VIMS | William & Mary
Virginia Institute of Marine Science

Research Digest

Issue No. 13

September - December 2024

(Intentionally left blank)

Message from the Associate Dean of Research and Advisory Services

This Digest is intended to provide stakeholders, colleagues, and interested persons a sense of the depth and breadth of the research happening at VIMS. While we attempt to be as comprehensive as possible, it likely does not contain every article published in the issue's timespan due to differences in timelines and release dates across various publishers and databases that curate peer reviewed research.

If you are interested in reading the full text of any article that you do not have appropriate library/institution access for, please contact the VIMS author or corresponding author of the paper. Contact information for current VIMS scientists can be found on our website: www.vims.edu/about/directory/search/.

Mark W. Luckenbach, Associate Dean

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

Topics In This Issue

(click topic heading below to jump to desired section)

Navigating this document

Click on one of the headings listed above to jump to the desired section. Alternatively, search the document using keywords or an author's name. To search for words or names, simultaneously press the 'ctrl' and 'F' keys, type the desired word or name in the search field, then press 'enter' or 'return'. If the search term is in the document, it will be highlighted.

VIMS authors in this issue

(Listed alphabetically by last name. An asterisk (*) indicates VIMS student.)

Additional Topics

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

Topic	**Chemistry**
Title	Nationwide occurrence of synthetic antioxidants in household dust from regions across China
Author(s)	Tan H., Qiao X., Yang L., Liang X., Tang S., Huang D., **Hale R.C.**, Deng Y., Dai Q., Xie P., Li J., Xia Y., Cai Z.
Journal	Environmental Science & Technology Letters, 11(12): 1370–1376 (2024)
Link	https://doi.org/10.1021/acs.estlett.4c00801
Summary	Synthetic antioxidants (SAOs) are additive chemicals with diverse commercial applications. We explored the levels and regional patterns of 56 SAOs in 1,407 household dust samples from 29 provincial administrative regions across China. SAO concentrations and compositions varied significantly across China, with coastal regions such as Hong Kong and Shanghai showing higher levels and a greater prevalence of novel SAOs.

Topic	**Coastal Geology**
Title	The impact of a major hurricane on sediment geochemistry and organic contaminants of a shallow subtropical estuary through strong resuspension
Author(s)	Xue J., Wang Z., Lin X., Lu K., Douglas S., **Hardison A.**, Liu Z.
Journal	Estuaries and Coasts, 48(1): 6 (2024)
Link	https://doi.org/10.1007/s12237-024-01432-w
Summary	Sediment geochemistry and organic contaminants in a shallow estuary are described before and after a category 4 hurricane passed through the shallow system. Sediment grain size and certain organic chemical classes were strongly affected by the decreased salinity and strong resuspension during the storm surge, in particular PAHs and n-alkanes.

Topic	**Phycology**
Title	Population genetics of the freshwater red alga *Batrachospermum gelatinosum* (Rhodophyta) II: Phylogeographic analyses reveal spatial genetic structure among and within five major drainage basins in eastern North America
Author(s)	Crowell R.M., Shainker-Connelly S.J., **Krueger-Hadfield S.A.**, Vis M.L.
Journal	Journal of Phycology, 60(6): 1437–1455 (2024)
Link	https://doi.org/10.1111/jpy.13512
Summary	This manuscript was led by a PhD student at Ohio University and explored the historical and contemporary forces that shape the genetic structure of the freshwater red alga *Batrachospermum gelatinosum.*

Back to topic list

Additional Topics (cont.)

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

Topic	**Phycology**
Title	Population genetics of the freshwater red alga *Batrachospermum gelatinosum* (Rhodophyta) I: Frequent intragametophytic selfing in a monoicous, haploid–diploid species
Author(s)	Shainker-Connelly S.J., Crowell R.M., Stoeckel S., Vis M.L., **Krueger-Hadfield S.A.**
Journal	Journal of Phycology, 60(6): 1420–1436 (2024)
Link	https://doi.org/10.1111/jpy.13510
Summary	Led by a PhD student based at UAB, this manuscript explored the reproductive system across the same range as its companion phylogeographic study to explored the influence of sexual versus asexual reproduction.

Topic	**Phycology**
Title	Clonality contributes to the spread of *Avrainvillea lacerata* (Bryopsidales, Chlorophyta) in Hawai‘i
Author(s)	Thornton B.M., Spalding H.L., Stoeckel S., Harris M.L., Wade R.M., **Krueger-Hadfield S.A.**
Journal	Journal of Phycology, 60(6): 1371–1389 (2024)
Link	https://doi.org/10.1111/jpy.13508
Summary	This manuscript explored the reproductive system and population structure of an invasive green alga in HI, *Avrainvillea lacerata*. Vegetative spread is confirmed by both genetic signatures and ecological observations providing much needed data for management of this alga.

