

# Research Digest



Issue No. 3 (April - June 2022)

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## Cover photo credit

Photo by: Kevin Weng

Caption: A juvenile white shark swims in an ocean pen set up by the Monterey Bay Aquarium to allow observation and safe captivity of the species.

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## Message from the Associate Dean of Research and Advisory Services

In addition to peer reviewed publications, this issue of the VIMS Research Digest includes, and subsequent issues will also include, annual survey reports, white papers, and technical reports authored by VIMS researchers or co-authored by VIMS and W&M graduate students. The inclusion of “gray literature”, like the inclusion of peer reviewed publications, is intended to inform external VIMS partners of relevant and timely research that informs advisory services, support and inform conservation and restoration activities in marine systems and contribute to the body of knowledge in the field of marine science.

Annual survey reports, white papers, and technical reports authored by VIMS researchers can be found in William & Mary (W&M) ScholarWorks. W&M ScholarWorks is an open-access repository and online publishing platform administered by W&M Libraries. It provides global access to the work of W&M faculty, staff, and students. In addition to survey reports, white papers, and technical reports, the repository contains a wide range of materials including, but not limited to, unpublished scholarly work, final grant reports, data sets, and much more. Links to reports in ScholarWorks are provided throughout the VIMS Research Digest and access to the database is open and free of charge.

We hope the Research Digest continues to be a useful source of information and a conduit to the breadth of research conducted at VIMS.

Mark W. Luckenbach, Associate Dean



Office of Research & Advisory Services  
Virginia Institute of Marine Science  
William & Mary

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Title	Sediment and terrestrial organic carbon budgets for the offshore Ayeyarwady Delta, Myanmar: Establishing a baseline for future change.
Author(s)	<b>Flynn, E.R.*</b> , <b>Kuehl, S.A.</b> , <b>Harris, C.K.</b> , <b>Fair, M.J.*</b>
Journal	Marine Geology, 447, art. no. 106782 (2022)
Link	<a href="https://doi.org/10.1016/j.margeo.2022.106782">https://doi.org/10.1016/j.margeo.2022.106782</a>
Summary	This study uses stable- and radio-isotopes to derive sediment and terrestrial organic carbon budgets for the offshore Ayeyarwady Delta, Myanmar. The offshore delta is found to efficiently trap ~80% of the fluvial sediment load on the continental shelf. Terrestrial organic carbon fluxes are also high offshore despite substantial tidal mixing.

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Title	Joint effects of fragmentation and mercury contamination on marsh periwinkle ( <i>Littoraria irrorata</i> ) movement
Author(s)	<b>Krull, M.*</b> , <b>Newman, M.C.</b>
Journal	Environmental Toxicology and Chemistry, 41(7), pp. 1742-1753 (2022)
Link	<a href="https://doi.org/10.1002/etc.5351">https://doi.org/10.1002/etc.5351</a>
Summary	There are different ways contaminants can interact and enhance the effects of habitat fragmentation, such as modifying the movement of organisms. The present study tested the hypothesis that mercury exacerbates the effects of fragmentation by affecting the movement of the marsh periwinkle <i>Littoraria irrorata</i> and reducing the probability of snails crossing fragmented microlandscape experimental systems.

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Title	Multi-biomarker analysis for identifying organic matter sources in small mountainous river watersheds: a case study of the Yuba river watershed
Author(s)	<b>Pondell, C.R.</b> , <b>Canuel, E.A.</b>
Journal	San Francisco Estuary and Watershed Science, 20(1) 2022
Link	<a href="https://doi.org/10.15447/sfews.2022v20iss1art5">https://doi.org/10.15447/sfews.2022v20iss1art5</a>
Summary	In this paper, measurements of PAH fluxes preserved in a lake sediment archive from the Sierra Nevada, California were compared with a historical geographic information system (GIS) dataset of area burned up to 150 km distance from the lake to determine the spatial scales for which these biomarkers are reliable proxies of biomass burning.

