Helena McMonagle, Ph.D.

PROFESSIONAL SUMMARY

Quantitative ecologist and science-policy professional with expertise in biological oceanography, ecological modeling, biogeochemistry, fisheries science, and marine carbon dioxide removal. Experienced in interagency and international coordination and communicating complex scientific concepts to wide audiences including students, stakeholders, and decision-makers.

EDUCATION

University of Washington, Seattle, WA 2019 - 2025
PhD, Aquatic and Fishery Sciences; **GPA**: 3.96/4.00. Advisors Dr. Tim Essington and Dr. Ray Hilborn. Dissertation title: "Confronting uncertainty in the contribution of mesopelagic fishes to the biological carbon pump". Teaching assistant for courses in Ecological Modeling and Statistical Inference, and Marine Conservation and Fisheries Management.

Wellesley College, Wellesley, MA 2012 - 2016
B.A. in Biological Sciences with Honors; **GPA**: 3.73/4.00. Relevant coursework: Marine Biology, Inorganic & Organic Chemistry, Limnology of Baikal, Climate Change & Society.

Sea Education Association, Woods Hole, MA Spring 2015
Marine Biodiversity and Conservation semester program. Relevant coursework: Biological Oceanography, Ocean Science, Public Policy. Co-led research on six-week research cruise.

RELEVANT WORK EXPERIENCE

Ocean Science and Policy Knauss Fellow*, National Science Foundation (NSF)* 2025 – Present
- Provided technical assistance to policy and communications teams on topics in ocean sciences.
- Co-led and moderated event about ocean science and impacts of climate change on ecosystems for over 300 attendees from non-profit organizations, Tribes, government agencies and Congress.
- Drafted work plans and concise reports on ocean observing for climate and weather forecasting, deep seabed mining, harmful algal blooms, coastal resilience, and other ocean-related topics.
- Authored news stories that spotlighted impact of NSF-funded research for the public.
- Contributed to cross-cultural dialogue and tracked action items for the intergovernmental G7 Future of the Seas and Ocean Initiative and the Arctic Monitoring and Assessment Programme.
- Reviewed research proposals, checked proposals for compliance, and summarized complex panel review information for scientists who submitted oceanography research proposals to NSF.
- Researched and prepared report for internal stakeholders about Congressional mandates and executive orders directing the agency's ocean science and policy directives.
- Led agendas and facilitated partnerships in interagency and intergovernmental policy meetings.

NSF Graduate Research Fellow, *University of Washington,* Seattle, WA 2019 – 2024
- Led and managed oceanographic research in marine biogeochemistry and food web ecology.
- Quantified the role of fishes and zooplankton in the biological carbon pump to inform carbon budgets, fisheries management, and estimates of active carbon transport and sequestration.
- Utilized large, long-term datasets to quantify the prevalence of mesopelagic fishes in the diets of marine predators in the California Current using spatial analysis tools.
- Planned and led fish and zooplankton sampling and fish respiration rate experiments at sea.
- Led workshop for 15-20 undergraduate and graduate students pursuing research grants.

- Awarded the Ecological Society of America's Graduate Student Policy Award for workshop in Washington, D.C. on science policy, and on communicating science with Congressional staffers.
- Collected long-term ecological time series data on sockeye salmon runs in Bristol Bay, Alaska.
- Tracked the status of the latest science in deep seabed mining and deep-sea fishing, and authored paper on trade-offs between deep sea ecosystem services and emerging ocean industries.
- Presented at public events at a library, retirement home, and teacher workshop.

Research Assistant, *Woods Hole Oceanographic Institution (WHOI),* Woods Hole, MA 2017 – 2019

- Analyzed fish growth rates using microscopy and image processing software, and measured nutritional condition of Arctic cod using molecular biology techniques (Llopiz Lab).
- Mentored an undergraduate student in study on mesopelagic fish otoliths and published results in *Frontiers in Marine Science* (Llopiz Lab).
- Collected fish and zooplankton at sea; conducted data analysis and visualization (Llopiz Lab).
- Examined effects of aquatic toxicants on gene expression and epigenetics in fish and published results in *Environmental Toxicology and Chemistry* (Aluru Lab).