Back to topic list

Additional Topics

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

Topic	**Science Communication & Education**
Title	The importance of integrating phycological research, teaching, outreach, and engagement in a changing world
Author(s)	Stancheva R., Cantonati M., Manoylov K., Furey P.C., Cahoon A.B., Jones R.C., Gillevet P., Amsler C.D., Wehr J.D., Salerno J.L., **Krueger-Hadfield S.A.**
Journal	Journal of Phycology, 60(6): 1335–1348 (2024)
Link	https://doi.org/10.1111/jpy.13507
Summary	This perspective was born out of discussions at a workshop at GMU where we identified gaps in how we train the next generation of phycologists.

Topic	**Socioeconomics**
Title	What they live for: Adaptive strategies of Virginia's small-scale commercial fishermen in a changing industry
Author(s)	**White S.B.**, Garrity-Blake B., **Scheld A.M.**
Journal	Marine Policy, 171: 106451 (2024)
Link	https://doi.org/10.1016/j.marpol.2024.106451
Summary	This article assesses the varying economic, ecological, and social changes on individual decision-making and resilience in Virginia's small-scale commercial fishing industry using semi-structured interviews.

Back to topic list

Aquaculture

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

Title	Risk-based valuation of surveillance data in open environments: Methods application to a key shellfish aquaculture production region
Author(s)	Gustafson L., Remmenga M., Duncan C., Bliss C., Bushek D., **Carnegie R.B.**, Giray C., Meyers T., Davis K., Hartman K., Elston R.
Journal	Journal of the World Aquaculture Society 56(1): e13109 (2024)
Link	https://doi.org/10.1111/jwas.13109
Summary	This paper considers the applicability of somewhat haphazard disease surveillance data, but abundant and collected over long periods of time, for drawing robust inferences about pathogen distributions. This important work will influence aquatic animal health management worldwide.

Title	The impact of exposure dosage and host genetics on the shedding kinetics of *Flavobacterium psychrophilum* in rainbow trout
Author(s)	Jones D.R., Everson J., Leeds T.D., Wiens G.D., **Wargo A.R.**
Journal	Journal of Fish Diseases, e14026 (2024)
Link	https://doi.org/10.1111/jfd.14026
Summary	*Flavobacterium psychrophilum* is a leading pathogen in rainbow trout aquaculture. How transmission is affected by host genotype or pathogen dosage is unknown. In this study, different lines of rainbow trout were exposed to multiple pathogen dosages. Fish mortality and pathogen shedding were measured. The results will help improve disease management.

Back to topic list

Biochemistry

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

Title	Effects of ocean warming with stable and fluctuating ocean acidification on seawater transition in Chinook salmon smolts
Author(s)	Frommel A.Y., Ghanizadeh-Kazerouni E., **Dichiera A.M.**, Hunt B.P.V., Brauner C.J.
Journal	Science of the Total Environment, 955: 177185 (2024)
Link	https://doi.org/10.1016/j.scitotenv.2024.177185
Summary	Ocean warming and acidification threaten fish populations globally. However, there is limited understanding of climate change impacts on the marine migration of juvenile salmon. Both constant and fluctuating CO_2 disrupted ion regulation in Chinook salmon smolts after seawater entry, but salmon compensated by increasing the expression of gill ion transporters.

Title	Exploration of the extracellular matrix of the red alga *Chondrus crispus* reveals unprecedented insights into carrageenan structures
Author(s)	Ropartz D., Lissarrague A., Jam M., Jouanneau D., Le Gall S., Annic B., Fanuel M., **Krueger-Hadfield S.A.**, Valéro M., Czjzek M., Rogniaux H., Hervé C.
Journal	Carbohydrate Polymers, 348: 122737 (2024)
Link	https://doi.org/10.1016/j.carbpol.2024.122737
Summary	This manuscript explored the cell walls of the economically and ecologically important red alga *Chondrus crispus*.

Back to topic list

Biogeochemistry

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

Title	Divergent responses of nitrogen-species loadings to future climate change in the Chesapeake Bay watershed
Author(s)	Bian Z., Pan S., Najjar R.G., **Friedrichs M.A.M.**, Hofmann E.E., Herrmann M., **Hinson K.E.***, **St-Laurent P.**, Tian H.
Journal	Journal of Hydrology: Regional Studies, 56: 102060 (2024)
Link	https://doi.org/10.1016/j.ejrh.2024.102060
Summary	This study quantifies how climate change will have different impacts on nitrogen exports to Chesapeake Bay, depending on nitrogen species considered. Warmer temperatures and small increases in river discharge will decrease ammonia and particulate-nitrogen export and increase nitrate (and total nitrogen) export. These insights will help inform nutrient reduction strategies.

