CONCURRENT SESSIONS

MORNING CONCURRENT SESSIONS

COASTAL RESTORATION – AUDITORIUM

11:00 am – 11:20 am
Lauren Alleman, Urban Ecologist, NYC Program, The Nature Conservancy
Valuing Natural and Built Infrastructure for Resilience: A Case Study in Howard Beach, Queens
On October 29, 2012, Hurricane Sandy struck New York City and brought storm surges over 13 feet, causing more than $19 billion in damages to the city. In the wake of Hurricane Sandy, New York City asked The Nature Conservancy (TNC) to prepare a conceptual study on how a mix of natural and built defenses could be implemented in a dense urban area. Given its vulnerability to flooding and sea-level rise, the City asked TNC to evaluate the community of Howard Beach, Queens.

TNC worked with engineering firm CH2MHILL to evaluate the multiple benefits of five conceptual alternatives to address resilience in the community of Howard Beach; two composed of solely natural, or green, infrastructure; two composed of both green and gray or hybrid infrastructure, and a gray-only (conventional-built) approach. We used an ecosystem services framework to evaluate the tradeoffs in each approach. The framework included a partial benefit-transfer economic evaluation, a habitat equivalency analysis to describe cumulative gains in ecosystem services over time, and an assessment of flood damages avoided using HAZUS (natural hazard loss estimation from FEMA).

We determined that the hybrid infrastructure alternatives provide the greatest net benefit to society when compared to all-green or all-gray approaches. This study demonstrates that not only do natural defenses contribute to flood protection; they also increase ecological and social resilience with the added benefits of enhancing both the environment -including water quality, habitat, and carbon sequestration -and the quality of life in surrounding communities -including recreation and aesthetics. This effort advances the discussion of the relative benefits of natural defenses in urban coastal resilience strategies.

11:20 am – 11:40 am
Clara Holmes, Seed Collection Coordinator, Mid-Atlantic Regional Seed Bank
The Mid-Atlantic Seed Bank Goes Regional
Established in 2012, the Mid-Atlantic Regional Seed Bank (MARSB) is a supported initiative of the NYC Department of Parks. Functioning as a regional hub for the National Seeds of Success program, MARSB aims to coordinate regional efforts to meet national SOS goals while working to meet the seed needs of the region itself. By working cooperatively with interested parties to collect and bank native seed to safeguard the genetic integrity of wild populations, MARSB is facilitating the development and availability of plant materials for conservation and restoration use.

Since 2012, MARSB has made over 150 eco-regional seed collections in seven states and has trained over 100 volunteers to collect seed using the SOS protocol. We have also partnered with public and private groups throughout the region to target specific species for restoration purposes. One such effort is our partnership with the USFS's National Seed Lab to collect and bank Ash seed throughout the Mid-Atlantic and specifically the state of New York. This program aims to secure a diverse suite of genes that can be used in both research and restoration in the fight against the Emerald Ash Borer.

This year MARSB will partner with the North Carolina Botanic Garden, the New England Wildflower Society and Seeds of Success to collect seed of coastal species as part of an effort by the Department of the Interior to make our coastlines more resilient. This program will focus on collecting seed to be used for restoration

CONCURRENT SESSIONS

MORNING CONCURRENT SESSIONS (continued)

projects resulting from Hurricane Sandy and other climate change related coastal restoration efforts. This talk will introduce the past work of MARSB and detail our efforts to collect coastal species for climate change related restoration activities.

11:40 am – 12:00am

Dennis Whigham PhD, Smithsonian Environmental Research Center

Phragmites Invasion in Chesapeake Bay Tidal Wetlands: Causes, Consequences and Management

The European invasive form of Phragmites australis (Common reed) has colonized vast areas of tidal wetlands in the Chesapeake Bay (C. Bay) with the concomitant loss of ecological attributes. In this presentation examples will be given to demonstrate the level of expansion that has occurred in MD tidal wetlands since MD DNR mapped tidal wetlands in the early 1970s. The consequences (e.g., loss of habitat, declines in diversity of native plant species) and causes behind the expansion (e.g., disturbance at landscape and local scales, eutrophication) of P. australis will be detailed.

