



Conserving Shellfish Reefs:

A Systematic Review Reveals the Need to Broaden Research Efforts

Trevyn Toone, Rebecca Hunter, Emilee Benjamin, Sean Handley, Jenny Hillman, Andrew Jeffs

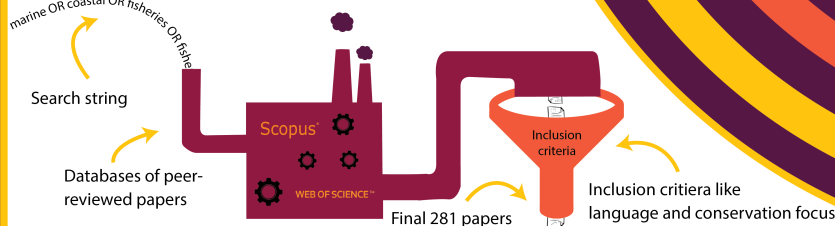
Introduction

- Shellfish like oysters and mussels can build **complex reefs** that filter water, create habitats, and stabilize the seafloor (Coen et al. 2007; Grabowski et al. 2012).
- Shellfish reefs have globally **severely declined** in recent history (Beck et al. 2009).
- Restoration projects and conservation initiatives are working to address these losses and rely on scientific research (Fitzsimons et al. 2020).
- However, this research is often **scattered, difficult to access, or not relevant** to the interested group.
- If the existing research is too heavily focused on a small subset of topics then it will not be as effective in addressing the wide range of conservation and restoration issues facing shellfish reefs (McKinnon et al. 2015).
- We compiled and analyzed the **existing base of research on shellfish reef conservation** to build a database for practitioners and highlight **potentially problematic patterns** in the extent of current research.



Methods

- A **comprehensive search string** captured 7,202 peer-reviewed papers related to shellfish conservation published up to 2021.
- These papers were screened for inclusion criteria resulting in **281 papers on shellfish conservation or restoration**.
- The 281 papers were analyzed by two reviewers to determine the **authorship, location, species studied, methods used, and outcomes measured**.



Acknowledgements

We are grateful to Morgan Rudd for her help conceptualizing this project and to Willa Brooks who assisted in the analysis framework. We are also thankful for the institutional support of The Nature Conservancy and NIWA.

Check out the paper for more info!



I'd love to hear from you!

✉ tt00112@aucklanduni.ac.nz

🐦 [@trevtoone](https://twitter.com/trevtoone)

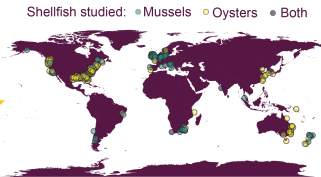
🌐 trevyntoone.com

Or watch this animation about the project!

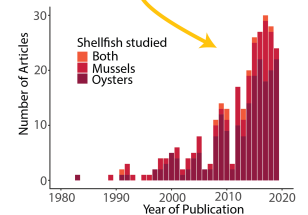


Results

- Shellfish conservation research is a dramatically growing field, but is **dominated by certain trends**.
- 80% of research is conducted in North America or Western Europe.
- Over half of all papers are published by **only academic authors**.
- 75% of all papers studied oysters while only 29% studied mussels.
- Over half of all papers studied **just a single species of oyster**.
- 96% of papers reported ecological outcomes and 92% used ecological methods.
- Only 12% reported social outcomes and **only 7% used social methods**.



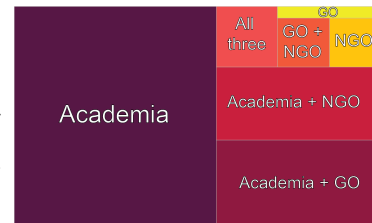
72% of articles were published in the last decade!



75% of papers studied oysters and over half of all papers studied the same species

Conclusions

- Shellfish reef conservation research is **dominated by academic authors publishing ecological research on oysters in North America** and making minimal use of social science methods.
- An uneven research base leaves many conservationists without science related to their area, species, or techniques.
- A perfect balance of research is not the goal, but **diversifying** how, where, and what we study can ensure that conservation and restoration is backed by **strong relevant science**.
- In particular, **social science methods and analyses** are missing from the current research base and could provide vital information to address shellfish declines and learn how shellfish reefs benefit people.



- **Institutions and funding bodies** should place high priority on filling in these gaps in our knowledge and **supporting projects** that focus on less frequently studied areas, species, methods and outcomes.

Cross-sector collaboration benefits research, but over half of papers were by only academic authors!

References

- Beck MW et al. (2009) Shellfish Reefs at Risk: A Global Analysis of Problems and Solutions. Arlington, VA
- Coen L et al. (2007) Ecosystem services related to oyster restoration. Marine Ecology Progress Series 341:303–307
- Fitzsimons JA et al. (2020) Restoring shellfish reefs: Global guidelines for practitioners and scientists. Conservation Science and Practice
- Grabowski JH et al. (2012) Economic valuation of ecosystem services provided by oyster reefs. BioScience 62:900–909
- McKinnon MC et al. (2015) Sustainability: Map the evidence. Nature 528:185–187