D’amy Steward

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RESEARCH INTEREST

My primary interest is marine population, community, and modeling ecology with emphasis on disturbance and recovery, anthropogenic impacts, and climate change of coastal ecosystems to provide the information necessary to pave a path toward a sustainable future. I am currently in pursuit of a PhD in the field of marine ecology, environmental sustainability, and public policy.

SUMMARY OF QUALIFICATIONS

A 2024 Sea Grant Knauss Fellow, I currently work in NOAA’s Office of Legislative and Intergovernmental Affairs. Prior to this I was a Master’s student at the University of Guam and will defend my Master’s thesis — modeling and evaluating the effectiveness of potential coral restoration efforts — in May 2024. Concurrently, I worked as a part-time Coastal Ecology Analyst with CSS for NOAA’s NCCOS Coastal Resilience Branch. A dual major in Biology and Environmental Science at Duke University, I was honored to be both a Hollings and Rachel Carson Scholar. Collaborating with NOAA, my Duke Honors Research Thesis mapped and calculated the benthic coverage, material composition, and deployment chronology of artificial reef material off the coast of North Carolina, South Carolina, and Georgia. Upon completing my thesis, I was invited by the team at NOAA’s Beaufort, NC lab to expand and lead the project nationally — an undertaking that required coordinating with resource managers across 18 coastal states, multiple federal institutions, and 10 time zones. I have collaborated (to include 1st authorship) on multiple papers relating to artificial reefs. More broadly, my research experience spans a variety of organizations, subjects, and venues to include: NOAA, Micronesian Conservation Coalition, Duke University Silliman Lab and Johnsen Lab, UCSD Schmidt Ocean Institute Terrill Lab, USD Reyns Research Group, and SEA Semester. Public engagement has been a hallmark of my experience through (1) sharing my research at national conferences, in popular media, through outreach events, and via my Ocean Steward website (www.oceansteward.org) and (2) self-initiated cross-cultural engagements in Saipan, Guam, Micronesia, Panama, and Singapore (to name a few). I continue to broaden and integrate practical and research competencies ranging from advanced diving, small boat, sailing, and aerial drone operation to computer coding and modeling.

EDUCATION

University of Guam **8/2021 – 5/2024**
MS Biology with Drs. Peter Houk and Laurie Raymundo. Modeling project evaluating the effectiveness of potential coral restoration efforts using long term data from Saipan, CNMI. Also conduct work with the lab maintaining various coral nurseries and outplants around Guam.

Duke University **8/2016 – 5/2020**
Double major: **BS Biology** with Ecology Concentration & **BS Environmental Science** with Marine Science and Conservation Concentration (Graduation with Distinction) Honors Research Thesis: Quantifying the Benthic Footprint of Artificial Reefs along the Southeast US Continental Shelf.

SEA Semester **7/2013 – 8/2013**

University of Southern California Wrigley Marine Science Institute
High school semester at SEA aboard research tall ship, *SSV Robert C. Seamans,* cruise S248A. Conducted research, stood watch, and studied at the USC Wrigley Marine Institute on Catalina.

HONORS AND AWARDS

2024 **Sea Grant Knauss Fellowship.** Serving as a Congressional Affairs Specialist in NOAA's Office of Legislative and Intergovernmental Affairs. Portfolio includes: National Marine Fisheries Service (NE Atlantic, Mid-Atlantic, and Great Lakes), Office of Education, Arctic Action Team, NOAA in the Caribbean, and Regional Collaboration Network.

2022-2023 **UDT/SEAL (US Navy Underwater Demolition Team/SEAL) Merit Scholarship Award.** Scholarship granted to Dependents of Veterans. $2,500.

2022 **Ecological Society of America Katherine S. McCarter Graduate Student Policy Award**. Provides graduate students with hands-on training and science policy experience through interactions with congressional decision-makers, federal agency officials, and ecologists working in science and public policy.

2020 **Duke Nicholas School of the Environment and Duke University Marine Lab Marine Science and Conservation Award.** Awarded at graduation by the faculty of the Duke Marine Lab to one outstanding Environmental Science student in recognition of excellence in scholarship, research, and citizenship.