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Title	Spatially calibrating polycyclic aromatic hydrocarbons (PAHs) as proxies of area burned by vegetation fires: Insights from comparisons of historical data and sedimentary PAH fluxes
Author(s)	Vachula, R.S., Karp, A.T., Denis, E.H., Balascio, N.L., <b>Canuel, E.A.</b> , Huang, Y.
Journal	Palaeogeography, Palaeoclimatology, Palaeoecology, 596, art. no. 110995 (2022)
Link	<a href="https://doi.org/10.1016/j.palaeo.2022.110995">https://doi.org/10.1016/j.palaeo.2022.110995</a>
Summary	Pyrogenic polycyclic aromatic hydrocarbons (PAHs) have been increasingly used as a molecular biomarker for fire occurrence in the paleorecord. In this paper, measurements of PAH fluxes preserved in a lake sediment archive from the Sierra Nevada, California were compared with a historical GIS dataset to determine at which spatial scales the biomarkers are reliable proxies of biomass burning.

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Title	Predator control of marine communities increases with temperature across 115 degrees of latitude
Author(s)	Ashton, G.V., Freestone, A.L., Duffy, J.E., Torchin, M.E., Sewall, B.J., Tracy, B., Albano, M., Altieri, A.H., Altvater, L., Bastida-Zavala, R., Bortolus, A., Brante, A., Bravo, V., Brown, N., Buschmann, A.H., Buskey, E., Barrera, R.C., Cheng, B., Collin, R., Coutinho, R., De Gracia, L., Dias, G.M., DiBacco, C., Flores, A.A.V., Haddad, M.A., Hoffman, Z., Erquiaga, B.I., Janiak, D., Campeán, A.J., Keith, I., Leclerc, J.-C., Lecompte-Pérez, O.P., Longo, G.O., Matthews-Cascon, H., McKenzie, C.H., Miller, J., Munizaga, M., Naval-Xavier, L.P., Navarrete, S.A., Otálora, C., Palomino-Alvarez, L.A., Palomo, M.G., <b>Patrick, C.</b> , Pegau, C., Pereda, S.V., Rocha, R.M., Rumbold, C., Sánchez, C., Sanjuan-Muñoz, A., Schlöder, C., Schwindt, E., Seemann, J., Shanks, A., Simoes, N., Skinner, L., Suárez-Mozo, N.Y., Thiel, M., Valdivia, N., Velez-Zuazo, X., Vieira, E.A., Vildoso, B., Wehrtmann, I.S., Whalen, M., Wilbur, L., Ruiz, G.M.
Journal	Science, 376 (6598), pp. 1215-1219 (2022)
Link	<a href="https://doi.org/10.1126/science.abc4916">https://doi.org/10.1126/science.abc4916</a>
Summary	We evaluated latitudinal patterns in predation strength on benthic marine communities along the Pacific and Atlantic coasts of the Americas. We found greater predation intensity and stronger impacts on benthic communities nearer the equator that were best explained by temperature, suggesting that climate warming may influence top-down control of communities.

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Title	Thermally insensitive physiological performance allows neonatal sharks to use coastal habitats as nursery areas
Author(s)	Bouyoucos, I.A., Simpfendorfer, C.A., Planes, S., <b>Schwieterman, G.D.</b> , Weideli, O.C., Rummer, J.L.
Journal	Marine Ecology Progress Series, 682, pp. 137-152 (2022)
Link	<a href="https://doi.org/10.3354/meps13941">https://doi.org/10.3354/meps13941</a>
Summary	Coastal sharks use nearshore habitats as nursery areas, but the physiological mechanisms that enable sharks to exploit these habitats remain understudied. We defined patterns of nursery area use and temperature-dependent physiological performance in two species. We found growth and metabolic performance were not strongly affected by temperature in either species.

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Title	Bifurcate responses of tidal range to sea-level rise in estuaries with marsh evolution
Author(s)	<b>Cai, X*</b> , <b>Qin, Q.</b> , <b>Shen, J.</b> , <b>Zhang, Y.J.</b>
Journal	Limnology and Oceanography Letters, 7(3): 210-217 (2022).
Link	<a href="https://doi.org/10.1002/lol2.10256">https://doi.org/10.1002/lol2.10256</a>
Summary	The response of tidal range in tidal marshes under sea-level rise (SLR) is essential to the marsh resilience, but how tidal ranges respond to different marsh evolutions remains unclear. We show the existence of bifurcate responses of tidal range to SLR using both numerical model and theoretical analyses.