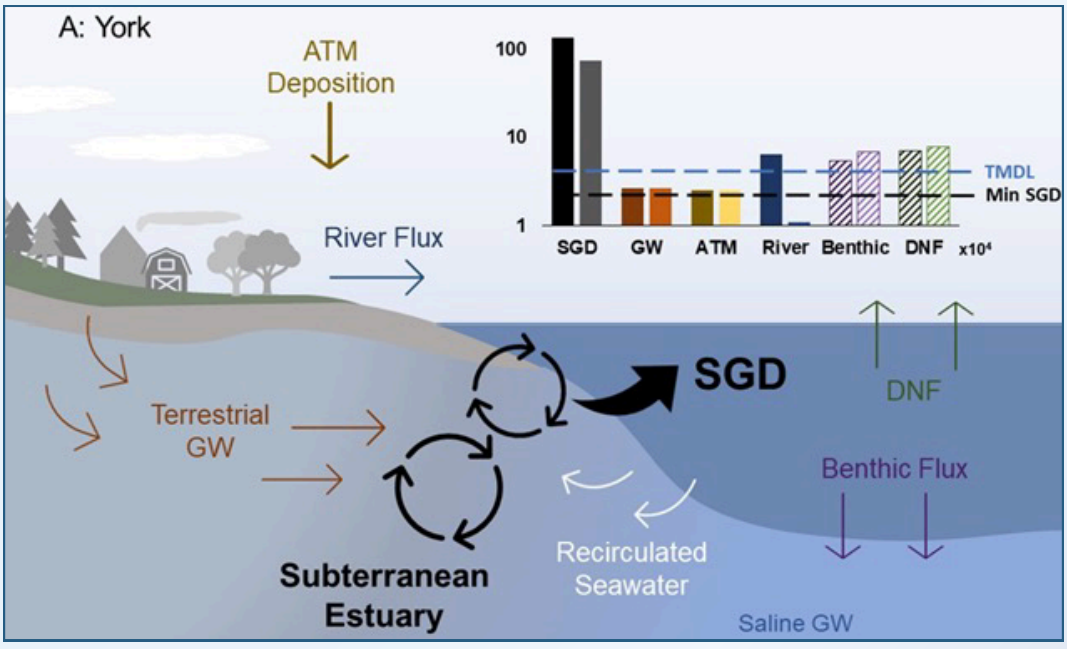
Title	Submarine groundwater discharge as a major nutrient source in river-fed vs. tidally dominated estuaries
Author(s)	**Wilson S.J.***, Tamborski J.J., **Song B.**, Bernhardt P., Mulholland M.R.
Journal	Limnology and Oceanography, 70(2): 426-442 (2024)
Link	https://doi.org//10.1002/lno.12772
Summary	Submarine groundwater discharge (SGD) significantly contributes nutrients to Chesapeake Bay tributaries, influencing harmful algal blooms. Seasonal SGD nutrient fluxes varied, exceeding riverine inputs. Findings highlight the need to include SGD in water quality models for effective ecosystem management and restoration in the Chesapeake Bay and similar coastal systems.

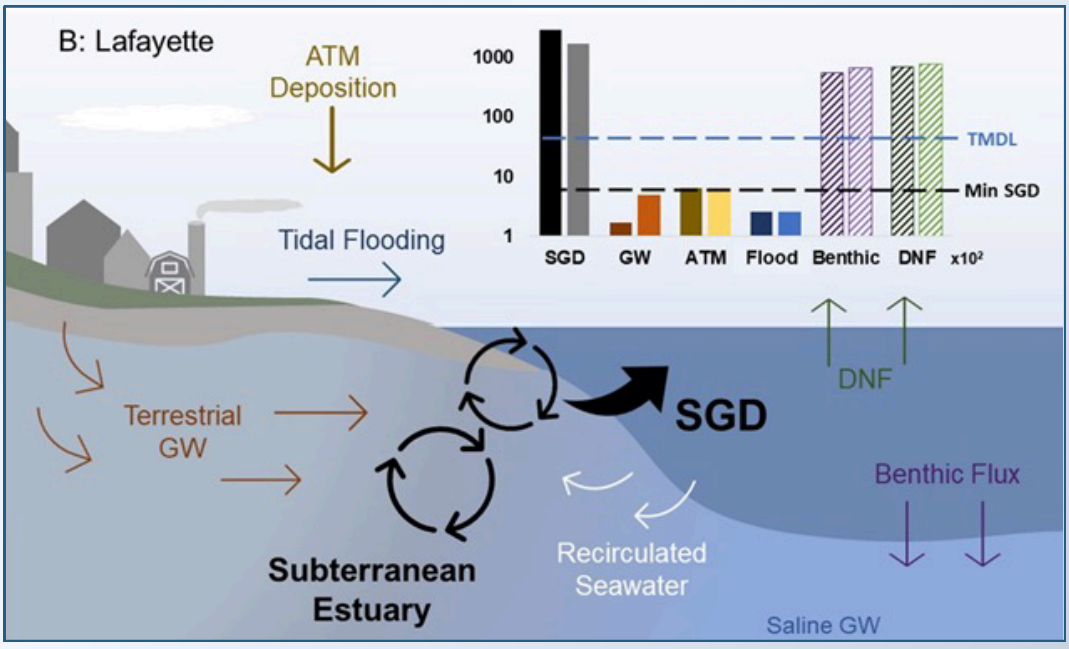
Title	Controls on spatial variation in porewater methane concentrations across United States tidal wetlands
Author(s)	Koontz E.L., Parker S.M., Stearns A.E., (…) **Lerberg S.B.**, Lucas S.B., Marcum P., Peter C.R., Phipps S.W., Raposa K.B., Rovai A.S., Schooler S.S., Twilley R.R., Tyrrell M.C., Uyeda K.A., Wulfing S.H., Aman J.T., Giacchetti A., Cross-Johnson S.N., Holmquist J.R.
Journal	Science of the Total Environment 957: 177290 (2024)
Link	https://doi.org/10.1016/j.scitotenv.2024.177290
Summary	This study delivers the first national-scale survey of tidal marsh porewater CH_4 concentrations and commonly measured biogeochemical covariates. Future sampling should focus on within- and between-site environmental gradients to accurately map CH_4 variation. This work demonstrates a unique approach to remote team science and the potential to strengthen collaborative research networks.