2018-2020 **NOAA Hollings Scholar and Scholarship.** Two-year merit scholarship recognizes outstanding students accompanied by a paid 10-week summer internship with NOAA. $29,000.

2017-2020 **Rachel Carson Scholars and Research Grant.** Provides 10 selected students direct research experience in marine science and conservation through small seminar experiences, experiential learning, enhanced faculty-student mentorship, scientific research, and professional development. Total funding: $5,500.

2016-2020 **UDT/SEAL (US Navy Underwater Demolition Team/SEAL) Merit Scholarship Award.** Scholarship granted to Dependents of Veterans. $20,000.

2016, 2017 **Coronado Rotary Scholarship.** One of two high school graduates awarded the Service Above Self scholarship. $5,000.

2016 **Sailors for the Sea Youth Award.** Award sponsored by US Sailing to acknowledge conservation work as a "beacon of hope amongst the next generation."

2015 **Sea Change Award, Alamitos Bay Yacht Club.** Awarded by the Alamitos Bay Yacht Club Board of Directors to recognize creating positive "SEA CHANGE" affecting the sport of sailing.

PUBLICATIONS

A.B. Paxton, D.N. Steward, K. Mille, J. Renchen, Z. Harrison, J. Byrum, C. Briton, R. Martore, A.

Nelson, M. Malpezzi, J. Tinsman, P. Clarke, C. Laporta, D. Molnar, P. Barrett, M. Rousseau, C. Newton, J. Sanders, M. McDonough, D. Shively, E. Wilkins, P. Murakawa, L. Havel, K.L. Riley, N.M. Bacheler, G.T. Kellison, J.C. Taylor. 2024. Artificial reef footprint in the United States ocean. Nature Sustainability 7, 140-147. https://doi.org/10.1038/s41893-023-01258-7

D.N. Steward, A.B. Paxton, N.M. Bacheler, C.M. Schobernd, K. Mille, J. Renchen, Z. Harrison, J. Byrum, R. Martore, C. Brinton, K.L. Riley, J.C. Taylor, and G.T. Kellison. 2022. Quantifying spatial extents of artificial versus natural reefs in the seascape. Frontiers in Marine Science (9):980384. doi: 10.3389/fmars.2022.980384

A.B. Paxton, D.N. Steward, Z.H. Harrison, and J.C. Taylor. 2022. Fitting Ecological Principles of Artificial Reefs into the Ocean Planning Puzzle. Ecosphere 13(2): e3924. https://doi.org/10.1002/ecs2.3924

Manuscripts in Review

A.B. Paxton, B.J. Runde, A.B. Bugnot, C. Smith, M. Saunders, M.L. Vozzo, R.K. Gittman, D.N. Steward, H.R. Lemoine, S. Narayan, B.J. Puckett, J. Allgeier, R. Morris, C. Angelini, S.E. Lester, P.N. Halpin, W. Seaman, B.R. Silliman. *In review.* Leveraging built marine structures to benefit natural habitats. Target journal: BioScience. Submission: December 2023.

A.B. Paxton, I.R. Foxfoot, C. Cutshaw, D.N. Steward, L. Poussard, T.N. Riley, T.M. Swannack, C.D. Piercy, S. Altman, B.J. Puckett, C.D. Storlazzi, T.S Viehman. *In review.* Evidence on the ecological and physical effects of built structures in shallow, tropical coral reefs: a systematic map. Target journal: Environmental Evidence. Submission: December 2023

Undergraduate Thesis (Committee Reviewed)

Steward, D.N. May 2020. Quantifying the benthic footprint of artificial reefs along the southeastern USA continental shelf. Undergraduate Honors Thesis, Department of Environmental Science, Duke University.

RESEARCH EXPERIENCE

University of Guam - Raymundo Coral Lab **7/2021 – 12/2023**
Graduate Research Assistant/Graduate Student

- Helped maintain and care for two in situ coral nurseries and collect and analyze data on nursery success.
- Helped build and install nursery and outplant structures.
- Outplanted and monitored corals around the island.

CSS and NOAA NCCOS – Coastal Resilience Branch **4/2023 – 9/2023**
Coastal Ecology Analyst (Part-time)
Synthesizing Evidence on the use of Built Structures in Coral Reef Ecosystems

- Used systematic mapping to understand the current state of knowledge surrounding the design, siting, implementation, and performance of built structures in coral restoration and coastal protection.
- Project partners include: NOAA National Centers for Coastal Ocean Science, U.S. Army Corps of Engineers – Engineering with Nature, and U.S. Geological Survey.

