STAC Members' Lightning Talks June 2025 Meeting

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Matthew Baker





University of Maryland Baltimore County Professor

Expertise:

- Landscape ecology Restoration
- Riparian Buffers
- Applied GIS/RS

Forest Ecology

- Stream Ecology
- Quantitative
 Analysis/Mod
- Hydrogeomorph

Analysis/Modeling

Matthew Baker

Watershed-scale effects of riparian buffers

Ecological **thresholds** and resilience (land use change, salinization, flow alt, disturbance, etc.)

Mapping & characterizing: watersheds, streams and forests

Urban Forest distribution, condition, services

Impacts of Mountaintop Mining

Urban hydrology: stormwater routing, flow, flooding, infiltration, and heat

Ecological restoration

Projects/Publications:

Distributed urban forest patch sampling detects edge effects for monitoring and management. (2025) <u>Ecosphere</u>

Releasing sediments while reconnecting rivers: dynamics of sediment evacuation from dam ponds. (2024) <u>Earth Surface Processes & Landforms</u>.

A lidar based method to remotely maps gullying and incision in Maryland Piedmont headwater streams. (2024) <u>Geomorphology</u>.

Mycorrhizal feedbacks linked to global forest biodiversity gradient. (2023) <u>Nature</u> Communications.

Improved methods for quantifying the effects of catchment spatial patterns on aquatic responses. (2023) <u>Landscape Ecology</u>.

Spatial configuration and time of day impact the magnitude of urban tree canopy cooling. (2021) Environmental Research Letters

Impacts of expanding impervious surface on specific conductance in urbanizing streams. (2019) Water Resources Research.

The capacity of urban forest patches to infiltrate stormwater is influenced by soil physical properties and soil moisture. (2019) <u>Journal of Environmental Management</u>.

Tracking geomorphic signatures of watershed suburbanization with multitemporal LiDAR (2014) Geomorphology

Cropland riparian buffers throughout Chesapeake Bay watershed: Spatial patterns and effects on nitrate loads delivered to streams (2014) Ecological Applications How novel is too novel? Stream community thresholds at exceptionally low levels of catchment urbanization (2011) Ecological Applications

















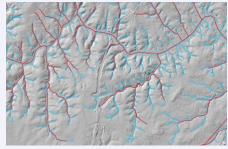


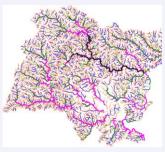
Matthew Baker

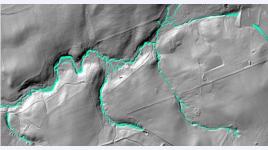
Current Project / Research

Application of AI/ML in stream channel mapping (CBP/CC)

- Feature detection
- Attribution



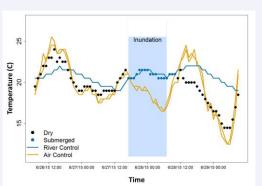




Detecting flow in ungauged watersheds (USGS-CESU/CBP/CC)

- Water yield
- Extent of mgt
- Sensitive to climate change





Future Interests:

- Geomorphic signatures of urbanization
- Quantification of tree canopy structure and species composition
- Application of remote time series to characterization of ecosystem status and trends

Kathy Boomer





Foundation for Food & Agriculture Research Scientific Program Director



Kathy Boomer

Overview of current research and projects:

- Elevating water (and water management) as a driver, not just an outcome of agroecosystem services and watershed health (SWITCHES)
- Recognizing and honoring local knowledge holders as invaluable technical experts, essential to advancing stewardship and developing practical, science-informed strategies for ensuring food and water security from local to global scales.
- Promoting conceptual modeling opportunities to facilitate knowledge integration.

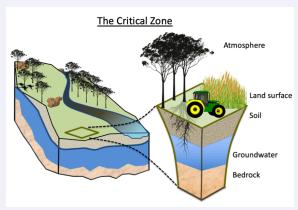
Projects/Publications:

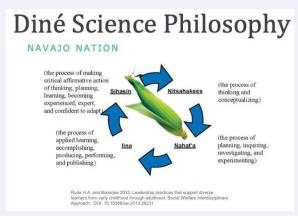
- Achieving Conservation through Targeting Information,
 Outreach and Networking (ACTION) RFA informed from STAC workshop, Advancing Outreach Effectiveness to Improve Conservation Practice Adoption
- Boomer, K, A. Jacobs, A. Collick, J. Frankenberger, C. Brosch, M. Ehrhart, J. Hubbart, C. Hiers, A. Harvey, and M. Cole. 2021.
 Linking Soil and Watershed Health to In-Field and Edge-of-Field Water Management. STAC Publication 21-002.
- Boomer, K.B., W. Boynton, A. Muller, D. Muller, and K. Sellner.
 2019. Revisiting Coastal Land-Water Interactions: The
 Triblet Connection. STAC Publication 19-005.
- Tomer, M.D., S. Porter, D.E. James, K.B. Boomer, J.A. Kostel, and E. McLellan. 2013. <u>Combining precision conservation technologies into a flexible framework to facilitate agricultural watershed planning</u>. Journal of Soil and Water Conservation 68:113A-120A.

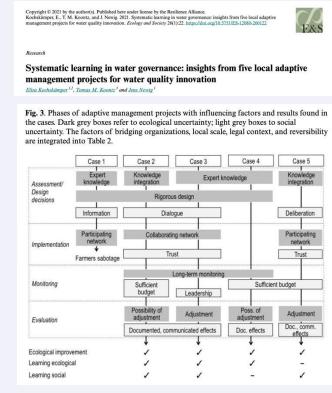


Kathy Boomer

Current Project / Research:







• Future Interests:

Supporting watershed restoration focused on food C water security by:

- Modeling community connections to areas of GW/SW interactions, 0 C 1st order flowpaths, and triblets to inform watershed management
- Advancing integrated water management strategies (precision irrigation, conservation drainage, nature-based solutions, and advanced grazing systems)

John Bovay





Agricultural and Applied Economics, Virginia Tech Associate Professor

Expertise:

- Economics of food and ag policy
- Health, prices, costs, environment

- Food safety
- Food loss and waste
- Climate-smart ag
- Hydroponics

John Bovay



COLLEGE OF AGRICULTURE AND LIFE SCIENCES
AGRICULTURAL AND
APPLIED ECONOMICS
VARGINIA TECH

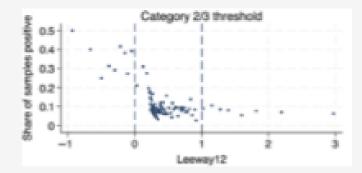
Overall program goal:

Use empirical economic methods to analyze public policies related to food and agriculture, with a focus on human health impacts, the distribution of welfare outcomes, and effects on the environment.

stac

Major Publications:

 Bovay (2025). "Shaming, stringency, and shirking: Evidence from food-safety inspections." American Journal of Agricultural Economics DOI: 10.1111/ajae.12480.



- Bovay and Sumner (2018). "Economic Effects of the U.S. Food Safety Modernization Act." Applied Economic Perspectives and Policy DOI: 10.1093/aepp/ppx039.
- Goodrich et al. (2023). "Battling bots: Experiences and strategies to mitigate fraudulent responses in online surveys." Applied Economic Perspectives and Policy DOI: 10.1002/aepp.13353



Current Research Projects

- On-Farm Loss and Waste of Vegetables (USDA NIFA AFRI)
 - Link two restricted-access, farm-level USDA data sets
 - Identify causes of on-farm loss and waste, with a focus on contracts and crop insurance premium subsidies
- Alliance to Advance Climate-Smart Agriculture (USDA NRCS)
 - Paying farmers \$100/acre (or animal unit) to adopt climate-smart practices
 - Evaluating market potential/consumer willingness to pay
- Economics of controlled environment agriculture (USDA NIFA RICSAF / USDA ERS)
 - How does the expansion of CEA affect markets?

Future Interests:

- Food prices, food insecurity, SNAP
- Worker safety and health
- Economics and ethics of food systems
- Food systems and culture
- Economics of ag-environment tradeoffs in the Chesapeake watershed

Chris Brosch





Delaware Department of Agriculture Deputy Secretary & LEADelaware Director

Expertise:

- Big beets
- Long bikes rides
- Second place at pub trivia

Scientific & Technical Advisory Committee

Chris Brosch

- Soil fertility and conservation
- Nutrient management
- Emerging contaminants
- Agriculture and aquaculture policy
- Emergency response
- Extension education
- Professional leadership
- Mental health
- Cycling infrastructure

Projects/Publications:

- 2009 TMDL
- 2015 DE WIP III
- Kleinman, et al. Phosphorus and the Chesapeake Bay:Lingering Issues and Emerging Concerns for Agriculture. Journal of Environmental Quality. Published Aug 15, 2019.
- Brosch, C., & Cartanza, G. (2021). Covid-19 acutely impacted the Delmarva poultry industry in early 2020. Delaware Journal of Public Health, 7(1),
- Natural and Working Lands chapter in 2022 Climate Action Plan
- 2022 & 2025 Highly pathogenic avian influenza outbreak responses



Chris Brosch

LEADelaware Executive Board





Nate Bruce Delaware Cooperative Extension

Farm Business Management

302-362-7619

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Mule Run Farms Farmer 302-381-6464 mulerunseed@gmail.com



Food Bank of Delaware Ag. Programs Director 609-502-1314 kbrolis@fbd.org



Nichole Krambeck Delcarm, LLC Insight Ag Scouting, LLC Certified Crop Specialist Owner/Agronomist 302-500-1003 302-827-3120 loganb283@gmail.com nichole@insightagscouting.com



L& L Farms Farm Manager

302-236-8987

lisa.porter921@gmail.com



Rebecca Schaller Delaware Department of Agriculture Controller 302-270-0511 rebecca.schaller@delaware.gov





Food Studies/ Urban Farm Coordinator Environmental Program Manager 302-505-4382 brooke.walls@delaware.gov



Delaware Cooperative Extension

Plant Diagnostician

302-502-1373

jillp@udel.edu

Ashley Tabibian 302-299-9315 ashley.tabibian@delaware.gov



Odyssey Charter School 864-838-0780 lisstracy43@gmail.com

Future Interests:

- PFAs fate/transport in soil & crops
- PFAs phytoremediation
- Communicating inclusivity
- Multimedia tools

Kathy Bunting-Howarth





New York Sea Grant Associate Director

Cornell Cooperative Extension
Assistant Director

Expertise:

- Coastal Management
- Marine Policy

- Public Engagement
- Social Science Methods
- Water Resource
 Management

Kathy Bunting-Howarth

My research is directed to support extension work. Since I support our entire program, I've done work to support the following focus areas

- Healthy Coastal Ecosystems
- Resilient Coastal Communities and Economies
- Sustainable Fisheries and Aquaculture
- Environmental Literacy and Workforce Development

Projects/Publications:

- People on the Move in a Changing Climate
 - https://www.pemocc.org/
- Living with Water: Documenting Lived Experience and Social-Emotional Impacts of Chronic Flooding for Local Adaptation Planning
 - https://digitalcommons.lmu.edu/cate/vol14/iss 1/4
- Socioecological Resilience In Jamaica Bay (articles and Book chapter)
 - https://link.springer.com/article/10.1007/s1125
 2-017-0701-2
- Impact Based Weather Reporting-Evaluation
- Crude Oil Transportation
- State-EPA Nutrient Innovation Task Group, An Urgent Call to Action: Report of the State-EPA
- Environmental Actions, Identity, and Environmental Groups







Kathy Bunting-Howarth

Current Activities

I thrive when facilitating groups to solve wicked problems.

- Natural and Nature Based Solutions
- Marine Carbon Dioxide Removal
- Receiving Communities (PEMOCC)
- Flood Water, Water Quality and Public Health
- PFAS and other Emerging Contaminant (Social aspects)

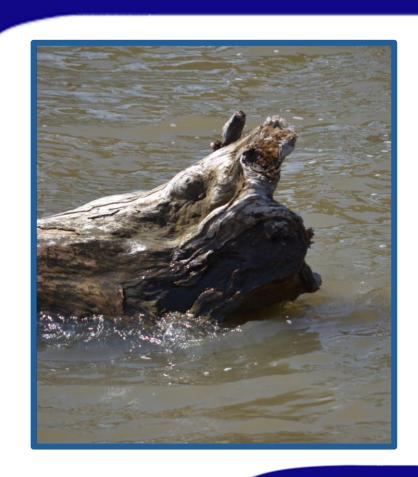
Future Interests:

- Long-term
 weather impacts
 on water quality
- Use of community/citiz en science in policy development
- Changes in human behavior and impacts on the environment post-COVID (remote work, values, AI, etc.)