Back to topic list

Featured Article

See Wilson S.J., et al. 2024 (on page 9)





Caption: Conceptual diagram of York river and Lafayette river DIN budgets (mol N d-1). The bar graph indicates inputs (solid bars) and outputs (uptake, hashed bars) for each river system in the spring and fall (dark and light). Fluxes in the York river are shown as mol d-1 x104 and in the Lafayette as mol d-1 x102. Terrestrial groundwater N loads are included as submarine groundwater discharge (terrestrial plus recirculated seawater flow paths).

Credit: Both diagrams are from Figure. 6 of Wilson S.J. et al. 2024 titled Submarine groundwater discharge as a major nutrient source in river-fed vs. tidally dominated estuaries.

Biogeochemistry (cont.)

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

Title	The role of benthic fluxes in acidifying the bottom waters in the northern Gulf of Mexico hypoxic zone based on an updated water column biogeochemical-seabed diagenetic and sediment transport model
Author(s)	**Yin D.**, **Cui L.**, **Harris C.K.**, Moriarty J.M., Beck H., Maiti K.
Journal	Journal of Advances in Modeling Earth Systems, 16(10): e2023MS004045
Link	https://doi.org/10.1029/2023MS004045
Summary	In this study, we used an updated Water Column Biogeochemical-Seabed Diagenetic and Sediment Transport Model to understand the role of benthic flux in acidifying bottom waters in Northern Gulf of Mexico hypoxic zone. We found that resuspension enhances bottom water acidification by increasing the benthic flux DIC/TAlk ratio.

Title	The seasonal patterns of hydrographic and biogeochemical variables in the Ross Sea: A BGC-Argo analysis
Author(s)	Cao R., **Smith W.O.**, Zhong Y., Riser S., Johnson K.S., Talley L.
Journal	Deep-Sea Research Part II: Topical Studies in Oceanography, 219: 105436 (2024)
Link	https://doi.org//10.1016/j.dsr2.2024.105436
Summary	This study reported the complete annual vertical distribution of temperature, salinity, nitrate, chlorophyll, and particulate and dissolved organic carbon on the continental shelf of the Ross Sea. The most rapid changes in all variables were observed in November as ice melted and in March as ice formed, confirming the critical role of ice in polar systems.

Back to topic list

Climate Change

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

Title	Too hot to handle: A meta-analytical review of the thermal tolerance and adaptive capacity of North American sturgeon
Author(s)	**Dichiera A.M.**, Earhart M.L., Bugg W.S., Brauner C.J., Schulte P.M.
Journal	Global Change Biology, 30(11): e17564 (2024)
Link	https://doi.org/10.1111/gcb.17564
Summary	This study reviews how North American sturgeon respond to thermal stress and their ability to adapt to rising temperatures. While sturgeon show some capacity for thermal tolerance plasticity, especially in young fish, their overall survival may be negatively affected by warming. Due to limited research, the long-term vulnerability of sturgeon to climate change remains unclear.

Title	Hypoxia influences the extent and dynamics of suitable fish habitat in Chesapeake Bay, USA
Author(s)	**Schonfeld A.J.***, **Ralph G.M.**, **Gartland J.**, **St-Laurent P.**, **Friedrichs M.A.M.**, **Latour R.J.**
Journal	Marine Ecology Progress Series, 748: 117-135 (2024)
Link	https://doi.org/10.3354/meps14706
Summary	Increased hypoxia in Chesapeake Bay, driven by human activity and climate change, reduces suitable fish habitat. Models predict further declines with warming and low oxygen. However, habitat suitability trends don't match those of declining abundance, indicating external influences. This study sheds light on the complexity of factors affecting habitat utilization.

