



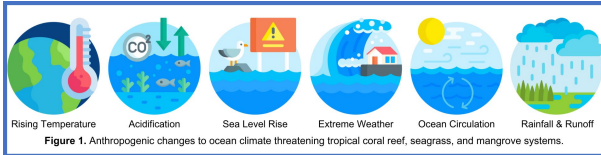
Background & Research Objectives

- Evidence synthesis is the process of compiling and analyzing as much relevant research on a given research topic as possible. Evidence synthesis products range from quantitative systematic reviews and meta-analyses to qualitative conceptual models and narrative reviews.
- A majority of tropical climate research focuses on the impacts of climate on tropical habitats and downstream effects of habitat degradation on fish, ecosystems, and dependent human communities. However, direct impacts of climate change on tropical fish are often overlooked.
- Thus, our research focuses on **how climate change directly impacts reef fish and leads to downstream impacts on tropical social-ecological systems** (fish populations, ecological communities, ecosystems, and dependent human communities).
- Here, we conduct an exploratory analysis using qualitative document coding to extract data. We use a conceptual model to focus our analysis and highlight the pathways through which climate change affects tropical fish and fisheries.



Methods

- Evidence Synthesis Training: Team members participated in a training course on evidence synthesis methodology and application.
- Search Strategy: This search began with a comprehensive review of specific climate impacts (see Figure 1) and was complemented by other highly relevant reviews and literature.
- Qualitative Text Coding: We extracted exact quotes about causal relationships between climate variables and outcomes of interest.
- Conceptual Model: We distilled selected quotes down by like topics into a conceptual model, which we chose as the most suitable evidence synthesis product for its flexibility in depicting relationships between multiple components.



Results

- Our full conceptual model is linked at the QR code in the top right.
- We have seen low representation of research regarding downstream impacts from ecological to social outcomes of climate change, as evident in Figure 2.

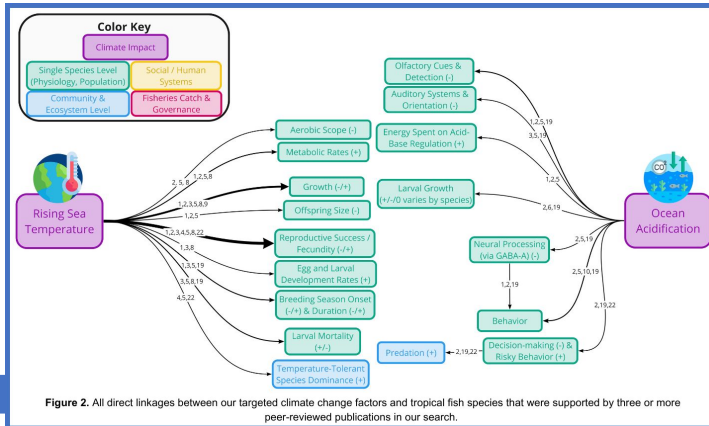


Figure 2. All direct linkages between our targeted climate change factors and tropical fish species that were supported by three or more peer-reviewed publications in our search.

- Connection to social systems in reviews further showcased a lack of understanding of how tropical social-ecological systems will be impacted by climate change. See Figure 3.

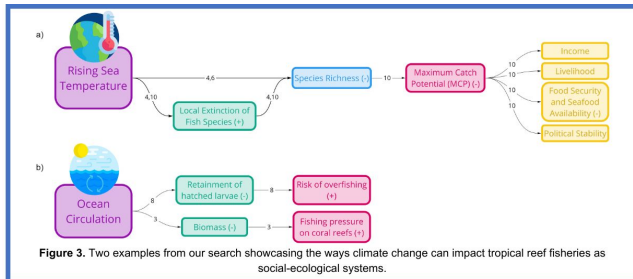


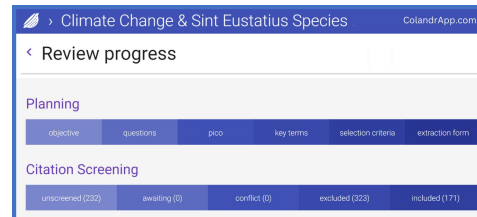
Figure 3. Two examples from our search showcasing the ways climate change can impact tropical reef fisheries as social-ecological systems.

Challenges

- Broad Scope: The research encompasses the impact of climate change on all tropical fish species, which makes the results difficult to interpret for single species analysis.
- Interacting Effects of Climate Change: Overall assertions of how all aspects of climate change were working on the system could not be easily integrated into our model.
- Identifying Causal Relationships: We included qualitative linkages that review authors clearly identified between aspects of climate change and tropical fish. In this process, nuances from the original scientific publications not clearly articulated by review authors may be lost.

Continued Directions

- How does climate change impact highly relevant reef fish in Sint Eustatius, Dutch Caribbean, and what are the downstream impacts on social-ecological systems?
- Search Strategy: We created a comprehensive search string and searched five literature databases: Web of Science, Scopus, Environmental Complete, Earth, Atmospheric & Aquatic Science Collection, and Google Scholar.
- Title-and-Abstract Screening: All papers were added to Colandr for review. Each paper is reviewed by at least two individuals for inclusion at the title-abstract level.



References & Acknowledgements

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- All current and previous faculty, staff, and students who helped with the project
- All authors of our selected papers (please contact us for full bibliography)
- Icon images in Figure 1 adapted from Flaticon.com.