

## Previous Seminar Information

September 12, 2013

### **Title: Shifting Baselines in Mid-Atlantic Estuaries**

Speaker: Dr. Vic Kennedy (University of Maryland Center for Environmental Science, Horn Point Laboratory, Cambridge)

Synopsis: Fisheries scientist Daniel Pauly created the term “shifting baselines” to highlight the fact that we tend to understand the past in light of our own experiences. When ecosystems change slowly,

Today’s observers may realize that there has been a change, but may not appreciate how great it has been. This seems to be especially true for aquatic systems, where changes seem less obvious

than those of passenger pigeons or bison on land. Dr. Kennedy will present information about early abundances of oysters, shad, sturgeon, and waterfowl to illustrate the productivity that mid-Atlantic estuaries once supported.

He will end with questions about how we might use this knowledge to set restoration goals and involve the public in supporting these goals.

- November 14, 2013

### **Title: The Chesapeake Atlantic Ecosystem Model: Demonstrating the Importance of State Agency Management Actions on Offshore Fish Stocks**

Speaker: Dr. Thomas Ihde (NOAA Chesapeake Bay Office, Annapolis, MD)

Synopsis: The Atlantis ecosystem modeling approach is an end-to-end simulation, integrating Bay-wide information from an array of disciplines and data at a variety of scales. The approach complements existing stock assessment approaches by linking geophysical information, watershed nutrient dynamics, habitat studies, fish and invertebrate population dynamics to fisheries production. State-managed estuarine environments have a direct, though typically non-quantified effect on federally-managed fisheries. Atlantis is an integrative tool that quantifies that connection. Goals of the work will be discussed, and simulation results will be presented that illustrate how the loss of marsh habitat in the Chesapeake Bay is predicted to affect Chesapeake fish populations. The preliminary results presented will be further refined to inform federal stock assessments of directional effects on federal fisheries like summer flounder. The model can also be made available to support state stock assessments and strategic planning.

- December 17, 2013

### **Title: Which Stream Restoration Approach is Best?**

Speaker: Richard Starr (US Fish and Wildlife Service, Annapolis, MD)

Synopsis: Many stream restoration approaches are being used in Maryland and throughout the Nation. And many times we ask ourselves or others, “Which stream restoration approach is best?” or “Which approach will give me the most benefits or up lift?” or “Which approach will give me more fish?” , etc. Mr. Starr will answer these questions. Well, not exactly. But he will describe an objective process that can be used to address these questions---to ensure that the best stream restoration approach is selected. The process embraces A Function-Based Framework for Stream Assessment and Restoration Projects (Harman et al., 2012). The seminar will describe this framework and provide examples of how the framework can be used to answer the questions asked above. Mr. Staff will wrap up with an update on the stream assessment and design guidelines being developed by U.S. Fish and Wildlife Service staff for the Maryland Department of the Environment.

- January 16, 2014

### **Title: How Can We Create a More Diverse Bay Movement?**

Speaker: Fred Tutman (Patuxent RiverKeeper)

Synopsis: The black experience in America includes an environmental context---one with particular social expectations, access to nature, educational sub-text, and a sense of place that includes a rich heritage with nature. Is the Chesapeake Bay preservation movement identified as purely a nature-loving movement, or is it just as committed to creating environmental fairness and equality? Fred Tutman, the only African-American Riverkeeper, will share his ideas and views on how to create an unstoppable and more inclusive preservation movement.

- May 9, 2013

### **Snakes Wanted: the Maryland Herp Atlas Project**

Glenn Therres (Maryland Department of Natural Resources, Annapolis)

Synopsis: The Maryland Amphibian and Reptile Atlas project is a 5-year effort designed to document the distribution of every species of snake, turtle, lizard, salamander, frog, and toad in Maryland. DNR is partnering with the Natural History Society of Maryland and others to accomplish this formidable task. Nearly 1,000 volunteers contributed data during the first three years of the project, and over 21,000 records of amphibians and reptiles have been compiled to date. Data are being collected in 1,293 survey units throughout the State. The help of all DNR employees in this effort would be appreciated. Recording and reporting the sighting of any species of snake, turtle, lizard, salamander,

frog, and toad found while on the job or 'off the clock' will help DNR document the statewide distribution of our herpetofauna.

- April 18, 2013

### **Can Terrestrial Landscapes Remove Mercury from the Atmosphere?**

Mark Castro (University of Maryland Center for Environmental Science, Appalachian Laboratory)

Synopsis: This seminar will focus on mercury dynamics in our environment. Dr. Castro will look at mercury emissions patterns, wet and dry deposition rates and mercury dynamics in the Savage River watershed, Maryland. Long-term (15+ years) emissions inventory data show significant decreases in the emissions of mercury from municipal and medical waste incinerators and coal fired power plants. These decreases are reflected in lower atmospheric concentrations of mercury in Garrett County. In contrast, however, more recent (5 years) reductions in mercury emissions from power plants have not lowered the wet deposition of mercury across Maryland. Further reductions in mercury emissions are needed to reduce the mercury concentrations in the biotic communities in ecosystems. However, of equal or more importance, is the role played by wetlands in the mercury cycle. Dr. Castro will use the Savage River system, one of the most pristine watersheds in Maryland, to highlight the importance of wetlands on mercury concentrations in brook trout. He will show that adjacent sub-watersheds with similar atmospheric inputs of mercury have very different mercury concentrations in brook trout, which may be related to the proximity if these streams to wetlands.

- March 14, 2013

### **From Columbia to Colombia**

Sarah Widman (Maryland Department of Natural Resources)

Synopsis: Bring your lunch and join Sarah, a DNR Fisheries Service employee, as she reminisces about her month-long adoption journey to Colombia, South America. She'll show photos and tell you about Ibague, Bogota, and Cartagena. She'll also share stories from her adventures, including what she learned about Colombian culture, geography, and much more.

- February 14, 2013

### **Maryland's GreenPrint: A Land Protection and Planning Tool for DNR-Wide Conservation Priorities**

Christine Conn (Maryland Department of Natural Resources, Annapolis)

Synopsis: Christine Conn, with MD/DNR's Office for a Sustainable Future, will provide an overview of the Department's updated GreenPrint interactive map. The GreenPrint tool has been expanded to include additional information and guidance on DNR's comprehensive set of conservation priorities. This enhancement was designed not only to update the ecological priorities DNR uses to focus Stateside Program Open Space conservation funding, but to also improve the communication and implementation of DNR's conservation values. Christine, along with other DNR GreenPrint Team members, will discuss how the tool is being used in a variety of applications including local government planning, integration with sister state agency programs, regional conservation planning and education, and outreach to land trusts and environmental groups.

- November 15, 2012

### **Integrating Stream and Wetland Restoration to Maximize Functional Benefits**

Joe Berg (Biohabitats, Inc., Baltimore MD), Keith Underwood (U&A, Inc., Annapolis MD) and Solange Filosa (University of Maryland, Center for Environmental Science, Solomons MD)

Synopsis: This seminar will provide a perspective on stream, wetland, and floodplain ecology and restoration in the region, including a discussion of the historical context and current management challenges. The speakers will address the sediment-rich, post-colonial land clearing period in this region; active channel enlargement due to modified watershed hydrology; sediment transport in urban streams; the need to modify hydrology to truly 'restore' streams; converting conveyance channels to material processing systems; and the regenerative design as one approach to benefiting society and the resource. The seminar will touch on how multiple restoration approaches, including Natural Channel Design, floodplain excavation, placement of woody debris, and base-flow channel design have been used to meet management goals. The seminar will also provide an overview of the University of Maryland's stream monitoring results and offer insights into how stream restoration may be used to further some of the Bay Program goals.

- October 18, 2012

### **Emerging Threats to Pennsylvania's Ichthyofauna: Natural Gas Extraction/Climate Change**

David Argent and William Kimmel (California University of Pennsylvania)

Synopsis: Historically, surface water quality throughout southwestern Pennsylvania has been degraded by a variety of anthropogenic activities. Mandates from the Clean Water and Surface Mine Reclamation Acts have improved water quality and fostered recovery

of fishery resources. Recently, several new threats to aquatic ecosystem integrity are emerging that could interrupt the recovery process. This seminar will describe baseline studies which highlight the potential impacts of two such stressors: natural gas extraction and climate change.

- September 27, 2012

### **Locating Sources of EPA Priority Pollutants in the Anacostia Watershed**

Harriette Phelps (University of the District of Columbia, Emeritus)

Synopsis: The urban Anacostia River is one of three Areas of Concern in the Chesapeake Bay watershed, with TMDLs for PCBs, pesticides, and trash. There is a fishing advisory in place and over 60% of fish in the river have tumors. This project was a 12-years survey of bioavailable EPA priority pollutants at 45 sites in the Anacostia watershed using active biomonitoring with translocation of the local freshwater Asiatic clam (*Corbicula fluminea*). The nearby Potomac River was the source of reference clams used to study the bioavailability of 73 EPA priority pollutants and metals. Maximum bioaccumulation with minimum mortality occurred with a two-week clam translocation. The non-tidal tributaries (94% of total flow) contained 17 sites with higher bioavailable toxics than found in the tidal mainstem Anacostia. Polycyclic aromatic hydrocarbons (PAHs) were highest near industrial parks and Metro stations. Pesticide levels (80% chlordane) exceeded the fish consumption advisory at small urban upstream sites in four tributaries. High heptachlor epoxide levels suggested legacy chlordane dumpsites. Sediment translocation studies indicated that *Corbicula* accumulated toxics from the water column and not consolidated sediments.