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Title Measuring organization of large surficial clasts in heterogeneous gravel beach sediments

Author(s) Lees, D.C., **Hein, C.J.**, Fitzgerald, D.M.

Journal Journal of Marine Science and Engineering, 10 (4), art. no. 525 (2022)

Link <https://doi.org/10.3390/jmse10040525>

Summary The 1989 Exxon Valdez Oil Spill devastated Prince William Sound, Alaska. We returned 30 years later to test the long-term impacts of associated cleanup activities on beach sedimentology and ecology. To do so, we developed a novel photogrammetric and sedimentological approach to quantifying clast “organization” on gravel beaches.

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Title Controls on sediment bed erodibility in a muddy, partially-mixed tidal estuary

Author(s) **Wright, C.L.\***, Friedrichs, C.T., Massey, G.M.

Journal Frontiers in Earth Science, 10, art. no. 805130 (2022)

Link <https://doi.org/10.3389/feart.2022.805130>

Summary High sediment bed erodibility can lead to a number of ecological and societal complications within an estuarine or coastal system. A 15-year data set of sediment cores and hydrodynamic information was utilized to create statistical models to predict the erodibility of the sediment bed of the York River estuary.

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Title	Estimation of juvenile striped bass relative abundance in the Virginia portion of Chesapeake Bay annual progress report: 2021 - 2022.
Author(s)	<b>Buchanan, J. R., Fabrizio, M. C., and Tuckey, T. D.</b>
Database	ScholarWorks, Virginia Institute of Marine Science, William & Mary (2022)
Link	<a href="https://doi.org/10.25773/eh6f-ps45">https://doi.org/10.25773/eh6f-ps45</a>
Summary	The Juvenile Striped Bass Seine Survey estimates the abundance of juvenile striped bass and other juvenile fishes in the Rappahannock, York and James river systems. Abundance data is compared to historical averages and discussed in relation to environmental conditions (temperature, salinity, dissolved oxygen and freshwater discharge) within each river system.

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Title	Evaluating a possible new paradigm for recruitment dynamics: predicting poor recruitment for striped bass ( <i>Morone saxatilis</i> ) from an environmental variable
Author(s)	<b>Gross, J.M.*</b> , Sadler, P., <b>Hoenig, J.M.</b>
Journal	Fisheries Research, 252, art. no. 106329 (2022)
Link	<a href="https://doi.org/10.1016/j.fishres.2022.106329">https://doi.org/10.1016/j.fishres.2022.106329</a>
Summary	Recruitment prediction, or forecasting, is an important component for setting fishery catch limits. We propose a new approach, called the “poor-recruitment paradigm”, for predicting recruitment using environmental variables. This approach hypothesizes that it is easier to predict poor recruitment rather than good recruitment because an environmental variable affects recruitment only when its value is extreme (lethal); otherwise, the variable may be benign and not influence recruitment.

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Title	Population dynamics of <i>Arctica islandica</i> at Georges Bank (USA): An analysis of sex-based demographics
Author(s)	Hemeon, K.M., Powell, E.N., Pace, S.M., Redmond, T.E., <b>Mann, R.</b>
Journal	Journal of the Marine Biological Association of the United Kingdom, 101(7) pp. 1003-1018 (2022)
Link	<a href="https://doi.org/10.1017/S0025315422000030">https://doi.org/10.1017/S0025315422000030</a>
Summary	The rare case of dimorphism in growth rate in a very long lived bivalve mollusc – females grow faster than males but exhibit the same age demographics.

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Title	Monitoring the abundance of American shad and river herring in Virginia’s rivers 2021 annual report
Author(s)	<b>Hilton, E. J., McGrath, P. E., Watkins, B., and Magee, A.</b>
Database	ScholarWorks, Virginia Institute of Marine Science, William & Mary (2022)
Link	<a href="https://doi.org/10.25773/hn6j-2821">https://doi.org/10.25773/hn6j-2821</a>
Summary	This report describes the results of the twenty-fourth year of a continuing study to estimate the relative abundance and assess the status of American shad ( <i>Alosa sapidissima</i> ) stocks in Virginia by monitoring the spawning runs in the James, York and Rappahannock rivers in spring 2021, evaluating hatchery programs, and contributing to coast-wide assessments (ASMFC 2007, ASMFC 2020).

