Hillary Marchwinski (Sullivan)
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EDUCATION

Ph.D Marine Science *2025*
Northeastern University Marine Science Center, Nahant, MA
Dissertation: "The impact of natural, altered, and restored hydrology on salt marsh biogeochemical processes"
NOAA Margaret A. Davison Fellow (2022-2024)

M.S. Biology *2014*
Clark University, Worcester, MA
Thesis: "The effects of nitrate fertilization on the photosynthetic performance of the salt marsh cordgrass, *Spartina alterniflora"*

B.A. Environmental Science: Conservation Biology *2013*
Clark University, Worcester, MA
Institutional honors: *Magna cum laude*

Semester in Marine Resources Management Studies *Spring 2012*
The School for Field Studies: Turks and Caicos Islands, BWI

EXPERIENCE

Cape Cod Restoration Coordinator, *Friends of Herring River, Wellfleet, MA 2025 – present*

- Provide ecosystem monitoring and implementation support for 4 restoration projects on Cape Cod in collaboration with Mass Audubon, NPS, and WBNERR
- Advance designs and implement nature-based solutions to maintain and improve ecological integrity across habitats, including riparian zones, wetlands, meadows, and woodlands

NOAA Margaret A. Davidson Fellowship, *Waquoit Bay National Estuarine Research Reserve (WBNERR), Mashpee, MA* *2022-2024*

- Developed collaborative science experiment working with reserve staff, municipal agencies, and tribal leaders
- Wrote, applied, and secured permits to install the first runnels on Cape Cod
- Measured the impact of impoundments and restored hydrology with runnels on salt marsh sediment dynamics, vegetation, and N cycling
- Maintained budget, submitted progress reports
- Participated in many professional development trainings, workshops, and professional meetings with a cohort of 23 other fellows

Graduate Research Assistant, *Northeastern University Marine Science Center, Nahant, MA* *2019-2025*

- **Chapter 1:** Understanding nitrogen retention in primary tidal creek after 16 years of nutrient enrichment using eco-system scale ^{15}N isotope enrichment
- **Chapter 2:** Salt marsh decomposition rates after hydrologic restoration with runnels
- **Chapter 3:** The impact of altered and restored hydrology on salt marsh sediment dynamics, vegetation, and N cycling

Research Associate I, *Woodwell Climate (formerly Woods Hole) Research Center, Falmouth, MA* *2021-present*

Waquoit Bay Pool Remediation: Salt marsh runnel restoration

- Prepares of permits for marsh restoration with contracting company
- Conducts field surveys of sediment characteristics, water levels, birds

Buzzard's Bay Coalition SNEP Project: Salt marsh runnel restoration

- Studied the effect of runnels as a mitigation strategy on salt marsh carbon decomposition using the Tea Bag Index and litterbags

TIDE Project: Ecosystem level salt marsh nutrient enrichment experiment

- Led field research team to examine nutrient cycling, plant dynamics, and food web responses to ecosystem-scale nutrient enrichment
- Designed a ^{15}N tracer experiment to determine fate of marsh nitrogen
- Helped write and secure 3-year $300k NSF grant

Arctic Methane Project:

- Facilitated the compilation of methane flux from eddy covariance towers for large-scale methane synthesis

Research Assistant III, *Woodwell Climate (formally Woods Hole) Research Center, Falmouth, MA* *2016-2021*

TIDE Project (see above)

Buzzard's Bay Coalition SNEP Project (see above)

Amazon Riparian Streams:

- Examined the effect of large-scale farming and deforestation on nutrient runoff to protected riparian zones in Brazilian Amazon using various nutrient addition approaches

Research Assistant II, *Marine Biological Laboratory, Woods Hole, MA* *2015-2016*

TIDE Project (see above)

Lab Manager, *Louisiana Universities Marine Consortium, Cocodrie, LA* *2015*

- Organized and ran field campaigns to collect salt marsh soil, water, plant, and gas samples
- Coordinated and conducted laboratory experiments, sample and data analysis
- Examined temporal and spatial patterns of *S. alterniflora* biomass and allometric growth

Research Assistant, *Louisiana Universities Marine Consortium, Cocodrie, LA* *2014-2015*

- Examined biogeochemical processes, including denitrification, nitrification, iron reduction, greenhouse gas emissions in salt marshes affected by an oil spill

Independent Research, Clark University, Worcester, MA *2012-2014*

- Used PAM fluorometry to examine the effect of nitrate fertilization on the photosynthetic performance of the salt marsh cordgrass *Spartina alterniflora*

Directed Research *at Center for Marine Resource Management, Turks and Caicos, BWI* *2012*

- Measured *Cassiopeia* abundance and size across a gradient of disturbed waters

PUBLICATIONS

Sullivan, H.L., W. Ferguson, J. Holtzer, L.A. Deegan, and J.L. Bowen. 2025. The impact of altered and restored hydrology on salt marsh sediment dynamics, vegetation, and N cycling. *Estuaries and Coasts* 48.