- May 17, 2012

### **Diseases Cause Some Significant Oyster Mortalities in Chesapeake Bay**

Chris Dungan (Maryland Department of Natural Resources, Oxford)

Synopsis: Meet the protozoan provocateurs of MSX and dermo diseases that have caused some significant oyster mortalities in Chesapeake Bay historically, but relatively low ones during recent years. Learn about the physical and environmental factors that modulate the pathogens and their diseases, and about oyster adaptations that may have shifted the play during recent decades. Disease impacts on oyster population dynamics will be reviewed in context with credits from natural and assisted recruitment, and debits from natural and harvest mortalities.

### **Gasland, the Film**

Introduced by Paul Kazyak (Maryland Department of Natural Resources, Annapolis)

SYNOPSIS: Written and filmed by Josh Fox, Gasland, an award winning and Oscar-nominated documentary film released in 2010, focuses on communities in the U.S. impacted by natural gas drilling, especially the practice known as hydraulic fracturing. During the filming of this controversial documentary, Fox embarked on a cross-country odyssey and spoke with citizens living near gas wells plus scientists, politicians, and gas industry executives for insights into this resource extraction process. He ultimately found himself in the halls of Congress as a subcommittee was discussing the Fracturing Responsibility and Awareness of Chemicals Act, a bill to amend the Safe Drinking Water Act to repeal a certain exemption for hydraulic fracturing. This process was exempted from the Safe Water Drinking Act in the Energy Policy Act of 2005.

- April 19, 2012

### **There's Something About Horseshoe Crabs...**

Stacy Epperson (Maryland Department of Natural Resources, Annapolis)

Synopsis: Why should we care about horseshoe crabs? The 3B's to start: Blood, Birds, & Bait. Stacy Epperson, Education Specialist in Chesapeake and Coastal Services and program manager for Raising Horseshoe Crabs in the Classroom will explain the value of horseshoe crabs to various stakeholders and how climate change may have a negative affect on all of the horseshoe crab industries. In addition she will demonstrate how to sex a juvenile crab molt (in case you are ever on Jeopardy), and will have some live juveniles to examine.

- March 15, 2012

### **A Snapshot of Cuba Today**

SPEAKER: Dr. Gwen Brewer

Synopsis: In mid-April 2011, Dr. Brewer participated in one of the Caribbean Conservation Trust's long-running bird surveys in Cuba. Both resident (particularly endemic) and migrant birds, 166 species in all, were seen in the course of her 2,600 km journey. She visited many of the ecosystems of this isolated island country, including pine and deciduous forest, extensive marshes, fields, caves, mangroves, beaches, and coastal scrub. Throughout her 10 day visit, Dr. Brewer had the opportunity to observe Cuban culture, history, and other natural history components such as insects, reptiles, amphibians and plants. Join us and take a look at Cuba more than 50 years after the revolution!

- February 16, 2012

### **FOREST CERTIFICATION: The Good, the Bad and the Ugly**

Jack Perdue (Maryland Department of Natural Resources, Annapolis)

Synopsis: Forest certification has become a more common and yet controversial platform from which to manage public, industry and conservation lands. Now that the Maryland DNR has 200,000 acres under both the Forest Stewardship Council and Sustainable Forestry Initiative programs, what does this really mean regarding how forests are managed and how the habitats and economies are supported on these lands. Jack Perdue, a forester with DNR for over 30 years who has been involved with certification efforts since 2003, will answer these questions.

- January 19, 2012

### **A River Runs Under It: Modeling the Distribution of Streams and Stream Burial in Large River Basins**

Andrew Elmore (University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg MD)

Synopsis: Stream network density exerts a strong control on hydrologic processes in watersheds, but for most of the mid-Atlantic region we have very little data on the location of streams. For example, most small streams, especially those that were buried beneath urban development, are not included in stream maps used by scientists and regulatory agencies. Dr. Elmore will report on new methods for mapping these “missing streams,” describe some results for Maryland watersheds west of the Chesapeake Bay, and show how the new stream maps can be applied to studies seeking to understand the impact of land-use on stream network structure and functioning.

- October 13, 2011

### **Ethnoichthyology in Edo: Legends, Lore and Life History of Lampridiform Fishes from Japan**

Jennifer Martin (Virginia Institute of Marine Science, College of William and Mary, Gloucester Point VA)

SYNOPSIS: The families Lophotidae, Radiicephalidae, Trachipteridae, and Regalecidae belong to the taeniosomous Lampridiformes, a rare group of mesopelagic fishes characterized in part by extremely elongate bodies and vivid coloration. Ragueleucus, for example, with its immense size (reported to 15 m) and fiery red mane (actually elongate dorsal fin rays), may well be the basis for many “sea serpent” sightings. Because of their striking appearance, these fishes have long been the source of folk tales in Japan that are commonly reflected in their local nomenclature. Examination of the ethnotaxonomy (folk taxonomy) of the lampridiform fishes in Japan reveals the anatomical, ontogenetic, ecological, and cultural information which is lost without translation of their Japanese common names.

- November 17, 2011

**How to See the Best of Grand Canyon, Zion, Bryce, Lee's Ferry, Lake Powell, Navajo, Grand Staircase Escalante, Indians & Mormons on a Tight Budget and Lose Weight**

Steve Carr (Maryland Department of Natural Resources, Annapolis)

Synopsis: Come along on a 10-day loop trip with Steve that starts and ends in Las Vegas. He'll tell you how to find each park, where to stay or camp, the best trails to hike, the best restaurants, and where to buy your supplies. He'll also provide you with interesting cultural tidbits about the prehistoric Anasazi Indians and the unique people who settled the American Southwest. Steve will autograph copies of his latest book, "The Canyon Chronicles", that will be available for sale after his seminar.

If you would like to view the presentation, click [here](#)

- December 8, 2011

**Costa Rica, from the Mountains to the Sea: Adventures of an Unconventional Traveler**

Paul Kazyak (Maryland Department of Natural Resources, Annapolis)

Synopsis: TBA  
February 18, 2010

**Abundance and Ecology of Larval Atlantic Menhaden Ingressing into the Chesapeake Bay**

Carlos Lozano, University of Maryland Center for Environmental Science,  
Chesapeake Biological Laboratory

Synopsis: Young-of-the-year (YOY) recruitment of Atlantic menhaden in Chesapeake Bay declined since the 1980's and has presently stabilized at a low level. This low level has raised concerns for coast-wide recruitment and contributes to "localized depletion" in the Bay. Reasons for the low recruitment are not yet understood, but a decline in larval supply to the Bay is one hypothesis. The objective of my research was to evaluate larval ingress. Ichthyoplankton surveys were conducted at the Bay mouth during November to April in three spawning seasons (2005-06, 2006-07, 2007-08). Abundance of ingressing larvae varied four-fold among years. Otolith microstructure analysis showed that ingressing larvae were hatched from September to March, and most arrived at the Bay mouth from December through February. Ocean-to-estuary transport periods ranged from 1-2 months. Hatch-date distributions indicated a consistent supply of ingressing larvae with evidence of multiple cohorts. Mean larval growth rates were faster in 2007-08 and 2005-06 than in 2006-07. Larvae



ingressing during February grew slower than in other months. Depth and horizontal distributions of larvae varied among days and time of day. Copepods (*Acartia* and *Centropages* sp.) were the dominant prey in all years. Feeding incidence was highest in 2006-07 and lowest in 2007-08. We observed no relationship between the abundance of ingressing larvae and YOY recruitment measured by the Maryland DNR seine survey. The YOY abundance index was relatively low in all three years, suggesting that factors in addition to larval supply act to control YOY Atlantic menhaden recruitment.

- March 18, 2010

### **Thermal Regimes of Maryland's Non-Tidal Streams**

Bob Hilderbrand, University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg, MD

Synopsis: Temperature data for streams sampled by the MBSS were used to derive thermal regimes for Maryland's non-tidal streams. Characteristics of Use class I and IV streams were quite variable and were difficult to relate to biotic condition. Thermal characteristics of MDE Use III streams were always colder on average than the other use classes, and their attributes closely paralleled those of trout-bearing streams in the MBSS database. Despite their cooler temperatures, a substantial number of these cold water streams had maximum temperatures above 24C, and a small percentage had daily average temperatures exceeding 20C. There was also a strong association between higher temperatures and lower abundances in trout streams. Should stream temperatures increase, many existing trout streams may exceed thermal maxima. There was strong evidence that increasing the amount of impervious surface area or urbanization in the watershed increases stream temperatures, and results suggest that urbanized streams may be a good analog for future temperature increases should climate change occur.

- April 2, 2010

### **Using Novel Modeling Techniques to Explore Unintended Consequences of Sediment and Nutrient Management for Marshes Facing Sea Level Rise**

Dr. Lora Harris, University of Maryland Center for Environmental Science, Solomons MD

Synopsis: To Be Announced

April 15, 2010

Bird Conservation in Colombia: Fighting Wars on Many Fronts

Gwen Brewer, Maryland Department of Natural Resources, Annapolis

Synopsis: Colombia is incredibly rich in biological diversity, with almost one fifth of all bird species and an impressive list of orchids, amphibians, and butterflies. Sadly, the mention of this South American country is more likely to conjure images of drug lords, kidnappings, and guerilla warfare. How do Colombian conservation organizations face the challenge of working in a country plagued by violence, land conversion, and economic difficulties? This talk will discuss the innovative and successful strategies of ProAves, a Colombian NGO, as well as provide an introduction to the fabulous natural riches of this increasingly accessible country.

- May 6, 2010

**Forest Certification: The Good, the Bad, and the Ugly (or What's the Funny Sticker Doing on My Wood?)**

Jack Perdue, MD/DNR Forest Service

Synopsis: The purpose of forest certification, sometimes know as "green certification", is to identify forestland that is managed to meet agreed-upon standards and, sometimes, label products originating from those forests. The underlying goal of forest certification is to promote forest practices that are environmentally, socially, and economically sustainable over the long term.