Shirley Clark





Penn State Harrisburg
Professor of Environmental Engineering
ASCE-NOAA Task Force

Expertise:

- Urban Hydrology
- Urban Runoff Quality
- SCM (BMP)
 Performance

- Climate Change on Urban Hydrology
- Urban Infrastructure Design

Shirley Clark

Older: Stormwater quality fate, transport, treatment

Analyzed sedimentation and filtration devices for treatment of sediment, nutrients, metals, organics, salt, and radionuclides.

Current: Land development practices on urban flooding in climate change conditions

Investigating impacts of compaction and other land development practices into modeling of urban hydrology

Current: IMPACTS OF LOSS OF FEDERAL DATA that impacts design, operation, maintenance of infrastructure (design today, in the ground to 2100)

Projects/Publications:

 https://sites.psu.edu/shirleyeclark/stormwaterresearch-group-psh/researchgoals/researchprojects-summary/

My website which is updated slowly with information on projects and presentations

Recent: https://sites.psu.edu/shirleyeclark/

stormwater-research-grouppsh/researchgoals/researchprojects-summary/locatingburied-urban-streams-usinghistorical-data/





Shirley Clark

Current Project / Research: Urban Infrastructure and Land Development Implications on Flooding, Water Quality, and Public Health

Purpose: When infrastructure fails, people's lives are affected by flooding, loss of access to services, and potentially by disease. Outside of disasters, the siting and design of infrastructure impacts public health, but we don't link the two issues.

Methods: ethnographic surveys, measures of compaction and infiltration, soil moisture, runoff flows, (literature review on public health currently)

Lessons Learned/Reinforced: Lateral shallow subsurface movement and reduced infiltration due to structural soil layer. Compaction layer may be penetrated by utilities and by green infrastructure.

Lessons Learned: Assumptions underlying the current modeling structure are incorrect.

Lessons Learned: Human decision-making is very complex and ties to a sense of community and place attachment.

Future Interests:

- Large data modeling and other tools I'm too old to have seen in school
- Environmental Humanities and History
- Spending time
 with One Water
 One Story –
 connecting art
 and storytelling
 to the STEM part
 of water quality





100 YEARS OF SCIENCE 1925-2025

UMCES100.org

UNIVERSITY OF MARYLAND CENTER FOR ENVIRONMENTAL SCIENCE



OUR CENTENNIAL CELEBRATION



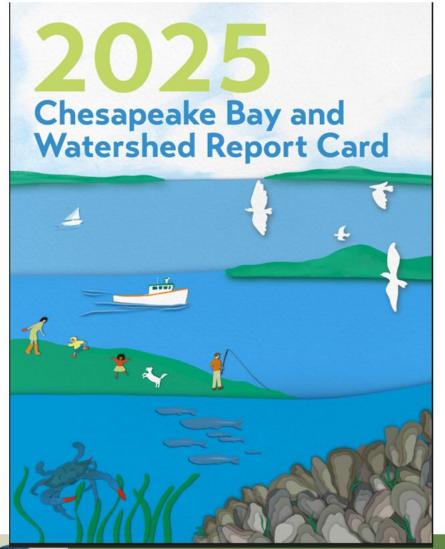


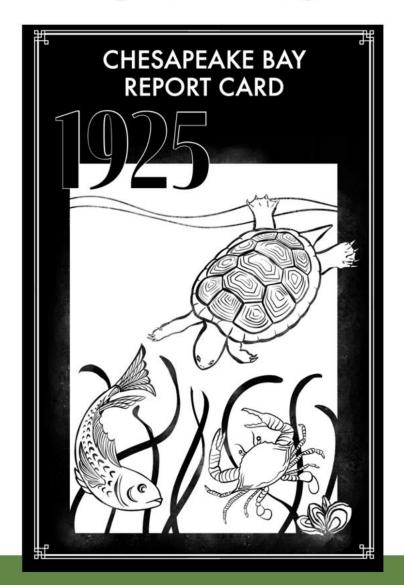
Lightning talk: The Chesapeake Bay and Watershed Report Card

Bill Dennison



2025 Report Card released yesterday





Bay health declined from the previous year but is still improving over time

Overall Bay





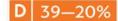
Scan here or visit ChesapeakeBayReportCard.org to learn more

Grade scale











Health trends

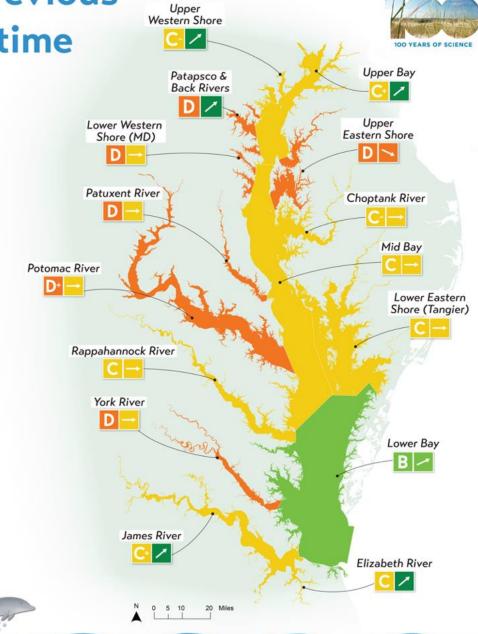




No change

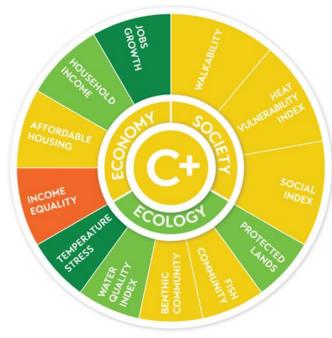
Slightly declining

Significantly declining



UMCES

Chesapeake Bay Watershed scores C+



Grade scale

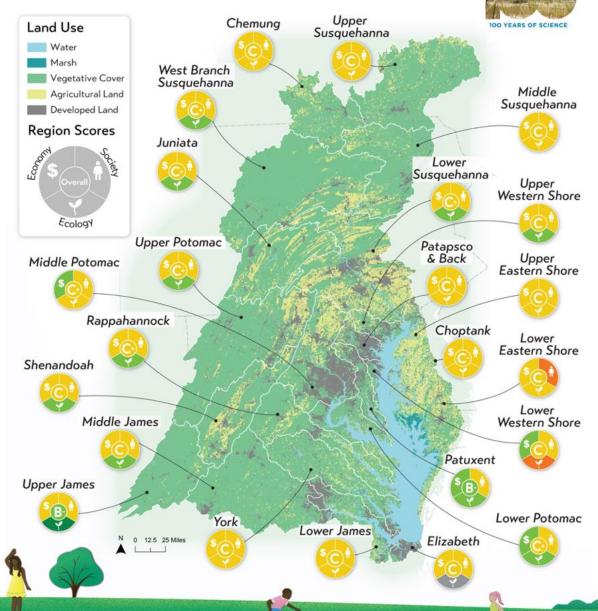




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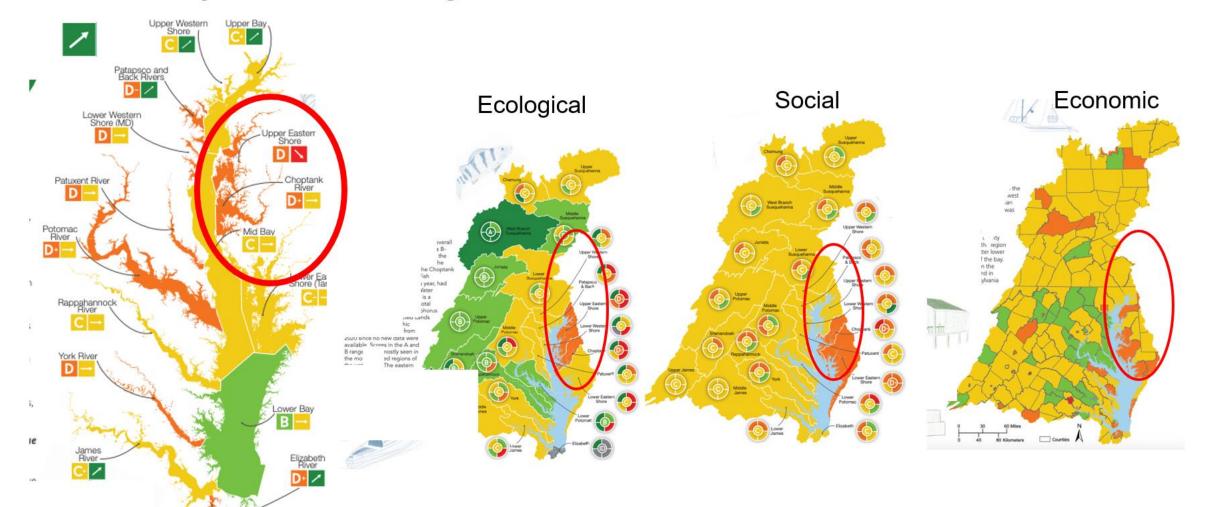






UMCES

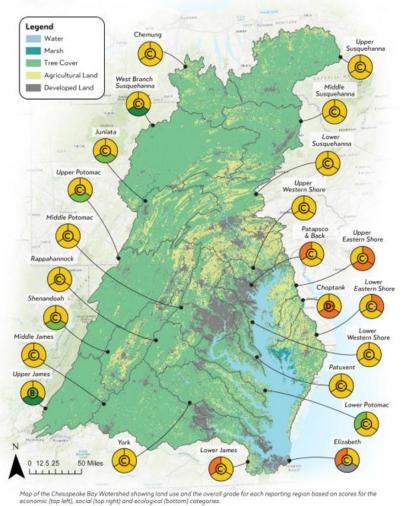
2022 report card: Systematic failure on Eastern Shore