Sullivan, H.L., A.F. Besterman, R.W. Jakuba, J.E. Costa, D. Mezan, L.A. Deegan, and J.L. Bowen. Salt marsh decomposition after hydrologic restoration with runnels. *Estuarine, Coastal and Shelf Science,* In revision.

Ying, Q. et al. 2024. WetCh$_4$: A machine learning-based upscaling of methane fluxes of Northern wetlands during 2016-2022. *Earth Systems Science Data.*

Besterman, A.F. R.W. Jakuba, **H.L. Sullivan**, J.E. Costa, W. Ferguson, D. Brennan, and L.A. Deegan. 2022. Early responses to runnels in southern New England Salt Marshes. Southern New England Program Final Report.

Jankowski, K.J., L.A. Deegan, C. Neill, **H.L. Sullivan,** P. Ilha, L. Maracahipes-Santos, N. Marques, and M.N. Macedo, 2021. Land use change alters ecosystem function in Amazonian headwater streams. *Water* 13:1667.

Babitch, J.W., J.A. Nelson, L.A. Deegan, **H.L. Sullivan**, and B.A. Stauffer. 2021. Resolving estuarine nitrogen use by phytoplankton communities using a whole system tracer approach. *Estuaries and Coasts*: 1-16.

Bowen, J.L., A.E. Giblin, A.E. Murphy, A.N. Bulseco, L.A. Deegan, D.S. Johnson, T.J. Mozder, J.A. Nelson, and **H.L. Sullivan**. 2020. Not all nitrogen is created equal: Differential effects of nitrate versus ammonium addition in coastal wetlands. *BioScience* 70: 1108-1119.

In prep

Sullivan, H.L., L.A. Deegan, J.A. Nelson, and J.L. Bowen. Determining the fate of land-derived nitrogen in salt marshes using a ^{15}N isotope tracer experiment.

Holtzer, J.L., L.A. Deegan, J.L. Bowen, **H.L. Sullivan**. Response and recovery of salt marsh benthic microalgae to nutrient enrichment.

FELLOWSHIPS

NOAA Margaret A. Davidson Graduate Fellowship Program | $124,000 | 2022 - 2024
Northeast Climate Adaptation Science Center (CASC) Fellow | 2022
Traina Undergraduate Research Fellowship | Clark University | $3,000 | 2009

AWARDS

Ketchum Prize | Best Graduate Student Oral Presentation | New England Estuarine Research Society Spring Meeting | 2024
Margaret A. Davidson Fellowship | "The interactive effects of altered and hydrology, nitrogen loading, and restoration on salt marsh nitrogen cycling" | $124,000 | 2022
Career Development Fund Grant | Woods Hole Research Center | $1,500 | 2022
NSF DEB Award (co-collaborator) | TIDE: Legacy effects of long-term nutrient enrichment on recovery of saltmarsh ecosystems | $1,550,134 | 2019
Graduate Research Travel Grant | Clark University| $500 | 2014
Traina Merit Science Scholarship | Clark University | $72,000 | 2009
Not funded
Margaret A. Davidson Fellowship | "The interactive effects of sea level rise and increased nitrogen on salt marsh productivity and nitrogen cycling" | 2020
NSF DEB Award (co-collaborator) | TIDE: Legacy effects of long-term nutrient enrichment on recovery of saltmarsh ecosystems | 2018

PROFESSIONAL DEVELOPMENT

Facilitation Basics | NOAA Office for Coastal Management | 2023
Science Communication | Cathy Angell Communications | 2023
How to Design a Compelling Grant Proposal and Presentation | Cathy Angell Communications | 2023
Planning Effective Projects for Coastal Communities | NOAA Office for Coastal Management | 2022
Introduction to Collaborative Science | Davidson Fellows training | 2022