Back to topic list

Fish & Fisheries

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

Title	Quantifying uncertainty in the contribution of mesopelagic fishes to the biological carbon pump in the northeast Atlantic Ocean
Author(s)	McMonagle H., Llopiz J.K., Maas A.E., **Steinberg D.K.**, Govindarajan A.F., Essington T.E.
Journal	ICES Journal of Marine Science, 81(10): 2037–2051 (2024)
Link	https://doi.org/10.1093/icesjms/fsae149
Summary	Mesopelagic fishes may contribute substantially to marine carbon export. Using data from the subarctic Northeast Atlantic Ocean, we compare carbon transported by adult fish, zooplankton, and sinking particles, and calculate uncertainty in the relative contribution of fishes.

Title	Extreme population densities reduce reproductive effort of Atlantic sea scallops in high-density recruitment events
Author(s)	**Kowaleski K.R*.**, **Roman S.A.**, **Mann R.**, **Rudders D.B.**
Journal	Marine Ecology Progress Series, 746: pg. 67-85 (2024)
Link	https://doi.org/10.3354/meps14688
Summary	The Atlantic sea scallop fishery utilizes rotational area management to protect dense aggregations. We investigated a potential density-dependent effect by examining reproductive effort (proportion of energy spent developing gametes) in two high-density recruitment events. Population density negatively impacted reproductive effort, illustrating a complexity of managing heterogenous populations of sessile invertebrates.

Title	Life beyond a jar: Effects of tank size and furnishings on the behaviour and welfare of Siamese fighting fish (*Betta splendens*)
Author(s)	Clark-Shen N., Tariel-Adam J., **Gajanur A.***, Brown C.
Journal	Animal Welfare, 33: e62 (2024)
Link	https://doi.org//10.1017/awf.2024.67
Summary	This experimental behavioral study assesses the welfare standards for Siamese fighting fish in the aquarium trade in Singapore. Treatments included variations in tank size and the level of enrichment in the tanks. Recommendations from this study include increasing the tank size and providing more enrichment for Siamese fighting fish.

Back to topic list

Title	Disentangling bottom-up and top-down controls on fish consumption of key prey in the northeast U.S. shelf ecosystem
Author(s)	**Gartland J.**, **Latour R.J.**
Journal	ICES Journal of Marine Science 81(8): 1669-1684 (2024)
Link	https://doi.org/10.1093/icesjms/fsae115
Summary	This study quantified predator consumption of forage fishes by combining predator catch and stomach content data in multivariate spatiotemporal models. Consumption trends were influenced by prey availability and fishery catch and have since been included in stock assessments to characterize prey natural mortality rates on the Northeast US Shelf.

Title	Commentary: Demographic response of osprey within the lower Chesapeake Bay to fluctuations in menhaden stock
Author(s)	**Latour R.J.**, **Gartland J.**, **Ralph G.M.**
Journal	Frontiers in Marine Science, 11: 1416687 (2024)
Link	https://doi.org/10.3389/fmars.2024.1416687
Summary	Watts et al. (2024) attempted to link reported declines in various osprey demographic trends to Atlantic menhaden abundance. We provide a critical evaluation of their statistical approach and identify key uncertainties that require consideration as the analyses presented did not establish a clear relationship between osprey and menhaden abundance and availability.

Title	Review of the grunt genus *Rhonciscus* (Lutjaniformes: Haemulidae) from the Western Atlantic, with the description of a new species from Brazil
Author(s)	Marceniuk A.P., Caires R.A., Rotundo M.M., Gasparini J.L., Brito G.J.S., Castilho J.C., Cerqueira N.N.C.D., Oliveira C., **Espindola V.C.**
Journal	Marine Biodiversity, 54(6): 89 (2024)
Link	https://doi.org/10.1007/s12526-024-01482-0
Summary	This study aims to review *Rhonciscus* species from the Western Atlantic based on morphological and genetic data. Our results bring the re-creation and redefinition of the limits of *Rhonciscus crocro* and *R. approximans* with the recently described *R. pauco* as a junior synonym, with a description of a new species of *Rhonciscus*.

Back to topic list

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

Title	Aerobic and anaerobic poise of white swimming muscles of the deep-diving scalloped hammerhead shark: comparison to sympatric coastal and deep-water species.
Author(s)	Royer M., Garcia D., Dickson K., **Weng K.C.**, Meyer C., Holland K.N., Drazen J.C.
Journal	Frontiers in Marine Science, 11: 1477553 (2024)
Link	https://doi.org//10.3389/fmars.2024.1477553
Summary	Our work on shark physiology (Royer et al) revealed enzyme characteristics that allow some species to hunt in oxygen-poor waters, which may become increasingly important as predators respond to ocean deoxygenation (VIMS Priority 1 global change, grand challenge of ocean processes).

