Sean B. Hardison

Quantitative Fisheries Ecologist
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Summary

I am a postdoctoral researcher working with the UAF Ecosystem Oceanography Lab and the NOAA Alaska Fisheries Science Center. I specialize in the development and application of spatiotemporal and animal movement models to understand how populations and communities respond to environmental variability and human activities. I received my PhD in Environmental Science from the University of Virginia and worked as Data Analyst at the Northeast Fisheries Science Center prior to my doctoral work. I am a passionate teacher, mentor, and advocate for open science and reproducible research.

Education

University of Virginia Charlottesville, VA
Ph. D., Environmental Science. 2019-2024

University of North Carolina Wilmington Wilmington, NC
M. Sc., Marine Biology. 2015-2017

Pennsylvania State University State College, PA
B. Sc., Biology. 2010-2014

Employment

Rivanna Statistical Ecology Group **Golden, CO**
Principal Investigator October 2025 - current

- I am currently leading a project funded by NOAA Fisheries via the Bering Sea Fisheries Research Foundation ($57,000) to study the seasonal habitat preferences and migratory dynamics of female Bristol Bay red king crab using satellite tagging data.

University of Alaska Fairbanks & NOAA Fisheries, Alaska Fisheries Science Center **Golden, CO**
Research Associate February 2024 - current

- I use innovative statistical methods to understand the habitat preferences of seasonally migratory Bristol Bay red king crab and to project crab distributions into seasons where we lack fisheries surveys characterizing stock distribution. Initial findings from this project are available as a pre-print that I am currently revising for resubmission.

University of Virginia **Charlottesville, VA**
PhD Student August 2019 - February 2024

- I studied how species asynchrony contributed to the stability and economic value of commercial fisheries in Chesapeake Bay, the impacts of a warming ocean on the abundances of inshore fishes in the Mid-Atlantic Bight using remotely sensed ocean temperature data, and the impact of large-scale seagrass restoration on inshore fish community diversity and abundance. This work, which involved coordinating a large research team, has resulted in two peer-reviewed publications so far.
- Virginia Sea Grant Fellow (2021-2022, $80,000 fellowship).

Integrated Statistics & NOAA Fisheries, Northeast Fisheries Science Center **Woods Hole, MA**
Scientific Data Analyst November 2017 - August 2019

- 2018 NOAA Fisheries Team Member of the Year Award recipient.
- I developed software tools (R) that enhanced the reliability of ecosystem indicator trend analyses and automated ecosystem reporting processes. This work resulted in one peer-reviewed publication.

- I coordinated the development of four ecosystem status reports and presented the findings of those reports to the Mid-Atlantic and New England Fishery Management Councils.

UNCW Shellfish Research Hatchery **Wilmington, NC**
MSc Student August 2015 - May 2017

- I studied the role of underwater sound produced by snapping shrimp in triggering the settlement of larval oysters onto reef structure.

Research Technician August 2015 - May 2017

- I contributed to the day-to-day operations of a large shellfish research facility. I aided in the execution of experiments and mentoring of new staff and students.

Publications

Hardison, Sean, et al., "Movement-informed projections of Bristol Bay red king crab seasonal distribution to support spatial management decisions." Pre-print. **In prep**.

Hardison, Sean, et al., "Integrating a seabird diet-derived recruitment index into a stock assessment model of Atlantic herring in the Northeast U.S." *Fisheries Research*. (2025a). https://doi.org/10.1016/j.fishres.2025.107571

Hardison, Sean, et al., "Seasonal asynchrony and harvest diversification contribute to demersal finfish fisheries stability in Chesapeake Bay." *Ecological Applications*. (2025b). https://doi.org/10.1002/eap.70097.

Hardison, Sean, Karen McGlathery, Max Castorani. "Effects of seagrass restoration on coastal fish abundance and diversity." *Conservation Biology*. (2023). https://doi.org/10.1111/cobi.14147.