INVITED TALKS

Speaker | Agriculture in salt marshes: Historic activity and modern-day impacts | Friends of Herring River Science Symposium: Water, Fresh and Salty| Eastham, MA | 2025
Speaker | Navigating Upstream: Planning and Implementing Restoration with Consideration for Marsh Migration | Society of Wetland Scientists Annual Meeting | Providence, RI | 2025
Salt Marsh Speaker | Vanderbilt Climate Change Workshop | Sea Education Association | Falmouth, MA | 2024
Salt Marsh Speaker | Research at the Reserve | Waquoit Bay National Estuarine Research Reserve | Mashpee, MA | 2024
Salt Marsh Speaker | SEASCape Summer Science Program | Falmouth, MA | 2022
Conference Speaker | Soil and Water Conservation Winter Meeting (Virtual) | 2022
Webinar Panelist | Kaneb Webinar Series | Woods Hole Research Center (virtual) | 2021
Pollution Speaker | Sturgis Charter School | Hyannis, MA | 2019
Panelist | Mattapoisett Land Trust showing of Straws documentary | Mattapoisett, MA | 2019
Webinar Speaker | N-Steps Seminar Series | Environmental Protection Agency (virtual) | 2018
Workshop Speaker | Gulf Lagniappe Adult Workshop | LUMCON | Cocodrie, LA | 2015
Seminar Speaker | REU Program | LUMCON | Cocodrie, LA| 2014
Presenter | Louisiana Estuaries Awareness and Discovery Camp | LUMCON | Cocodrie, LA | 2014

CONFERENCE PRESENTATIONS AND TALKS (first author is presenter)

H.L. Sullivan, M. Tyrrell, Linda A. Deegan, and J.L. Bowen (poster) | Salt marsh restoration and the nitrogen cycle | Coastal Estuarine and Research Federation (CERF) Richmond, VA | Nov 2025

H.L. Sullivan, M. Tyrrell, and W. Ferguson (oral) | Runnel restoration and marsh migration in Cape Cod salt marshes | Society of Wetland Scientists Annual Meeting, Providence, RI | Jul 2025

H.L. Sullivan, M. Tyrrell, W. Ferguson, L.A. Deegan, and J.L. Bowen (poster) | Salt marsh climate adaptation: Can runnels restore our marshes? | National Estuarine Research Reserve (NERR) Annual Meeting, Kennebunkport, ME | Oct 2024

H.L. Sullivan, W. Ferguson, L.A. Deegan, and J.L. Bowen (oral) | The impact of altered and restored hydrology on salt marsh N cycling | New England Estuarine Reserve Society (NEERS) Spring Meeting, Freeport, ME | Apr 2024
*****Ketchum Prize for Best Graduate Student Oral Presentation

H.L. Sullivan**,** W. Ferguson, **L.A. Deegan**, and J.L. Bowen (oral) | The impact of altered and restored hydrology on salt marsh N cycling | Coastal Estuarine and Research Federation (CERF) Biennial Meeting, Portland, OR | Nov 2023

H.L. Sullivan, A. Besterman, R. Jakuba, L.A. Deegan, and J.L. Bowen (poster) | The impact of runneling as a hydrologic adaptation strategy on salt marsh carbon decomposition | National Estuarine Research Reserve (NERR) Annual Meeting, Seattle, WA | Oct 2022

H.L. Sullivan, A. Besterman, R. Jakuba, L.A. Deegan, and J.L. Bowen (oral) | The impact of runneling as a hydrologic adaptation strategy on salt marsh carbon decomposition | New England Estuarine Reserve Society (NEERS) Spring Meeting Salem, MA | Apr 2022

H.L. Sullivan, A. Besterman, R. Jakuba, L.A. Deegan, and J.L. Bowen (virtual) | The impact of runneling as a hydrologic adaptation strategy on salt marsh carbon decomposition | Coastal Estuarine and Research Federation (CERF) Biennial Meeting | Nov 2021

Bowen, J.L., A.E. Giblin, A.E. Murphy, A.N Bulseco, L.A. Deegan, D.S. Johnson, J.A. Nelson, T.J. Mozdzer, and **H.L. Sullivan** (virtual) | Storing carbon in coastal marshes requires understanding anthropogenic nitrogen supply | Coastal Estuarine and Research Federation (CERF) Biennial Meeting | Nov 2021