The number and aerial extent of the expansion has reached the point where restoration is not possible in many subestuaries of C. Bay. There are, however, subestuaries where the invasive form now occurs but the number of patches is low enough for restoration to occur. A proposed approach toward conservation and restoration will be described.

RESTORATION AND GREEN INFRASTRUCTURE – ROOM 125

11:00 am – 11:20 am

Steven Allison, LEED, ISA Certified Arborist, Landscape Designer, Floura Teeter Landscape Architects

Urban Bioretention Management: The Challenges of Maintaining Living Systems

Urban bioretention has fast become an answer for problematic urban stormwater runoff locally and nationally. These living systems while healthy create a clean chemical free way of treating stormwater at the source. The challenges of maintaining these living systems increase when warranties end and budgets are cut. This presentation takes a look at how we can care for these living systems while working within a budget. Breaking down the components of the system and outline what is critical for typical facilities and what may cost more in the long run.

Without proper maintenance these living systems can lose the ability to reduce the pollution load they were initially intended to provide. By understanding how these living systems operate, we can begin to answer these critical questions:

- Why is maintenance more than aesthetics?
- How little of maintenance can we get away with?
- What maintenance is critical?
- How can we maintain the necessary chemistry within the soil?

We will explore the science of these living systems and discuss how incorporating timely maintenance can benefit the budget as well as the environment.

11:20 am – 11:40 am

Marit Larson, Director, Wetlands Restoration, NYC Dept. Parks & Recreation, Natural Resources Group

Habitat Restoration and Green Infrastructure Opportunity Analysis for the Alley Creek/Little Neck Bay Watershed and Habitat Restoration Plan

Alley Creek, a tributary to Little Neck Bay in Long Island Sound, is a rare example in New York City of a stream

MORNING CONCURRENT SESSIONS (continued)

with a continuous riparian corridor almost entirely preserved by City parkland, and featuring diverse natural habitats, including some of high ecological value. Yet the urban watershed of this creek contributes to impaired water quality in the stream and Bay, and sections of degraded forest and wetland habitat exhibit the impacts of urban stressors. In 2012, the NYC Depart of Parks & Recreation's Natural Resources Group (NRG) initiated the Alley Creek Watershed Plan, which articulates goals for watershed restoration and provides a framework of specific strategies for reaching those goals, along with broad level and site specific recommendations for action, prioritized for implementation over the short and long term. The ecological restoration recommendations in the Plan were developed by comparing target or reference conditions to existing conditions in the watershed.

Conditions were assessed using several protocols that NRG and its partner, the Natural Areas Conservancy, were in the process of implementing city-wide across parklands, including assessments of: coastal restoration opportunities; ecological conditions in salt marshes; management concerns in natural areas, and social perceptions of parkland. To address other impacts on habitat and water resources, a new protocol was developed to identify opportunities for managing stormwater using green infrastructure on City-owned property. A desktop analysis and field unspections were used to screen sites based on physical factors that would increase cost or limit project effectiveness. Further prioritization was then based on factors that would influence feasibility and water quality benefit, including results from hydrologic modeling performed by the NYC Dept. of Environmental Protection. In part as a result of the planning process, several of the priority restoration recommendations in the Plan are already being implemented or have received funding.

11:40 am – 12:00am

Trinh Doan, Environmental Protection Specialist, DC Watershed Protection Division

Reimagining the Schoolyard as a Stormwater Practice and Incentive Programs that Will Help

The District Department of the Environment (DDOE) Watershed Protection Division – Planning and Restoration Branch's "RiverSmart Schools" (formerly known as "Greener Schools, Cleaner Water"), now in its seventh year, was developed to assist teachers with the training and financial resources required to install conservation sites on their school grounds and utilize them for educational purposes. Once installed the sites have the added benefit of serving as outdoor learning spaces that support experiential teaching practices and promote environmental stewardship. Training sessions focused on teacher and staff orientation toward garden-ecology based lessons. Typical installations included tree planting, raised bed creation, butterfly gardens, edible gardens, bird nesting and feeding platforms, as well as watering stations.

