients. *PLoS One* 11(1): e0146976. <https://doi.org/10.1371/journal.pone.0146976>

Vaitla B, Collar D, Smith MR, Myers SS, Rice BL, Golden CD (2018) Predicting nutrient content of ray-finned fishes using phylogenetic information. *Nature Communications* 9(3742).<https://doi.org/10.1038/s41467-018-06199-w>

Free CM, Mangin T, García Molinos J, Ojea E, Burden M, Costello C, Gaines SD (2020) Realistic fisheries management reforms could mitigate the impacts of climate change in most countries. *PLoS One* 15(3): e0224347. <https://doi.org/10.1371/journal.pone.0224347>

Please cite the original papers when referring to their data and in any other appropriate circumstance. When referencing the web application, we recommend the following citation:

Free CM et al. (2020) Nutrition, fisheries, and climate change web explorer. Available online at:<https://emlab-ucsb.shinyapps.io/nutricast/>

The development of this web application was funded by the Environmental Defense Fund (EDF). All data and code for the application is available on GitHub [here](https://github.com/cfree14/nutrient_endowment).