Besterman, A., R.W. Jakuba, L.A. Deegan, W. Feruson, D. Brennan, J. Costa, **H.L. Sullivan,** and N.K. Ganju (virtual) | 'Runneling' Toward climate adaptation: An emerging hydrologic management strategy for salt marshes | Coastal Estuarine and Research Federation (CERF) Biennial Meeting | Nov 2021

Besterman, A., R.W. Jakuba, L.A. Deegan, W. Ferguson, D. Brennan, J. Costa, **H.L. Sullivan,** and N.K. Ganju (virtual) | "Runnelling". Toward climate adaptation: assessing a hydrologic management strategy for salt marshes | New England Estuarine Research Society (NEERS) Spring Meeting | Apr 2021

Sullivan, H.L., L.A. Deegan, J.A. Nelson, and J. Bowen (poster) | Determining the fate of anthropogenic nitrogen in saltmarshes using a large-scale 15N isotope tracer experiment | National Coastal and Estuarine Virtual Summit | Sept 2020

Sullivan, H.L., L.A. Deegan, J.A. Nelson, and J. Bowen (oral) | Determining the fate of anthropogenic nitrogen in saltmarshes using a large-scale 15N isotope tracer experiment | Coastal Estuarine Research Federation (CERF) Biennial Meeting, Mobile, AL | Nov 2019

Schutte, C., M.W. Rich, J. Marton, **H.L. Sullivan,** R. Bedsoe, M. Dawson, B. Donnelly, and B.J. Roberts (oral) | Spatial patterns in soil biogeochemical process rates along a wetland salinity gradient. | American Geophysical Union (AGU) Fall Meeting, Washington, DC | Dec 2018

Miller, H.M.*, **H.L. Sullivan**, and L.A. Deegan (oral) | Quantifying nitrification and ammonification from sites in a northern Massachusetts salt marsh. New England Estuarine Research Society (NEERS) Spring Meeting. New Bedford, MA. Oct 2018
*Postgraduate advisee

Sullivan, H.L., A.E. Giblin, and L.A. Deegan (oral) | Whole-system salt marsh ^{15}N tracer study. | New England Estuarine Research Society (NEERS) Spring Meeting, Portsmouth, NH | Apr 2018
Sullivan, H.L., A.E. Giblin, and L.A. Deegan (oral) | Whole-system salt marsh ^{15}N tracer study. | Coastal Estuarine and Research Federation (CERF) Biennial Meeting, Providence, RI | Nov 2017

Hill, T.D., B.J. Roberts, **H.L. Sullivan**, S.P. Setta, A. Chelsky, M.W. Rich, A. Hopple (oral) | Three years of biomass and allometry measurements in Spartina alterniflora marshes of coastal Louisiana | Gulf of Mexico Oil Spill and Ecosystem Science Meeting, Tampa, FL | Feb 2016

Roberts, B.J., K. Chatelain, S. Fortin, A. Chelsky, S.P. Setta, **H.L. Sullivan**, N. Ceresnak, K., Baudoin R. Scheuermann, A. Bernhard, A. Paterson, A. Engel, and A. Giblin (oral) | Highly variable biogeochemical process rates across salt marsh soil subhabitats: implications for scaling-up plot level measurements | Gulf of Mexico oil Spill and Ecosystem Science Meeting, Tampa, FL | Feb 2016

Sullivan, H.L, B.J. Roberts, M.W. Rich, R. Bledose, M. Dawson, B. Donnelly, and J.M. Marton (poster) | Spatial patterns in biogeochemical process rates along a Louisiana wetland salinity gradient in the Barataria Bay estuarine system | Gulf of Mexico Oil Spill and Ecosystem Science Meeting, Houston, TX | Feb 2015

Roberts, B.J., M.W. Rich, **H.L. Sullivan,** R. Bledose, M. Dawson, B. Donnelly, and J.M. Marton | Spatial patterns in biogeochemical process rates along a Louisiana wetland salinity gradient in the Barataria Bay estuarine system | American Geophysical Union Fall Meeting, San Francisco, CA | Dec 2014

Connolly, C.T., S.A. Spawn, **H.L. Sullivan,** S. Ludwig, J.D. Schade, and S.M. Natali (poster) | The effects of permafrost thaw on organic matter quality and availability along a hill slope in northeastern Siberia | American Geophysical Union Fall Meeting, San Francisco, CA | Dec 2014