Cheng, Selina, Kinsey Tedford, Rachel Smith, **Sean Hardison**, et al., "Coastal vegetation and bathymetry influence blue crab abundance across spatial scales." *Estuaries & Coasts*. (2022). https://doi.org/10.1007/s12237-021-01039-5

Bastille, Kimberly, **Sean Hardison**, et al., "Improving the IEA approach using principles of open data science." *Coastal Management*. (2020). https://doi.org/10.1080/08920753.2021.1846155.

Hardison, Sean, et al., "A simulation study of trend detection methods for integrated ecosystem assessment." *ICES Journal of Marine Science*. (2019). https://doi.org/10.1093/icesjms/fsz097.

Kariyat, Rupesh, **Sean Hardison**, et al., "Leaf trichomes affect caterpillar feeding in an instar-specific manner." *Communicative & Integrative Biology*. (2018). https://doi.org/10.1080/19420889.2018.1486653

Kariyat, Rupesh, **Sean Hardison**, et al., "Plant spines deter herbivory by restricting caterpillar movement." *Biology Letters*. (2017). https://doi.org/10.1098/rsbl.2017.0176.

Research Software & Technical Reports

Bastille, Kimberly, **Sean Hardison**, et al., editors. Technical Documentation, State of the Ecosystem Report. 2019, https://noaa-edab.github.io/tech-doc/.

Beltz, Brandon, Andrew Beet, Kimberly Bastille, and **Sean Hardison**. ecodata: Documentation of Ecosystem Indicator Reporting. R Package Version 6.0, 2019, GitHub, https://github.com/noaa-edab/ecodata

Gaichas, Sarah,. . . , **Sean Hardison**, et al., editors. "State of the Ecosystem: Mid-Atlantic." National Marine Fisheries Service. (2018, 2019).

Gaichas, Sarah,. . . , **Sean Hardison**, et al., editors. "State of the Ecosystem: New England." National Marine Fisheries Service. (2018, 2019).

Teaching Experience

Teaching Assistantships at UVA and UNCW

Atmosphere & Weather (Fall 2021, 2023)

- I served as lecture and lab TA for this undergraduate-oriented introductory climatology course. I gave lectures, led in-class experiments, organized a semester-long weather forecasting contest, and during COVID-19, aided in the transitioning of labs from an in-person to online format.

Principles of Ecology (Spring 2020)

- A writing-intensive ecology lab course focused on developing field research skills for testing ecological theory. I converted the materials for this course into an online version suitable for remote learning during COVID-19. I taught students basic data manipulation and statistical methods using R.

Advanced Ecological Data Analysis (Spring 2019)

- A graduate-level course in ecological data analysis and statistics. I was responsible for the lab portion where I lectured on material not covered in lecture and helped students work through analyses and programming challenges. I focused on teaching reproducible research methods using R and Git/Github.

Marine Biology (Spring 2016)

- A lab course that split students' time between the lab and in the field. I was responsible for leading field and experimental work, lecturing, and tutoring. I taught students how to analyze their data in R.

Genetics (Spring 2016)

- My first TAship, I led in-class experiments, lectured, and taught students the fundamentals of genetics.

Presentations

"Movement-informed projections of Bristol Bay red king crab seasonal distribution to support spatial management," *North Pacific Marine Sciences Organization (PICES)*, Yokohama, Japan, November 2025.

"Movement-informed projections of Bristol Bay red king crab seasonal distribution to support spatial management," *UAF Fisheries Seminar*, Juneau, AK, November 2025.

"Revealing seasonal Bristol Bay red king crab distributions by combining satellite tagging and bottom trawl surveys," *American Statistical Association, CoWy Chapter Meeting*, Denver, CO, April 2025.

"Revealing seasonal Bristol Bay red king crab distributions by combining satellite tagging and bottom trawl surveys," *Bering Sea Fisheries Research Foundation Industry Day Symposium*, Seattle, WA, September 2024.

