

Lorie Winchell Staver

Associate Research Professor

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Education:

2015 Ph.D., Marine, Estuarine, Environmental Science, University of Maryland, College Park

1986 M.S., Marine, Estuarine, Environmental Science, University of Maryland, College Park

1982 B.S., Biology, St. Lawrence University

Professional Background:

July 1 2023 - present, Associate Research Professor, University of Maryland Center for Environmental Science (UMCES), Horn Point Laboratory (HPL)

January 2018 – June 2023, Associate Research Scientist, UMCES, HPL

January 2016 – January 2018, Assistant Research Scientist, UMCES, HPL

2007 – 2016, Senior Faculty Research Assistant UMCES, HPL

2000 – 2006, Faculty Research Assistant, UMCES, HPL

1997 – 2000, Faculty Research Assistant, University of Maryland College Park

1986 – 1997, Faculty Research Assistant, UMCES, HPL

Research

A. *Areas of Professional Expertise:* wetland ecology; submersed aquatic vegetation ecology; restoration ecology; water quality

B. Peer Reviewed Publications:

Carruthers, T.J.B., S.B. Jones, M.K. Terrell, J.F. Scheibly, B.J. Player, V.A. Black, J.R. Ehrenwerth, P.D. Biber, R.M. Connolly, S. Crooks, J.P. Curole, K.M. Darnell, A.M. Dausman, A.L. DeJong, S.M. Doyle, C.R. Esposito, D.A. Friess, J.W. Fourqurean, I.Y. Georgiou, G.D. Grimsditch, S. He, E.R. Hillmann, G.O. Holm, J. Howard, H. Jung, S.D. Jupiter, E. Kiskaddon, K.W. Krauss, P.S. Lavery, B. Liu, C.E. Lovelock, S.K. Mack, P.I. Macreadie, K.J. McGlathery, J.P. Megonigal, B.J. Roberts, S. Settelmyer, **L.W. Staver**, H.J. Stevens, A.E. Sutton-Grier, J.A. Villa, J.R. White, and M. Waycott. 2024.

Identifying and filling critical knowledge gaps can optimize financial viability of blue carbon projects in tidal wetlands. *Frontiers in Environmental Science* 12.

<http://dx.doi.org/10.3389/fenvs.2024.1421850>

Plough, L., B. Lee, **L. W. Staver**. 2024. The effect of dieback on the genetic diversity of *Spartina alterniflora* in restoration marshes of the Chesapeake Bay. *Wetland Ecology and Management*. <https://doi.org/10.1111/rec.14311>

Morris, J.T., and **L.W. Staver**. 2024. Elevation Changes in Restored Marshes at Poplar Island, Chesapeake Bay, MD: II. Modeling the Importance of Marsh Development Time. *Estuaries and Coasts* 47: 1799–1813. <https://doi.org/10.1007/s12237-024-01342-x>

Staver, L.W., J.T. Morris, J.C. Cornwell, J.C. Stevenson, W. Nardin, P. Hensel, M.S. Owens, and A. Schwark. 2024. Elevation Changes in Restored Marshes at Poplar Island,