Sullivan, H.L., K.A. Friedman, D.L. Robertson, D.S. Johnson. (poster) | The effect of nitrate fertilization on the photosynthetic performance of *Spartina alterniflora* | Joint Aquatic Science Meeting, Portland, OR | May 2014

Connolly, C.T., K. Sather, **H.L. Sullivan,** , J.D. Schade, W.V. Sobczak, and P.J. Mann (poster). | Organic matter biolability and enzyme activities within stream benthic sediments in Northeastern Siberia | American Geophysical Union Fall Meeting, San Francsico, CA | Dec 2013

DEPARTMENT PRESENTATIONS (first author is presenter)

H.L. Sullivan, W. Ferguson, L.A. Deegan, and J.L. Bowen (oral) | The impact of altered and restored hydrology on salt marsh N cycling | Northeastern University Graduate Research Symposium | May 2023
*****Faculty Prize for Best Graduate Student Oral Presentation

Sullivan, H.L., J.S. Caplan, J.A. Nelson, A. Eilar, L.A. Deegan, R.S. Warren, J.L.Bowen, and T.J. Mozdzer (oral) | Long-term salt marsh vegetation response to nutrient enrichment and sea-level rise | Northeastern University Graduate Research Symposium | May 2022

Sullivan, H.L., A. Besterman, R. Jakuba, L.A. Deegan, and J.E. Bowen (oral) | The impact of salt marsh remediation on carbon decomposition | Northeastern University Graduate Research Symposium | May 2021

Armstrong, K.A*., **H.L. Sullivan**, and L.A. Deegan (poster) | The effect of nitrate fertilization on benthic chlorophyll a concentrations | May 2018
*Undergraduate advisee

Sullivan, H.L., K.A. Friedman, D.L. Robertson (poster) | The effect of nitrate fertilization on photosynthetic performance of *Spartina alterniflora* | Clark University Bumpus Symposium for Graduate Biology Research | May 2013

Sullivan, H.L., K.A. Friedman, D.L. Robertson | The impact of nitrate fertilization on the photosynthetic activity of *Spartina alterniflora* | Clark University Academic Spree Day | Apr 2013

Sullivan, H.L., K.A. Friedman, D.L. Robertson (poster) | The effects of nitrate fertilization on the physiology of a common Salt marsh cordgrass species, *Spartina alterniflora* | Clark University Fall Fest Undergraduate Research Symposium | Oct 2012

TEACHING ASSISTANTSHIPS

Northeastern University, Boston, MA *Spring 2022, 2023, 2024*
Ecology Lab

Clark University, Worcester, MA *Spring 2014*
Earth System Science Lab

MENTORSHIP

Katherine Grabner | Woodwell Climate Research Center Undergraduate Intern | 2024
Rosie Hazleton | Northeastern University 3-Seas Master's Student | 2023
Aaron Edley | Woods Hole Partnership and Education Program Undergraduate Student | 2023
Julia Holtzer | Northeastern University 3-Seas Master's Student | 2022
Abigail Eilar | Northeastern University 3-Seas Master's student | 2020
Julia Holtzer | Northeastern University Co-op student | 2020
Audrey Kocher | Post-graduate Intern, TIDE Project | 2019
Anstasia Pulak | Post-graduate Intern, TIDE Project | 2019
Katherine Storer | Governor's Academy, high school intern, TIDE Project | 2019
Sarah Griffen | Governor's Academy, high school intern, TIDE Project | 2019
Haley Miller | Post-graduate interns, TIDE Project | 2018
Megan Corberie | Post-graduate interns, TIDE Project | 2018
Katie Armstrong | Undergraduate researcher, Mount Holyoke College | 2017-2018
Samantha Fortin | Roberts' lab REU students, LUMCON | 2015
Kristen Chatelin | Roberts' lab REU students, LUMCON | 2015
Brian Donnelly | Roberts' lab REU students, LUMCON | 2014
Mia Dawson | Roberts' lab REU students, LUMCON | 2014

PROFESSIONAL ASSOCIATIONS

Cape Restoration Action Team (C-RATS) Member *2024- present*
Coastal and Estuarine Research Federation (CERF) Member *2018 – present*
New England Estuarine Research Society (NEERS) Member *2018 – present*
Massachusetts Ecosystem Climate Adaptation Network, Salt Marsh Working Group, Nutrients Subgroup *2020 - present*
Coastal and Estuarine Research Federation (CERF) Career Development and Education Committee Member *2018-2019*