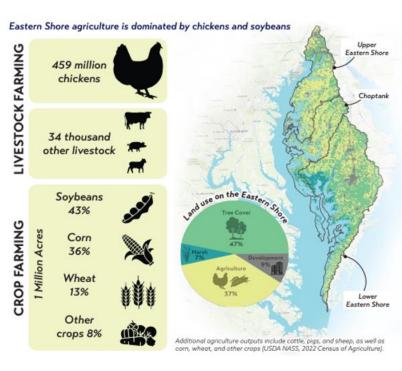




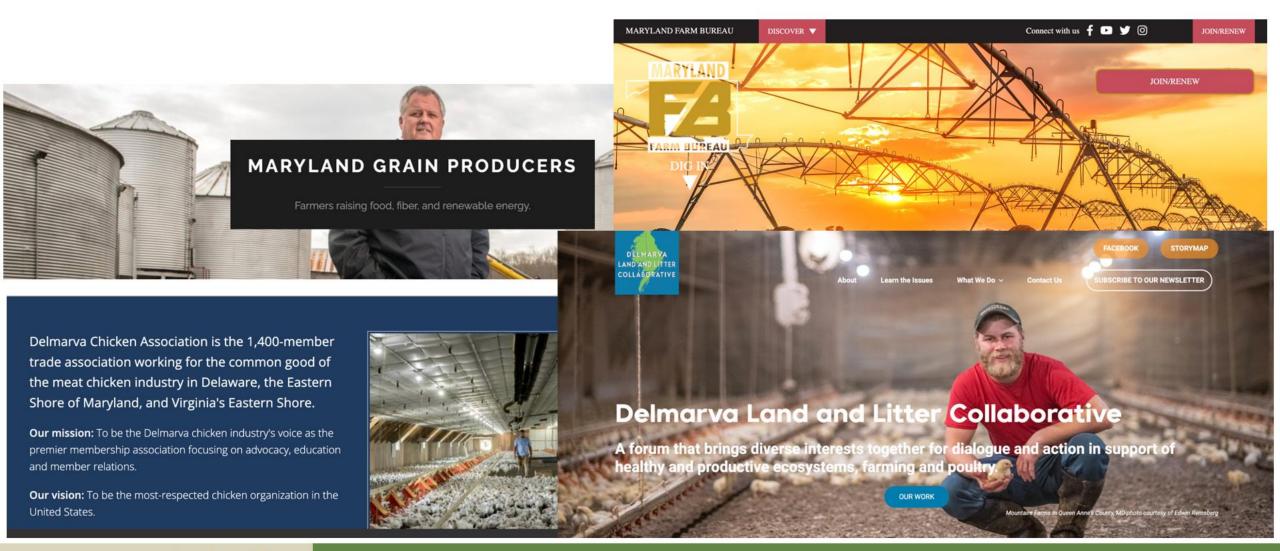
2023-4 report card: Delmarva focus





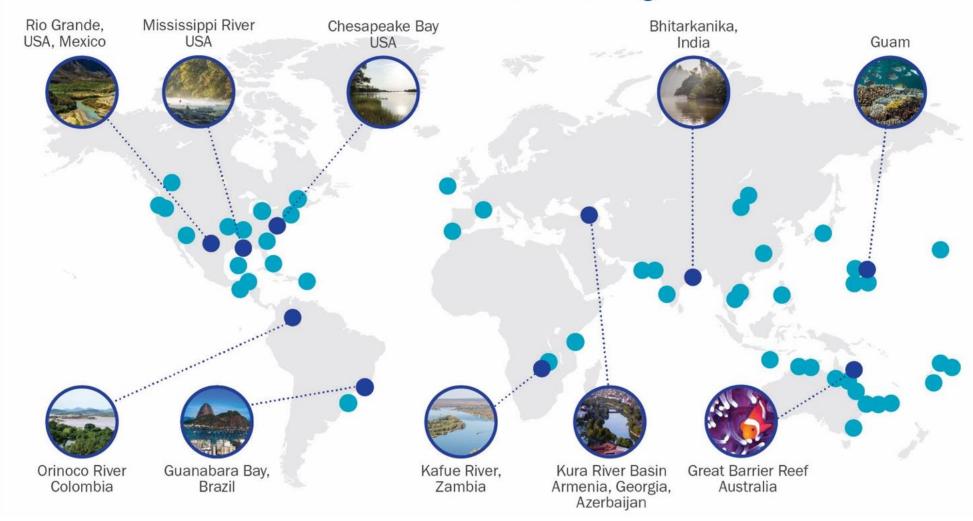


Conversations initiated with farming community





Report cards are increasingly being used internationally

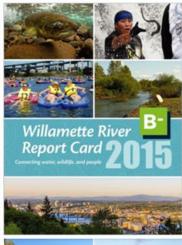






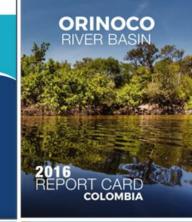






Western Lake Erie
1st Report Card







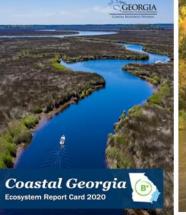


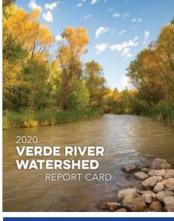


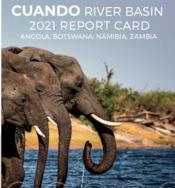






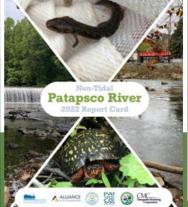


















Examining the current report card landscape

UMCES Chesapeake Bay & Watershed Report Card

- Bay and watershed-wide scientific overview and trend tracking
- Geographically-explicit reporting
- Policy support and scientific credibility



Longevity, good visuals, trend analysis



Needs more human/ cultural relevance, can get too complicated

CBF State of the Bay Report

- Data analysis for public education and advocacy
- Used for member engagement and building awareness
- Broad appeal to general audiences



Emotional resonance, outreach power



Less technical, limited data transparency

Local or Tributary Report Cards

- Reflect local conditions and community priorities
- Used for planning, stewardship, and education
- Tailored to grant, regulatory, or local needs



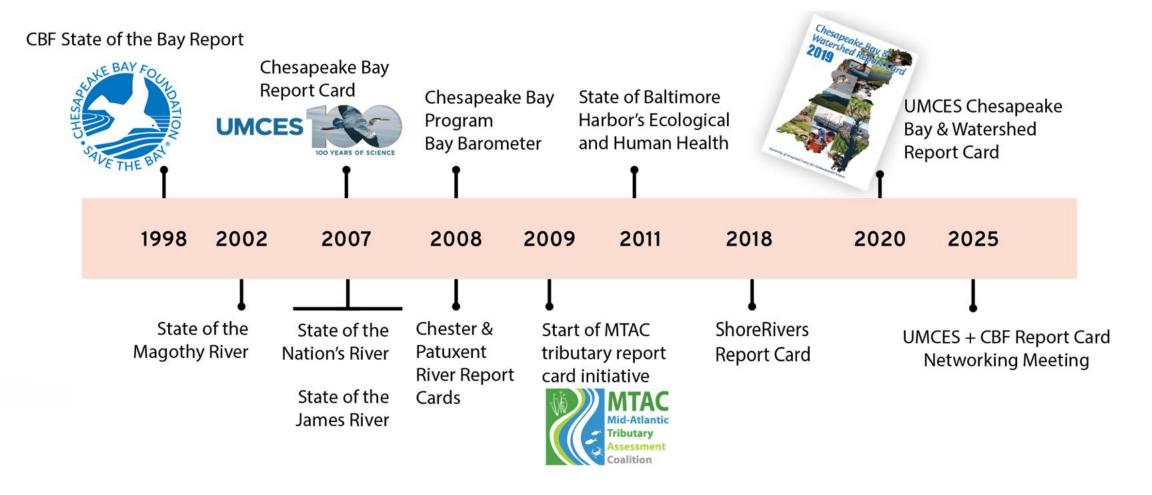
Locally relevant, links local waters to the Bay



Inconsistent format/ data, limited reach

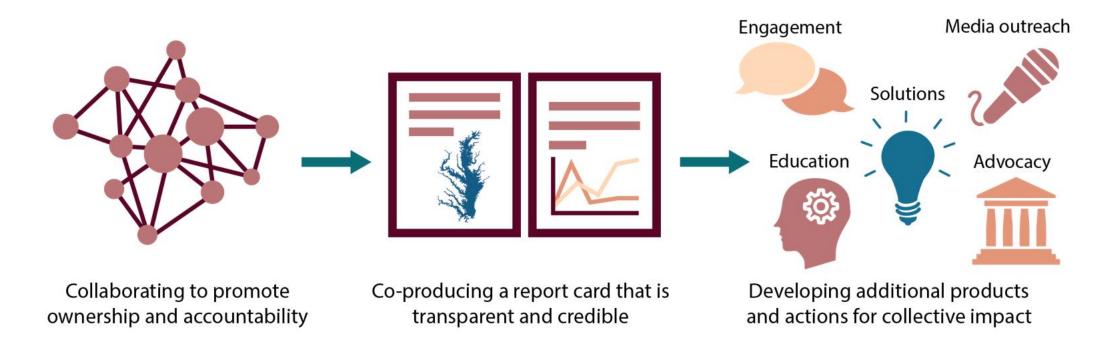


Report cards are popular in the Chesapeake Bay





Moving forward with a joint vision





KC Filippino





Hampton Roads Planning District Commission Senior Water Resources Planner

Expertise:

- Water Quality
- Stormwater
- Nutrient cycling

- Harmful Algae Blooms
- Local Government coordination

KC Filippino

With a background in estuarine science and harmful algal bloom research, I bring a strong understanding of the science behind Bay restoration. My role is about translating that science into clear, workable policies that local governments can adopt—and advocating for tools and flexibility they need to succeed.

Science

Regional

Coordination

Policy

Local Needs

Current Projects

- Manage <u>Regional Water Quality Monitoring Program</u> for stormwater model inputs
- > Project Management
 - NFWF funded restoration project on industrial property
 - Green parking lot retrofit
- Bay-related efforts
 - Beyond Bean Counting
 - Bay 101 training for stormwater managers
 - Natural capital accounting
 - Modeling BMPs and climate change impacts







KC Filippino

Projects beyond just the Bay

EPA Climate Pollution Reduction Grant – Developing Hampton Roads first ever Climate Action Plan

What's in your Floodwaters? – Identifying risks of toxic pollutants to climate change impacts

Land Use and Land cover data for Virginia

The future of Bay restoration = better land use planning

- Tools, outreach, and education for redevelopment, green infrastructure, sustainability
- Climate resilience planning
- Seek funding for Brownfields redevelopment
- Bring in local perspectives to ensure science supports practical, scalable solutions
- Integrate new tools, data syntheses, and expertise to help local governments lead by example

Carl Friedrichs





Virginia Institute of Marine Science Professor / Assoc. Director of CBNERR-VA

Expertise:

- Estuarine & Coastal
 Sediment Dynamics
- Water Quality
 Monitoring Networks

Water Clarity

Remote Sensing

Water Quality

Criteria Attainment

Carl Friedrichs

Focus areas, oldest to newest (1985 - present):

<u>Hydrodynamics</u>: Tides, Waves, Estuarine Circulation, Boundary Layers, Bed Stress, Mixing

<u>Sediment Dynamics</u>: Sand Scour, Mud Erosion, Suspension, Object Burial, Mud Gravity Flows

<u>Morphodynamics:</u> Evolution of Shelves, Coasts, Estuaries, Marshes, and Tidal Flats

Water Clarity: Floc Dynamics, Turbidity, Secchi Depth, Kd, TSS, Organics, Satellite Reflectance

Water Quality: Dissolved Oxygen, Chlorophyll, Nitrogen, Phosphorus, Criteria Attainment

Most Recent Publications about Chesapeake Bay:

- Turner, J., C. Friedrichs, D. Parrish, and K. Fall, 2025. Chesapeake Bay water clarity: challenges and successes. In Press: Annual Review of Marine Science. Preprint at https://bit.ly/4mWa8bE
- Testa, J., W. Liu, W. Boynton, D. Breitburg, C.
 Friedrichs, M. Li, D. Parrish, M. Trice, and D. Brady,
 2024. Physical and biological controls on short-term variations in dissolved oxygen in shallow waters of a large temperate estuary. Estuaries and Coasts. 47:
 1456–1474. https://doi.org/10.1007/s12237-024-01372-5

These two papers use CBP water quality monitoring data to better understand controls on Chesapeake Bay water clarity and dissolved oxygen.



Carl Friedrichs

Turner et al. (in press):

Nitrogen & sediment input to the Bay has decreased (especially since ~1993).

TSS & Kd ↓ meant light ↑, so algae & Chlor ↑, and Secchi depth got worse.

More N reduction led to N limitation, algae & Chlor ↓, and improvement in Secchi depth after ~2009.

Key point: Sediment & N ↓ means more light and (eventually) less algae.

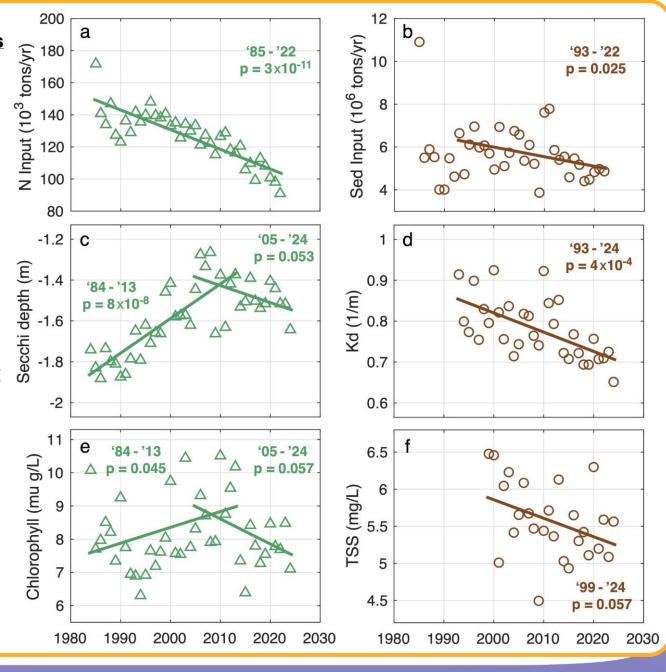
Long-Term Bay Trends

Better conditions are downward on all plots.

a,b: Annual inputs to Bay according to CBP Phase 6 Watershed Model

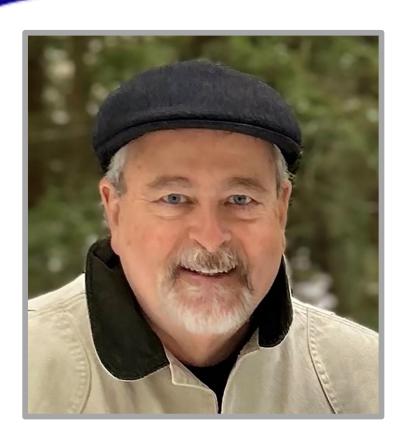
c,d,e,f: Median annual Values observed along Bay mainstem by CBP Monitoring Program

(Kd = diffuse light attenuation coeff.
TSS = total suspended solids. All data are flow normalized.)