The RiverSmart Schools program has expanded the earlier schoolyard conservation concept to include a focus on green infrastructure that provides stormwater management on-site. Low Impact Development (LID) technologies are now emphasized when opportunities are available at participating school sites. All participating schools are evaluated for LID opportunities in an initial stormwater audit conducted by DDOE staff. School sites identified as LID appropriate have access to a larger funding source and their design, engineering and construction is completed through a formal stormwater permitting, contract, and construction process.

Some participating schools continue to be installed under the earlier conservation model. These smaller projects rely on teachers and students working with DDOE staff to create sites appropriate for environmental education. Learning goals associated with the larger LID projects may have a broader orientation including water cycle and watershed integration. The RiverSmart Schools program seeks to standardize both the menu of construction options and the education components across large and small projects. Additionally, we have incentive programs that will assist and encourage stormwater management practices: RiverSmart Rewards, RiverSmart Homes, Stormwater Retention Credit, Greenroof Rebate, Rain Barrel Rebate, Shade Tree Rebate, and Rain Garden & Pervious Paver Rebate.

CONCURRENT SESSIONS

MORNING CONCURRENT SESSIONS (continued)

HABITAT RESTORATION – ROOM 120

11:00 am – 11:20 am
Jennifer Greenfeld, NYC Department Parks & Recreation, Natural Resources Group
"Guidelines for Urban Forest Restoration**" – The Anti-Cookbook or 30 Years of Experience Restoring Forests in New York City**
Since 1984, the Natural Resources Group (NRG) at the New York City Department of Parks and Recreation (NYC Parks), has been working in forested landscapes across the five boroughs of New York City. This talk will introduce a new publication compiling the theories and practices developed, implemented and tested during this time period. The book includes an overview of the ecological and restoration principles behind NRG's approach to forest restoration, as well as a step-by-step guide to building sustainable urban forests. The information is presented through the lens of New York City, but the challenges confronted by NYC Parks are found in most dense urban areas: a legacy of encroachment upon and neglect of natural areas, fragmentation, and the rampant spread of invasive plant species.

Faced with the challenge of understanding current conditions, potential value, function and management needs of NYC natural areas, NRG staff quickly discovered that their experience with rural and wilderness areas had not fully prepared them for the complexities of urban wilds. Over time, in the process of restoring more than 1,600 acres of natural areas, including 1,400 acres of forest, NRG has developed, borrowed, and shared new restoration techniques. While there have been countless articles, summary reports, and management plans published, this is our first attempt to capture the full breadth of NRG's forest restoration knowledge and experience in a single document.

The talk will review the contents of the book sharing specific examples from:

- Background and Context
- Planning the Work: Site Inventory, Assessment & Selection; Site Planning and Design
- Building the Forest: Site Preparation; Planting, Establishment, and Adaptive Management
- Case Studies illustrating each step of the process.

11:20 am – 11:40 am
Adam Mitchell, Research Assistant, Dept. of Entomology and Wildlife Ecology, University of Delaware
Modifying Soil Properties to Restore Plant Communities for Arthropods following Plant Invasion and Drought
Changes in plant and soil characteristics following invasion can affect the quality of habitat for other organisms, such as arthropods. However, mitigating the effects of plant invasion can be difficult if invasive plants are robust to traditional management tools, such as fire and herbicide. We investigated the efficiency of an alternative restoration tool by modifying soil properties in areas that were impacted by invasive Old World bluestem grasses (OWBs, Dichanthium annulatum) and examining the effects on communities of native plants and arthropods. We applied ten soil treatments (simple disturbance, carbon amendment, mycorrhizal fungi, pH increase, pH decrease, and all the above in combination with a native seed mix) in 2011, which coincided with extreme drought and provided us with the opportunity to test the efficacy of our treatments under varying environmental conditions. Although changes in soil chemistry from treatments were short-lived, we observed reduced dominance of OWBs in areas treated with soil disturbance and seeding. As drought subsided, we observed fewer arthropods in treated plots than in OWB monocultures, but arthropod communities in OWB monocultures were dominated by invasive herbivores. In contrast, we observed a more diverse arthropod