What many may not realize is that the Maryland Department of Natural Resources has been involved with the two major certification systems for over six years. Currently, over 80,000 acres are certified through both the Forest Stewardship Council and Sustainable Forest Initiative programs.

What does this mean to DNR, the resource managers, the public, and the resource?

Why are there two systems and how do they differ?

What have we learned as the result of our certification experience?

Why forest management certification matters?

And, what do the new funny labels on wood products really mean?

We will discuss forest certification plus how to build a better mouse trap at: Forest Certification: The Good, the Bad, and the Ugly

- May 20, 2010

**Implementing the Maryland Healthy Air Act**

John Sherwell, MD/DNR Resource Assessment Service

Synopsis: To Be Announced

January 27, 2011

Determining Optimal Dredged Material Placement Locations for Restoring the Chesapeake Marshlands Complex

SPEAKER: Charlotte Shearin (Environmental Systems Analysis, Inc., Annapolis MD)

Synopsis: Using dredged material to restore wetlands in the Chesapeake Marshlands Complex (CMC) could offer solutions to two problems: 1) restoring and protecting the marshes in the CMC and 2) finding an innovative reuse for material dredged from the Chesapeake Bay approach shipping channels. A risk-based optimization model will be discussed that assesses and compares restoration options for two alternative years when the project may begin (2023 and 2036) and represents a preliminary screening of material placement locations. Restoration of the Barbados Island Area and the Confluence Area of the Little Blackwater and Upper Blackwater rivers appears to provide significant environmental benefits, suggesting that restoration at these locations would provide the best return on investment. Low marsh restoration also provides a significant portion of the accrued benefits. Based on a sensitivity analysis, it appears that the choice of when to begin the project also represents tradeoffs between on-site habitat benefits and recreational benefits. Considering the limitations, model results should be interpreted cautiously.

- January 13, 2011

**Title: Restoration of Non-tidal Streams in the Coastal Plain: Implementing Step Pool Storm Conveyance (SPSC) Systems and Wetland Seepage Systems in Anne Arundel County**

Speakers: Hala Flores and Janis Markusic (Anne Arundel County Department of Public Works, Annapolis MD)

Synopsis: Anne Arundel County contains over 1,500 miles of non-tidal waterways. These waterways include perennial streams, numerous intermittent and ephemeral streams, wetlands, floodways, and storm water management conveyances. As a requirement of the County's NPDES MS4 Permit (Section III.F) to assess watershed and stream conditions, comprehensive stream assessments were completed within seven of twelve major watersheds. Through this work, the County is physically assessing stream reach condition, identifying channels in need of rehabilitation, and prioritizing those reaches for rehabilitation. Methods employed include Step Pool Storm Conveyance (SPSC) systems for ephemeral channels and storm drain outfalls and Wetland Seepage Systems for

perennial channels. This talk will discuss the appropriate design and implementation of these systems in Anne Arundel County.

- December 16, 2010

**Title: BioNet: Targeting Terrestrial and Freshwater Biodiversity Conservation in Maryland**

Speaker: Lynn Davidson (Maryland Department of Natural Resources, Annapolis)

Synopsis: In 2005, the Maryland Department of Natural Resources developed the Maryland Wildlife Diversity Conservation Plan to provide a framework and overall direction for wildlife diversity conservation efforts in the State. The Plan identifies 502 animals of Greatest Conservation Need and the Key Wildlife Habitats that support them. One of the most significant sections of the Plan is the list of overarching conservation actions that have broad impacts across taxonomic groups and habitats. Two of these actions include, “Identify the most important sites through the State for wildlife diversity conservation” and “Develop a core network of protected wildlife diversity conservation lands to capture the full array of Maryland’s wildlife species.” DNR’s Natural Heritage Program began a project in 2006 to accomplish the first of these actions. This talk will introduce you to the BioNet project: its development, its current status, and its future needs.

- November 10, 2010

**Title: Caspian Sturgeon: Living Fossils---Their Past, Present, and (Maybe?) Future**

Speakers: Alexi Sharov (Maryland Department of Natural Resources, Annapolis MD)

Synopsis: Several species of sturgeon belonging to the family Acipenseridae, one of the oldest groups of bony fishes, live in the Caspian Sea. Sturgeon are a primary source of caviar, a popular delicacy that humans have demanded for over a century. After surviving nearly 200 million years with little change, Caspian sturgeon are now at the brink of extinction. Excessive exploitation, poaching, pollution, and habitat destruction have all led to the precipitous decline of sturgeon populations in the last two decades. This talk will focus on sturgeon evolution, their biology, the history of the Caspian Sea fishery, artificial reproduction practices, and a sea ranching program. I will look at the results of population dynamics modeling and also discuss what actions are most important to preserve Caspian sturgeon stocks.

- October 18, 2010

**Title: Finding Species and the Conservation Network: A Novel Approach to Conservation in Ecuador**

Speaker: Christopher James (Finding Species, Ecuador)

Synopsis: Come learn about Ecuador's amazing biodiversity. Finding Species, an NGO with offices in Maryland and Ecuador, has been spearheading collaborative efforts in conservation for many years. Its beautiful and scientifically-accurate photos of Ecuador's biodiversity are known throughout the country and abroad. Now Finding Species is coordinating the activities of a "Conservation Network", an informal association of long-term research projects, sustainable development efforts run by communities, and private reserves dedicated to the preservation and restoration of Ecuador's native ecosystems. This talk will be an overview of Ecuador's biodiversity and the Conservation Network's synergic actions to prevent biodiversity losses.

- October 15, 2010

**Title: Geology of the Marcellus Shale in Western Maryland**

Speakers: Jeff Halka and David Brezinski (Maryland Geological Survey, Baltimore MD)

Synopsis: Over the last 70 years, the 400 million-year-old Oriskany Sandstone has been the primary target of Appalachian gas exploration. Tens of thousands of conventional wells have been drilled into this rock formation. However, geologists have generally understood that the gas contained within this porous sandstone unit was likely generated in the overlying organic-rich Marcellus Shale. Recent developments in well drilling and stimulation technologies have made it possible to exploit these organic-rich layers directly and allow the capture of gas contained within the less permeable shale.

The Marcellus Shale represents the oldest of several Appalachian organic-rich shale units that have the potential for exploitation with new unconventional drilling techniques. The Marcellus was deposited 390 million years ago when western Maryland was located about 30 degrees south of the equator. This rock unit was formed in a geographically-restricted, deep sea setting that formed as the result of tectonic plate collision in areas now buried beneath Maryland's Coastal Plain. This collision produced a seaway that may have been as much as 10,000 feet deep. Below the warm, well-lit surface waters where animals and plants survive, the waters were stagnant and devoid of circulation. As a result, at depths greater than about 100 to 200 meters the water column was oxygen deficient. Thus, when the animals and plants that lived in the shallow waters died, their remains sunk into the anoxic waters and were preserved in the oxygen-free depths.

Through millions of years, organic material sank to the sea floor and accumulated as a black organic shale. This carbon-rich shale was subsequently buried by as much as 15,000 feet of rock. During the ensuing millions of years, the elevated temperatures and pressures from the overlying blanket of rocks, as well as added pressures from mountain-building episodes, served to heat the organic matter. This prolonged heating caused the break-up of long organic kerogen molecules into shorter and shorter hydrocarbon molecules that make up natural gas.

- September 30, 2010

**Title: Discovering Rare Fish Species in South America, and Balancing Biodiversity with Economic Development**

Speaker: Jason Willey (Environmental Resource Management, Annapolis MD)

Synopsis: Demand for aluminum is increasing worldwide, and the resulting consumptive pressure will require creative, science-based measures to minimize the impact of mining on sensitive ecosystems. Mining interests in Suriname are in the process of developing a plan for mining bauxite from Nassau Plateau, a remote cloud forest plateau in eastern Suriname. Due to concerns over the potential project-related impacts on fish, the project proponent has invested in a multi-year investigation of the fish fauna of the plateau, and is currently using molecular phylogenetic techniques and hydrographic profiling of the plateau's streams to understand the project's likely effects on fish. This investigation has led to several important biological discoveries, including the discovery of at least one new species of catfish, the re-discovery of another catfish species that had not been seen in decades and was considered likely extinct, and extension of the known ranges of several other fish species. The Nassau project will be presented as a case study of the complex relationship between the often-competing needs for economic development and conservation, and the potential ecological consequences of prohibitions on industrial development in developing countries.

- September 9, 2010

**Title: Exploring the Deepwater Horizon Oil Spill from an Oyster Perspective: Field Notes from a Trip to the Gulf of Mexico**

Speaker: Mike Naylor (Maryland Department of Natural Resources, Annapolis MD)

Synopsis:TBA

- May 20, 2010

**Implementing the Maryland Healthy Air Act**

John Sherwell, MD/DNR Resource Assessment Service

Synopsis: The Maryland Legislature passed the Healthy Air Act during the 2006 session in response to what was seen as slow and inadequate regulation by the U.S. EPA. The Act is a four-pollutant bill, covering sulfur dioxide (a precursor to acid rain and source of fine particulate matter), oxides of nitrogen or NO<sub>x</sub> (an essential contributor to the formation of ground-level ozone and smog, a precursor to acid rain, and a toxin), mercury (a neurotoxin that is dramatically bioaccumulated in aquatic food chains), and carbon dioxide (a principal contributor to the growing greenhouse gas levels in the atmosphere). The Act affects all large, fossil-fueled electricity generating stations in the State. From his position in DNR's Power Plant Research Program, John oversaw the permitting associated with the implementation of the Act. This presentation will discuss the pollution control measures implemented to date, their performance, and the environmental benefits associated with the Act. April 15, 2010

### **Bird Conservation in Colombia: Fighting Wars on Many Fronts**

Gwen Brewer, Maryland Department of Natural Resources, Annapolis

Synopsis: Colombia is incredibly rich in biological diversity, with almost one fifth of all bird species and an impressive list of orchids, amphibians, and butterflies. Sadly, the mention of this South American country is more likely to conjure images of drug lords, kidnappings, and guerilla warfare. How do Colombian conservation organizations face the challenge of working in a country plagued by violence, land conversion, and economic difficulties? This talk will discuss the innovative and successful strategies of ProAves, a Colombian NGO, as well as provide an introduction to the fabulous natural riches of this increasingly accessible country.