Benjamin Hayes



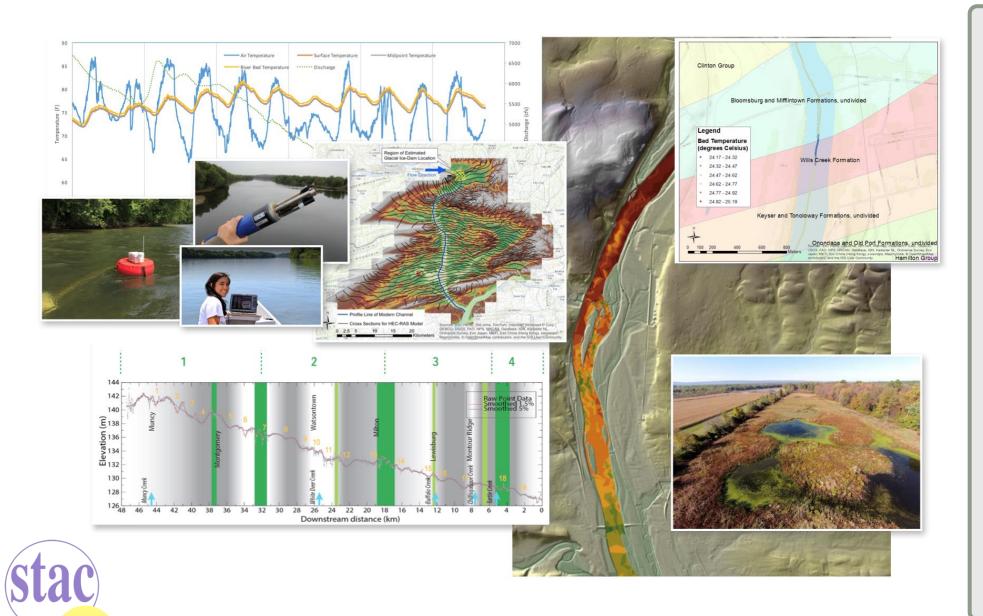


Bucknell University

Professor, Watershed Sciences and Engineering

- Fluvial Geomorphology
- Hydrogeology
- Stream Restoration





INTERESTS

1. Landscape System Science (LLS)

"Memory" - How episodes in the past determine our ability to envision future scenarios.

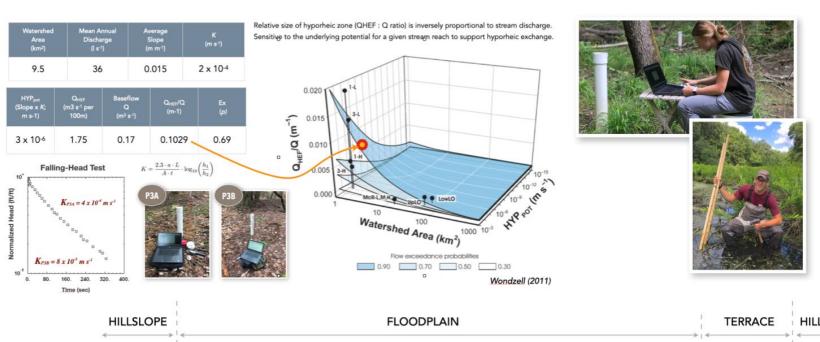
2. Temperature

Measuring spatial and temporal variability

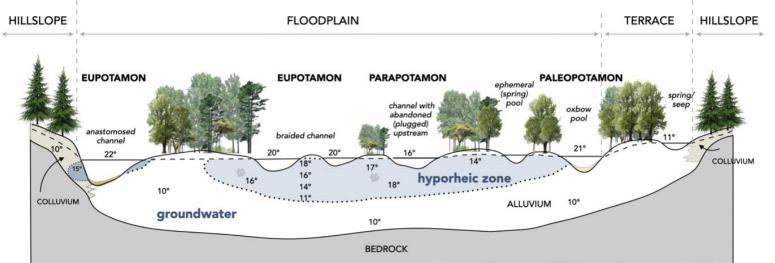
Atmosphere-waterriver bed influences

3. Alluvial architecture

- Groundwatersurface water interactions
- Aquifer storativity and hyporheic exchange potential



preferential flow



INTERESTS

1. Landscape System Science (LLS)

"Memory" - How episodes in the past determine our ability to envision future scenarios.

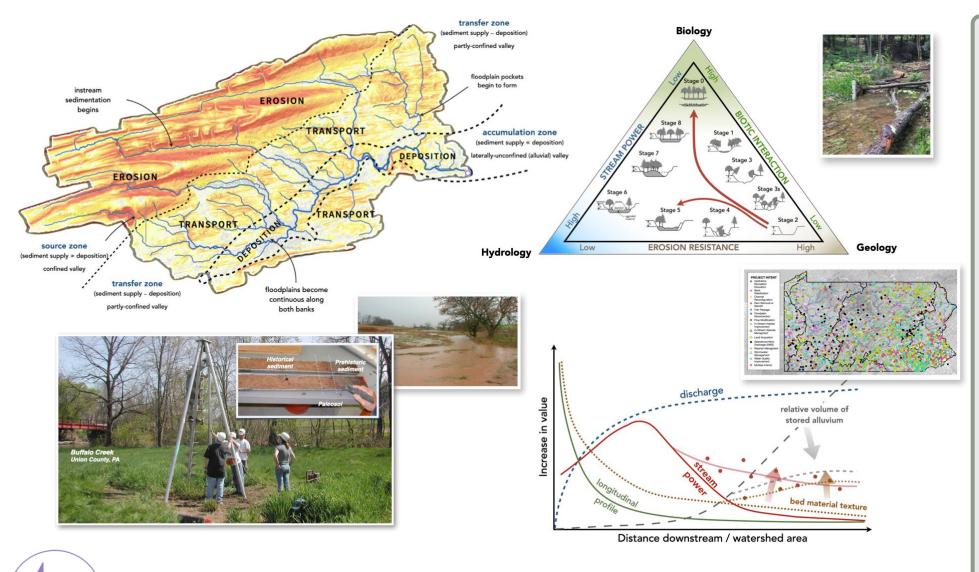
2. Temperature

Measuring spatial and temporal variability

Atmosphere-waterriver bed influences

3. Alluvial architecture

- Groundwatersurface water interactions
- Aquifer storativity and hyporheic exchange potential



INTERESTS

4. Stream Restoration

What does history tell us?

Guiding image

Channel Form vs process-based design approaches

5. Sediment continuity

Intrinsic thresholds, continuity, and legacy sediments

6. Trajectories

- Assessment of > 6,000 restoration projects
- Socio-ecologic factors preventing adaptive management
- Reconnectivity; stream-wetland complexes

Jeni Keisman

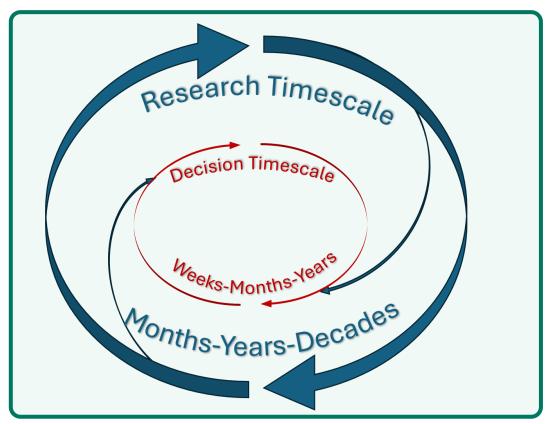


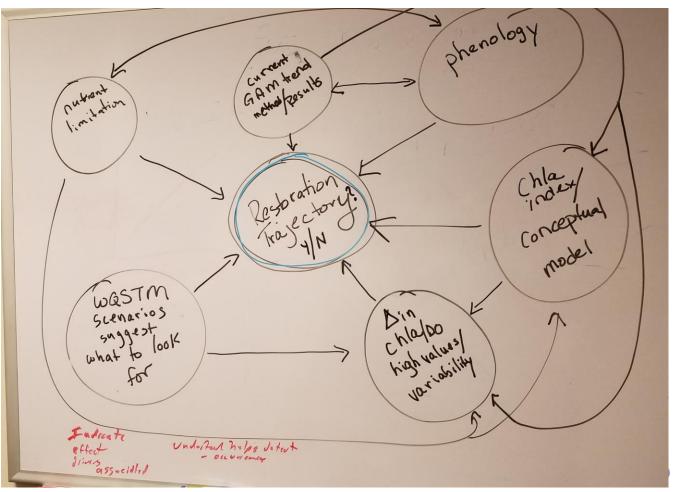


Hydrologic Impacts Branch Chief USGS Water Resources Mission Area

- Factors affecting water availability and use (quantity + quality)
- Strategic science planning
- Research integration and synthesis
- Multi-disciplinary team leadership

Jeni Keisman







ESPD Hydrologic Impacts Branch

The Hydrologic Impacts Branch supports the USGS Water Mission Area mission with research and integrated assessments to understand status and trends in water availability.

We track water quantity and quality through time, from soils to river channels, and from field to national scale. We use field and laboratory work as well as data-driven and process modeling approaches to quantify and infer causal connections between stressors, water availability, and affected natural and











Location: Catonsville, MD
Areas of expertise: Interactions between hydrology, geomorphology, and ecology. Work includes integrated assessments, predictive machine-learning models, trends assessments, and cascal inference methods development to explain drivers of water quality and ecosystem health.



Location: Catoroville, MD
Areas of expertise: Ecosystem ecologis
with a focus on science synthesis and
integration, strategic planning, and
research management. Research has
included studies of nutrient cycling in
forest soft, factors affecting changes is
water quality and ecosystem satura and
functioning, and the water-energy
mean.

Projects and Functions currently managed by HIBsters:

Daren Carlisle

Location: Lawrence, KS

Extensive experience with

communities.

