Matthew W. Gray, Ph.D.

University of Maryland Center for Environmental Science
Horn Point Laboratory, 2020 Horns Point Rd. Cambridge, MD 21613
Office phone: 410-221-8348; cell (215)-595-6404; email: mgray@umces.edu

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, 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. *Accepted.*

O.R. Chaparro, D.A. Mardones-Toledo DA, **M.W. Gray**, V.M. Cubillos VM, J.M. Navarro, L.P. Salas-Yanquin. *Female-embryo relationships in Ostrea chilensis: brooding, embryo recognition, and larval hatching*. Marine Biology. Accepted

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)*. Estuaries and Coasts. Accepted.

O. R. Chaparro, L. P. Salas-Yanquin, A. S. Matos, J. A. Bűchner-Miranda, **M. W. Gray**, V. M. Cubillos, J. A. Pechenik (2018). *Pre-hatching development in the intertidal zone negatively affects juvenile survival and physiology in the muricid gastropod Acanthina monodon*. Marine Biology 165:155. Doi: 10.1007/s00227-018-3412-1

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, 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, 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

I. Vona, **M.W. Gray**, W. Nardin. *Breakwaters impact on sediment supply for salt marsh*. Chesapeake Bay Sentinel Site Cooperative's Marsh Resilience Summit. Williamsburg, VA 2/2019

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, C. 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 and Fellowships

Maryland Industrial Partnerships: Oyster Master ($262,900; Lead Principle Investigator, 0.5 mo/yr) 2019-2020

Dominion Energy Charitable Foundation: Greening the Gray: Adding oysters to shoreline barriers to reduce shoreline erosion, improve water quality and the natural ecosystem ($12,000; Lead Principle Investigator, 0.25 mo/y) 2019-2021

Radcliff Foundation: Shellfish Aquaculture Innovation Laboratory: Using Science and New Technologies to Assist Shellfish Aquaculture Businesses in Maryland ($391,100; Co-Principle Investigator, 2 mo/y) 2019-2022

Palmer Foundation: Water Quality Benefits of Oyster Castles 2019-2021 ($42,512; Lead Principle Investigator, 0.42 mo/y)

Deerbrook Charitable Trust: *The unintended effects of oyster restoration – hatchery-induced genetic changes to larval behavior and feeding*, 2017- 2019 ($195,263; Co-Principle Investigator, 1 mo/y)

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; 12 mo/y)

Partnership for The Delaware Estuary Science Fellowship: *Freshwater mussel restoration in Southeastern Pennsylvania* 2007-2009 (12 mo/y).

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

Nature, 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 Biologist for ShoreRivers Spat Collection Outreach Program 2017-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

Jack Guy. *New York diner chomps on an oyster, finds pearl.* CNN (12/18/18).

Kirsten Fleming. Diner at Grand Central oyster bay finds pea-sized pearl in his lunch. The New York Post (12/15/18).

Dave Wheelan. *The oyster dudes of Horn Point Lab: A chat with Drs. Matt Gray and Louis Plough*. The Talbot Spy (10/16/18).

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: Scientific Writing and Communication MEES 608D, UMCES-HPL, MD 2018

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. Costal 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