- April 2, 2010

### **Using Novel Modeling Techniques to Explore Unintended Consequences of Sediment and Nutrient Management for Marshes Facing Sea Level Rise**

Dr. Lora Harris, University of Maryland Center for Environmental Science, Solomons MD

Synopsis: The Chesapeake Bay estuary has been the focus of a prolonged and extensive water quality restoration effort focused on reducing sediment and nutrient loads from watersheds undergoing extensive land use change. Despite our appreciation of projected changes in precipitation and temperature, we are just beginning to modify management actions to take into account the interactive effects of climate change on pollutant delivery. In particular, the role of natural systems such as wetlands in mitigating nutrient and sediment loads through

accretion, burial, and denitrification warrants further investigation using tools that link watershed activities to wetland ecosystem processes, while also considering the impacts of sea level rise and changes in hydrology. Nutrient delivery is expected to increase in the Chesapeake Bay region due to climatic effects and land use changes that will likely result in greater runoff and an increase in sedimentation. At the same time, sea level rise will continue to affect areas occupied by tidally-influenced marshes. These broad predictions require the development of new tools that will increase our capacity to respond to changing environmental conditions and prepare for a future climate that will include greater variability and more intense disturbances.

- February 18, 2010

### **Abundance and Ecology of Larval Atlantic Menhaden Ingressing into the Chesapeake Bay**

Carlos Lozano, University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory

Synopsis: Young-of-the-year (YOY) recruitment of Atlantic menhaden in Chesapeake Bay declined since the 1980's and has presently stabilized at a low level. This low level has raised concerns for coast-wide recruitment and contributes to "localized depletion" in the Bay. Reasons for the low recruitment are not yet understood, but a decline in larval supply to the Bay is one hypothesis. The objective of my research was to evaluate larval ingress. Ichthyoplankton surveys were conducted at the Bay mouth during November to April in three spawning seasons (2005-06, 2006-07, 2007-08). Abundance of ingressing larvae varied four-fold among years. Otolith microstructure analysis showed that ingressing larvae were hatched from September to March, and most arrived at the Bay mouth from December through February. Ocean-to-estuary transport periods ranged from 1-2 months. Hatch-date distributions indicated a consistent supply of ingressing larvae with evidence of multiple cohorts. Mean larval growth rates were faster in 2007-08 and 2005-06 than in 2006-07. Larvae ingressing during February grew slower than in other months. Depth and horizontal distributions of larvae varied among days and time of day. Copepods (*Acartia* and *Centropages* sp.) were the dominant prey in all years. Feeding incidence was highest in 2006-07 and lowest in 2007-08. We observed no relationship between the abundance of ingressing larvae and YOY recruitment measured by the Maryland DNR seine survey. The YOY abundance index was relatively low in all three years, suggesting that factors in addition to larval supply act to control YOY Atlantic menhaden recruitment.

- March 18, 2010

### **Thermal Regimes of Maryland's Non-Tidal Streams**



Bob Hilderbrand, University of Maryland Center for Environmental Science,  
Appalachian Laboratory, Frostburg, MD

Synopsis: Temperature data for streams sampled by the MBSS were used to derive thermal regimes for Maryland's non-tidal streams. Characteristics of Use class I and IV streams were quite variable and were difficult to relate to biotic condition. Thermal characteristics of MDE Use III streams were always colder on average than the other use classes, and their attributes closely paralleled those of trout-bearing streams in the MBSS database. Despite their cooler temperatures, a substantial number of these cold water streams had maximum temperatures above 24C, and a small percentage had daily average temperatures exceeding 20C. There was also a strong association between higher temperatures and lower abundances in trout streams. Should stream temperatures increase, many existing trout streams may exceed thermal maxima. There was strong evidence that increasing the amount of impervious surface area or urbanization in the watershed increases stream temperatures, and results suggest that urbanized streams may be a good analog for future temperature increases should climate change occur.

- January 27, 2010

### **Warning Signs of Climate Change in the Himalayan Mountains**

Dr. Subodh Sharma (Kathmandu University, Nepal, and Visiting Fulbright Scholar at Towson University, Towson MD)

Synopsis: This talk offers everyone a unique opportunity to take a tour of the Himalayan Mountains without leaving Annapolis. Dr. Sharma, a Fulbright Scholar temporarily working at Towson University, will tell us about the importance of this "Top of the World" region, from a global context. He will provide evidence of climate change effects there, and will also describe a bioassessment program that he developed to study streams, rivers, and lakes in Nepal, Bhutan, India, Pakistan, and Bangladesh.

[Link to the 2.5 MB .pdf presentation file](#)

- January 14, 2010

### **Population Size Estimates and Ecological Services of Freshwater Mussels in the Upper Delaware River**

William Lellis (USGS-Leetown Science Center, Northern Appalachian Research Laboratory, Wellsboro PA)

Synopsis: A double-sampling study design was used to estimate species composition and population size of freshwater mussels in the upper Delaware River (NY, PA, NJ). Survey data indicate that of nine species of mussels found,

the eastern elliptio (*Elliptio complanata*) uniformly comprised 98% of the total population of approximately 2 million mussels (>10 mm long) per river mile. Energetic modeling indicates that this single species may provide significant ecosystem services during certain seasons and flow conditions. For example, the river-wide population of eastern elliptio has the ability to filter 2-6 billion gallons of water and nearly 80 tons of sediment per day.

- October 29, 2009

### **Geodesy at the Water's Edge: the Importance of Precise and Accurate Positioning in Coastal Observing Systems**

Dr. Philippe Hensel (NOAA National Geodetic Survey, Silver Spring MD)

**Synopsis:** Coastal habitats are increasingly vulnerable to global environmental change as a result of current and predicted increases in eustatic sea level, the frequency and magnitude of coastal storms, changing climatic zones, invasive species, and the many pressure on coastal resources from increasing coastal populations.

The proper stewardship of these resources relies on the ability to accurately and precisely monitor spatially-explicit trends in geomorphology, hydrology, and biological communities over time. Recently, the NOAA National Ocean Service--together with other Federal, State, and private partners--has invested in building infrastructure, models, and tools to provide accurate positioning within coastal habitats in support of coastal research and management. The heart of the system is a stable, consistent, and accurate positional framework in three dimensions based on updated vertical bench marks within coastal habitats, which include traditional geodetic marks, tidal marks, and Surface Elevation table (SET) marks. Global Navigation Satellite System (GNSS) and high accuracy leveling surveys connect these local networks to the National Spatial Reference System (NSRS). Multiple observation systems, from long-term tide gauges and the Continuously Operating Reference Systems (CORS) to short-term water level recorders and SET data, from LiDAR surveys to individual vegetation plots, are all connected to the NSRS through the local positional framework. Connections to the NSRS enable data to be compared with a high degree of accuracy over both space and time. Data fusion, linking ground-based observations to remote sensing (e.g., LiDAR surveys), is spawning new techniques and tools to enhance our ability to use remotely-sensed data to measure coastal elevation and habitat change. This talk will highlight how geospatial infrastructure is serving as a foundation for connecting coastal environmental data sets, and how this information can be used to advance science and management in the vulnerable coastal zone.

- December 10, 2009

### **The South River, Legacy Sediments, and the Future of the Resource**

Erik Michelsen, South River Federation

**Synopsis:** Several years of data collected on the South River, anecdotal accounts, and field observations throughout the watershed point to one inescapable conclusion: Legacy agricultural soils which washed off the land as forests were cleared throughout the region in the post-colonial period still remain in vast quantities in both the stream valleys and near tidal portions of creeks, sediment that makes its way into tidewater both during base flow and particularly after rain events. In some cases, these legacy sediments remain partially entrapped behind historic mill dams and, in others, they comprise over a meter of silt over top of a formerly vast stream and wetland complex that once delivered virtually sediment-free flow to the river and provided an extensive nursery for freshwater-dependent fishes. These sediments and the nutrients bound to them constitute a largely unacknowledged source of impairment to waterways like the South River throughout the Chesapeake watershed. This presentation will explore the historical impacts on a variety of tributaries to the South River, regulatory hurdles to repairing these systems, and possible restoration solutions.

- October 15, 2009

### **66 Degrees North: 8 Days of Roaming Around Iceland**

Ron Klauda, MD/DNR Resource Assessment Service

**Synopsis:** Located in the north Atlantic just south of the Arctic Circle, many people think Iceland is covered by ice and snow much of the time, if not year round.

When my wife Kathy and I drove about 1500 km on The Ring Road in early June, we saw snow-capped mountains, high valley glaciers, and a few patches of snow. But mostly, the place was gloriously green. We experienced a diverse landscape of lush meadows grazed by sheep and horses, fields of wild flowers, miles of tundra, hot springs, geysers, lava fields, waterfalls, glacial rivers, lakes, beaches, long-dormant volcanoes, and a couple that could erupt again anytime. We sampled a country with 52% of its land area uninhabited, and a population density of only 7.5 people per square mile. We ate foods both familiar and new. And, we returned home filled with fond memories of a clean, efficient, modern northern European country, sparsely populated with hardy and friendly people. Come along as we travel from Keflavik (Leifur Eiricksson Air Terminal is nearby) and Reykjavik (the Capital, population of 177,720) in the southwestern corner to Vik i Myrdal (picturesque village of 297 situated between mountains, sea cliffs, and a black sand beach) along the south coast and then on north and east to Akureyri (second largest city, population of 17,522) and Myvatn (the 'midge lake'). I'll also talk about Iceland's economy, fisheries, invasive species problems, their push toward sustainability, and teach you a few Icelandic words.

