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I. Education

Oregon State University	Ph.D. Fisheries Science	2009-2016
Drexel University	M.Sc. Environmental Science	2007-2009
Wagner College	B.Sc. Biology	2001-2005

II. Professional Background

University of Maryland	Assistant Professor	2017-Present
University of Maine	Postdoctoral Research Associate	2016-2017
Oregon State University	Graduate Research Assistant	2009-2016
Drexel University	Graduate Research Assistant	2007-2009
G&C Environmental Services	Environmental Consultant	2006-2008
Rutgers University	Research Technician	2005-2006

III. Research

A. Areas of Expertise

Ecological physiology of bivalves, restoration, habitat evaluation, aquaculture production, bivalve ecosystem services, and ocean acidification.

B. Peer-Reviewed Journal Publications

M.W. Gray and C. Langdon (2018). *Ecophysiology of the Olympia Oyster, Ostrea lurida, and Pacific Oyster, Crassostrea gigas*. Estuaries and Coasts, 41: 521-535

M.W. Gray, C.J. Langdon, G. G. Waldbusser, B. Hales, and S. Kramer (2017). *Mechanistic understanding of ocean acidification impacts on larval feeding physiology and energy budgets of the mussel M. californianus*. Marine Ecology Progress Series, 563: 1-94.
DOI:10.3354/meps11977

G.G. Waldbusser, **M.W. Gray**, B. Hales, C.J. Langdon, B.A. Haley, P. Schrader, E.L. Brunner, C.A. Miller, I. Gimenez, and G. Hutchinson. (2016). *Slow shell building, a trait for resistance to acute ocean acidification impacts*. Limnology and Oceanography, 61(6): 1969-1983.
DOI: 10.1002/lno.10348.

M.W. Gray, S. Kramer, and C.J. Langdon (2015). *Particle processing and gut kinematics of planktotrophic bivalve larvae*. Marine Biology, 162(11):2187-2201. DOI:10.1007/s00227-015-2746-1.

G.G. Waldbusser, B. Hales, C.J. Langdon, B.A. Haley, P. Schrader, E.L. Brunner, **M.W. Gray**, C.A. Miller, I. Gimenez, G. Hutchinson (2015). *Ocean acidification has multiple modes of action on bivalve larvae*. PlosOne, 10(6) DOI: 10.1371/journal.pone.0128376

G. G. Waldbusser, B. Hales, C. J. Langdon, B.A. Haley, P. Schrader, E. L. Brunner, **M. W. Gray**, C. A. Miller, I. Gimenez (2015). *Saturation-state sensitivity of marine bivalve larvae to ocean acidification*. Nature Climate Change, 5:273-280. DOI:10.1038/nclimate2479

M. W. Gray and Danielle Kreeger (2014). *Monitoring fitness of caged mussels (*Elliptio complanata*) to assess and prioritize streams for restoration*. Aquatic Conservation Marine and Freshwater Ecosystems, 24(2):218-230. DOI:10.1002/aqc.2395

P. S. E. zu Ermgassen, **M. W. Gray**, C. J. Langdon, M. D. Spalding, R. D. Brumbaugh (2013). *Quantifying the historic contribution of *Olympia* oysters to filtration in Pacific Coast (USA) estuaries and the implications for restoration objectives*. Aquatic Ecology, 47(2): 149-161. DOI:10.1007/s10452-013-9431-6.

J. Burger, M. Gochfeld, C. Jeitner, **M. Gray**, T. Shukla, S. Shukla, S. Burke (2007). *Kelp as a bioindicator: Does it matter which part of 5 m long plant is used for metal analysis?* Environmental Monitoring and Assessment, 128(1-3):311-21. DOI:10.1007/s10661-006-9314-6

C. Manuscripts in Prep

M. W. Gray, P.E. zu Ermgassen, J. Gair, E. Lemagie, J. Lerczak, and C. J. Langdon. *Predicted filtration services of historic and restored populations of native *Olympia* oysters (*Ostrea lurida*) and non-native Pacific (*Crassostrea gigas*) oysters*. Estuaries and Coasts. In revision.