- Chesapeake Bay, MD: I. Trends and Drivers of Spatial Variability. *Estuaries and Coasts* 47: 1784–1798. <https://doi.org/10.1007/s12237-023-01319-2>
- Kim, C., L.W. Staver, X. Chen, A. Bulseco, J.C. Cornwell, and S.Y. Malkin. 2023. Microbial Community Succession Along a Chronosequence in Constructed Salt Marsh Soils. *Microbial Ecology* 85: 931 - 950.
- Cornwell, J. C., M. S. Owens, **L. W. Staver**. 2022. Nutrient retention and release in eroding Chesapeake Bay tidal wetlands. *Journal of American Water Resources Association* 58(6):940-957. <https://onlinelibrary.wiley.com/doi/abs/10.1111/1752-1688.12984>
- Nardin W., Y. Taddia , M. Quitadamo , I. Vona , C. Corbau , G. Franchi , **L. Staver** , A. Pellegrinelli. 2021. Seasonality and characterization mapping of restored tidal marsh by NDVI imageries coupling UAVs and multispectral camera. *Remote Sensing* 13(21):4207. <https://www.mdpi.com/2072-4292/13/21/4207>
- Staver, L. W.**, J. C. Cornwell, N. J. Nidzieko, K. W. Staver, J. C. Stevenson, M. Owens, W. Boynton, and L. Lopez-Gonzalez. 2021. The Fate of Nitrogen in Dredged Material Used for Tidal Marsh Restoration. *Journal of Marine Science and Engineering* 9(849). <https://doi.org/10.3390/jmse9080849>.
- Taddia, Y., A. Pellegrinelli, C. Corbau, G. Franchi, **L. W. Staver**, and W. Nardin. 2021. High-Resolution Monitoring of Tidal Systems Using UAV: A Case Study on Poplar Island, MD (USA). *Remote Sensing* 13:1364. <https://www.mdpi.com/2072-4292/13/7/1364>
- Baker, R., M. D. Taylor, K. W. Able, M. W. Beck, J. Cebrian, D. D. Colombano, R. M. Connolly, C. Currin, L. A. Deegan, I. C. Feller et al. 2020. Fisheries Rely on Threatened Salt Marshes. *Science* 370 (6517):670-71. <https://www.science.org/doi/10.1126/science.370.6517.670-b>
- Colombano, D. D., S. Y. Litvin, S. L. Ziegler, S. B. Alford, R. Baker, M. A. Barbeau, J. Cebrián, R. M. Connolly, C. A. Currin, L. A. Deegan, J. S. Lesser, C. W. Martin, A. E. McDonald, C. McLuckie, B. H. Morrison, J. W. Pahl, L. M. Risse, J. A. M. Smith, **L. W. Staver**, R. E. Turner, and N. J. Waltham. 2021. Climate Change Implications for Tidal Marshes and Food Web Linkages to Estuarine and Coastal Nekton. *Estuaries and Coasts* 44:1637–1648 <https://doi.org/10.1007/s12237-020-00891-1>
- Waltham, N. J., C. Alcott, M. A. Barbeau, J. Cebrian, R. M. Connolly, L. A. Deegan, K. Dodds, L. A. Goodridge Gaines, B. L. Gilby, C. J. Henderson, C. M. McLuckie, T. J. Minello, G. S. Norris, J. Ollerhead, J. Pahl, J. F. Reinhardt, R. J. Rezek, C. A. Simenstad, J. A. M. Smith, E. L. Sparks, **L. W. Staver**, S. L. Ziegler, and M. P. Weinstein. 2021. Tidal Marsh Restoration Optimism in a Changing Climate and Urbanizing Seascape. *Estuaries and Coasts* 44:1681–1690. <https://doi.org/10.1007/s12237-020-00875-1>
- Cornwell, J. C., M. S. Owens, **L. W. Staver**, and J. C. Stevenson. 2020. Tidal Marsh Restoration at Poplar Island I: Transformation of Estuarine Sediments into Marsh Soils. *Wetlands* 40:1673-1686.
- Staver, L.**, J. Stevenson, J. Cornwell, N. Nidzieko, K. Staver, M. Owens, L. Logan, C. Kim, and S. Malkin. 2020. Tidal Marsh Restoration at Poplar Island: II. Elevation Trends, Vegetation Development, and Carbon Dynamics. *Wetlands* 40:1687-1701.
- Lipej, L., M. Mistri, M. Orlando-Bonaca, C. Palinkas, **L. Staver** and J. C. Stevenson. 2020. Status of Critical Habitats and Invasive Species. In: *Vectors of Change in Coastal Ecosystems and the Services They Provide: A Comparative Analysis of the Northern Adriatic Sea and the Chesapeake Bay*. Malone, T., A. Malej and J. Faganeli, editors. American Geophysical Union.