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Title	Evaluation of striped bass stocks in Virginia: Monitoring and Tagging Studies, 2021 Progress Report - 1 December 2020 - 30 November 2021.
Author(s)	<b>Latour, R. J., Bonzek, C. F., and Gartland, J.*</b>
Database	ScholarWorks, Virginia Institute of Marine Science, William & Mary (2022)
Link	<a href="https://doi.org/10.25773/3bp3-vw78">https://doi.org/10.25773/3bp3-vw78</a>
Summary	This report presents the results of striped bass ( <i>Morone saxatilis</i> ) tagging and monitoring activities in Virginia during the period 1 December 2020 through 30 November 2021. It includes an assessment of the biological characteristics of striped bass taken from the 2021 spring spawning run and estimates of annual survival and fishing mortality based on annual spring tagging.

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Title	Ontogenetic niche structure and partitioning of immature sandbar sharks within the Chesapeake Bay nursery
Author(s)	<b>Latour, R.J., Gartland, J.*, Peterson, C.D.*</b>
Journal	Marine Biology, 169(6), art. no. 76. (2022)
Link	<a href="https://doi.org/10.1007/s00227-022-04066-3">https://doi.org/10.1007/s00227-022-04066-3</a>
Summary	This paper describes development of ecological niche models for small (< 71 cm) and larger (≥ 71 cm) immature sandbar sharks inhabiting the lower Chesapeake Bay and results showed appreciable differences in the ranges of temperature, salinity, DO, and depth utilized by the two size-classes as well as low annual niche equivalency.

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Title	Virginia Game Fish Tagging Program annual report 2021
Author(s)	<b>Musick, S., Gillingham, L.</b>
Database	VIMS Marine Resource Report No. 2022-3. ScholarWorks, Virginia Institute of Marine Science, William & Mary (2022).
Link	<a href="https://doi.org/10.25773/baf5-fs21">https://doi.org/10.25773/baf5-fs21</a>
Summary	The 2021 Virginia Game Fish Tagging Program Annual report summarizes the tagging and recapture data reported by anglers for 2021. Overall life history and habitat utilization data are given in addition to target species summaries for black drum, black sea bass, cobia, summer flounder, red drum, sheephead, spadefish, speckled trout, tautog and grey triggerfish.

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Title	Rangewide population structure of the clearnose skate
Author(s)	<b>Nelson, L.N.*</b> , Jones, C.M., <b>McDowell, J.R.</b>
Journal	Transactions of the American Fisheries Society, 151(3):356–372, tafs.10351 (2022)
Link	<a href="https://doi.org/10.1002/tafs.10351">https://doi.org/10.1002/tafs.10351</a>
Summary	Skates (family Rajidae) are benthic elasmobranchs that are highly vulnerable to incidental fishery bycatch, are discarded at sea, and are poorly accounted for in catch records. This study used molecular techniques to assess the population structure of Clearnose Skate for use as a biological reference point for further research and management. The results from this investigation can be used to better monitor and manage this vulnerable elasmobranch.

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Title	A biologging database of juvenile white sharks from the northeast Pacific
Author(s)	O'Sullivan, J., Lowe, C.G., Sosa-Nishizaki, O., Jorgensen, S.J., Anderson, J.M., Farrugia, T.J., García-Rodríguez, E., Lyons, K., McKinzie, M.K., Oñate-González, E.C., <b>Weng, K.</b> , White, C.F., Winkler, C., Van Houtan, K.S.
Journal	Scientific Data, 9(1), art. no. 142 (2022)
Link	<a href="https://doi.org/10.1038/s41597-022-01235-3">https://doi.org/10.1038/s41597-022-01235-3</a>
Summary	In some fields, data are uploaded to public servers (e.g., climate and oceanography data). In other fields data are proprietary, held by individual researchers or groups in perpetuity. The Monterey Bay Aquarium's juvenile white shark research program opted for a public data model by providing its entire dataset to the public via the Animal Telemetry Network.