M.W. Gray, O. Chaparro, S. P. O'Neil, D. Brady. *Brood chambers may prepare young for tomorrow's acidic oceans and estuaries*. Journal of Shellfish Research. Accepted.

M.W. Gray and C. Langdon. *Particle processing by *Olympia* oysters (*Ostrea lurida*) and Pacific oysters (*Crassostrea gigas*)*. Submitted.

M.W. Gray, D. Brady, A. Ecker, J. Snyder. *Site selection and production estimates for Eastern oyster *Crassostrea virginica* aquaculture throughout Maine U.S.A.* In preparation.

M.W. Gray, D. C. Brady, J. Testa, K. Copeland, L. Mayer. *Changes in estuarine carbonate carrying capacity amid shellfish aquaculture expansion and ocean acidification*. In preparation.

D. Technical reports

Brady, D.C., J.V. DePinto, S. C. Chapra, D.M. Di Toro, M. A. M. Friedrich, **M.W. Gray**, T. Jordan, M. Xia. (2017). Scientific and Technical Advisory Committee: Chesapeake Bay Water Quality and Sediment Transport Model (WQSTM) Review.

E. Presentations

M.W. Gray, P. zu Ermgassen, J. Gair, C.J. Langdon, E. Lemagie, J. Lerczak. *Spatially explicit estimates of *Olympia* (*OSTREA LURIDA*) filtration services: a model-based approach for augmenting ecosystem services and reducing resource use during restoration*. National Shellfish Association, Seattle WA; 3/2018.

M.W. Gray. *Brooding: a life-history trait that is preparing young for ocean acidification?* Virginia Institute of Marine Biology. Gloucester Point, VA; 10/2017

M. W. Gray, D. C. Brady. *Remote sensing and in situ monitoring to enhance shellfish production and identify new habitats in Maine*. National Shellfish Association, Knoxville, Tennessee; 03/2017

M. W. Gray, P. zu Ermgassen, E. Lemagie, J. Lerczak, C. Langdon, J. Gair. *Filtration services of the native *Olympia* oyster (*Ostrea lurida*) and the introduced Pacific oyster (*Crassostrea gigas*): Improved resolution of ecosystem services from physiological and oceanographic studies*. Pacific Coast Shellfish Growers Association, Hood River; 09/2015

- M. W. Gray, C. Langdon. *Feeding physiology of the native Olympia oyster (Ostrea lurida) and the introduced Pacific oyster (Crassostrea gigas): Implications for ecosystem services and restoration from laboratory and in situ studies*. National Shellfisheries Association, Monterey, California; 03/2015
- M. W. Gray, S. Kramer, C. Langdon. *A novel dual bead technique for evaluating the feeding physiology and behavior of bivalve larvae*. National Shellfish Association, Monterey, California; 03/2015
- M. W. Gray, S. Kramer, C. J. Langdon. *A novel technique for determining ingestion rates, gut passage time, and gut mechanics of bivalve larvae*. Pacific Coast Shellfish Growers Association, Vancouver, Washington; 09/2014
- M. W. Gray, C.J. Langdon, G.G. Waldbusser, B. Hales, B. Haley, P.S. Schrader. *A novel technique for determining the impact of ocean acidification on the feeding physiology of bivalve*. Coastal and Estuarine Research Federation, San Diego, California; 11/2013
- M. W. Gray, C.J. Langdon, G.G. Waldbusser, B. Hales, B. Haley, P.S. Schrader. *A novel technique for determining the impact of ocean acidification on the feeding physiology of bivalve larvae*. Pacific Coast Shellfish Growers Association, Bend, Oregon; 09/2013
- M. W. Gray, C. Langdon. *The feeding physiology of Olympia oysters (Ostrea lurida)*. National Shellfisheries Association, Seattle, Washington; 04/2012
- M. W. Gray, Chris J. Langdon. *Feeding physiology of Olympia oysters (Ostrea lurida)*. Pacific Coast Shellfish Growers Association, Salem, Oregon; 10/2011
- M. W. Gray, R. Vander Schaaf, J. Johnson, S. Groth, C. Langdon. *The feeding physiology of the native Olympia oyster (Ostrea lurida)*. Pacific Coast Shellfish Growers Association, Tacoma, Washington; 10/2010
- M. W. Gray. *Fiddler crabs as bioindicators of recovery from an oil spill in Staten Island salt marshes*. Metropolitan Association of College and University Biologists, Brooklyn, NY; 11/2004