PUBLICATIONS

---

1. **McMonagle, H.**, Llopiz, J.K., Maas, A.E., Steinberg, D.K., Govindarajan, A.F., Essington, T.E. (2024). Quantifying uncertainty in the contribution of mesopelagic fishes to the biological carbon pump in the Northeast Atlantic Ocean. ICES Journal of Marine Science 81 (10), 2037-2051.
2. Bucklin, A., Batta-Lona, P.G., Questel, J.M., Wojcicki, M., Wiebe, P.H., Llopiz, J.K., Glancy, S., Caiger, P.E., **McMonagle, H.**, Francolini, R., Govindarajan, A., Jech, J.M. and Thorrold, S.R. (2024). Metabarcoding and morphological analysis of diets of mesopelagic fishes in the NW Atlantic Slope Water. Frontiers in Marine Science 11, 1411996.
3. Martin, A.P., Dominguez, A.B., Baker, C.A., Baumas, C.M., Bisson, K.M., Cavan, E., Freilich, F., Galbraith, Galí, E.M., Henson, S., Kvale, K.F., Lemmen, C., Luo, J.Y., **McMonagle, H.,** de Melo Viríssimo, F. *et al*. (2024). When to add a new process to a model–and when not: a marine biogeochemical perspective. Ecological modeling 498, 110870.
4. **McMonagle, H.**, Llopiz, J.K., Hilborn, R., Essington, T.E. (2023). High uncertainty in fish bioenergetics impedes precision of fish-mediated carbon transport estimates into the ocean's twilight zone. Progress in Oceanography 217, 103078.
5. Bisson, K., **McMonagle, H.**, Iglesias, I., Halfter, S., Gallo, N. (2023). Five reasons to take the precautionary approach to deep sea exploitation. Communications Earth & Environment 4 (1), 152.
6. Govindarajan, A.F., Llopiz, J.K., Caiger, P.E., Jech, J.M., Lavery, A.C., **McMonagle, H.**, Wiebe, P.H. and Weifeng Z. (2023). Assessing mesopelagic fish diversity and diel vertical migration with environmental DNA. Frontiers in Marine Science 10, 1-13.
7. Quigley, L.A., Caiger, P.E., Govindarajan, A., **McMonagle, H.**, Jech, J.M., Lavery, A.C., Sosik, H.M., Llopiz, J.K. (2023). Otolith characterization and integrative species identification of adult mesopelagic fishes from the western North Atlantic Ocean. Frontiers in Marine Science 10, 1217779.
8. Aluru, N., Hallanger, I., Bjornsdatter, L., **McMonagle, H.**, Harju, M. (2021). Hepatic gene expression profiling in Atlantic Cod *(Gadus morhua)* liver after exposure to organophosphate flame retardants revealed altered cholesterol biosynthesis and lipid metabolism. Environmental Toxicology and Chemistry 40 (6), 1639-1648.
9. Koslow, J.A., **McMonagle, H.**, Watson, W. (2017). Influence of climate on the biodiversity and community structure of fishes in the southern California Current. Marine Ecology Progress Series 571, 193-206.

Manuscript in preparation and under review:

10. **McMonagle, H.,** Llopiz, J.K., Maas, A.E., Steinberg, D.K., Govindarajan, A.F., Essington, T.E. Refining predictions of respiration rates of mesopelagic fishes and zooplankton using respirometry and proxy measurements. In prep.
11. Batta-Lona, P.G., You, V., Llopiz, J.K., **McMonagle, H**., Govindarajan, A., Lefebvre, L.S., Wiebe, P.H., Bucklin, A. DNA metabarcoding of mesopelagic fish diets in the NE Atlantic: insights and applications for deep-sea food webs and ecosystems. In review, ICES Journal of Marine Science.
12. Sato, M., Erickson, C.K., **McMonagle, H.**, Llopiz, J.K. Mesoscale eddy structure drives spatial variability in mesopelagic fishes. In review, Limnology and Oceanography.
13. Sato, M., Erickson, Z., Drago, L., Maas, A. E., **McMonagle, H.**, and Steinberg, D. K. Temporal dynamics of mesopelagic fishes within a mesoscale eddy: a Lagrangian perspective. In review, Limnology and Oceanography Letters.

GRANTS AND AWARDS

John A. Knauss Ocean Policy Fellowship: Awarded by Sea Grant to pursue one year of federal service in ocean science and policy at the U.S. National Science Foundation.

Ecological Society of America Graduate Student Policy Award: Covered travel and policy training in preparation for meetings with Congressional offices to communication graduate research outcomes.