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Title	Estimating relative abundance of young-of-year American eel, <i>Anguilla rostrata</i> , in the Virginia tributaries of Chesapeake Bay (Spring 2021)
Author(s)	<b>Tuckey, T. D., and Fabrizio, M. C.</b>
Database	ScholarWorks, Virginia Institute of Marine Science, William & Mary (2022)
Link	<a href="https://doi.org/10.25773/fhba-4k64">https://doi.org/10.25773/fhba-4k64</a>
Summary	An American eel benchmark stock assessment found that the American eel stock status is depleted and emphasized the importance of a coastwide survey. This report summarizes the results of the 2021 sampling effort focused on the recruitment of juvenile, glass-stage American eel in Virginia.

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(VIMS authors in **bold**, asterisk indicates VIMS student)

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Title	Spatiotemporal modeling of nursery habitat using Bayesian inference: Environmental drivers of juvenile blue crab abundance
Author(s)	<b>Hyman, A.C.*</b> , <b>Chiu, G.S.</b> , <b>Fabrizio, M.C.</b> , <b>Lipcius, R.N.</b>
Journal	Frontiers in Marine Science, 9, art. no. 834990 (2022)
Link	<a href="https://doi.org/10.3389/fmars.2022.834990">https://doi.org/10.3389/fmars.2022.834990</a>
Summary	Using GIS and field survey data, authors used Bayesian modeling to infer nursery habitat value for juvenile blue crabs within the Chesapeake Bay. Salt marshes, turbidity, and their interaction showed positive associations with abundance. Salt marshes should be considered a nursery habitat for blue crabs, even amidst extensive seagrass beds.

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Title	Are Amphipods <i>Orchestia grillus</i> (Bosc, 1802) (Amphipoda: Talitridae) infected with the trematode <i>Levinseniella byrdi</i> (Heard, 1968) drawn to the light?
Author(s)	<b>Johnson, D.S.</b>
Journal	Journal of Crustacean Biology, 42(2), art. no. ruac017 (2022)
Link	<a href="https://doi.org/10.1093/jcobiol/ruac017">https://doi.org/10.1093/jcobiol/ruac017</a>
Summary	Parasites can markedly change their host's behavior. When the saltmarsh amphipod <i>Orchestia grillus</i> (Bosc, 1802) is infected with the trematode <i>Levinseniella byrdi</i> (Heard, 1968) it is bright orange and is found in the open. I tested the hypothesis that infected amphipods are found in the open because <i>L. byrdi</i> reverses their innate photophobia. Results indicated that <i>O. grillus</i> is normally photophobic, but not drawn to light when infected with <i>L. byrdi</i> . Instead, <i>L. byrdi</i> appears to neutralize the amphipod's photophobia.

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Title	Non-native red alga <i>Gracilaria vermiculophylla</i> compensates for seagrass loss as blue crab nursery habitat in the emerging Chesapeake Bay ecosystem
Author(s)	Wood, M.A., <b>Lipcius, R.N.</b>
Journal	PLoS ONE, 17(5), art. no. e0267880 (2022)
Link	<a href="https://doi.org/10.1371/journal.pone.0267880">https://doi.org/10.1371/journal.pone.0267880</a>
Summary	At present, the non-native red macroalga <i>Gracilaria vermiculophylla</i> has no widespread negative impacts on seagrass in the York River or most regions of Chesapeake Bay. We posit that <i>Gracilaria</i> has become an important alternative nursery habitat for the blue crab in Chesapeake Bay and can potentially mitigate impacts of climate change on seagrass nursery habitats.

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Title	Pattern formation in marsh ecosystems modeled through the interaction of marsh vegetation, mussels, and sediment
Author(s)	Zaytseva, S., Shaw, L.B., Shi, J., <b>Kirwan, M.L.</b> , <b>Lipcius, R.N.</b>
Journal	Journal of Theoretical Biology, 543, art. no. 111102 (2022)
Link	<a href="https://doi.org/10.1016/j.jtbi.2022.111102">https://doi.org/10.1016/j.jtbi.2022.111102</a>
Summary	Spatial self-organization, a common feature of multi-species communities, can provide important insights into ecosystem structure and resilience. We use a mathematical model to describe self-organization of an eroding marsh shoreline based on three-way interactions between sediment volume and two ecosystem engineers –cord grass <i>Spartina alterniflora</i> and ribbed mussels <i>Geukensia demissa</i> .