- Fleri, J., W. Nardin, **L. W. Staver**, S. Lera and A. Gerevini. 2019. The effects of tides, channel morphology, and vegetation on sediment fluxes in a restored tidal marsh on Poplar Island (MD), USA. *Earth Surface Processes and Landforms*. DOI 10.1002/esp.4646.
- Reese, J. G., P. C. McGowan, **L. W. Staver**, and C. R. Callahan. 2015. Fish crows (*Corvus ossifragus*) prey on eggs of Virginia rail (*Rallus limicola*) and common tern (*Sterna hirundo*). *Maryland Birdlife* **64**:51-57.
- Staver, L. W.**, K. W. Staver, and J. C. Stevenson. 1996. Nutrient inputs to the Choptank River estuary: Implications for watershed management. *Estuaries* **19**:342-358.
- Staver, L. W.**, and J. C. Stevenson. 1994. The impacts of the exotic species *Hydrilla verticillata* on the shallows in Chesapeake Bay. Pages 364-370 in *Toward Sustainable Coastal Watersheds: The Chesapeake Experiment*. Chesapeake Research Consortium, Norfolk, VA. CRC Press.
- Stevenson, J. C., **L. W. Staver**, and K. W. Staver. 1993. Water-quality associated with survival of submersed aquatic vegetation along an estuarine gradient. *Estuaries* **16**:346-361.
- Jones, T. W., and **L. Winchell**. 1984. Uptake and photosynthetic inhibition by Atrazine and its degradation products on four species of submerged vascular plants. *Journal of Environmental Quality* **13**:243-247.

C. Other Significant Reports and Publications:

- Cahoon, D. R., J. H. Olker, A. G. Yeates, G. R. Guntenspergen, J. B. Grace, S. C. Adamowicz, S. C. Anisfeld, A. H. Baldwin, N. Barrett, L. Beckett, A. Benzecry, L. K. Blum, D. M. Burdick, W. Crouch, M. C. Ekberg, S. Fernald, K. W. Grimes, J. Grzyb, E. K. Hartig, D. A. Kreeger, M. Larson, S. Lerberg, J. C. Lynch, N. Maher, M. Maxwell-Doyle, L. R. Mitchell, J. Mora, V. O'Neill, A. Padeletti, D. J. Prosser, T. Quirk, K. B. Raposa, W. G. Reay, D. Siok, C. Snow, A. Starke, J. C. Stevenson, **L. Staver**, and V. Turner. 2019. Hurricane Sandy impacts on coastal wetland resilience. USGS Technical Report 2018-1142, Reston, VA.
- Batiuk, R. A., R. J. Orth, K. A. Moore, W. C. Dennison, J. C. Stevenson, **L. W. Staver**, V. Carter, N. B. Rybicki, R. E. Hickman, S. Kollar, S. Bieber, and P. Heasley. 1992. Chesapeake Bay Submerged Aquatic Vegetation Habitat Requirements and Restoration Targets: A Technical Synthesis. Chesapeake Bay Program. 186 pp.

Conference Presentations

- Staver, L. W.** et al. Special session on the Poplar Island restoration project. Restore America's Estuaries 2024
- Palinkas, C., **L. Staver**. Sediment-vegetation interactions in the created marshes of living shorelines: does age matter? Biennial meeting of the Coastal and Estuarine Research Federation. November 2021.
- L. W. Staver**, J. C. Stevenson, P. McGowan, C. Evaluating marsh response to environmental stressors: what can we learn from monitoring data? Coastal and Estuarine Research Federation, November 1-11, 2021.
- Palinkas, C., **L. Staver**. Sediment-vegetation interactions in the created marshes of living shorelines: does age matter? Restore America's Estuaries Living Shoreline Technology Transfer. October 2021.