Areas of expertise: Fisheries science,

statistics, ecology, and ecotodcology.

manipulating large datasets, Machine

Learning, investigating interventions

connections between stressors and

and scenarios, and making causal

- Building capacity for assessment and prediction of post-wildfire water availability
- . CONUS EcoFlows
- . EcoFlows Regional IWAAs
- . Hydrology & hydrologic consequences of legacy land use and land use change
- Interpretation of Pesticide, PFAS, and geogenic constituents data in SW and GW nationwide
- IWAAS Trends and Drivers
- · National Integrated Water Availability Assessments
- . Environmental Health: Impacts of mining on water supplies
- . Simulating Drought Risk and Expanding Prototype to National Coverage
- · Transboundary water quality: Kootenai River

Hydrologic Impacts Branch: Conceptual Frameworks Drive Model Development



Prototype modeling and assessment of post-**Ecological Impacts of Altered Flows** wildfire water availability "Natural" Observed **DRIVER ATMOSPHERIC FIRE ECOLOGIC** LAND SURFACE SOIL Category of factors Condition Condition **Processes** Characteristics Characteristics **Processes** Characteristics Vegetation % Soil organic Land use/cover Habitat matter Precipitation Alteration from Slope disturbance % Clay content **FACTOR** Storms Proximity to fire Biogeochemical Available water Background Solar radiation Burn severity Watershed size Sensitivity Measurable cycling capacity Snowmelt Area burned Aspect property with a Carbon cycling (Exposure) **Erodibility** Aridity index Burn frequency **Ecoregion** direct or inverse Nutrient cycling Hydrologic Droughts Geology relation to one or Contaminant group Evaporation Surface runoff bioavailability more stressors. Liquid limit Topography Evapo-Soil metals **Adaptive Potential** Elevation transpiration Soil permeability Land use change Capacity **Impacts** Hydric capacity **Tropical Cyclone Impacts to Water Quality STRESSOR** Baseflow **Nutrients** Dissolved organic Runoff Dissolved ions A variable that can Sediment nutrients Vulnerability Water table carbon Streamflow Suspended material affect water Sediment Dissolved metals Dissolved oxygen Percolation Turbidity availability and Water transport Heavy Rainfall Wind Discharge Carbon ecosystem health Scour **Drivers** temperature Specific conductance Adapted from IPCC 2007 **Effects** Storm Surge **Impacts EFFECT** Macroinvertebrate diversity Fish kills Biogeochemical processes Nitrogen & phosphorus **Flooding** Macroinvertebrate density Water quality Potential impact of **Availability** mobilization Habitat alteration Peak flows Coastal combined stressors Feeding Flow paths Debris flow on water availability or Inland **DBPs** Effects on biota C-Q relations ecosystem health Overbank Aquatic health guidelines Water vield Treatment costs Turbidity Maximum contaminant levels Food web dynamics Infrastructure failure Overtopping GW wells Moving fresh-saline Sediment transport GW contamination Elliott et al. 2024 Drinking water Eco habitat damage interface SW/GW drinking Salinization Sewage treatment Eco habitat damage Wastewater lagoons water SW/GW drinking water Industrial/ag water Industrial/ag water

Public Supply

Windham-Myers et al. 2024

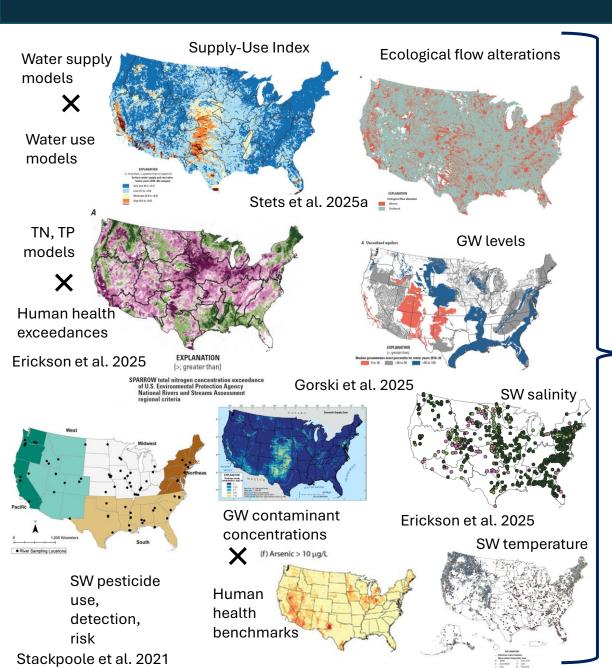
Ecological

Agricultural

Industrial

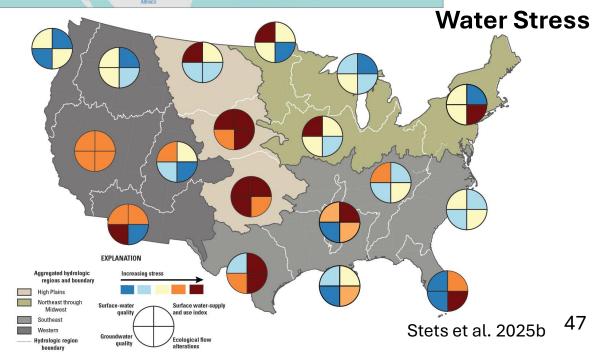
Hydrologic Impacts Branch: National Assessments Integrate Multiple Models & Observations







Water Cycle



Jeni Keisman

Future Interests:

- Predictive modeling and risk assessment of water availability for human and natural uses
- Using decision science to prioritize science/research directions
- Innovative nature-based and biotechnology solutions to address water resource management and sustainable use.
- Natural capital accounting
- USGS Profile with publication list: <u>Jeni Keisman, Ph.D. | U.S. Geological Survey</u>



Figure Citations

Elliott, S. M., Hornberger, M. I., Rosenberry, D. O., Frus, R. J., & Webb, R. M. (2024). A conceptual framework to assess post-wildfire water quality: State of the science and knowledge gaps. *Water Resources Research*, 60, e2023WR036260. https://doi.org/10.1029/2023WR036260

Erickson, M.L., Miller, O.L., Cashman, M.J., Degnan, J.R., Reddy, J.E., Martinez, A.J., and Azadpour, E., 2025, Status of water-quality conditions in the United States, 2010–20 (ver. 1.1, February 2025), chap. C of U.S. Geological Survey Integrated Water Availability Assessment—2010–20: U.S. Geological Survey Professional Paper 1894–C, 85 p., https://doi.org/10.3133/pp1894C.

Goodling, P.J., Oelsner, G.P., Hecht, J.S., Cherry, M.L., Johnson, Z.C., Koenig, L. E., and Headman, A.O., 2024, Long-term water-quality trends for rivers and streams within the contiguous United States using Weighted Regressions on Time, Discharge, and Season (WRTDS): U.S. Geological Survey data release, https://doi.org/10.5066/P914BOYS.

Gorski, G., Stets, E.G., Scholl, M.A., Degnan, J.R., Mullaney, J.R., Galanter, A.E., Martinez, A.J., Padilla, J., LaFontaine, J.H., Corson-Dosch, H.R., and Shapiro, A., 2025, Water supply in the conterminous United States, Alaska, Hawaii, and Puerto Rico, water years 2010–20 (ver. 1.1, January 17, 2025), chap. B *of* U.S. Geological Survey Integrated Water Availability Assessment—2010–20: U.S. Geological Survey Professional Paper 1894–B, 60 p., https://doi.org/10.3133/pp1894B.

IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

Stackpoole, S.M., Shoda, M.E., Medalie, L., Stone, W.W, 2021. Pesticides in US Rivers: Regional differences in use, occurrence, and environmental toxicity, 2013 to 2017, Science of The Total Environment, 787 (147147). https://doi.org/10.1016/j.scitotenv.2021.147147.

Stets, E.G., Archer, A.A., Degnan, J.R., Erickson, M.L., Gorski, G., Medalie, L., and Scholl, M.A., 2025a, The National integrated water availability assessment, water years 2010–20, chap. A of U.S. Geological Survey Integrated Water Availability Assessment—2010–20: U.S. Geological Survey Professional Paper 1894–A, 24 p., https://doi.org/10.3133/pp1894A

Stets, E.G., Cashman, M.J., Miller, O.L., and Powlen, K.A., 2025b, Integrated water availability in the conterminous United States, 2010–20, chap. F of U.S. Geological Survey Integrated Water Availability Assessment—2010–20: U.S. Geological Survey Professional Paper 1894–F, 41 p., https://doi.org/10.3133/pp1894F.

Windham-Myers, L., Root, T.L., Petkewich, M.D., Musgrove, M., Gill, A.C., Weaver, J.C., Conaway, C.H., Lindsey, B.D., Parchaso, F., Knowles, N., and Tomaszewski, E.J., 2024, State of science, gap analysis, and prioritization for southeastern United States water-quality impacts from coastal storms—Fiscal year 2023 program report to the Water Resources Mission Area from the Water Availability Impacts of Extreme Events Program—Hurricanes: U.S. Geological Survey Open-File Report 2024–1048, 64 p., https://doi.org/10.3133/ofr20241048





Associate Professor and Director Law,
Policy and Engineering
Associate Professor of Civil Engineering
Penn State

Expertise:

Sustainability
 Science

- Natural Resources Policy
- Civil Engineering

Law Policy Engineering The Law Policy and Engineering Initiative is an interdisciplinary educational and transdisciplinary research, engagement and service program at the interface of law, policy and engineering at Penn State.





Engaged Research &Experiential Learning



Legislative Fellowships



I explore the complex interactions and interdependencies between people, institutions, and the environment to better understand and improve governance, resilience, and decision-making.

Knowledge-to-Action Gap

- Approaches to producing science more likely to be used (e.g., coproduction, engaged research)
- Boundary organizations and intermediaries
- Drivers/barriers to use including context (e.g., individual, organizational, and institutional factors)

https://lpe.psu.edu/kirchhoff-lab



I seek to understand what water governance and policy arrangements lead to better environmental and social outcomes?

Water Governance

• Study of collaborative water governance and conditions under which water quality improved (i.e., government led collaborations) or not (e.g., conflict resolution).

https://lpe.psu.edu/kirchhoff-lab



Knowledge-to-Action Gap

What role do boundary organizations and intermediaries play in accelerating climate adaptation?

- Rapid evidence synthesis

Water Policy

How do ordinances (and other factors) enable GSI in PA?

- Ordinance analysis, survey and interviews.

https://lpe.psu.edu/kirchhoff-lab

Future Interests:

- Use of Al in evidence synthesis
- Engaged research and change processes
- Social science and collaborative governance



Scott Knoche





Morgan State University PEARL Director

- Non-Market Valuation (RP, SP)
- Social Science Survey
 Research Methods
- Regional Economic Impact Analysis
- Coupled Social-Ecological Models
- Research Coproduction

Scott Knoche

I apply a quantitative social science toolkit to understand preference and economic values related to the following:

- Outdoor Recreation (eg, rec fishing, hunting, boating)
- Environmental Restoration (oysters, seagrass, grasslands)
- Public Access and Urban Coastal Greenspace
- Aquaculture Production and Seafood Consumers
- Trash in Urban Waterways

Projects/Publications:

- Baltimore BLUE-Core: BLUEspace COllaborative REsearch for Urban Coastal Access and Climate Resilience in South Baltimore (PI - MDSG)
- Identifying a Quantitative Trash Threshold for the Recreational Use of Rivers/Streams (PI -MDE/MWCOG/EPA)
- Assessing Hunter Opinions and Economic Impacts Associated with Sika Deer/Black Bear Hunting (PI -MDDNR)
- Sustainable Aquaculture Systems Supporting Atlantic Salmon (Co-PI - USDA)
- Economic Valuation of Harmful Algal Bloom Control in Freshwater Lakes and Reservoirs (Co-PI - USACE)















Scott Knoche

Current Project / Research

Baltimore BLUE-Core: BLUEspace COllaborative REsearch for Urban Coastal Access and Climate Resilience in South Baltimore (MDSG)

- Year 1 Building and Enhancing Relationships in South Baltimore
- Years 2 & 3 Quantitative & Qualitative Research with the Community
- Year 4 Applying Findings to Develop & Improve Access to Coastal Green/Blue Spaces



Future Interests:

Climate

 Social & Economic Implications of AI

Research
CoProduction

Ellen Kohl





University of Maryland, Baltimore County Assistant Professor

- Environmental Justice
- Intersectional geographies

- Environmental Governance
- Science-Policy Interface

Ellen Kohl

Interactions between scientists, policy makers, and activists to understand how policy perpetuates injustices and how activists contest unjust policies

Qualitative Analysis: Archival Research, Semi-Structured Interviews, Participant Observation

Critical Policy Analysis

Understand how science is used as a tool of oppression, and to understand how it can be used as a tool of liberation

Projects/Publications:

- Examining Children's Environmental Health (CEH)
 Science and Science-Based Regulatory Policy (NSF)
 - Examining how CEH science is used in rulemaking and understanding why CEH and EJ don't work together.
- Environmental Data Governance Initiative
 - Examining the implications of the new administration on climate change, public health, and environmental justice
- Kitchen Table Reflexivity
 - Intersectional methodological approach that intentionally recognizes that the context in which we do our research and who we talk about our research with impacts our research











Ellen Kohl

How does the US EPA use Children's Environmental Health (CEH) and Environmental Justice (EJ) Research/Science in rulemaking (PM2.5, PFAS, chlorpyrifos, and lead)?