Title	Bony fish skeleton
Author(s)	**Hilton E.J.,** editors: Alderman S.L., Gillis T.E.
Book	Encyclopedia of Fish Physiology (second edition), Academic Press, pg. 308-322. (2024)
Link	https://doi.org/10.1016/B978-0-323-90801-6.90014-4
Summary	The understanding and appreciation of the skeleton of fishes (comprising hundreds of individual bones and cartilages) is central to so many aspects of the evolutionary and ecological biology of fishes generally. This article provides a brief overview of the skeletal structure of actinopterygians and fish-like sarcopterygians.

Title	Diseases of marine fish and shellfish in an age of rapid climate change
Author(s)	Rowley A.F., Baker-Austin C., Boerlage A.S., Caillon C., Davies C.E., Duperret L., Martin S.A.M., Mitta G., Pernet F., Pratoomyot J., **Shields J.D.**, Shinn A.P., Songsungthong W., Srijuntongsiri G., Sritunyalucksana K., Vidal-Dupiol J., Uren Webster T.M., Taengchaiyaphum S., Wongwaradechkul R., Coates C.J.
Journal	iScience 27(9):110838 (2024)
Link	https://doi.org/10.1016/j.isci.2024.110838
Summary	Disease outbreaks have become more frequent, intense and widespread in marine ecosystems. We provide case studies covering some of the world's most important commercial species to illustrate the magnitude of disease-related problems linked to climate change.

Back to topic list

Marine & Estuarine Ecology

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

Title	Co-infection is linked to infection prevalence and intensity in oysters amidst high environmental and spatial variation
Author(s)	Tracy A.M., Pagenkopp Lohan K.M., **Carnegie R.B.**, McCollough C.B., **Southworth M.**, Ogburn M.B.
Journal	Journal of Invertebrate Pathology, 207: 108201 (2024)
Link	https://doi.org/10.1016/j.jip.2024.108201
Summary	The work sheds new light onto the ecological interactions affecting oyster disease dynamics in Chesapeake Bay.

Title	The role of zooplankton community composition in fecal pellet carbon production in the York River Estuary, Chesapeake Bay
Author(s)	**Sharpe K.N.***, **Steinberg D.K.**, **Stamieszkin K**.
Journal	Estuaries and Coasts, 48(1): 17 (2024)
Link	https://doi.org/10.1007/s12237-024-01442-8
Summary	This study is the first to quantify whole-community mesozooplankton fecal pellet carbon (FPC) production in an estuary, accounting for diel and seasonal variations in community composition. Findings indicate zooplankton FPC production in estuaries can exceed that of oceanic systems and suggest that FPC export is important in estuarine benthic-pelagic coupling.

Title	Coastal dune management affects above and belowground biotic characteristics
Author(s)	White A.E., Cohn N., **Davis E.H.***, **Hein C.H.**, Zinnert J.C.
Journal	Scientific Reports, (14): 22688. (2024)
Link	https://doi.org/10.1038/s41598-024-73312-z
Summary	We found that dune management significantly impacts living and non-living belowground biomass and root structure within the top 150 cm of sediment and dune plant community composition. Importantly, we found linkages between vegetative cover, elevation, and belowground biomass, which may be used to rapidly estimate belowground biomass from surface measurements in the future.

Back to topic list

Physical Oceanography

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

Title	Total water level prediction at continental scale: Coastal ocean
Author(s)	**Cui L.**, **Ye F.**, **Zhang Y.J.**, **Yu H.**, **Wang Z.**, Moghimi S., Seroka G., Riley J., Pe'eri S., Mani S., Myers E., Park K., Tang L., Yang Z., Wang Y.
Journal	Ocean Modelling, 192: 102451 (2024)
Link	https://doi.org/10.1016/j.ocemod.2024.102451
Summary	This study improves total water level (TWL) simulation at a continental scale using a geoid-based datum, satellite altimetry, and a 3D unstructured-grid model, reducing errors to 14 cm. Findings highlight regional barotropic biases (10–30 cm), challenges in capturing thermohaline steric effects, and the influence of large-scale currents on non-tidal variability.

Title	Offshore wind farms could impact coastal marine heatwaves in eastern boundary upwelling systems
Author(s)	Dalsin M., Walter R.K., **Mazzini P.L.F.**
Journal	Estuarine, Coastal and Shelf Science, 313: 109102 (2024)
Link	https://doi.org//10.1016/j.ecss.2024.109102
Summary	In this paper we examined the sensitivity of coastal marine heatwaves (MHWs) to seawater temperature increases motivated by OSW-induced warming. Using a novel long-term coastal water temperature record spanning over four decades, we find that there is the potential for significant increases in MHW days, with individual MHWs becoming more intense and prolonged.

Title	Wind-driven nearshore overturning currents off the northeastern Shandong Peninsula in the Yellow Sea in winter
Author(s)	Hu L., Zhai F., Liu Z., Gu Y., **Wu W.**, Li P., Liu J., Ding J., Sun L.
Journal	Frontiers in Marine Science, 11: 1478811 (2024)
Link	https://doi.org/10.3389/fmars.2024.1478811
Summary	The northeastern waters of the Shandong Peninsula are the nearshore area of the Bohai Sea and North Yellow Sea. There are intensive mariculture and marine ranching activities. In situ observations showed that two-layer overturning currents were robust phenomena in this area in winter. Using high-resolution numerical simulations and experiments, this current study investigated the characteristics and mechanisms of the overturning currents that have not been well established.