- September 24, 2009  
**Mystery of the Waters of the Galapagos – A Diving Experience**

Michael Barbour, Tetra Tech

**Synopsis:** The diversity of aquatic life around the Galapagos Islands is among the highest in the World, because five strong currents converge there bringing a tremendous food source.

It is the mating grounds of the Scalloped Head Pacific Hammerhead Shark, a major feeding grounds of the Whale Shark, the only place where penguins (the Galapagos Penguin) can be found on the Equator, and a place where marine iguanas share habitat with turtles, sea lions, and blue footed boobies. Waters around the Galapagos Islands are a diver's paradise, but not for the faint-hearted or the novice. Dangers abound, but beauty prevails.

- May 28, 2009  
**Eelgrass Makes a Comeback in the Potomac River: A Review of DNR's Large-Scale *Zostera marina* (eelgrass) Restoration Efforts in Maryland**

Kathryn Busch, Tidewater Ecosystem Division, Maryland Department of Natural Resources, Annapolis

**Synopsis:** Submerged aquatic vegetation (SAV) serves a vital role in maintaining a healthy Chesapeake Bay ecosystem. As a result of systemic losses, SAV restoration is an important component of the Chesapeake Bay Program's (CBP) restoration efforts. In 2003, the CBP created the "Strategy to Accelerate the Protection and Restoration of Submerged Aquatic Vegetation in the Chesapeake Bay" to help achieve the goal of increasing SAV acreage in the Bay. As part of this strategy, large-scale eelgrass restoration efforts were initiated in two Maryland rivers. Initial site selection was accomplished using GIS-based targeting models, test plantings, and habitat assessments. From 2003 to 2007, nearly 4 million seeds were dispersed over 26 acres in the Patuxent River and almost 9 million seeds over 40 acres in the Potomac River. Eelgrass seedling germination has been consistent throughout the project. However, recruitment success varied dramatically between the two rivers. Restoration locations in the Patuxent experienced initial seedling germination, but no long-term plant survival, possibly due to high turbidity and high summer water temperatures. Eelgrass within several restoration locations in the Potomac are thriving and have expanded beyond initial seeding extents. Healthy eelgrass beds now cover about five acres of the Potomac for the first time in decades. Continued survival and expansion of restored eelgrass beds in the Potomac support the future use of large-scale seeding methods to achieve SAV restoration.

- May 21, 2009  
**Blowing Up the Myths about Mountaintop Removal Mining**

J.W. Randolph, Appalachian Voices and Ross Geredien, MD DNR

**Synopsis:** Mountaintop removal mining is a devastating form of coal mining currently being practiced in Appalachia. Entire mountains are blasted apart to get at the coal seams and the waste is dumped into river valleys. Over a million acres of Appalachia have been destroyed and over 1200 miles of streams have been buried and polluted from mountaintop removal mining. Yet, burning the extracted coal is providing less than 5% of our annual electricity needs. Some of this coal is burned to generate electricity for homes, schools, and businesses right here in Annapolis. This mining practice can and must change. With Appalachian coal reserves dwindling, intense interest in renewal energy sources growing, and new leadership in Washington, there is hope on the horizon. In this talk, I will discuss what the people of Appalachia are doing to save their mountains, streams and communities at this crucial time in history. Learn how you can join them by promoting the Clean Water Protection Act in Congress, or by spreading the word in your own communities. This presentation is available as a [1.6 MB pdf file](#).

- May 12, 2009

**Soil Planet: Designing the Smithsonian Exhibition *Dig It! The Secrets of Soil***

J. Patrick Megonigal, Smithsonian Environmental Research Center, Edgewater MD

**Synopsis:** There is an enormous gap in perceptions about the importance of soil resources between the general public and scientists, impeding the discovery and adoption of new approaches to soil management. An ambitious attempt to educate the general public about soils opened in July 2008 at the Smithsonian's National Museum of Natural History in Washington, DC. Dig It! The Secrets of Soil is a 460 square-meter exhibition that reveals the complex world of soil and how these hidden ecosystems support life on earth. It was designed to explore the breadth of soil science, and to address the implications of human impacts on soil resources. The exhibit is rich in audiovisual and interactive components. Testing suggests it is very successful at accomplishing the primary goal---people about the importance of understanding and conserving soil resources in forests, wetlands and agricultural areas. Educators can find teaching resources based on the exhibit at [www.forces.si.edu/soils](http://www.forces.si.edu/soils). The exhibit will travel across North America for four years after it closes on January 3, 2010.

- May 7, 2009

**Nitrogen Transport and Transformation in the Otter Point Creek and Monie Bay NERR Watersheds**

Michael J. Castellano (Penn State University, University Park, PA)

**Synopsis:** Transport of human-derived reactive nitrogen to surface and ground waters has increased eutrophication and polluted drinking water supplies. Current

concepts for the prevention of reactive nitrogen delivery to water resources focus on carbon-based stabilization mechanisms. However, hydrology also plays a critical role in the transport and transformation of nitrogen. Working within forests and agroecosystems, I will compare carbon-based and hydrology-based mechanisms of ecosystem nitrogen removal and retention. The importance of these mechanisms will be related to well-inventoried and easy-to-measure soil properties that offer outreach potential and management implications.

- April 29, 2009  
**The Historical and Paleocological Record of Land Use and Estuarine Eutrophication: The Importance of Nitrogen**

Dr. Grace S. Brush (Johns Hopkins University, Baltimore, MD)

**Synopsis:** Today, chemically-synthesized nitrogen is recognized as a major cause of aquatic eutrophication and anoxia, resulting in “dead zones” in many coastal regions of the world. Biological and geochemical profiles from sediment cores throughout the Chesapeake Bay show that in pre-colonial time nitrogen influxes were very low, suggesting that biological nitrogen fixation was balanced by denitrification. During this time, the landscape consisted of a diversity of forests, coastal marshes, floodplains and inland wetlands, many of which were created by beavers. Hence, there were many opportunities for denitrification. Estuarine conditions did not change much in early post-colonial time when agriculture consisted of small farms separated by patches of forest. But, by the middle 19th century and continuing into the 20th century, more than three-fourths of eastern North America was deforested, primarily for agriculture. Deforestation was accompanied by draining many of the wetlands to produce arable land. Thus, landscape vegetation, hydrology and geochemistry were changed and areas for denitrification greatly decreased. At the same time, other sources of nitrogen fertilizers became available, including guano, nitrate deposits and after World War I synthetic nitrogen. How can the coastal regions be restored? Returning the landscape to pre-colonial conditions is not an option. A watershed approach is needed, which in addition to reducing nitrogen inputs, would include planting forest stands on appropriate soils throughout the watershed. In addition, denitrification can be increased throughout the watershed by restoring wetlands where it is hydrologically feasible, as well as by using technologies such as retrofitting sewage waste systems for denitrification. Efforts to remove nitrogen from the environment are expensive and are designed primarily for restoring the estuarine and coastal fishery. However, societal needs have changed, so that coastal systems are valued for services, including aesthetics and recreation, as well as the provision of food. Hence, the future health of coastal regions may depend on the willingness and ability of the public to pay for multi-goal management strategies directed toward many services. This presentation is available as a [3.6 MB pdf](#) file.

- March 27, 2009

**Hill of Grace**

Raymond Morgan II, University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg, MD

**Synopsis:** This seminar is based on Dr. Morgan's sabbatical and zymurgical exploits in Australia and New Zealand in early 2008. He will discuss the effects of urbanization on the Australian landscape in Victoria. Conservation of the unique fish biota associated with South Australia, as affected by water use issues and climate change in the Murray River Basin, will also be described. Dr. Morgan will comment on his travels in New Zealand.

- February 19, 2009

**CO<sub>2</sub>, Climate Change and Public Health: the Botanical Perspective**

Lewis Ziska, U.S. Department of Agriculture, Beltsville, Maryland

**Synopsis:** The epidemiological implications with respect to climate change and public health (e.g., shifts in disease vectors) are beginning to be acknowledged. Less recognized, however, are the potential links between climate, plant biology and public health. In addition to being affected by climate (e.g., temperature determines plant range), carbon dioxide (CO<sub>2</sub>) represents the raw material needed for photosynthesis and its rapid increase in the atmosphere is expected to stimulate plant growth. There are a number of means by which plant biology intersects with human health, including aero-biology (allergens, asthma), contact dermatitis (rashes), toxicology (poison ingestion), pharmacology (plant-based analgesics), that are likely to be affected by the ongoing changes in CO<sub>2</sub>/climate. In this over-view, I will discuss current research efforts by USDA to address these issues, current progress and future directions. This presentation is available as a [3.53 MB PowerPoint](#) file.

- January 22, 2009

**Using GIS to Target Forest Conservation and Restoration Needs: An Assessment of Charles County Forests.**

Rob Feldt, Maryland Department of Natural Resources

**Synopsis:** Rob will discuss an analysis conducted by the Maryland DNR Forest Service to assess forest conservation and restoration potential in Charles County. This assessment is intended to help county planners prepare for future growth by prioritizing forest conservation efforts and guiding forest restoration projects to augment current water quality, open space, and wildlife habitat. He will explain what data layers were used and describe the scoring method and model outputs which paint unique pictures of Charles County's forests. The presentation is linked [here](#) as a 11MB PowerPoint file.