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Title	Modelling the effects of copepod diel vertical migration and community structure on ocean carbon flux using an agent-based model
Author(s)	Countryman, C.E., <b>Steinberg, D.K.</b> , Burd, A.B.
Journal	Ecological Modelling, 470, art. no. 110003 (2022)
Link	<a href="https://doi.org/10.1016/j.ecolmodel.2022.110003">https://doi.org/10.1016/j.ecolmodel.2022.110003</a>
Summary	Creation of a new model allows investigation of zooplankton community structure and behavior effects on fecal pellet carbon flux in the ocean. Diel vertical migration behavior in the model resulted in model fecal pellets fluxes that were closer to that of field data, compared to scenarios with no diel vertical migration. Validation with field data shows that trait-based relationships for physiological traits can be used to give insight into variability in particle flux in the deep sea.

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Title	Spatial variability of microzooplankton grazing on phytoplankton in coastal southern Florida, USA
Author(s)	<b>Millette, N.</b> , Kelble, C., Smith, I., Montenero, K., Harvey, E.
Journal	PeerJ, 10, art. no. e13291 (2022)
Link	<a href="https://doi.org/10.7717/peerj.13291">https://doi.org/10.7717/peerj.13291</a>
Summary	While microzooplankton grazing rates on phytoplankton have been studied across the globe, there are still large regions of the ocean that are understudied, such as the sub-tropical coastal area around south Florida, USA. Microzooplankton grazing data from the Everglades outflow is what would be expected based on global patterns, but factors other than microzooplankton grazing are more important in controlling phytoplankton biomass in the Florida Keys.

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Title	Numerical investigation of the control factors driving Zhe-Min Coastal Current
Author(s)	Zhang, Y., Chai, F., <b>Zhang, J.</b> , Ding, Y., Bao, M., Yan, Y., Li, H., Yu, W., Chang, L.
Journal	Acta Oceanologica Sinica, 41 (2), pp. 127-138 (2022)
Link	<a href="https://doi.org/10.1007/s13131-021-1849-4">https://doi.org/10.1007/s13131-021-1849-4</a>
Summary	The complex China Coastal Current is investigated using a 3D model to reveal the major controls for such a system including freshwater plume and wind.

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Title	Historical biogeographic range shifts and the influence of climate change on ocean quahogs ( <i>Arctica islandica</i> ) on the Mid-Atlantic Bight
Author(s)	LeClaire, A.M., Powell, E.N., <b>Mann, R.</b> , Hemeon, K.M., Pace, S.M., Sower, J.R., Redmond, T.E.
Journal	Holocene 32(9), pp. 964-976 (2022)
Link	<a href="https://doi.org/10.1177/09596836221101275">https://doi.org/10.1177/09596836221101275</a>
Summary	The long lived bivalve <i>Arctica islandica</i> has well defined thermal tolerances. The presence of fossil shells in regions of the Mid Atlantic Bight where no live specimens are currently found provide a history over ~4000 years of movement of the seasonal “cold pool” footprint back and forth across the inner continental shelf.

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Title	Integrative omics analysis highlights the immunomodulatory effects of the parasitic dinoflagellate <i>Hematodinium</i> on crustacean hemocytes
Author(s)	Li, M., Huang, Q., Lv, X., <b>Small, H.J.</b> , Li, C.
Journal	Fish and Shellfish Immunology, 125, pp. 35-47 (2022)
Link	<a href="https://doi.org/10.1016/j.fsi.2022.04.050">https://doi.org/10.1016/j.fsi.2022.04.050</a>
Summary	Parasitic dinoflagellates in genus <i>Hematodinium</i> have caused substantial economic losses to valuable marine crustacean fisheries. It is unknown how the parasite evades the host immune response. Using omics approaches we show that the parasite remodeled the host hemocyte miRNome and proteome, and exhibited multifaceted immunomodulatory effects and potential immune-suppressive mechanisms.