Micronesian Conservation Coalition **8/2022 – 12/2023**

Marine Team

- Researcher and marine team member with Micronesian Conservation Coalition.
- Conducted manta ray surveys and identification along Guam's coastal areas.
- Conducted photomosaic surveys of spawning areas.

Johnston Applied Marine Sciences **7/2021 – 8/2022**
Saipan, CNMI
Research Assistant
Advisor: Dr. Lyza Johnston

- Examined resiliency of sexually propagated corals in restoration.
- Conducted coral spawning larval collection via spawning nets.
- Monitored, counted, and maintained larvae post fertilization in the lab, in the ocean nursery, and post outplant.
- Used novel "Larval Seed Beads" (LSBs) as settlement substrate for coral larvae.
- Funded by the NOAA Ruth Gates Coral Restoration and Innovation grant awarded to Dr. Johnston.

Collaboration with the National Oceanic and Atmospheric Administration **5/2020 – Present**
Quantifying the benthic footprint of artificial reefs in the US coastal ocean
D'amy Steward and Dr. Avery Paxton

- Goal: quantify the benthic footprint and spatial distribution of artificial reefs along the entire U.S. coastline.
- Relevance: increase knowledge and understanding of the quantity, composition, size, distribution, and lack of standardized data to facilitate better data collection and inform future design, deployment, regulation, and restoration of artificial reefs.
- Continuation and expansion of senior thesis project.
- Collaborations with: Massachusetts Division of Marine Fisheries; Rhode Island Department of Environmental Management; Connecticut Department of Energy and Environmental Protection; New York State Department of Environmental Conservation; New Jersey Department of Environmental Protection; Delaware Department of Natural Resources and Environmental Control; Maryland Department of Natural Resources; Virginia Marine Resources Commission; North Carolina Department of Environmental Quality; South Carolina Department of Natural Resources; Georgia Department of Natural Resources; Florida Fish and Wildlife Conservation Commission; Alabama Marine Resources Division; Mississippi Department of Marine Resources; Louisiana Department of Wildlife and Fisheries; Texas Parks and Wildlife Department; California Department of Fish and Wildlife; Washington Department of Fish and Wildlife; Hawaii Department of Land and Natural Resources; NOAA Southeast Fisheries Science Center; NOAA NCCOS; Duke University; Atlantic States Marine Fisheries Commission; Gulf States Marine Fisheries Commission; CT DEEP.

Silliman Lab, Marine Conservation Ecology **8/2018 – 5/2020**
Duke University Marine Lab
Beaufort, North Carolina
Rachel Carson Scholar, Senior Thesis
Advisors: Drs. Avery Paxton and Brian Silliman
Quantifying the benthic footprint of artificial reefs along the southeastern USA continental shelf

- Project lead, collaborating closely with NOAA.
- Goal: quantify the benthic footprint and spatial distribution of artificial reefs along the southeast U.S. continental shelf (North Carolina, South Carolina, Georgia, and Florida).

- Relevance: increase knowledge and understanding of the quantity, composition, size, distribution, and lack of standardized data to facilitate better data collection and inform future design, deployment, regulation, and restoration of artificial reefs.

Ernest F. NOAA Hollings Scholarship Internship **5/2019 – 8/2019**
Saipan, Northern Marianas Islands
NOAA Hollings Scholar
Advisor: Steve McKagan
Spatial Analysis of the Invasive Striped Eel Catfish in the Saipan Lagoon

- Project lead.
- Goal: establish baseline data for invasive striped eel catfish, *Plotosus lineatus*.
- Relevance: first study ever conducted in the Commonwealth of the Northern Marianas to shed light on the distribution and relative population size of the species and behavior and habitat preference in order to inform future studies and educate the local population.
- https://bit.ly/2yCgJVE
- Volunteer assistant on coral nursery project with fellow NOAA Hollings Scholar.