- L. W. Staver**, J. C. Stevenson, J.C. Cornwell, N. Nidzieko, K. W. Staver, M. S. Owens. Blue carbon potential in beneficial use projects: an example from Poplar Island. Maryland Water Monitoring Council, December 4, 2020.
- Palinkas, C., **L. Staver**, M. Bolton. The impact of living shorelines to adjacent nearshore (subtidal) habitats. American Shore and Beach Protection Association. October 2020.
- Palinkas, C., **L. Staver**. Assessing the effectiveness and potential resiliency of living shorelines in mesohaline Chesapeake Bay. Restore America's Estuaries National Coastal and Estuarine Summit. September 2020.
- Palinkas, C., **L. Staver**. Long-term impacts of living shorelines to SAV habitats in Chesapeake Bay. Chesapeake Bay Trust Pooled Monitoring Forum. June 2020.
- Palinkas, C., **L. Staver**. Sediment-vegetation feedbacks in the created marshes of living shorelines. Chesapeake Community Research Symposium. June 2020.
- Palinkas, C., **L. Staver**. Integrating biogeomorphic feedbacks in the coastal zone to bolster coastal resiliency. European Geosciences Union. April 2020.
- Palinkas, C., **L. Staver**. Role of living shorelines in effective and sustainable coastal-management strategies. Social Coast Forum. February 2020.
- Osborn, Michelle and **L. W. Staver**. Poplar Island – challenges and successes of a large-scale restoration project in the Chesapeake Bay. Delaware Wetlands Conference, January 28-29, 2020, Wilmington, DE.
- Palinkas, C., **L. Staver**, C. Gurbisz, M. Bolton*. Comparing ecosystem services provided by submersed aquatic vegetation (SAV) beds and created tidal marshes. Biennial Meeting of the Coastal and Estuarine Research Federation. November 2019.
- Staver, L. W.**, J. C. Stevenson, J. C. Cornwell, N. Nidzieko and M. S. Owens. The influence of high nutrient availability on the carbon balance in restored marshes: an example from Poplar Island, Maryland in Chesapeake Bay. Coastal and Estuarine Research Federation, November 3-7, 2019, Mobile, AL.
- Staver, L. W.** Striking a balance between competing goals in tidal marsh restoration: habitat value versus resilience to sea-level rise. Coastal and Estuarine Research Federation, Workshop: Concepts and Controversies in Tidal Marsh Ecology, November 2-3, 2019, Dauphin Island, AL.
- Staver, L.W.**, J. C. Stevenson, J. Cornwell, M. Owens. Including Ecology in Ecological Restoration: Design Considerations for Tidal Marsh Restoration with Fine-Grained Dredged Material. Society of Wetland Scientists, May 28-31, 2019, Baltimore, MD.
- Cornwell, J. C., M. S. Owens, **L. W. Staver**, J. C. Stevenson. Wetland Soils Derived From Estuarine Sediments: Geochemical Observations. Society of Wetland Scientists, May 28-31, 2019, Baltimore, MD.
- Palinkas, C., **L. Staver**. Quantitative assessment of living shoreline effectiveness and impacts to adjacent habitats over the last decade. Marsh Resilience Summit. February 2019.
- Staver, Lorie**, J. C. Stevenson, J. Cornwell, M. Owens, and N. Nidzieko. The Influence of High Nutrient Availability on the Carbon Balance in Restored Marshes: An Example from Poplar Island, MD in Chesapeake Bay. American Geophysical Union, December 2018, Washington, D.C.
- Nardin, W., Y. Taddia, C. Corbau, G. Franchi, G. Silsbe and **L. Staver**. UAVs to assess channels' shape evolution in a restored salt marsh. American Geophysical Union, December 2018, Washington, D.C.