Critical Policy Analysis: word count, archival research, content analysis

- 1. Examples of ways that US EPA regulations don't align with available science
 - OP Chemicals move from chemicals as class to specific chemicals & selection of one specific endpoint to establish developmental neurotoxicity (Hyland 2025)
 - Chlorpyrifos privileging of toxicology data over epidemiological data
 - PM 2.5 looking for alignment of toxicology and epidemiological data
 - PFAS importance of what counts as PFAS
- 2. Use of uncertainty in policy making instead of looking at what we know, rely on what we don't know as a way to limit policy.

Future Interests:

- Storytelling for placemaking
- Environmental justice and children's environmental health coalitions
- What would it take for environmental governance to actually protect the most vulnerable

Yusuke Kuwayama





University of Maryland, Baltimore County Associate Professor of Public Policy

- Water quality valuation
- Managed aquifer recharge

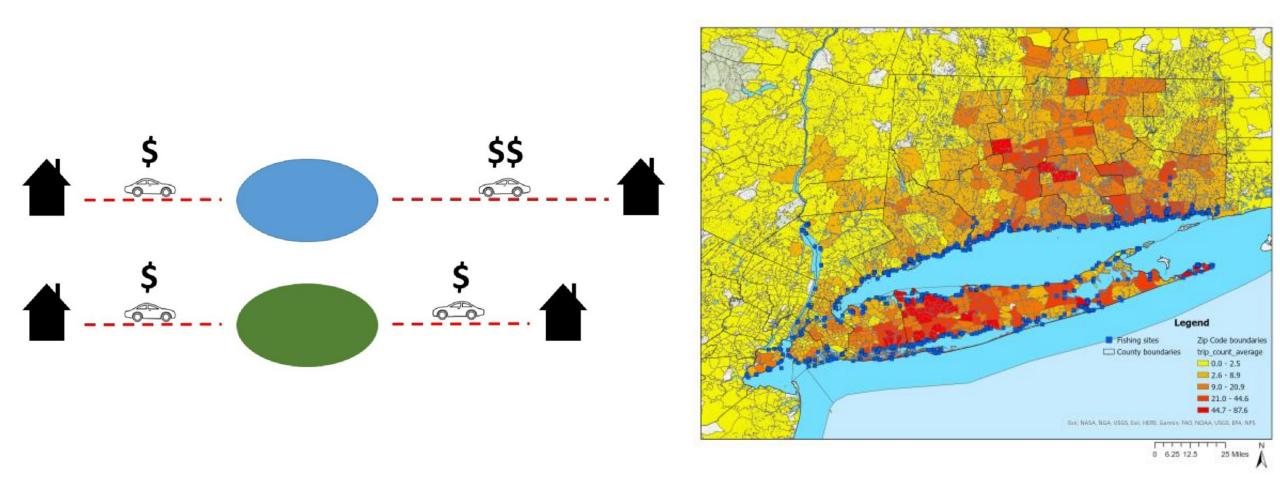
- Connected groundwater-surface water systems
- Societal value of scientific information







Nonmarket valuation: Travel cost models

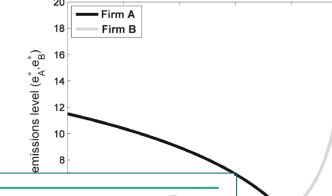


$$V_{ikt} = \alpha_0 + \alpha_1 Travel_{ikt} + \alpha_2 WQ_{kt} + \gamma_t + \eta_k + \nu_{ikt}$$

Nonmarket valuation: Hedonic pricing method



Decisionmaking under uncertainty



Environ Resource Econ (2017) 68:473–499 DOI 10.1007/s10640-016-00 CrossMark

Review

Cel

Optimal Manage with Time Lags a

Yusuke Kuwayama¹ •

Accepted: 4 May 2016 / Publ © Springer Science+Busines

Abstract Many enviror few days to several cen

Decision-making under great uncertainty: environmental management in an era of global change

Stephen Polasky¹, Stephen R. Carpenter², Carl Folke^{3,4} and Bonnie Keeler⁵



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¹Department of Applied Economics & Department of Ecology, Evolution and Behavior, University of Minnesota, St Paul, MN 55108, USA

²Center for Limnology, University of Wisconsin, Madison, WI 53706, USA

³ Beijer Institute, Royal Swedish Academy of Sciences, PO Box 50005, SE-104 05, Stockholm, Sweden

⁴Stockholm Resilience Center, Stockholm University, SE-106 91, Stockholm, Sweden

⁵Institute on the Environment, University of Minnesota, St Paul, MN 55108, USA

Value of scientific information



Contents lists available at ScienceDirect

Journal of Environmental Economics and Management

journal homepage: www.elsevier.com/locate/jeem





Early warning systems, mobile technology, and cholera aversion: Evidence from rural Bangladesh

Emily L. Pakhtigian a,*, Sonia Aziz

Springer Link

Published: 13 November 2019

Market-based methods for monetizing uncertainty reduction

Roger Cooke & Alexander Golub

Environment Systems and Decisions 40, 3-13 (2020) Cite this article

211 Accesses | 3 Citations | 3 Altmetric | Metrics

GeoHealth

Research Article 🙃 Open Access 💿 🕦

Quantifying the Human Health Benefits of Using Satellite Information to Detect Cyanobacterial Harmful Algal Blooms and Manage Recreational Advisories in U.S. Lakes

Signe Stroming, Molly Robertson, Bethany Mabee, Yusuke Kuwayama 🔀 Blake Schaeffer

First published: 18 June 2020 | https://doi.org/10.1029/2020GH000254 | Citations: 18

Data & Policy (2023), 5: e16 doi:10.1017/dap.2023.12

RESEARCH ARTICLE

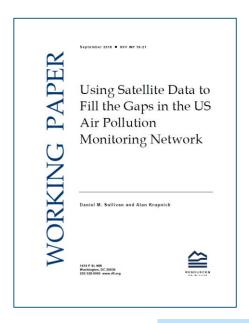


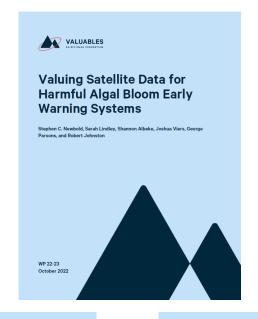
Examining the value of satellite data in halting transmission of polio in Nigeria: A socioeconomic analysis

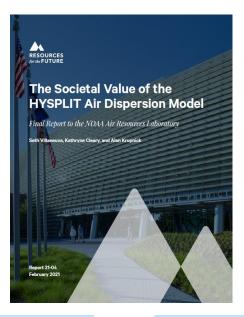
Mariel Borowitz¹, Janet Zhou², Krystal Azelton³ and Isabelle-Yara Nassar¹

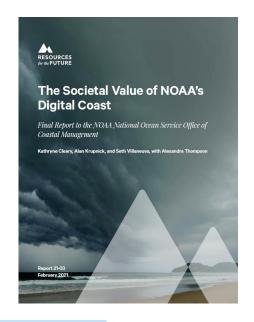


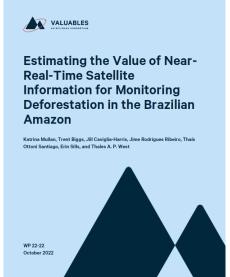
Value of scientific information

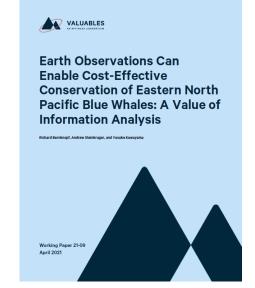


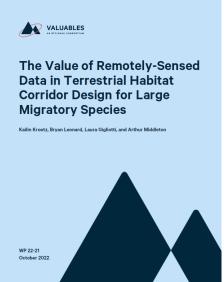












Erin G. Letavic, P.E.





Herbert, Rowland & Grubic, Inc.
Team Leader | Municipal & Water Resources

- Agricultural stormwater
- Municipal engineering

- Fundraising
- Public outreach
- Building teams

Erin G. Letavic, P.E.

Who is HRG: ~ 400 employee civil engineering consulting firm (PA, MD, WV, OH); Harrisburg, PA

My education:

B.S. Geology, Music Performance minor – Allegheny College

M.Eng. Environmental Engineering – Penn State University Capital Campus

Future Interests:

Agricultural technology

- AI/ML and design efficiencies
- Climate adaptations
 for food production
- Model & monitoring alignment

Key Projects:

Countywide Action Plans







Center for Conservation Assistance Training



Agriculture Conservation Assistance Program







Mark Monaco





NOAA NOS National Centers for Coastal Ocean Science Senior Scientist for Coastal & Ocean Ecosystems

- Marine Spatial Ecology
- Marine Spatial Planning
- Integrated Ecosystem
 Assessments for EBM

- Habitat Mapping
- Species' HSM
 - Coral Ecosystem
 Science
- Fish Ecology

Mark Monaco

Overview of your research & management activities

Practicing NOAA scientist and manager in the field of coastal & marine spatial ecology and planning in support of ecosystem-based management for over 41 years

Research

Science leadership, research, and assessment portfolio focused on delivering management relevant science for conservation, protection, and restoration of coastal and marine resources.

Coastal and ocean planning to define and evaluate marine protected area boundaries (e.g., NOAA National Marine Sanctuaries), and marine spatial modeling and assessments designed to minimize conflicts among ocean users when locating ocean industries (e.g. Offshore Energy).

NOAA Integrated Ecosystem Assessments to support EBM needs (e.g., ecological relevancy of MPA boundaries).

Management

Science leadership positions include serving as the Director of NOAA/NCCOS Center Coastal Monitoring & Assessment (2009-2016). Chief of the NOAA/NCCOS Marine Spatial Ecology Division (2017-2023). Currently Senior Scientist for Coastal and Ocean Ecosystems in NOAA's Ocean Service.





Projects/Publications:

Co-developed & authored STAC CESR Living Marine Resources publications and plans. Still in play!!

Rose, K., Monaco, M. E., Ihde, T., Hubbart, J., Smith, E., Stauffer, J., & Havens, K. J., L. McDonnell, L.C. Linker, and K.S. Gootman. In Review. Proposed framework for analyzing ecosystem restoration actions on living resources: A case study using the Chesapeake Bay. Journal of the American Water Resources

Ecological connectivity to support marine spatial planning to support siting & evaluation of ocean conservation and industries (e.g., MPAs, OSW, Aquaculture, DSM?)

Monaco, M.E., A. M. Friedlander, and 6 co-authors. 2007. Characterising reef fish populations and habitats within and outside the US Virgin Islands Coral Reef National Monument: a lesson in marine protected area design. Fisheries Management and Ecology, 2007, 14, 33–40

Integrated ecosystem assessments to support EBM

Monaco, M.E., Spooner, E., Oakes, S.A., Harvey, C.J. and Kelble, C.R. 2021. Introduction to the NOAA Integrated Ecosystem Assessment Program: Advancing Ecosystem Based Management. Coastal Management, 49:1, 1-8. https://doi.org/10.1080/08920753.2021.1846109.







Mark Monaco

Current Project / Research

Fish acoustic telemetry in Chesapeake Bay to define species' habitat utilization and movement patterns. Component of NOAA's Changing Ecosystems and Fisheries Initiative (CEFI) (POC; Bethany.Williams@noaag.gov).



Tracking Fish Movement in the Restored Poplar Island - NCCOS - National Centers for Coastal Ocean Science

Monitoring and assessment of Caribbean reef fish abundance & defining species habitat affinities through NOAA's National Coral Monitoring Program (NCRMP).

National Coral Reef Monitoring Program Sampling in the U.S. Virgin Islands - NCCOS - National Centers for Coastal Ocean Science

Future Interests:

- Spatial
 management of
 Chesapeake Bay
 resources within
 changing coastal
 & estuarine
 environments.
- Enhance
 integration of
 natural and
 social sciences
 with
 governances
 structures for
 management
 (e.g., CESR
 implementation).