Reyns Research Group, Marine Ecology **5/2018 – 8/2018**
University of San Diego
Volunteer Research Assistant
Advisor: Dr. Nathalie Reyns

- Assisted in the collection and analysis of data examining barnacle larval transport in La Jolla, CA.

Schmidt Ocean Institute **7/2018**
"Mapping the Cascadia Margin – Methane Seeps" cruise FK 180722
Research Assistant to Chief Scientist Susan Merle, Oregon State University

- Conducted multi-beam mapping aboard the R/V Falkor.
- Collaborated with onboard scientists and artists to promote the intersection of science, art, and technology to raise public interest in marine science.

The Johnsen Lab, Sensory Biology **8/2017 – 12/2017**
Duke University
Student Researcher
Advisor: Dr. Bob Fitak
American Shad Magnetoreception

- Researched magnetoreception in American Shad of North Carolina through analysis of magnetic field and shad population data.

Terrill Lab, Coastal Observing Research and Development Center **5/2017 – 8/2017**
University of California San Diego
Scripps Institute of Oceanography Marine Physical Laboratory
SIO MPL Summer Intern
Advisor: Dr. Megan Cimino

- Manually analyzed AIS data to identify patterns in vessel tracks and vessel speed to identify fishing behaviors in the South Pacific. Overlaid tracks with environmental variables to predict where illegal fishing might occur.
- Learned and applied R for in-depth data analysis; presented research results to faculty.

PRESENTATIONS

Academic Presentations

Steward, D.N. *June 22, 2023*. Modeling the Outcomes of Coral restoration. **Asia-Pacific Coral Reef Symposium**, Singapore. (Oral Presentation)

Steward, D.N.; Paxton, A.B.; Schnobernd, C.M.; Kellison, G.T.; Bacheler, N.M.; Taylor, J.C. *February 23-March 4, 2022 (virtual due to COVID-19)*. Quantifying Spatial Extents of Artificial Versus Natural Reefs in the Seascape. ***Ocean Sciences Meeting***, Honolulu, HI, USA. (Oral Presentation)

Steward, D.N., Paxton, A.B. *November 4-6, 2020 (rescheduled from April due to COVID-19).* Quantifying the benthic footprint of artificial reefs in the US coastal ocean. ***Florida Artificial Reef Summit,*** Melbourne, FL, USA. (Oral Presentation)

Steward, D.N. *March 21, 2020 (canceled due to COVID-19).* Quantifying the benthic footprint of artificial reefs along the USA continental shelf. ***Atlantic Coast Conference (ACC) Meeting of the Minds***, Chapel Hill, NC, USA. (Oral Presentation) * One of five students selected to represent Duke and present research at conference of students selected from all ACC schools.

Steward, D.N. *February 21, 2020*. Spatial analysis project of the invasive striped eel catfish in the Saipan Lagoon. ***Ocean Sciences Meeting***, San Diego, CA, USA. (E-Lightening Poster Session)

Steward, D.N. *July 30, 2019*. Spatial analysis project of the invasive striped eel catfish in the Saipan Lagoon. ***NOAA Hollings Scholar Symposium***, Silver Spring, MD, USA. (Oral Presentation)

Outreach Presentations

The Rotary Club of Coronado, Virtual Presentation **1/26/22**
- Shared research on artificial reefs and master's research.

The Ocean Race Summits, Newport, RI **9/16/20**
Virtual Action Lab 1 – Youth for 30 x 30
- Shared the importance of communicating science to those outside the scientific community.

Blue Vision Summit, Washington, D.C. **5/2017**
Earth Echo International
Panelist
- Served on youth leadership panel to discuss the importance of and ideas to promote engaging youth leaders in the field of ocean conservation.
- Discussed strategies for mobilizing youth to protect the future of our oceans.

Sailors for the Sea **2013 - 2016**
First Ambassador and Spokesperson
- Multiple speaking engagements at yacht clubs (dinners, events, and regattas) and schools.

OUTREACH & SYNERGISTIC ACTIVITIES

University of Guam Drone Corps **7/2023 – 12/2023**
Cohort 3 Student Participant
- The program is a collaborative effort between NASA Guam Space and NASA Guam EPSCoR that aims to teach and support responsible Federal Aviation Administration-licensed pilots who can provide support to research projects in the region.