- Palinkas, C. M. and **L. Staver**. Promoting living shorelines for shoreline protection: understanding potential impacts to and ecosystem trade-offs with adjacent submersed aquatic vegetation (SAV). American Geophysical Union, December 2018, Washington, D.C.
- Staver, Lorie**, J. C. Stevenson, P. Hensel and N. Nidzieko. Tidal marsh restoration in the mid-Atlantic: designing for resilience to accelerating sea-level rise. Coastal and Estuarine Research Federation November 2017, Providence, RI.
- J. C. Stevenson, **L. Staver**, M. Kearney. Geomorphic and ecological factors and survival of tidal wetlands: the necessity of determining inflection points. Coastal and Estuarine Research Federation November 2017, Providence, RI.
- J. C. Stevenson, **L. Staver**. Optimizing resilience in tidal marshes created with fine-grained dredged material in upper Chesapeake Bay. Restore America's Estuaries, December 2016, New Orleans, LA.
- Staver, L. W.**, J. C. Stevenson, J. C. Cornwell, M. S. Owens and P. Hensel. Destabilizing effects of nitrogen in created tidal marshes in upper Chesapeake Bay. Coastal and Estuarine Research Federation, November 2015, Portland, OR.
- Staver, L. W.**, J. C. Stevenson, J.C. Cornwell, M. Owens and P. Hensel. Sustainability in the created marshes at Poplar Island restoration project in mid-Chesapeake Bay National Conference on Ecosystem Restoration, July 2013, Chicago, IL.
- Staver, L. W.**, J. C. Stevenson, J. C. Cornwell, M. Owens, and P. Hensel. Organic deposition and sediment accretion in the nutrient rich tidal marshes at Poplar Island, MD. Coastal and Estuarine Research Federation, November 2013, San Diego, CA.
- Stevenson, J. C., **L. W. Staver**, J. C. Cornwell, M. Owens, and P. Hensel. Can we build tidal marshes in estuaries to keep abreast of sea-level rise? Coastal and Estuarine Research Federation, November 2013, San Diego, CA.

Mentorship

Graduate Students

Ben Malmgren (MS); co-advisor; graduation 12/24

Julia Charest (MS); expected graduation 08/25

Erika Koontz (MS); co-advisor

Amanda Schwark (PhD); co-advisor

Graduate Committees

Anji Cooper (MS)

Julia Smeltzer (CBL)

Peer Reviews

Biogeochemistry

Ecological engineering

Estuaries and Coasts

Remote Sensing

Wetlands

Advisory Groups

Poplar Island Restoration Project (Adaptive Management Team, Upland Development Team, Working Group, Habitat Subgroup)
Bay Enhancement Working Group (Maryland Port Administration, MPA); Confined Aquatic Disposal (CAD) Technical Advisory Committee (MPA)
Maryland Coastal Bays Science and Technical Advisory Committee (STAC, EPA Chesapeake Bay Program)
Chesapeake Bay Program Wetlands Workgroup (EPA)
Marshes for Tomorrow Core Analysis Team (Maryland Audubon)
New Jersey Beneficial Use Learning Network Advisory Board (NJ TNC)
Salt Marsh Restoration Team (USFWS), advisory team

Statistics

Publons: <https://www.webofscience.com/wos/author/record/AAV-5350-2021>

Current and Pending Grants

Current Support

Title: Expanding the application of drone technology to tidal marsh monitoring

Objectives: Explore the use of drones to measure vegetation cover and elevation in newly installed living shorelines

Percent per year effort: 8.3% (1 mo/y)

Amount of support to Staver: \$50,335

Name and address of funding source: Grayce B. Kerr Fund; 117 Bay St STE 2A, Easton, MD 21601

Period of performance: 1 January 2023 – 31 May 2025

Title: Towards predicting the sustainability of living shorelines as a coastal resilience strategy

Objectives: Evaluate sediment and vegetation characteristics in living shorelines with field and remotely sensed data

Percent per year effort: 8.3% (1 mo/y)

Amount of support to Staver: \$28,257

Name and address of funding source: Maryland Sea Grant; 5825 University Research Ct Suite 1350, College Park, MD 20740

Period of performance: 1 February 2024 – 31 March 2026

Title: Interactions and impacts between submerged aquatic vegetation and floating shellfish aquaculture at Choptank Oyster Co. Maryland Department of Natural Resources

Objectives: Assess potential impacts to adjacent SAV associated with floating shellfish aquaculture

Percent per year effort: 4.2% (0.5 mo/y)

Amount of support to Staver: \$8,581

Name and address of funding source: Maryland Department of Natural Resources; 580 Taylor Ave., Annapolis, MD 21401