Back to topic list

Title	Potential future impacts (2016–2055) of offshore wind energy development on the Atlantic surfclam, *Spisula solidissima*, fishery in the U.S. Mid-Atlantic Bight Continental Shelf.
Author(s)	Moya A., Powell E., **Scheld A.M.**, Borsetti S., Klinck J., Hofmann E., Spencer M., Curchitser E., Munroe D.
Journal	Fisheries Oceanography, e12720 (2024)
Link	https://doi.org//10.1111/fog.12720
Summary	This research was built on Spencer et al. 2024a,b, using models of the Atlantic surfclam (*Spisula solidissima*) population and fishery to understand potential future interactions with offshore wind energy development. It was found that offshore wind development may reduce catch and increase fishing costs, though these interactions are dynamic.

Title	What is the future of the Atlantic surfclam (*Spisula solidissima*) fishery under climate-induced warming on the Mid-Atlantic Bight Continental Shelf: A multidecadal assessment
Author(s)	Spencer M., Powell E., Klinck J., Munroe D., Borsetti S., **Scheld A.M.**, Hofmann E., Curchitser E.
Journal	Fisheries Oceanography, e12708 (2024)
Link	https://doi.org/10.1111/fog.12708
Summary	This research investigated the potential impacts of Atlantic surfclam (*Spisula solidissima*) range expansion and population increases on the commercial fishery. Projected increases in biomass were found, unsurprisingly, to lead to increases in catch and landings per unit effort, though fishing costs may increase as exploitable biomass moves further offshore.

Title	Newly discovered deep-water nursery and spawning habitats of the queen conch *Aliger gigas* in Puerto Rico
Author(s)	Cruz-Marrero W., Stevens B.G., **Lipcius R.N.**
Journal	Marine Ecology Progress Series, 750: pg. 65-76 (2024)
Link	https://doi.org//10.3354/meps14736
Summary	The queen conch is a large marine gastropod and sustains one of the most important fisheries in the Caribbean. We discovered deep-water nurseries and aggregations of juvenile queen conch in deep-water spawning grounds at 27 m depths. Densities in deep-water habitats rivaled those in shallower habitats and indicate that deep-water nursery and spawning habitats warrant protection.

Back to topic list

Title	Sublethal exposure of eastern oyster *Crassostrea virginica* to the goniodomin-producing dinoflagellate *Alexandrium monilatum*: Fate of toxins, histopathology, and gene expression.
Author(s)	**Gaillard S.**, **Small H.J.**, **Carnegie R.B.**, Harris T.M., Tanniou S., Réveillon D., Hess P., **Reece K.S.**
Journal	Journal of Aquatic Animal Health, 36(4): 374-394 (2024)
Link	https://doi.org/10.1002/aah.10227
Summary	This work provides an important perspective on oyster-harmful algal bloom interactions, in particular highlighting the absence of clear disease signs in oysters exposed to *Alexandrium*. It opens the door to new research avenues that would seek to better understand the secret of the oyster's success in interacting with this potentially detrimental algal species.

Title	Clearance rates and toxin accumulation by North Atlantic bivalves during harmful algal blooms caused by the dinoflagellate, *Dinophysis acuminata*, in NY, USA, estuaries
Author(s)	McGuire B.T., **Sanderson M.P.**, **Smith J.L.**, Gobler C.J.
Journal	Harmful Algae, 141: 102745 (2024)
Link	https://doi.org//10.1016/j.hal.2024.102745
Summary	This study assessed bivalve (oyster, mussel and clam) clearance and toxin accumulation during HABs formed by *Dinophysis acuminata*. All bivalve species studied actively cleared *Dinophysis* from a natural, mixed assemblage during short-term experiments, and always at rates that exceeded the clearance of suspended chlorophyll-a. Active clearing of *Dinophysis* translated into the accumulation of toxins in bivalve tissues.

Title	Chapter 8 - History and taxonomy of haplosporidians, and haplosporidiosis in bivalve mollusks
Author(s)	**Reece K.S.**, Bushek D., **Carnegie R.B.**
Journal	Diseases of Bivalves: Historical and Current Perspectives, pg. 95-116 (2024)
Link	https://doi.org//10.1016/B978-0-12-820339-2.00003-6
Summary	Haplosporidians are a large group of parasites with hosts ranging from bivalve molluscs, prawns and abalone to parasitic trematodes. Some have had profound impacts on aquaculture and fisheries of bivalve shellfish. Molecular diagnostic assays are available for most important pathogens. Their complex taxonomic history is being resolved using molecular phylogenetics.