- Participated in a three-week preparatory knowledge course hosted by Bella Wings Aviation followed by the FAA 107b examination.
- 40 flight hours supported and sponsored by Drone Corps.

University of Guam Marine Lab Community Seminar Series **1/2022 – 5/2023**
Program Coordinator
- Organized bi-weekly seminar series from visiting scientists, faculty, local scientists, local organizations, student presentation, student thesis proposals, and student thesis defenses.
- Managed email listserv of over 400 participants sharing seminar information and other opportunities on island including various applications, outreach events, and volunteer opportunities.

Pacific Mini Games **7/2022**
Saipan, CNMI
Va'a Volunteer
- Volunteered with local community members to host, setup, and conduct the Va'a (outrigger canoe) races.
- Worked with over 15 island nations and the International Va'a Association.
- Invited to 2023 Pacific Games in Solomon Islands as an Official representing Guam.

Our Future is Science - Aspen Institute **12/2021 – 7/2022**
Mentor Program
- Worked with high school students "to cultivate leaders who will make a difference in the world through social justice and science."

Sailors for the Sea Powered by Oceana **9/2020 – Present**
Skipper Program
- Engaged local sailing community through outreach to educate about ocean health and ways to take action to protect our marine environments.

Duke University Sustainable Ocean Alliance **8/2019-5/2020**
Executive Board Member
- Led a group of 40 students in the effort to ban the use of single-use plastics at large campus events.

Duke University: Girls Exploring Science and Technology (GEST) **4/13/2019**
Facilitator
- Led water quality testing lab and discussion sponsored by Duke University Marine Lab Girls STEM Camp.

Duke Oyster Farm **8/2018 – 12/2018**
Assistant Farmer
- Assisted in construction of nursery bags and farm set up.
- Planted and transplanted spat and juvenile oysters.
- Assisted in maintenance of the farm.
- Recruited volunteers farming support.

EarthEcho International Inaugural Youth Leadership Council **2/2016 – 6/2018**
Council Member and Ambassador
- Provided guidance for organization's youth programs and resources, and advised partner organizations and other external groups on development of youth strategies.

- Represented EarthEcho at events, conferences and trainings.
- Conceived and lead implementation of 3T4E (Three pieces of Trash For the Earth) an initiative in which volunteers pick up 3 pieces of trash, post a selfie, and leverage social media (#3T4E) to promote the global participation.
    - Program reached 19 countries, 24 states, with a collection of 1,158 + pieces of trash with 1.6 million impressions in one day.
- Produced educational video for the World Water Monitoring Challenge.

Sailors for the Sea **6/2014 - 8/2016**

West Coast Ambassador

- *Sailors for the Sea* (SFTS) – a non-profit ocean conservation organization.
- Served as first SFTS ambassador.
- Spoke at regattas, yacht clubs, and dinners educating boating communities, both adults and children, about ocean conservation.
- Promoted *Clean Regattas* participation and action.
- Created informational banner; submitted regatta reports, blogs, Facebook entries, and produced a handbook for future ambassadors.

SKILLS

Program, software, and technology experience.

- R Studio
- ArcGIS Pro
- ArcGIS Desktop
- ArcGIS StoryMaps
- Agisoft Metashape
- Swift Active Screener
- ImageJ
- EK60 Sonar/EK80 Sonar (Simrad)
- Multibeam EchoSounder
- REMUS Unmanned Underwater Vehicle
- CoralNet
- Final Cut Pro

Certifications

- PADI Advanced Open Water Diver
- PADI Nitrox Diver
- PADI Rescue Diver
- Emergency O2 Administration
- US Sailing Level 1 Instructor
- CPR / First Aid
- California Boating License
- FAA Remote Pilot Certificate (Part 107)

OTHER WORK EXPERIENCE

Sailing Coach **8/2020 – 7/2021**

Mission Bay Yacht Club

- Taught sailing in multiple boat types to all skill levels and ages.
- Coached the advanced race team.
- Responsible for sailboat and powerboat maintenance and repair.
- Developed protocol for boat care and organization.

AP Biology Tutor **8/2020 – 6/2021**

- Tutored one-on-one AP Biology.
- Prepped high school senior for AP Test in additional to weekly exams.
- Prepared notes and lesson plans for each session.