NSF Graduate Research Fellowship Program ($153,000): Awarded by the National Science Foundation. Provides three years of graduate student stipend and tuition support from 2021-2024.

Presentation awards: Awarded Best Lightning Talk (2022) and People's Choice Award (2023) at the School of Aquatic and Fishery Science's annual Graduate Research Symposium.

SAFS Fellowship ($102,000): Awarded by the School of Aquatic and Fishery Sciences at the University of Washington. Provides eight academic quarters of tuition and stipend support from 2019-2021.

Technical Staff Training Grant ($5000): Awarded by Woods Hole Oceanographic Institution to further develop professional skills among technicians. Covered two statistics courses at Oregon State University.

Scripps Undergraduate Research Fellowship ($6000): Awarded by the National Science Foundation's Research Experience for Undergraduates program. Provided stipend support during summer of 2015.

Association for the Sciences of Limnology and Oceanography Multicultural Program: Provided travel funding and accommodation to present at the 2016 Ocean Sciences Meeting in New Orleans, LA.

Jerome A. Schiff Fellowship ($2000): Provided travel funding from Wellesley, MA to Woods Hole, MA to complete senior honors thesis work, and some funding to offset student work-study in 2015-2016.

INVITED TALKS

Panelist at Ecological Society of America Annual Meeting, Baltimore, MD. 2024. Invited speaker on panel about early career opportunities in science policy for undergraduate and graduate students.

Guest lecturer for Marine Conservation and Management, **University of Washington,** Seattle, WA. 2023. Lecture: "Mesopelagic fish and trade-offs in ecosystem services" for ~90 undergraduate students.

Guest lecturer for in Biological Oceanography, Sea Education Association, Woods Hole, MA. 2021. Lecture: "Mesopelagic fish and trade-offs in ecosystem services" for ~20 undergraduate students.

Guest lecturer for Marine Ecology, **Stonehill College,** Easton, MA. 2018. Lecture: "A Glimpse into the Ocean's Twilight Zone". Presented interactive lecture on mesopelagic ecology for ~30 undergraduates.

CONFERENCE PRESENTATIONS

Ecological Society of America, Baltimore, MD. 2024. "Quantifying uncertainty in the contribution of mesopelagic fishes to the biological carbon pump in the Northeast Atlantic Ocean." Oral presentation.

Ocean Twilight Zone Symposium, Woods Hole, MA. 2023. "Identifying and tackling uncertainty in fish-mediated carbon flux". 2023. Oral presentation and poster.

Effects of Climate Change on the World's Ocean, Bergen, Norway. 2024. "High uncertainty in fish-mediated carbon transport into the ocean's twilight zone. In-person, recorded presentation available at: https://www.youtube.com/watch?v=ODXyQZLSYyk&t=5712s.

SAFS Graduate Student Symposium, Seattle, WA. "Fish and the carbon cycle: do they matter?" Best Lightning Talk, 2022. "Using Github's Copilot to Write R Code Faster". People's Choice Award, 2023.

Ocean Sciences Meeting, New Orleans, LA. 2016. "Relationships between climate and biodiversity of fish assemblages in the southern California Current region". Oral presentation.

Wellesley College, Wellesley, MA. "Initial microbial colonizers of microplastics in the North Atlantic Ocean". April 2016. Oral, public presentation at Wellesley College Ruhlman Conference.

WORKSHOPS & MEETING LEADERSHIP

Mesopelagic Science to Action Workshop, Boston, MA. 2025. Invited participant in workshop to develop a roadmap for science to action pathways for management of the mesopelagic zone.

Frontiers in Ocean Sciences, **National Science Foundation (NSF)**, Alexandria, VA. 2025. Planned and moderated free, public event on research in climate science, ecosystem resilience, and natural hazards. Available at: https://www.nsf.gov/events/7th-annual-frontiers-ocean-sciences-symposium/2025-06-30

Bridging International Activity and Related Research Into the Twilight Zone (BIARRITZ), 2019, Southampton, UK. Empiricists and modelers came together to advance knowledge of the twilight zone by enhancing international collaboration across eight major mesopelagic zone research programs.

ICES Annual Science Conference, 2021. Co-convened session on "Biomass, biodiversity, and ecosystem services in the mesopelagic zone" with Dr. Tom Langbehn and Dr. Peter Wiebe.