- December 10, 2008  
**A Latin Journey: Running up Mountains, Walking through Ruins and Swimming with Penguins**

Sarah Widman, Maryland Department of Natural Resources

**Synopsis:** Sarah Widman, Fisheries Service, shares her experiences from a recent trip to Peru and Ecuador. See the Incan ruins in Cusco and Machu Picchu, the Andes Mountains, and the Galapagos Islands. View underwater video of sea lions, sea turtles, sharks, and penguins. Learn about the interesting history of the Incas and the Galapagos Islands.

January 16, 2014

Speaker: Fred Tutman (Patuxent RiverKeeper)

Title: How Can We Create a More Diverse Bay Movement?

Synopsis: The black experience in America includes an environmental context---one with particular social expectations, access to nature, educational sub-text, and a sense of place that includes a rich heritage with nature. Is the Chesapeake Bay preservation movement identified as purely a nature-loving movement, or is it just as committed to creating environmental fairness and equality? Fred Tutman, the only African-American Riverkeeper, will share his ideas and views on how to create an unstoppable and more inclusive preservation movement.

February 5, 2014

Postponed due to icy roads. This has been rescheduled to June 5th.

Speaker: Dr. Dan Fiscus (Frostburg State University)

Title: Life, Money and the Deep Tangled Roots of Systemic Change for Sustainability

Synopsis: For many working to achieve sustainability, it may appear the problem is well-known and some partial solutions are also well-known. But we can't get the traction or leverage to make real change to human social, economic and environmental systems to actualize sustainability in the industrial nations. While it may be easier and give quicker payback to work on the "low hanging fruit" of change for sustainability (e.g., technical solutions, increasing efficiency, new light bulbs), this talk suggests the necessity of equal effort devoted to the "deep tangled roots" that extend down to the foundations of our academic disciplines, science practices, management, policy and cultural mindsets. Many



agree our need for successful large scale change is urgent. This talk integrates two major leverage points for systemic change---fundamental and dominant paradigms of life science and of economic systems---to help create sustainability in reality. I will also report on applications of these ideas at Frostburg Grows---an innovative tree nursery, food production, composting, renewable energy and training center built on a former coal mine in western Maryland.

February 6, 2014

Speaker: Paul Kazyak (Maryland DNR, Annapolis)

Title: Tales from Down Under: Paul's Bucket-list Trip to See Kangaroos and Kiwis

Synopsis: Join us to hear Paul tell highly exaggerated tales from his month-long trip to Australia and New Zealand in the winter of 2013. From the South Island to Sydney, see some of the most beautiful and bizarre creatures and landscapes in the world. Observations on culture, ecology, sustainability, and the status of craft beers will also be offered.

February 20, 2014

Speaker: Dr. Jeffrey Cornwell (University of Maryland Center for Environmental Science, Horn Point Laboratory, Cambridge)

Title: Oyster Restoration, Aquaculture and Nitrogen Removal – A Biogeochemist's Perspective

Synopsis: Increasing the numbers of the eastern oyster (*Crassostrea virginica*) in Maryland's Chesapeake Bay has a number of ecosystem and societal benefits, including providing substrate for hard bottom benthos, improved water quality through filtration of light attenuating algae and sediments, employment in the seafood industry, and the subject of this presentation, nitrogen removal. Recent studies at the Horn Point Laboratory have examined the roles of on-bottom oyster restoration and aquaculture in floats in nitrogen removal. The most obvious role in nitrogen removal occurs when nitrogen in oyster tissues and shells is removed from the estuary during harvest. Recent work has shown that a microbial process occurring at high rates in oyster reefs - denitrification that leads to nitrogen conversion to dinitrogen gas – provides an even larger water quality benefit. Comparison of nitrogen removal will be made between on-

bottom oyster establishment and current aquaculture practices. The potential water quality value of restoration and new research in Harris Creek will be discussed.

March 20, 2014

Speaker: Carlton Haywood

Title: Ecological Limits of Hydrologic Alteration (ELOHA): Easy to Say, Harder to PinPoint

Synopsis: Ecological Limits of Hydrologic Alteration (ELOHA): Easy to say, harder to pinpoint.

The UA Army Corps of Engineers, The Nature Conservancy, and the Interstate Commission on the Potomac River Basin, collaborated on the Middle Potomac River Watershed Assessment. This study investigated the relationship between streamflow alteration and ecological response in the Potomac River and its tributaries in an area defined as the Middle Potomac (which included all of the Potomac watershed except the North Branch and the watersheds below Occoquan Creek and Piscataway Creek). One component of the study was to assess stream and small rivers environmental flow needs, for which the Ecological Limits of Hydrologic Alteration (ELOHA) methodology was used. The study area's large extent, 11,550 sq. mi. and parts of four states and the District of Columbia, presented challenges not faced in other ELOHA studies. Despite these challenges, strong relationships were found between urbanization (impervious surface), and hydrologic alteration. Land use change was found to be a more significant cause of hydrologic alteration than water withdrawals and impoundments. This study was unable to pinpoint exact ecological limits of hydrologic alteration but did reveal relationships between increasing flow alteration and degrading macroinvertebrate community health. The methodologies used will be reviewed with a focus on how the project tackled the challenges of assembling comparable hydrologic and biological datasets and accounting for confounding factors presented in such a large watershed.

[Link to presentation file](#)

April 17, 2014

Speaker: David Kazyak (University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg)

Title: Sex, Growth, and Survival: Insights from a Large-scale Brook Trout Tagging Effort

Synopsis: Brook trout exhibit highly variable life histories and are declining across much of their range. Since 2010, researchers at the University of Maryland's Appalachian Laboratory have collaborated with DNR Fisheries Service staff to individually tag and monitor more than 3500 brook trout in the Savage River watershed, offering insights into the population dynamics of Maryland's only native trout species. Mr. Kazyak will report findings from this study and discuss how the results have changed our understanding of brook trout in the State.

May 8, 2014

Speaker: Dr. Matt Fitzpatrick (University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg)

Title: Novel approaches to modeling and mapping patterns of stream biodiversity in Maryland

Synopsis: Biotic inventories of stream communities, such as the Maryland Biological Stream Survey, routinely are used to inform management of aquatic ecosystems. Given the expense of field sampling, the coverage of biotic inventories typically is sparse relative to the extent of the area of management concern, and therefore planning often relies on extrapolation of biological attributes to entire watersheds or on some other, usually environment-based, stream classification scheme. In this talk, I will discuss ongoing research to produce a biologically-optimized stream classification for Maryland. Our approach combines new spatial analysis techniques, high-resolution maps of Maryland streams (including locations of buried stream segments), and new statistical modeling approaches to produce comprehensive maps of the distribution of biodiversity in Maryland streams and to estimate how 40 years of urbanization have affected stream biodiversity. Our methods incorporate both local and landscape-scale characteristics of individual stream reaches as well as the role of stream connectivity in determining community composition. The major goal of the project is to develop a spatial predictions of aquatic communities that best discriminate stream reaches with similar biological characteristics and which can be used to inform the protection and restoration of streams in the context of ongoing urbanization.

Link to a .pdf of the presentation

June 5, 2014

Speaker: Dr. Dan Fiscus (Frostburg State University)

Title: Life, Money and the Deep Tangled Roots of Systemic Change for Sustainability

Synopsis: For many working to achieve sustainability, it may appear the problem is well-known and some partial solutions are also well-known. But we can't get the traction or leverage to make real change to human social, economic and environmental systems to actualize sustainability in the industrial nations. While it may be easier and give quicker payback to work on the "low hanging fruit" of change for sustainability (e.g., technical solutions, increasing efficiency, new light bulbs), this talk suggests the necessity of equal effort devoted to the "deep tangled roots" that extend down to the foundations of our academic disciplines, science practices, management, policy and cultural mindsets. Many agree our need for successful large scale change is urgent. This talk integrates two major leverage points for systemic change---fundamental and dominant paradigms of life science and of economic systems---to help create sustainability in reality. I will also report on applications of these ideas at Frostburg Grows---an innovative tree nursery, food production, composting, renewable energy and training center built on a former coal mine in western Maryland.

June 17, 2014

Speaker: Amanda Johnson (Maryland Department of Natural Resources, Oxford)

Title: The 2013 Unusual Mortality Event

Synopsis: Ms. Johnson will discuss the Unusual Mortality Event (UME) that began last summer and is continuing to affect east coast populations of Bottlenose Dolphin (*Tursiops truncatus*) this year, with a cumulative mortality so far of over 1183 animals. She will discuss UME's in general, provide some background information on DNR's stranding response team, and then focus her talk on DNR's experience with the UME in Maryland. She will describe the disease that is responsible for the dolphin mortalities, the causes and symptoms, DNR's procedures for response and sample collection, show some current data from Maryland and other east coast states, and share some stories about interesting cases encountered during 2013.

Link to a .pdf of the presentation

September 23, 2014:

Speaker: Dave Bolton (Maryland Geological Survey, Baltimore)

Title: Flaming Tap Water? Exploding Houses? Methane in Well Water in the Appalachian Plateau in Maryland

Synopsis: The development of natural gas reserves of the Marcellus Shale in Pennsylvania and other states has led to claims that methane has contaminated shallow ground water near these wells. However, methane can occur naturally in ground water, since organic material is common in sedimentary rocks of the Appalachian Plateau. In most areas, there has been little or no testing of well water prior to gas well drilling, development, and production. Furthermore, there is no EPA drinking-water standard for methane in water, so water wells are rarely tested for methane or other gases. Without baseline data, the effect of natural gas development is difficult to determine. In 2012-2014, the Maryland Geological Survey analyzed methane concentrations in more than 80 water-supply wells in Garrett and Allegany counties to acquire baseline data. Methane was detected in almost half of the tested wells and in all geologic formations. This talk will discuss the occurrence and distribution of well-water methane, and implications for gas well development in the Marcellus Shale.