OUTREACH

Executive Board Member | Woods Hole Science and Technology and Education Partnership | Woods Hole, MA | 2019- Present
Outreach Speaker | SEA Education Association Pre-College Program | Falmouth, MA | 2023-2025
Science Fair Judge | Middle school science fair | Falmouth, MA | 2016 – 2022
Science Fair Judge | Falmouth Academy | Falmouth, MA | 2017 – 2024
Science Fair Judge | Middle school science fair | Mashpee, MA | 2021
Tidepool Tour Guide | High School Marine Science Symposium | Nahant, MA | 2021
Outreach Speaker | The Siena School | Silver Spring, MD (virtual) | 2020
Outreach Speaker | Lawrence Middle school | Falmouth, MA (virtual) | 2020
Skype a Scientist Program | Manchester Central High School | 2020
Volunteer for Whale Day | Johnson Elementary School | Nahant, MA | 2020

Outreach Speaker | Mattapoisett Land Trust Education Middle School Program | Cuttyhunk, MA| 2017-2019; 2023; 2025
Outreach Speaker | Mattapoisett Land Trust Education Program, Bourne, MA | 2017-2019
Field Trip Organizer | Old Rochester Regional High School | Falmouth, MA | 2019
Field Trip Organizer | Martha's Vineyard Public Charter School Falmouth, MA | 2019
Outreach Speaker | Martha's Vineyard Public Charter School | West Tisbury, MA | 2019
Blog/Photo Contributor | non-profit EnTidaled Project | 2014
Science Fair Judge | 6th and 7th grade science fair | Houma, LA | 2014
Campus Coordinator, Executive Leader, & Site Manager | non-profit Students Helping Children Across Borders project: Working for Worcester | Worcester, MA | 2013 – 2014
Science Fair Judge for 6th and 7th grade science fair | Douglas, MA | 2013
Volunteer Presenter | Mock Academic Conference | Worcester, MA | 2013

APPLIED FIELD AND LABORATORY TECHNIQUES

Field:

- Sediment core collection, salt marsh plant identification, redox probe (Hanna), shear vane measurements
- Tidal channel water velocity measurement using Acoustic Doppler Current Profiler (ADCP)
- Automatic water collecting using SIGMA/ISCO water samplers
- *In situ* gas analysis with LiCOR,
- Photosynthesis measurements using Pulse Amplitude Modulated (PAM) Fluorometer
- Water quality measurements using Hobo pressure sensors, conductivity loggers, and YSI Sondes

Laboratory:

- Aqueous dissolved inorganic nutrient concentration analysis (NO_3^-, NO_2^-, NH_4^+, and $PO4^{3-}$) using a nutrient autoanalyzer (Astoria Pacific and Lachet)
- Aqueous dissolved inorganic nutrient concentration (NH_4^+), analysis using spectrophotometer
- Nitrogen and carbon analysis on EA Carbon and Nitrogen analyzer,
- Greenhouse gas measurements using Shimadzu Gas Chromatograph
- Chlorophyll analysis using fluorometer
- Whole core ^{15}N incubations and OX/MIMS analysis
- $^{15}NH4$ isotope diffusion techniques

Computer:

- Rstudio
- Microsoft Office Suite

Boat: Massachusetts Boater Education Certified; boat trailering
SCUBA: NASE Open Water and PADI Advanced Open Water Diver certified
Language: Conversational understanding of Spanish and Portuguese

NEWS AND MEDIA

"Think link an ecosystem: Two long-term research projects enter their third decade, bringing new insights into ecological change." By Sarah Ruiz, *Woodwell Climate Research Center Feature* (2023)

"Plum Island study to examine salt marsh recovery from pollution" by Jack Shea, The Daily News of *Newburyport* (2019)

"In the Great Marsh and other coastal wetlands, climate change is harming delicate ecosystems" By David Abel, *Boston Globe* (2019)

CERTIFICATIONS

CPR Certified	*Expires Jun 2026*
Boat U.S. Foundation Boating Safety Course	*Aug 2014*
PADI Advanced Open Water Certification	*Apr 2012*
NASI Open Water Certification	*Jun 2012*