PUBLIC OUTREACH

Public dissertation defense, Seattle, WA. "Confronting uncertainty in the contribution of twilight zone fishes to the biological carbon pump." Available at: https://www.youtube.com/watch?v=gOk-dDIGUB4

University of Washington Scholars Studio, Seattle, WA. "What could deep sea fish (and their sinking poop) do for the ocean's ability to absorb our greenhouse gas emissions?" February 2022. Live-streamed oral presentation, available at: https://tinyurl.com/UWScholarsStudioMcMonagle

The Kenney Senior Living Community, Seattle, WA. "A Glimpse into the Twilight Zone". Spoke with about 50 community members about the ocean's twilight zone, ocean exploration, and the carbon cycle.

Falmouth High School, Falmouth, MA. "The Ocean Twilight Zone: Why Should We Care?" December, 2018. Interactive presentation at an optional assembly for high school students. Presentation published by Falmouth High School and available at: https://www.youtube.com/watch?v=N8QoDlCZpEI

TEACHING EXPERIENCE

University of Washington, Seattle, WA 2021
Teaching Assistant: Led lab sections and guest lectured in Marine Conservation and Management course. Graded student essays critiquing published, peer-reviewed journal articles.

University of Washington, Seattle, WA 2021
Teaching Assistant: Led lab sections with coding in R, and mentored undergraduate and graduates in Ecological Modeling course. Troubleshooted coding issues and mentored students in course projects.

Marine Biological Laboratory, Woods Hole, MA 2016
Teaching Assistant: Co-taught microbial ecology for 20 undergraduate students in the Semester in the Environmental Science program. Led fieldwork in Waquoit Bay, taught lab and research skills.

The Vieques Conservation and Historical Trust, Vieques, Puerto Rico 2014, 2015
Educator and Field Research Assistant: Taught youth science program and collected plankton and water quality data for environmental monitoring of local bioluminescent bay.

SERVICE EXPERIENCE

Ocean Science and Policy Knauss Fellow*, National Science Foundation (NSF)* 2025 – Present

- Presented at four public events about climate change, sustainability and deep-sea ecology for *Science on a Sphere* and *Expert Is In* for visitors at the Smithsonian Museum of Natural History.

NSF Graduate Research Fellow, *University of Washington,* Seattle, WA 2019 – 2024

- Coordinated annual outreach event, Aquatic Sciences Open House at University of Washington. Hosted ~500 attendees, including K-12 students and their parents, for interactive activities.
- Fact-checked three children's books in science outreach related to deep-sea science.
- Provided interviews and fact-checking for "All the Fish We Cannot See" in Hakai Magazine, and wrote article for the University of Washington website about dissertation research.
- Led hands-on marine food webs activities for K-8 students at STEAM Night in Shoreline, WA.
- Collaborated with SeaDoc Society to run workshop for STEM teachers and informal educators about meeting science standards through marine science lessons about local marine ecosystems.
- Served as the graduate student representative for a faculty search and hiring committee.
- Officiated Orca Bowl competition for high school students that promotes ocean science literacy.
- Volunteered for Skype a Scientist to speak with three classrooms as a visiting ocean scientist.

Research Assistant, *Woods Hole Oceanographic Institution*, Woods Hole, MA 2017-2019

- Facilitated and led educational opportunities at local research institutions for students in the Falmouth Public Schools as a Board Member of Falmouth STEM Boosters.
- Assessed high school science fair projects during annual Science Fair in 2017, and mentored a student in her science fair project in 2018.
- Mentored three undergraduate students in molecular biology and research methods as a volunteer lab hand for the Marine Biodiversity and Conservation Course at Sea Education Association.

RELEVANT SKILLS

Technical Skills
Proficient in MS Office, Github, and R programming. Introductory Python and MATLAB. Journal peer reviewer. Grant writing skills.

Field Experience
2000+ hours field work at sea. Oceanographic data collection and sample processing (e.g., using CTDs, plankton nets, and midwater trawls). Salmon stream surveys, fish tagging, fish dissection, and otolith collection and analysis. SCUBA Nitrox Certified. Massachusetts Boating Safety Course. Driver's license.

Languages
Proficient in Spanish. Elementary German.

Professional Skills
Critical thinking, problem-solving, NOAA Facilitation Basics Course, NSF Merit Review Basics Course, relationship building, science communication, excellent written and oral communication skills.