[Link to a .pdf of the presentation](#)

October 23, 2014:

Speaker: Dr. David Nelson (University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg)

Title: Geographic Origin and Population Dynamics of Bats and Eagles Killed at Wind-Energy Facilities in North America

Synopsis: Growing concern over greenhouse gas emissions associated with energy production from the combustion of fossil fuels has prompted a proliferation of renewable-energy production in the United States and abroad. Despite the environmental benefits associated with renewable-energy development, recent studies also highlight potential negative impacts on wildlife, including the largely unanticipated and widespread mortality of bats and birds at utility-scale wind-energy facilities. Determining whether different species are vulnerable to population declines resulting from wind-turbine collisions, as well as other threats, is a major conservation and resource-management objective. In this talk, I will present the results of ongoing research using stable isotope and genetic data to assess the geographic origins and genetic diversity of (1) red and hoary bats experiencing mortality in the central Appalachians and (2) golden eagles experiencing mortality at the Altamont Pass Wind Resource Area in California. These data are helping provide new insights into the movement ecology and population

structure of these species, with implications for the demographic impact of mortality and sustainable renewable- energy development.

November 7, 2014:

Speaker: John Epifanio (Conservation Geneticist, Illinois Natural History Survey)

Title: Going with the “flow” – a fisheries conservation journey from genes to rivers

Synopsis: Fish biodiversity in Illinois is confronted with a broad suite of human-caused challenges common to many areas of the US. As result, fishery management and aquatic ecosystem conservation benefit from the collaborative partnership of resource managers with scientists. Our ultimate goal is to add value to the management and conservation enterprise by addressing key ecological uncertainties and monitoring effectiveness of management actions. In this presentation, John will provide an overview of three fisheries-focused research and monitoring programs conducted by his lab group at the Illinois Natural History Survey in partnership with the Illinois Department of Natural Resources.

November 13, 2014:

Speaker: Dr. Bradley Stevens (University of Maryland Eastern Shore)

Title: Using Underwater Video to Assess Abundance and Behavior of Black Sea Bass and Sea-Floor Habitats in the Maryland Coastal Zone

Synopsis: Underwater video systems are becoming increasingly useful for studying fish abundance, behavior, and their habitats. Black sea bass occupy heterogeneous habitats during summer that are extremely difficult to assess with towed nets, so abundance of BSB stock is poorly known. Since 2010, we have been using underwater video to study BSB abundance, behavior and habitats in the Maryland coastal zone. Initial studies used small Go-Pro © video cameras attached to commercial fish traps, and revealed that only a small proportion (1-3%) of fish that encounter traps become captured. Habitat type is the most important variable in determining fish abundance, and use of bait had little impact. Current research is focused in two areas: 1) using a hi-resolution digital camera system to document seafloor habitats and epibenthic communities in the Maryland Windpower development area, and 2) using small video cameras to study the impacts of trap fishing on seafloor habitats, especially corals and gorgonians. The latter study indicates that a large proportion of trap-deployments have some impact with seafloor marine life. Expanded use of inexpensive UW video systems will become a major feature of marine scientific research in the near future.

December 11, 2014:

Speaker: Dr. Matthew Ogburn (Smithsonian Environmental Research Center, Edgewater, MD)

Title: Assessment of River Herring Spawning Runs in Chesapeake Bay

Synopsis: River Herring populations have declined by more than 90% along the US Atlantic coast in recent decades. The loss of these important forage fish has eliminated an important fishery and has likely had far-reaching consequences for Chesapeake Bay food webs. To support conservation and population recovery efforts, we have been working to develop and test methods for River Herring monitoring that would enhance current monitoring efforts. These methods include: rigorous spawning run counts in representative spawning streams, watershed-scale assessments of habitat use for spawning, and assessments of fish passage efficiency at key fish ladders and other potential obstructions to migration.

January 15, 2015:

Speaker: Jim Uphoff and Margaret McGinty (Maryland Department of Natural Resources)

Title: "Managing Chesapeake Bay's Land Use, Fish Habit and Fisheries: Developing and Applying Impervious Surface Reference Points"

Synopsis: The Impervious Serfs have worked to quantify and communicate the impact of development on Maryland's Chesapeake Bay fisheries to stakeholders and agencies involved in planning and zoning, and fisheries management. Development (measured as percent impervious surface in a watershed or IS) has added a major new ecological feature, suburbs and cities, to watersheds. As development proceeds, multiple stressors of fish habitat (altered stream flow, nutrients, sediment, toxic contaminants, endocrine disruptors, etc.) accumulate. Productivity lowers and fisheries deteriorate as habitat becomes unsuitable for egg through adult life stages due to watershed development. We adapted the biological reference point target and threshold concept employed in marine fisheries management to develop watershed IS reference points (ISRPs). ISRPs should help regulators recognize levels of development that conserve fish habitat (target of 5% or less IS, a rural watershed) or degrade fish habitat (a suburban threshold of 10% IS). Reviews of county comprehensive development plans provide opportunities to use ISRPs to influence planning and zoning. Application of ISRPs results in a triage approach for fisheries management, land conservation, and restoration activities. We recommend conserving remaining watersheds that are at the target level of development as the best strategy for maintaining productivity of Maryland's fisheries. Egg-per-recruit models, commonly used to establish safe fishing mortality levels under equilibrium conditions, can be modified to account to judge how habitat deterioration from continuous watershed development lowers safe fishing levels. When applied to Blueback Herring and Yellow Perch, development past the ISRP threshold resulted in productivity so low that a sustainable level of fishing could not be estimated.

February 12, 2015:

Speaker: Ward Slacum (Oyster Recovery Partnership)

Title: Three Years of Evaluating an Electronic Reporting System in the Maryland Blue Crab Fishery: What Have We learned?

Synopsis: In 2012, Maryland fisheries managers, commercial fishing industry representatives and other stakeholders implemented a Pilot Project with a goal to evaluate if daily reporting using an electronic reporting system could improve the reliability of harvest information reported by the blue crab fishery. The Pilot Project was the outcome of discussions between Maryland fisheries managers and the Blue Crab Design Team that focused on identifying opportunities where industry and management could work together to improve industry accountability and enhance overall blue crab management. The results of the Pilot Project demonstrated that industry had the capability to use an electronic reporting system daily and that reported harvest could be successfully verified for accuracy through dockside monitoring and dealer reports. With the endorsement of the Blue Crab Design Team and Department of Natural Resources the Pilot Project continued through 2014. Over that timeframe more than 100 watermen have reported 6,975 crabbing trips. Watermen were instrumental in the development of the final reporting system and many valuable lessons were learned during the Pilot.

March 12, 2015:

Speaker: Dr. Dave Secor (University of Maryland, Chesapeake Biological Laboratory, Solomons)

Title: Migration Ecology of Chesapeake Bay Striped Bass

Synopsis: A long-term priority question in the assessment and management of coastal striped bass is the rates of egress and residency for striped bass produced in the Chesapeake Bay. Past tagging and otolith tracer analysis demonstrate these rates vary strongly with size, sex, and season but these data are too coarse to employ in current efforts by ASMFC to implement spatially explicit stock assessment models. A unique and timely opportunity exists to leverage telemetry assets deployed by the US Navy, a cooperative Chesapeake Bay Section 6 Award, and Atlantic state scientists cooperatively sharing data through the Atlantic Coastal Telemetry Network and the Mid-Atlantic Telemetry Observing System. Through ASMFC funding, UMCES scientists are tracking a representative group of 100 Potomac River striped bass tagged and released in spring and fall 2014 for a 2.5 year period within the Potomac River and across major regions and tributaries of the Chesapeake and the Atlantic Coast. Telemetry receivers have been deployed in the lower Potomac, mid-Bay and in coastal waters off DelMarVa. Sex- and size-stratification in the sample is permitting us to resolve sex and size-specific patterns in coastal migration. Other research aims include evaluating migration cues, use of different spawning reaches, visitation to non-natal estuaries, and incidence of straying and skipped spawning.

April 16, 2015:



Speaker: William Harbold (DNR)

Title: Assessing Impacts of Dam Removal on Patapsco River Biota

Synopsis: A Maryland Biological Stream Survey (MBSS) biologist will give a presentation on the MBSS's monitoring efforts associated with dam removals in the Patapsco River. This project has been ongoing since 2009, covering the completed removal of two dams (Simkins Dam and Union Dam) and the impending removal of a third (Bloede Dam). The primary focus of the MBSS's monitoring efforts has been to document the impacts of dam removals on the Patapsco River's biota by sampling both before and after the removal event. Specific areas of focus include anadromous fish, American eels, resident fish, and benthic macroinvertebrates. The presentation will cover the methods, results, and some brief conclusions drawn from monitoring these areas from 2009 through the present.

View the presentation here (pdf)

May 14, 2015:

Speaker: Dr. Mark Southerland (Versar Inc., Columbia MD)

Title: In and Out of Africa: Lions and Leopards and Lemurs! Oh my!

Synopsis: Mark, Mary, Kelly, and Julia enjoy traveling to far-away places, especially where exotic animals are involved. That said, their August 2015 trip to southern Africa is their favorite. Mark will narrate their travels from Cape Town to Sabi Sands Game Reserve to Victoria Falls and finally to Madagascar. The African big five will be in evidence as well as a pack of the rare wild dogs. The show concludes with several species of chameleons and lemurs, found only on Madagascar, including the other-worldly aye-aye.