Period of performance: 1 January 2023 – 31 December 2025

Title: Resiliency through Restoration site monitoring and adaptive management

Objectives: Monitor sediment and vegetation characteristics at 4 living shoreline sites and

provide guidance on data analysis to support adaptive management
Percent per year effort: 8.3% (1 mo/y)
Amount of support to Staver: \$20,364
Name and address of funding source: Maryland Department of Natural Resources; 580 Taylor Ave., Annapolis, MD 21401
Period of performance: 1 January 2023 – 31 March 2025

Title: Making Cambridge resilient flood mitigation project: Phase I – Design and Permitting
Objectives: Conduct pre-installation field surveys and provide guidance on living shoreline design

Percent per year effort: 4.2% (0.5 mo/y)
Amount of support to Palinkas: \$22,111
Name and address of funding source: Maryland Emergency Management Agency through the City of Cambridge; 410 Academy Street, Cambridge, MD 21613
Period of performance: 1 September 2023 – 31 August 2026

Title: A model approach to ecological and community resilience in Oxford, Maryland.
Objectives: Conduct post-installation field surveys at a newly installed living shoreline in Oxford
Percent per year effort: 5.0% (0.6 mo/y)
Amount of support to Staver: \$22,111
Name and address of funding source: National Wildlife Federation through the City of Oxford; 101 Market Street, Oxford MD 21654-0339
Period of performance: 1 May 2024 – 31 December 2025

Title: Poplar Island Wetlands Monitoring Program: 2024-2025 Studies to Address Sustainability in the Poplar Island Marshes
Objectives: Monitoring, targeted studies and advising for Poplar Island habitat restoration project
Percent per year effort: 25% (3 mo/y)
Amount of support to Staver: \$189,940
Name and address of funding source: Maryland Environmental Service; 259 Najoles Road Millersville, MD 21108
Period of performance: 1 July 2024 – 31 December 2025

Title: Assessing the Carbon Sequestration Capacity of the Poplar Island Wetlands
Objectives: Estimate carbon sequestration rates for the restored marshes at Poplar Island using existing data, new data collection and the Blue Carbon Manual protocol
Percent per year effort: 6.25% (0.75 mo/y)
Amount of support to Staver: \$179,986
Name and address of funding source: Maryland Environmental Service; 259 Najoles Road Millersville, MD 21108
Period of performance: 1 June 2024 – 31 December 2026

Title: UMCES Support of Mid-Bay Restoration Project Planning: 2024 – 2026
Objectives: Advising, document review, meeting attendance for planning of Mid-Bay Habitat Restoration Project
Percent per year effort: 8% (1.0 mo/y)

Amount of support to Staver: \$36,426

*Name and address of funding source: Maryland Environmental Service; 259 Najoles Road
Millersville, MD 21108*

Period of performance: 1 June 2024 – 31 December 2026

*Title: Inventory of rare plants in Piscataway Park to inform collaborative management of park
vegetation resources*

*Objectives: Conduct field surveys for rare plants in Piscataway National Park; map observations;
provide conservation recommendations for each species of rare plant observed.*

Percent per year effort: 7.5% (0.69 mo/y)

Amount of support to Staver: \$127,063

Name and address of funding source: National Park Service, National Capital Parks - East

Period of performance: 1 September 2023 – 31 August 2028

*Title: Testing the Efficacy of a Marsh Soil Microbial Index as an Early Warning Indicator of
Inundation Stress*

*Objectives: Collect vegetation data in Maryland coastal wetlands, advise and assist on study of
soil microbial community sampling.*

Percent per year effort: 2.1% (0.25 mo)

Amount of support to Staver: \$6,478

*Name and address of funding source: Maryland Coastal Bays Program; 8219 Stephen Decatur
Highway Berlin, MD 21811*

Period of performance: 1 July 2023 - 30 April 2025 (w/ NCE)

Pending

Title: Applied Field Research on Ecological Functions at Living Shoreline Installations

*Objectives: Synthesizing data from previous work within and adjacent to living shorelines and
nearby natural shorelines to develop broadly applicable metrics.*

Percent per year effort: 4.2% (0.5 mo)

Amount of support to Staver: \$64,554

Name and address of funding source: USACE

Period of performance: June 2025 – May 2028