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Title	A novel antibody-based biosensor method for the rapid measurement of PAH contamination in oysters
Author(s)	<b>Prossner, K.M.*</b> , <b>Vadas, G.G.</b> , <b>Harvey, E.</b> , <b>Unger, M.A.</b>
Journal	Environmental Technology and Innovation, 28, art. no. 102567 (2022)
Link	<a href="https://doi.org/10.1016/j.eti.2022.102567">https://doi.org/10.1016/j.eti.2022.102567</a>
Summary	We developed a new method to rapidly and inexpensively measure polycyclic aromatic hydrocarbon (PAH), a known carcinogen, concentrations in individual oysters using antibody-based biosensor technology. With this method we were able to rapidly map PAH concentrations in oysters throughout the historically polluted Elizabeth River and assess the levels we found in these oysters based on thresholds used in previous human health risk assessments.

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Title A deterministic model for understanding nonlinear viral dynamics in oysters

Author(s) **Qin, Q., Shen, J., Reece, K.S.**

Journal Applied and Environmental Microbiology, 88(8) 2022

Link <https://doi.org/10.1128/aem.02360-21>

Summary We introduced the first mathematical model for in-host viral dynamics in oysters, which includes key processes such as oyster filtration, viral replication, antiviral immune response, apoptosis, autophagy, and selective accumulation. This provides a framework to guide future experiments and numerical modeling to allow better prediction and management of outbreaks.

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Title Discard mortality of sea scallops *Placopecten magellanicus* following capture and handling in the U.S. dredge fishery

Author(s) **Rudders, D.B.**, Benoît, H.P., Knotek, R.J., Mandelman, J.A., **Roman, S.A.**, Sulikowski, J.A.

Journal Marine and Coastal Fisheries, 14(2), art. no. e10197 (2022).

Link <https://doi.org/10.1002/mcf2.10197>

Summary Discard mortality, which represents the fraction of animals that do not survive the capture and handling process, was estimated for the commercial sea scallop dredge fishery that operates along the continental shelf of the northwest Atlantic Ocean. Results suggest that roughly 21% of the scallops discarded eventually perish as a result of capture. Study results were consistent with assumptions used in stock assessment models and will prove useful to inform future management strategies.

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Title The status of Virginia's public oyster resource 2021

Author(s) **Southworth, M., and Mann, R. L.**

Database ScholarWorks, Virginia Institute of Marine Science, William & Mary (2022).

Link <https://doi.org/10.25773/6GB1-V305>

Summary This report summarizes the 2021 results of two long-term surveys conducted annually at VIMS. The shellstring survey monitors recruitment of the Eastern oyster, *Crassostrea virginica*, annually from late spring through early fall in three Virginia western Chesapeake Bay tributaries. The dredge survey, in collaboration with the Virginia Marine Resources Commission (VMRC), conducts a dredge survey of selected public oyster bars in Virginia tributaries of the western Chesapeake Bay to assess the status of the existing oyster resource.

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Title Refining real-time predictions of *Vibrio vulnificus* concentrations in a tropical urban estuary by incorporating dissolved organic matter dynamics

Author(s) Bullington, J.A., **Golder, A.R.\***, Steward, G.F., McManus, M.A., Neuheimer, A.B., Glazer, B.T., Nigro, O.D., Nelson, C.E.

Journal Science of the Total Environment, 829, art. no. 154075 (2022)

Link <https://doi.org/10.1016/j.scitotenv.2022.154075>

Summary Waikiki, Hawaii is one of the most visited coastal areas in the United States. However, the popular tourist destination harbors *Vibrio vulnificus*, a pathogenic "flesh eating" bacterium. Scientists developed a statistical model to predict *V. vulnificus* dynamics in Waikiki and its upstream watersheds based on rainfall, temperature, and nutrients.

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Title Contrasting controls on seasonal and spatial distribution of marine cable bacteria (*Candidatus Electrothrix*) and Beggiatoaceae in seasonally hypoxic Chesapeake Bay

Author(s) Malkin, S.Y., Liao, P., Kim, C., Hantsoo, K.G., Gomes, M.L., **Song, B.**

Journal Limnology and Oceanography 67(7), pp. 1357–1373 (2022)

Link <https://doi.org/10.1002/lno.12087>

Summary This paper reports the seasonal dynamics of sulfide/sulfur-oxidizing bacteria associated with hypoxia events in the Chesapeake Bay. A high abundance of cable bacteria was found in a shoal site with bioturbating macrofauna. Among various environmental variables, DO, sulfide, and organic matters are important drivers of cable bacteria and other sulfur-oxidizing bacteria in marine sediments.

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