If you can't make the seminar, you can view the photographs at the following link:

<https://southafricaandmadagascar2014.shutterfly.com/>

# 2015 - 2016 Seminars

**September 10, 2015**

**Title** - Shaping our Ocean Future: Balancing Ecosystems and Economies

**Presenters** – Presenters – Catherine McCall, Gwynne Schultz, and Joe Abe; DNR's Chesapeake and Coastal Service, Carrie Kennedy; DNR's Fisheries Service and Mark Talty, DNR's Office of the Attorney General (tentative)

Just off Maryland's Atlantic coast, uses of our ocean waters are intensifying and we continue to learn more about the living resources that comprise our marine ecosystems. As human uses of our ocean environment changes and new uses emerge, there is an ever-growing need to proactively engage stakeholders, collect data and conduct environmental surveys all while proactively discussing how to balance natural resource needs with human uses. We will share how Maryland is approaching this resource-use balance and describe current and future efforts to collaborate and shape ocean issues spanning from energy development to environmental studies to fishing use. This seminar will include a short film, brief presentation and a panel discussion.

**October 8, 2015**

**Title** - Factors Contributing to Increased Iron Concentrations and Flocculate Associated with Iron-oxidizing Bacteria in Regenerative Stream/stormwater Conveyance Structures (RSCs)

**Presenter** – Michael Williams; University of Maryland Center for Environmental Science

Regenerative stormwater conveyances (RSCs) are built as a series of pools separated by rocky berms. Each retention pond has a thick seepage bed made of sand and wood chips. RSCs are effective at reducing the flashiness of stormwater runoff, thereby preventing streambed erosion. Stormwater is also retained for a longer period of time thereby increasing particulate settling and potentially enhancing rates of nutrient processing (i.e., denitrification). Although there is currently a great deal of interest in this type of best management practice (BMP) as a means of reducing nutrient and sediment export from disturbed catchments, little is known of its nutrient and sediment retention efficiency over time and whether there are unintended ecological consequences associated with these structures. For example, the accumulation of flocculate associated with iron-oxidizing bacteria (IOB) has been observed at various RSC sites, yet it is unknown whether the concentration of this flocculate is predominately natural, a consequence of leached iron (Fe)

from the materials used in the RSC construction, or because of mobilized Fe associated with higher groundwater levels in adjacent riparian zones that may occur after construction. Deleterious ecological effects associated with large deposits of flocculate from these bacteria potentially include limiting the extent of benthic substrate that aquatic macroinvertebrates can recolonize and changes in the redox potential and rates of biogeochemical processing in stream sediments. Large quantities of flocculate and the oily sheen on surface waters commonly associated with IOB can also negatively affect the aesthetics of an aquatic system. An extensive dataset of Fe and other solutes from groundwater wells and perennial streams in RSCs located in the Coastal Plain and Piedmont physiographic provinces of MD and DC, as well as from leaching experiments of the RSC fill material, have been evaluated. This talk will focus on the relative importance of various sources of Fe, the factors responsible for the formation of Fe flocculate, and ecological implications of this flocculate in natural and RSC systems.


**November 19, 2015**

**Title -**  [Preliminary Findings from Maryland's First Large-scale Freshwater Mussel Relocaiton](#)

**Presenter** - Matt Ashton; Maryland Department of Natural Resources

Freshwater mussels are the most imperiled aquatic fauna in North America. Relocation is widely used as a conservation action to avoid impacts to mussels and their habitat. The efficacy of mussel relocation is not well known because the ecology of most species is poorly understood, only a few relocations have been monitored, and recapture rate has been low. Implementing best practices and new survey techniques has seemingly improved mussel survival and recapture. Results from the first large scale mussel relocation in Maryland and preliminary findings from the first year of monitoring are presented. The main objective of the study was to reduce risk to the mussel population by removing as many individuals as practical while also detecting rare species. The relocation also entails a rigorous monitoring plan to evaluate its efficacy. Ultimately, we will compare mussel condition at relocation sites over time to that observed at control sites to assess the efforts success and inform standards for future relocations in Maryland.

**December 10, 2015**

**Title -**  [Native Bees in Maryland: Species, Biogeography, Habitat, Management, Conservation...Trends?](#)

**Presenter** – Sam Droege; U.S. Geological Survey

Almost 430 species of bees have been recorded in the Maryland. Likely, the ultimate number of species will approach 500. Currently, we are documenting the distribution of bees in the state by targeting surveys in each of the counties. Many of the species are tied to particular pollen plants, others are associated with deep sand areas in the state, 20% are nest parasites, many are rare, past collecting is weak, and discoveries of new state species are being made all the time. Management needs to target habitats, emphasizing biodiverse open field species, deer control, and changes in patterns of tree planting, herbiciding and mowing throughout the state.

**January 14, 2016**

**Title** -  [Emerald Ash Borer Risks and Responses in Maryland](#)

**Presenters** - Anne Hairston-Strang and Colleen Kenney; both MD DNR Forest Service

What does EAB mean for Maryland's forests? This invasive insect has killed 99% of the ash trees in the Lake States, and is now found throughout Maryland since this summer's finds on the Eastern Shore and north of Baltimore. Ash is common in rural and urban forests, with losses affecting water quality, wood products, and community livability. Responses have included community response plans with urban tree inventory data, workshops, homeowner information sheets, silvicultural guidance for forest landowners, pilot treatment projects with communities, biocontrol releases, and utilization strategies. Knowing when and what to treat is key to effective response. The prognosis of ash in the U.S. is unclear, but efforts to pursue long-term recovery include studying "lingering ash" and spreading biocontrols.

**February 11, 2016**

**Title** - Eagles of the Chesapeake Bay and a Look at Nesting Season

**Presenters** - Craig A. Koppie, Eagle/Raptor Biologist, U.S. Fish & Wildlife Service, Chesapeake Bay Field Office and Teena Ruark Gorrow, Professor, Salisbury University

Through rare photographs and the sharing of personal stories, get an eagle's view of the Chesapeake Bay, as well as the current status of the area's bald and golden eagle populations. Following their presentation, Koppie and Gorrow will sign copies of their award-winning book, *Inside a Bald Eagle's Nest: A Photographic Journey through the American Bald Eagle Nesting Season*. Released in December 2013 by Schiffer Publishing, *Inside a Bald Eagle's Nest* was nationally recognized by The Nature Generation with the 2014 Green Earth Book Award at the National Press Club in Washington, DC. Copies of the

book, including a limited number of first editions, will be available for purchase during the event at a 10% discount.

 [People Are Talking: Inside a Bald Eagle's Nest](#)

 [Inside a Bald Eagle's Nest National Green Book Award](#)

 [Inside a Bald Eagle's Nest Flyer](#)

### **March 10, 2016**

**Title** - Extra! Extra! Read All About It! – Interesting Wildlife Health and Disease Cases from the Cooperative Oxford Laboratory

**Presenter** - Cindy Driscoll; Cooperative Oxford Laboratory

Our speaker, Cindy Driscoll, is often asked "what ever happened to..." or "what was the cause of..." or "I saw a dead ....whatever". Cindy's talk will focus on interesting wildlife health and disease cases at the Cooperative Oxford Lab over the past few years. Cindy will provide brief updates on cases including: 1) cold-stunned marine animals (manatees and turtles), 2) the 2013-2016 East Coast Bottlenose Dolphin Unusual Mortality Event (UME), 3) the Snowy Owl irruption from 2013 through 2015 and a follow up on veterinary multi-state investigation of cases (over 100 owls), 4) a Poplar Island Harmful Algal Bloom (HAB) and bird mortalities, 5) Avian Influenza preparedness; an interagency effort, 6) the Maryland One Health Bulletin - Interagency Veterinary Newsletter, 7) Dark False Mussel and dog mortalities in Anne Arundel County, 8) 2015 Hammerhead Shark mortality in Ocean City, 9) fall 2015 Robin mass mortality event, and 10) the November 2015 Middle River fish mortality event. Many of these cases have been prominently featured by local and statewide news media.

### **April 14, 2016**

**Title** - Targeting Behavior Changes in Chesapeake Bay: Where to Aim?

**Presenter** - Jamie Testa; University of Maryland Center for Environmental Science

Who's willing to change their behaviors in the interest of Chesapeake Bay health? Limited by financial constraints, it may be ideal for watershed organizations to focus their stewardship and educational initiatives on actions most likely adopted by their constituents. The Bay Survey, hosted online between 2013-2015, asked participants questions about stewardship practices in and around their homes. The survey found that more people are

likely to plant a rain garden if provided with help financially; most people do not have a rain barrel, but those who do have them installed and hooked up; and, there is an equal likelihood people will install rain barrels as rain gardens at their home. These are just a few of the results that will be presented during this seminar. This presentation looks at the results of The Bay Survey in Maryland and compares the counties with the best return rates (Anne Arundel and Dorchester).

**May 12, 2016**

**Title** - Expedition Antarctica

**Presenter** - Sarah Widman; Maryland DNR

Join Sarah as she regales us with stories of hurricanes at sea, encounters with some of the rarest orcas on Earth, identifying new humpback whales, and seeing penguin mating rituals that are seldom shown on video. Sarah will relive details of her journey through Santiago, Chile, Patagonia, and of course Antarctica.

**May 19, 2016**

**Title** - Traveling to Costa Rica the Eco-Tourism Way

**Presenter** - Mario Córdoba, Professional Guide

Join Mario Córdoba, a professional Costa Rican guide, in an exploration of the wonders of this beautiful Central American country. Mario will briefly introduce the Tico way and then dive into the natural beauty of Costa Rica. Learn about the amazing biodiversity of a country that only covers .03% of the Earth's surface but claims almost 6% of the biodiversity (the highest density anywhere on the planet). Explore traveling as an eco-tourist to stunning areas of Costa Rica, minimizing your carbon footprint in a country that is striving to be carbon neutral by 2021. An experienced bird guide and naturalist, Mario will cover birds, wildlife, and plants of Coast Rica as well!