Back to topic list

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

Title	Chapter 7 - Perkinsosis (aka dermo) of bivalve mollusks
Author(s)	**Reece K.S.**, **Carnegie R.B.**, Bushek D.
Journal	Diseases of Bivalves: Historical and Current Perspectives, pg. 71-93 (2024)
Link	https://doi.org/10.1016/B978-0-12-820339-2.00020-6
Summary	*Perkinsus* species cause a wasting disease of molluscs and gastropods around the world. Many hosts are important fisheries and aquaculture species. These parasites can have devastating impacts. In the past 25 years, molecular tools aided discovery of four of the seven species. They also helped elucidate host and geographic ranges.

Title	Climate-induced warming on the mid-Atlantic Bight Continental Shelf: Predictions of the future distribution and carrying capacity of the Atlantic surfclam (*Spisula solidissima*) and the expanding ecotone with the ocean quahog (*Arctica islandica*)
Author(s)	Spencer M., Powell E., Klinck J., Monroe D., LeClaire A., Borsetti S., **Scheld A.M.**, Hofmann E., Curchitser E.
Journal	Fisheries Oceanography, e12709 (2024)
Link	https://doi.org/10.1111/fog.12709
Summary	This research explored shifts in habitat suitability in the Mid-Atlantic Bight for Atlantic surfclam (*Spisula solidissima*) and ocean quahog (*Arctica islandica*) due to warming bottom water temperatures. Simulations indicated progressive colonization of offshore habitats by Atlantic surfclam and habitat compression for ocean quahog due to reduction in the Cold Pool.

Back to topic list

Toxicology

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

Title	Prenatal and postnatal exposure to organophosphate esters and replacement flame retardant mixtures and childhood respiratory outcomes
Author(s)	Mendy A., Percy Z., Braun J.M., Lanphear B., **La Guardia M.J**., **Hale R.C.**, Yolton K., Chen A.
Journal	Environmental Research, 266: 120514 (2024)
Link	https://doi.org//10.1016/j.envres.2024.120514
Summary	Early life exposure to organophosphate esters (OPEs) and replacement brominated flame retardants (RBFRs) has been associated with adverse respiratory outcomes, but the effects of OPE and RBFR mixtures commonly detected in house dust are unknown. Results suggest these mixtures are contributing factors for adverse respiratory outcomes in childhood.

Title	Microplastic leachate negatively affects fertilization in the coral *Montipora capitata*
Author(s)	Wilkins K.W., Yew J.Y., **Seeley M.**, Richmond R.H.
Journal	Integrative and Comparative Biology, 64(4): pg. 1131-1140 (2024)
Link	https://doi.org/10.1093/icb/icae143
Summary	This study investigated the effects of microplastics and their leachate (i.e., the chemicals released from plastic in seawater) on corals. The authors found that there was reduced gamete fertilization when corals were exposed to the plastic leachate, but not during exposure to microplastics themselves. This result was consistent across most of the four tested types of plastic polymers.

Back to topic list

Wetlands

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

Title	A test of functional balance theory for wetland biomass allocation in a global change experiment
Author(s)	**Bruns N.E.**, Noyce G.L., Megonigal J.P., **Kirwan M.L.**
Journal	Geophysical Research Letters, 51(22): e2024GL110902 (2024)
Link	https://doi.org//10.1029/2024GL110902
Summary	Root growth controls salt marsh survival under sea level rise and carbon capture. We use theory on how plants optimize nutrient acquisition to study how warming and elevated CO_2 impact root growth. Our work also reveals that eutrophication may reduce the adverse impacts of warming on root growth in marshes.

Title	Latitudinal trends in the biomass allocation of invasive *Spartina alterniflora*: Implications for salt marsh adaptation to climate warming
Author(s)	Chen Y, Wu F, Wang Y, Guo Y, **Kirwan M.L.**, Liu W and Zhang Y.
Journal	Frontiers in Marine Science, 11:1510854 (2024)
Link	https://doi.org/10.3389/fmars.2024.1510854
Summary	*Spartina alterniflora* grows over a wider latitudinal range in China than it does in the U.S. affording an opportunity to examine how it responds to temperature warming. We found an optimum latitude (temperature) for above ground and belowground plant growth, beyond which warming has a negative influence.

Title	Early detection of invasive *Phragmites australis* at the tidal marsh-forest ecotone with airborne LiDAR
Author(s)	Xiong B., Han S., **Messerschmidt T.C.**, **Kirwan M.L.**, Gedan K., Qi M.
Journal	Ecological Indicators, 167: 112651 (2024)
Link	https://doi.org/10.1016/j.ecolind.2024.112651
Summary	Early detection of *P. australis* at the ecotone will be critical to the management of this invasive species in coming decades. In this study, we develop and validate a new method for early detection of *P. australis*, using open access airborne LiDAR data that can uniquely penetrate the tree canopy and detect *P. australis*.

Back to topic list