Greg Noe





USGS, Florence Bascom Geoscience Center, DE Research Ecologist

Expertise:

- ECOSYSTEM ECOLOGY:
 plants,
 biogeochemistry,
 sediment, soils, hydro
 geomorphology
- Wetlands, streams, rivers, and estuaries

Greg Noe

WATERSHED AND CONNECTION TO ESTUARY

- · Floodplain effects on water quality
- Streambank erosion
- · Sediment fingerprinting
- Stream restoration
- Wetland restoration and creation
- Tidal freshwater zone
- Salinization / SLR
- Head-of-tide
- · Various Chesapeake studies

Projects/Publications:

- Stream Team
- Tidal Swamp
- Review of sediment science and management in Chesapeake
- Measure and model streambank erosion and floodplain deposition for ALL Chesapeake streams/rivers
- Ecosystem services valuation of floodplain benefits
- STAC stream restoration effectiveness
- Ghost Forests in coastal zone





Greg Noe

Current Project / Research

- Connecting conservation practices to local stream health in the Chesapeake Bay watershed
 - Do TMDL BMPs improve local stream health? Which stressors change?
 Bugs, fish, riparian improvement?
 - https://doi.org/10.3133/fs20243030
- Impacts of coastal and watershed changes on upper estuaries: causes and implications of wetland ecosystem transitions along the US Atlantic and Gulf Coasts.
 - Resilience of tidal freshwater wetlands
 - Impacts of SLR and salinization
 - Changes in sediment supply near head-of-tide

Future Interests:

 Phosphorus saturation of stream/river sediments and role in increasing P stream loads





West Virginia University
Assistant Professor, Environmental Engineering

Expertise:

- Wastewater Treatment
- Organic Waste Management
- Resource Recovery

- Sustainable Development
- LCA/LCCA
- AI/ML

Sustainable waste(water) management

Interdisciplinary (e.g., ag, anthro, public health)

Local and global (West Virginia & Costa Rica)

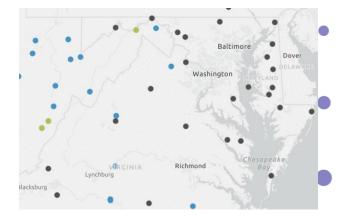


Projects/Publications:

- EPA: <u>Lagoon nutrient</u> removal
- NSF IRES: <u>Sustainable</u> <u>wastewater treatment</u> <u>in Costa Rica</u> (w/ anthropologists)
- USDA: <u>Appalachian</u>
 <u>Community Technical</u>

 <u>Assistance & Training</u>
- DoL: New entrants to Appalachia water workforce











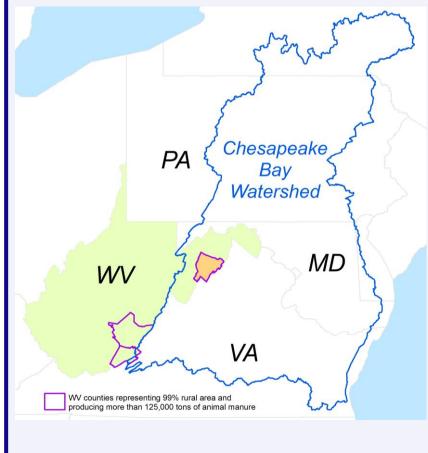


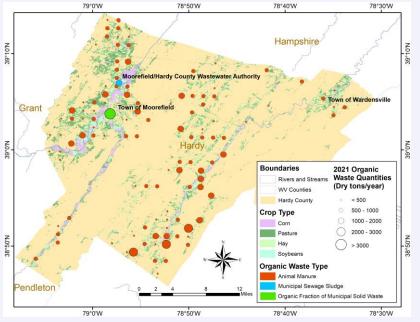


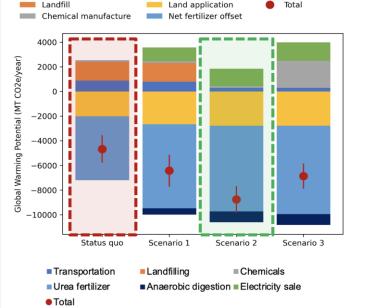




Prior Work: Integrating GIS, LCA, TEA for Improved Organic Waste Management in Hardy County, WV







Net electricity offset

<u>Data:</u> WVDEP, USDA, WVGISTC, **Stakeholder engagement** (WVCA, WVDA, and farm visits) <u>Methods:</u> Grid search, Spatial modeling and analysis using ArcToolBox

LCA: US EPA WARM/TRACI, NuGIS model

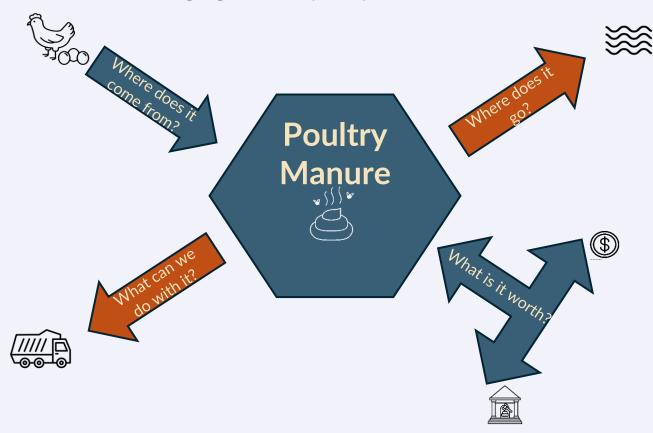
TEA: US EPA CoEAT/ OrganEcs, NPV

Future Interests:

- More AI/ML
- More Policy

- Septage Management
- Cybersecurity

Current Project: NSF CAREER: Leveraging ML and policy for sustainable resource recovery in WV and Costa Rica



Future Interests:

- More AI/ML
- More Policy

- Septage Management
- Cybersecurity

Current Project: NSF CAREER: Leveraging ML and policy for sustainable resource recovery in WV and Costa Rica

Developing a Human-In-The-Loop Al Model to Decode Poultry CAFOs in West Virginia

Poultry Manure

Machine Learning-driven
Hydrological Risk Assessment
for Synthetic Seasonal and
Annual Nutrient Loss
Prediction

A Data-Driven Nutrient
Policy Framework to
Assess Stakeholder
Alignment in State
Legislation

Simulating Regional Material
Movement Symbioses Through an
Al-Driven Deterministic Road
Freight Model



Leah H. Palm-Forster





University of Delaware

Associate Professor of Applied Economics
Director, Center for Experimental & Applied Economics

Expertise:

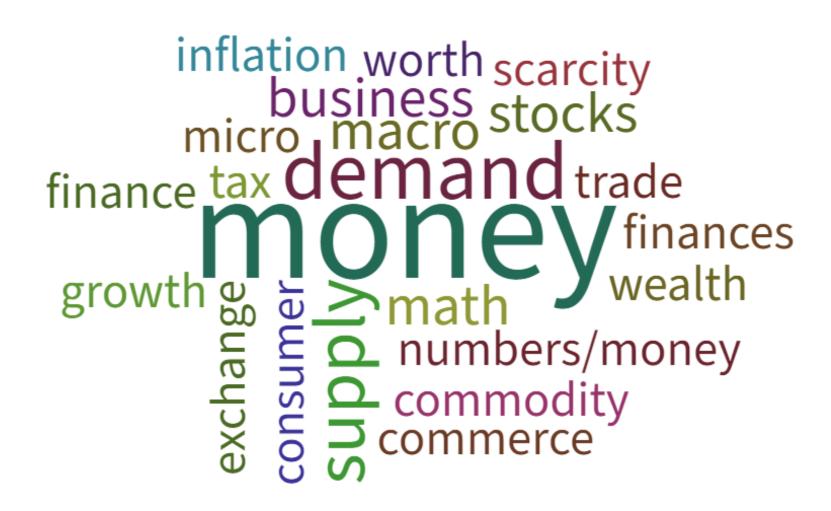
- Farmer decision
 making considering
 economic (and
 behavioral) drivers
- BMP & tech adoption

- Agri-environmental programs – public & private
- (new) Adaptation to changing conditions in coastal landscapes

Scientific & Technical Advisory Committee

What words would you use to describe economics?

These are the words I get from my students on the first day of my intro class:

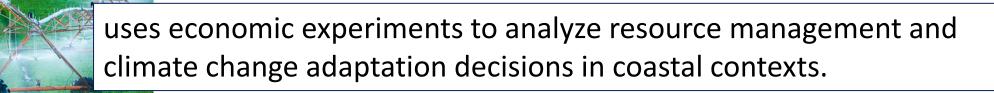


My research word cloud (according to ChatGPT & Claude):





My research group





examines farmer decision making related to nutrient and water management, and adoption of climate-smart practices.

informs the design of cost-effective programs that enhance ecosystem services and resilience to hazards exacerbated by climate change.

Inspiration and motivation:

"[Experiments] can be particularly powerful to empirically test whether and to what extent potential policy changes lead to anticipated (and potentially unanticipated) impacts when implemented in real-life contexts, but prior to the universal application of the policy change."

(Behaghel, Macours, and Subervie, 2019, European Review of Agricultural Economics)

POLICY FORUM

ENVIRONMENTAL POLICY

Create a culture of experiments in environmental programs

Organizations need a better "learning by doing" approach

Ferraro, P.J., T.L. Cherry, J.F. Shogren, C.A. Vossler, T.N. Cason, H.B. Flint, J.P. Hochard, O. Johansson-Stenman, P. Martinsson, J.J. Murphy, S.C. Newbold, L. Thunström, D. van Soest, K. van 't Veld, A. Dannenberg, G.F. Loewenstein, and L. van Boven. 2023. "Create a culture of experiments in environmental programs." *Science* 381(6659):735–737.

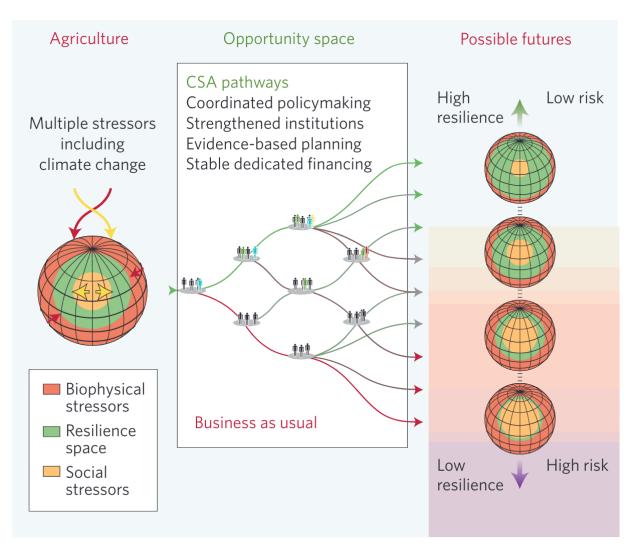


Figure printed in: **Lipper, L.**, et al. 2014. "Climate-smart agriculture for food security." Nature Climate Change 4(12):1068–1072.



From lab to field to farm: Applying behavioral science insights to agri-environmental programs

Patrick M. Fleming^a (D), Leah H. Palm-Forster^b (D), Hannah Connuck^c, and Alice E. Fodor^c

^aFranklin & Marshall College, Lancaster, Pennsylvania; ^bUniversity of Delaware, Newark, Delaware; ^cChesapeake Watershed Initiative, Lancaster, Pennsylvania

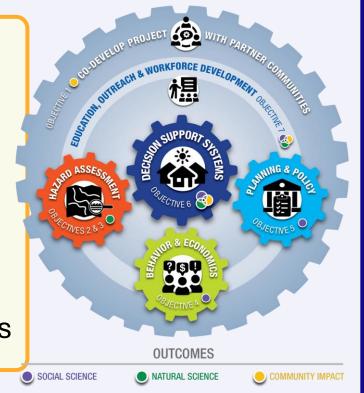
- Policy implementation trial in Lancaster, PA -- leveraged insights from behavioral economics to empower a local catchment council to meet shared goals
 - streambank restoration
 - information framing, peer comparisons, financial incentives, and investments in long-term relationship-building
- Financial incentives were not the driving force \rightarrow high erosion rates motivated participation; social connections sustained engagement.

Leah H. Palm-Forster

New project (and future interests):

Risks, Impacts, & Strategies for Coastal Communities (RISCC) (link)

- Perceptions and adaptation to coastal threats in agricultural and residential landscapes:
 - > Salinization
 - Flooding
- Responses to heterogeneous risks
- Preferences among adaptation strategies
- Provision of landscape-scale ecosystem services





leahhp@udel.edu Website Link













Kenneth Rose





Horn Point Lab (UMCES)
France-Merrick Professor in Sustainable
Ecosystem Restoration

Expertise:

- Fisheries
- Habitat assessment

- Modeling
- Pop dynamics

Kenneth Rose

Using simulation modeling (often agent-based) to quantify how environmental variation and inter-specific interactions affect population and food web dynamics.