F. Grants

- Deerbrook Charitable Trust: *The unintended effects of oyster restoration – hatchery-induced genetic changes to larval behavior and feeding*, 2017 (\$195,263). Co-PI
- Oregon Society of Conchologists Scholarship for Mollusk Research: *Native oyster ecophysiology, 2013-2015* (total sum: \$2,000)
- Mamie Markham Graduate Research Award 2013 & 2015 (total sum: \$20,000)
- National Estuarine Research Reserve System (NOAA) Graduate Research Fellowship 2010-2014 (\$85,926)
- Partnership for The Delaware Estuary Science Fellowship: *Freshwater mussel restoration in Southeastern Pennsylvania 2007-2009*.

G. Awards

- Outstanding Reviewer Journal of Experimental Marine Biology and Ecology 2018

H. Professional Participation:

- Active Professional Society Membership
National Shellfish Association

Coastal and Estuarine Research Federation
Association for the Science of Limnology and Oceanography

Journal Referee

Marine Ecology Progress Series (2), Journal of Experimental Marine Biology and Ecology (2),
Journal of Marine Biology, Journal of Fish Diseases, PeerJ, Science of The Total Environment,
Elementa, Hydrobiologia, Ecological Modelling.

IV. Outreach and Service

A. Current Committee Involvement:

Maryland Department of Natural Resources, Oyster Advisory Commission Member, 2018-
Present

Lead reviewer, 2017. Oyster module- *effect of oyster sanctuaries, aquaculture, and fisheries on the
water quality of Chesapeake Bay*. Chesapeake Bay Program: Scientific and Technical Advisory
Committee (STAC).

Maryland Sea Grant Steering Committee on Aquaculture Research in Maryland, 2017.

B. Press

Amy Liu. Rough Season Ends for Watermen Oystering in Maryland WBOC 3/30/18

Alex Mann. *State slashes oyster restoration acreage goal*. The Washington post 11/2017

V. Teaching and Training:

Instructor: Estuarine Oceanography. University of Maine, Darling Marine Center Walpole ME
2016.

Guest Lecturer, Oyster restoration and ecosystem services. Aquaculture, Oregon State University,
Newport OR 2015.

Guest Lecturer, Oyster aquaculture and restoration. Coastal Ecology and Resource Management,
Oregon State University, Newport 2014.

Guest Lecturer Bivalve reproduction and larval nutrition. Oregon Coast Community College,
Newport OR 2013

Guest Lecturer, Oyster feeding physiology and larval nutrition Oregon Coast Community College,
Newport OR 2012

VI. Advising and Mentoring:

Graduate Mentoring at UMCES

Brendan Campbell, UMCES 2018-

Undergraduate Research Mentoring

Victoria Williams, University of Richmond, Maryland Sea Grant Research for Undergraduates
2018

Alwyn Ecker, Wheaton College, University of Maine Undergraduate Internship, 2017

Tania Couture, McGill University, University of Maine Undergraduate Internship, 2017

Andrew Moreira, Mt. Allison University, University of Maine Undergraduate Internship,
2016

Avery Andrus, University Grand Valley State University, Oregon State University Research
Experience for Undergraduate- NSF 2013

Ashley Bulesco, University of Hawaii, Oregon State University Research Experience for
Undergraduate- NSF 2011

Ed Phillips, Undergraduate Senior Research Project, Oregon State University, 2010