"Improving seasonal predictions of Bristol Bay red king crab spatial distributions with movement-integrated SDMs," *NMFS AFSC Crab Plan Team Meeting*, Seattle, WA, September 2024.

"Evaluating spatiotemporal overlaps between crab distributions and fishing gear bottom contacts in the Eastern Bering Sea," *Presentation to Amendment 80 Fleet representatives*, Seattle, WA, June 2024.

"Seabirds for Stock Assessment: Developing an Atlantic herring recruitment index from common tern food habits data in the Gulf of Maine," *Atlantic Herring Stock Assessment Working Group*, Woods Hole, MA, March 2024.

"Exploring the causes and consequences of synchrony in Chesapeake Bay demersal fish metacommunities," *American Fisheries Society Meeting*, Spokane, WA, August 2022.

"Spatial portfolio effects support commercial fishery stability but fail to diffuse systematic risk," *UVA Enviroday*, Charlottesville, VA, March 2022.

Workshops Led* & Guest Lectures†

*"Statistics in Space", Building the intuition for spatial and spatiotemporal modeling in R using sdmTMB. *NMFS AFSC Kodiak Lab*, May 2024. Materials available at https://github.com/seanhardison1/statistics_in_space.

†"Statistics in Space", *Messy Data: Statistical Methods in Ecology and Environmental Sciences*, University of Virginia, October 2022. Materials available at https://github.com/seanhardison1/statistics_in_space.

*"Getting Git", Version control for ecologists using Git and Github, *Charlottesville, VA*, June 2022. Materials available at https://github.com/seanhardison1/gh_workshop.

*"Open Science with Rmarkdown", Doing reproducible science with Rmarkdown, *Charlottesville, VA*, January 2022. Materials available at https://github.com/seanhardison1/rmd_workshop.

†"Generalized additive models", *Advanced Ecological Data Analysis*, University of Virginia, October 2019.

*"sf: Simple features in R", Working with spatial data in R, *UMass Dartmouth*, June 2019. Materials available at https://github.com/seanhardison1/sf-workshop.

Press

"Study Highlights the Benefits of Biodiversity for Commercial Fisheries." (2025). Virginia Institute of Marine Science.

"Study Highlights the Benefits of Biodiversity for Commercial Fisheries." (2025). UVA College and Graduate School of Arts & Sciences.

"Seagrass Restoration Renews Fish and Biodiversity at Astonishing Rates." (2023). UVA Environmental Institute.

Service

Member of the Bering Sea & Aleutian Islands Crab Plan Team for providing the North Pacific Fishery Management Council with the best available stock assessment advice (2024, 2025).

Reviewer for *Ecosphere*, *Marine Ecology Progess Series* and *Nature Based Solutions*.

Formally mentored 2 undergraduate students through the UVA Undergraduate Research Mentorship Program.

Co-led the Falmouth Litter Reduction Team, a citizen-science group whose efforts led to the ban of single-use plastic liqour bottles ("nips") in Falmouth, MA. Covered by Cape and Islands Public Radio.

Reproducible Research Repositories & Other Software

Hardison et al. pre-print: King crab projection study

Hardison et al. 2025a: "Seabirds for stock assessment" study

Hardison et al. 2025b: Asynchrony-stability study

Hardison et al. 2023: Seagrass-associated fish study

Hardison et al. 2019: Trend simulation study

Hardison, Sean. "stable: an experimental R Shiny application for partitioning variability within complex adaptive hierarchical systems." (2022). https://github.com/seanhardison1/stable.

Hardison, Sean. "pcs: An R package for querying race results and rider data from ProCyclingStats.com." (2021). https://github.com/seanhardison1/pcs.

Hardison, Sean. "vcrshiny: A shiny app for visualizing research data from the Virginia Coast Reserve LTER." (2020). https://github.com/seanhardison1/vcrshiny.