Multi-stressors, climate variation, invasive species, habitat loss and restoration.

Projects/Publications:

- Rose et al. 2024. Advancing bioenergetics-based modeling to improve climate change projections of marine ecosystems. *Marine Ecology Progress Series* 732: 193-221.
- Ciotti et al. in press. Measuring juvenile habitat quality for fishes and invertebrates. *Biological Reviews*.
- Breitburg et al. 2018. Declining oxygen in the global ocean and coastal waters. *Science* 359, 6371, eaam7240.



Kenneth Rose

Current Project / Research

Myself and Mark Monaco were co-authors on the CESR report and lead the supplemental report (with Tom Ihde, Jason Hubbart, Eric Smith, Jay Stauffer, and Kirk Havens) to CESR entitled: *A Proposed Framework for Analyzing Water Quality and Habitat Effects on the Living Resources of Chesapeake Bay.*

That framework is now being implemented by the CBP at the demonstration level. Mark and I are leading that effort in an advisory roles.

Also involved with Beyond 2025.

Future Interests:

Finish CESR



Michael Runge





USGS Eastern Ecological Science Center Senior Scientist

Expertise:

- Decision analysis (normative)
- Adaptive management

- Quantitative ecology
- Endangered species
- Waterfowl harvest management

Michael Runge

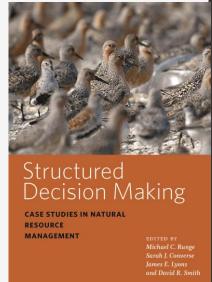
Using the principles and tools of decision analysis to help federal, state, and tribal management agencies navigate the science-policy interface.

Focus on applied quantitative science, with wide application:

- Endangered species (manatees, polar bears, right whales)
- Migratory birds (waterfowl, eagles)
- Great Barrier Reef adaptation
- Disease management (SARS-CoV-2, CWD,...)
- Water management (Glen Canyon, Bay-Delta, Southern Hills aquifer)

Projects/Publications:

- "Which uncertainty? Using expert elicitation and expected value of information to design an adaptive program" (2011)
- "Optimal timing for managed relocation of species faced with climate change (2011)
- "Endangered species recovery: a resource allocation problem" (2018)
- "Harnessing multiple models for outbreak management" (2020)
- "An introduction to decision science for conservation" (2022)









Michael Runge

Illustrative Project (USGS SIR 2015-5176)

Glen Canyon Dam LTEMP EIS (20-yr ops plan)

- 27 participating federal, state, tribal, and NGO agencies
- ~10 subject-matter expert teams
- 12 fundamental objectives (18 performance metrics)
- 7 alternatives (19 variant long-term strategies)
- Used multi-criteria decision analysis to frame the questions, organize the assessments, and deliberate the tradeoffs
 - Changed the narrative from an argument about science to a debate about values

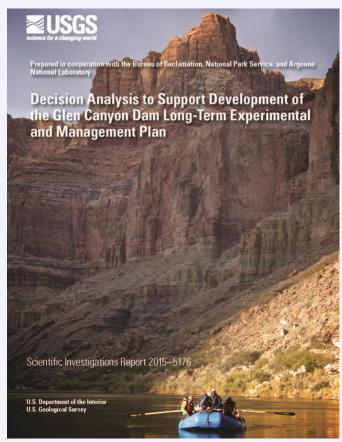


Photo © Amy S. Martin, 2014

Future Interests:

- Predictive human dimensions, embedded in decision frameworks
- The interface of indigenous epistemology and normative decision theory
- Organizational behavior and the adoption of decision quality practices

Larry Sanford





University of Maryland Center for Environmental Science Vice President for Education and Professor

Expertise:

- Graduate Education
 Estuarine Physics
- Sediment transportWaves
- Turbulence

 Physical-biological interactions

Larry Sanford

Recent research in collaboration with students and colleagues:

Flow and sediment transport thru and around bottom cage aquaculture farms.

Numerical modeling of particle attachment to marsh plant stems

Influence of the Susquehanna Flats grass bed on flow and sediment transport during storms

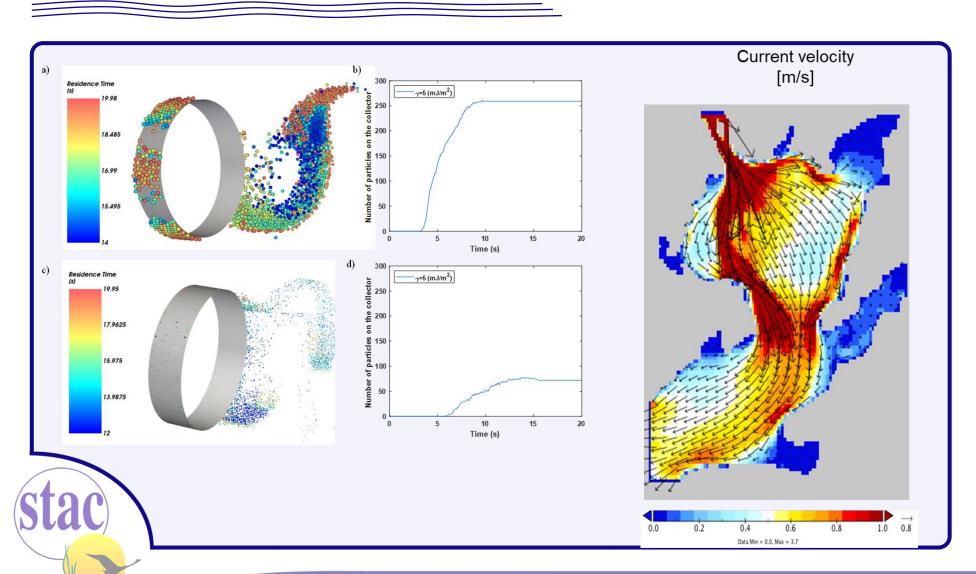
Suspended sediment characteristics in upper Chesapeake Bay



Projects/Publications:

- Gurbisz, C., Testa, J., Hodgkins, C., Muir, S., & Sanford, L. (2025). Oyster aquaculture effects on submersed aquatic vegetation habitat are inconsistent across space and time. Marine Ecology Progress Series. doi.org/10.3354/meps14833
- Khademishamami, M., Sanford, L., Nardin, W., & North, E. (2025). Direct interception of particles by a vegetation stem with varying adhesive forces.
 Journal of Geophysical Research: Earth Surface.
- Biddle, M.M., Palinkas, C., and Sanford, L.P. (2021).
 Modeling impacts of submersed aquatic vegetation on sediment dynamics under storm conditions in upper Chesapeake Bay. Estuaries and Coasts. DOI: 10.1007/s12237-021-00941-2\

Larry Sanford



Future Interests:

- Learning more about AI/ML for teaching and research
- Phase 7 Model Review
- Finishing manuscripts
- Retirement
 - Piano
 - Travel
 - Volunteering

Tess Thompson





Biological Systems Engineering, VA Tech Associate Professor, Extension Specialist

Expertise:

- Stream restoration
- Wetlands restoration
- Urban streams

Streambank erosion and role of vegetation

Tess Thompson

My research focuses on:

- 1. the role of vegetation in flow resistance and streambank erosion resistance,
- 2. mitigating the impacts of urban development on stream stability, and
- 3. predicting the onset and rate of streambank erosion.

My extension program focuses on educating the general public about stream management on private lands and flood resilience; improving stream restoration design

Projects/Publications:

 Soil microbes play a major role in streambank erosion resistance

Smith, D.S.*, T.M. Wynn-Thompson, M.A. Stemler, M.A. Williams, J.R. Seiler, and W.C. Hession. 2023. Root reinforcement and extracellular products reduce streambank fluvial erosion. Science of the Total Environment, 896(February), 165125.

https://doi.org/10.1016/j.scitotenv.2023.165125

 To protect channel physical integrity following urbanization, we need to design stormwater management to maintain pre-development bed sediment transport, not runoff peak flow or volume

Towsif Khan, S., Wynn-Thompson, T., & Sample, D. 2025. Stormwater controls for channel stability: Focusing on bed material transport prevents degradation. Journal of Environmental Management, 374. https://doi.org/10.1016/j.jenvman.2024.123651

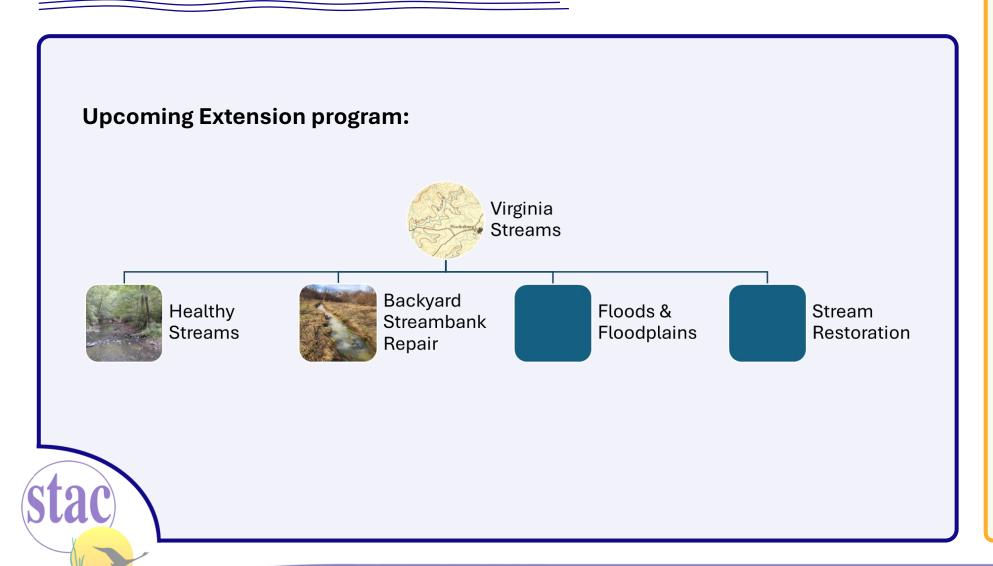








Tess Thompson



Future Interests:

- Changing urban stormwater regulations (policy)
- Effects of green infrastructure and green space on overall wellbeing (psychological, heat, health, etc.)

Weixing Zhu





Healthy Watershed; Healthy Bay! Binghamton University (SUNY)

Expertise:

Ecosystem Biogeochemistry

Forests, Wetlands, Nitrogen and
 Streams Phosphorus flow

Plant and Soil Carbon pools/fluxes

Weixing Zhu

I am broadly interested in the biogeochemistry of N, P, and C, and land conservation from forests to wetlands to streams/rivers.

Working with the Upper Susquehanna Coalition (USC) and NYS DEC, we try to achieve goals of watershed conservation, habitat restoration, and nutrient reduction from the headwater region.

A Healthy Watershed is critical to the Healthy Bay! From upland forests to streams and rivers, conservation and habitat protection affects nutrient cycling and C sequestration at local watershed and Chesapeake Bay downstream.

Projects/Publications:

- Mahadeo, Colucci, and Zhu 2025. Anthropogenic subsidies affect arthropod communities and litter decomposition in an urban riparian forest. *Urban Ecosystems*
- Lundquist and Zhu 2019. Aquatic insect diversity in streams across a rural-urban land use discontinuum. Hydrobiologia
- Craig and Zhu 2018. Impacts of deicing salt and nitrogen addition on soil nitrogen and carbon cycling in a roadside ecosystem. Water Air & Soil Pollution
- Kearney, Zhu, Graney 2013. Inorganic nitrogen dynamics in an urban constructed wetland under base-flow and storm-flow conditions. Ecological Engineering







Weixing Zhu

Current Project / Research

Working with USC, DEC and SRBC for the headwater nutrient and sediment reductions (above Towanda site)

Nutrient reductions as Co-Benefit of Acid-Mine Drainage (AMD) Treatment – STAC Technical Review 2025

Go beyond Bay - Healthy Watershed, Healthy Bay!

Future Interests:

- Beyond N/P reduction! C sequestration and C/N/P interactions
- Land conservation!30 by 30 for the Bay Watershed
- Habitat protection/resto ration and Biodiversity research