MORNING CONCURRENT SESSIONS (continued)

community in treated plots as OWB dominance decreased. Based on our findings, simple soil disturbance in combination with seeding of native plants may increase diversity of native plants and arthropods where invasive plants are dominant in the short term, but monitoring over longer time frames may reveal additional benefits from soil modification. Given their short generation time and sensitivity to changes in the environment, arthropods may serve as indicators of restoration success. In addition, arthropods provide a substantial source of food to organisms at other trophic levels, and management strategies that aim to restore habitat for wildlife will likely need to restore habitat for arthropods first.

11:40 am – 12:00am
Larry Murrell
Soil Restoration: Reversing Soil Compaction in Damaged Clay Soils

It is widely recognized that soil decline of residential properties in New Jersey follows a pattern of 1) water-logging, 2) anaerobic-bacteria-generated toxins impairing plant health, 3) compaction, 4) rapid erosion, and 5) a higher water table. Use of pesticides and inorganic fertilizers only accelerates the deleterious compaction and erosion in a vicious cycle. This results in a domino effect of chronically higher water tables, contributing to further water-logging and flooding of residential sub-divisions. We observed in 2013-2014, over the course of 1-4 months' time, that high levels of air-infusion into eroded clay soils transforms the clay so it becomes highly porous. The improved soil porosity reversed surface pond formation and stopped chronic sump pump activity for three one acre inter-connected properties. We will present experimental evidence that the water table has been lowered 3-5 feet on these properties. The dynamic changes in the water table over the course of four rain events in December 2014 and January 2015 make a compelling case that the perched water table underlying these properties observed in the spring of 2013 has collapsed because of the transformation of clay 400-800 feet down slope of these properties. Air infusion over a period of years has changed the clay porosity, which has improved underground water flow in the natural channels, or swales, and ditches for these properties, and is due to two factors: fracturing of the clay layers by air infusion and improved microbiology in these critical flow paths.

The approaches that we outline of accomplishing air-infusion are cost effective and work for damaged soils in very short time frames of 1-2 months, see www.damagedsoilrestoration.com. The most promising strategy under development employs "free" water from roofs which becomes converted to aerated water as water exits the down spouts and enters an air-infusing structure. This approach funnels the water into inexpensive fiber-columns in the ground, holes filled with tightly compacted salt grass, one structure for every down spout of a house. In less than 5-minutes, aerated water is transferred to the soil and air micro-bubbles are entrained in water flowing below the soil surface, distributing down slope in the surface water and eventually into the ground water. By using all water coming from a residential roof, hundreds of gallons of water are distributed into the adjacent soil from a one inch rain event. We know that five gallons of water captures 5 gallons of air as micro-bubbles, or 18,000 cc of air for a 14" diameter x 60" deep hole filled with compacted salt-grass. As a consequence air-infusion at the corners of a house total to many millions of cc or air entering the soil in a season. Rapid improvements in plant health and vitality are usually seen in less than 1-month for tests done to-date. There seems no logical reason that even larger structures would not produce analogous improvements in soil vitality for non-residential applications. Such applications are currently under investigation.

CONCURRENT SESSIONS

AFTERNOON CONCURRENT SESSIONS

LAND MANAGEMENT FOR RESTORATION – AUDITORIUM

1:30 pm – 1:50 pm
Nathan Shampine, Natural Lands Manager, Mt Cuba Center
Data-Driven Land Management: Using Data Collection and GIS to Establish Goals and Prioritize Land Management and Restoration Decisions
In a time when monetary budgets and staff availability are decreasing while the need for restoration is increasing, making land management and restoration decisions can often be difficult and overwhelming. Where should we focus our efforts? How can we be efficient and effective? How do we know our management is enhancing the natural ecosystem and benefiting native flora and fauna? Utilizing available tools and technology, land managers can easily make data-driven, intentional and impactful management decisions. Learn how Mt. Cuba Center's Natural Lands staff prioritize, monitor, collect, and analyze data using ArcGIS to inform and guide future habitat restoration and management actions on 535 acres of preserved land in the Delaware Piedmont. Natural Lands Manager Nathan Shampine will both demonstrate examples of how his team has chosen reforestation sites and show how they have developed a long term vegetation survey to track changes over time.

