

Previous Seminar Information

- 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_x (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 penquins (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. 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

CO₂, 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 (CO₂) 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 CO2/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.