1:50 pm – 2:10 pm
Tracy Beerley, Morris Arboretum
An Adaptive Management Plan of the Natural Lands Section of Morris Arboretum of the U of Penn
The Morris Arboretum of the University of Pennsylvania is a public garden and educational institute located in the northwest corner of Philadelphia County, Pennsylvania. This project has assembled an adaptive management plan for the Natural Lands Section of Morris Arboretum. The framework for an adaptive management plan includes the following steps: (1) assessment of the current status of the site; (2) determination of future desired conditions with measurable objectives; (3) design and implementation of ways to accomplish desired objectives; and (4) monitoring and evaluation. Physical conditions including geology, hydrology, soils and topography were obtained to gain information about the Natural Lands Section. A botanical survey of the canopy, understory and herbaceous layers was conducted to gather baseline data on the abundance and diversity of plant species. With existing knowledge and data gained through the survey, descriptions of the desired conditions with measurable objectives were described in moderate detail. Monitoring and evaluation is a critical component of an adaptive plan, however the time line for the task is beyond the scope of this project. The results of this project further reveal the ecological issues associated with an urban landscape disturbed by the negative impacts from overpopulation of deer and invasive plant species. Overall, this project has assembled an adaptive management plan for a variety of purposes including operational management, planning, and fund-raising for future development.

2:10 pm – 2:30pm
Kristen King & John Krawchuk, NYC Parks, Central Forestry, Horticulture & Natural Resources Division
Ecological Restoration and Historic Preservation: Two Case Studies from NYC
The urban landscape of New York City contains a wealth of ecological, cultural, and historic resources, which overlap in several locations across the 10,000 acres of natural areas owned and managed by NYC Parks' Natural Resources Group. How restoration work proceeds at these locations reveals a delicate balance between the management goals of urban natural resource management and historic preservation.

The Fort Totten battery is a former US Army fortification that dates to 1862 and was used as a Project Nike air defense site from 1954 until its abandonment in the 1970's. The naturalized area surrounding the historic

AFTERNOON CONCURRENT SESSIONS (continued)

structures has become valuable ecological habitat for migrating waterfowl, and a large forest restoration project began in 2014 to remove invasive vinelands and replant native trees and shrubs. North Brother Island was the site of a quarantine hospital from 1885 - 1938, and later housed war veterans and their families, and was the site of one of the first youth drug and alcohol rehabilitation facilities. The island is now a bird sanctuary and is off-limits to the public, but invasive species have decreased the quality of wildlife habitat. In 2014 NYC Parks, with funding assistance from NYS DOS under Title IV of the Environmental Protection Fund, began a large restoration project to carefully remove invasive species in naturalized areas and replant native trees and shrubs to create appropriate nesting structures for black-crowned night herons and other waterfowl.

In each of these cases, NYC Parks forest restoration staff worked closely with historic preservation staff in NYC Parks' Capital division to direct work on the site to prevent damage to historic and cultural resources while successfully moving toward ecological restoration targets. This presentation will provide insight and anecdotes from this sort of work.

RESTORATION – ROOM 125

1:30 pm – 1:50 pm
Claudia West & Shane Morgan, White Clay Creek Wild & Scenic Rivers Program/North Creek Nurseries
Cleaning Water with Native Plants
Older detention basins are commonly covered by turf which limits water cleaning function and provides little ecological benefit. Basins perform better if vegetated with dense layers of attractive native plants. However, retrofitting existing basins and improving their functionality and aesthetic quality with limited budgets in mind is a true challenge. Join us as we share lessons learned from the award-winning basin retrofit at The Hunt at Louviers in Newark, DE. We will openly discuss common mistakes as well as success stories to give you the knowledge and tools you need to create stormwater management structures of high performance and publicly accepted aesthetics.

1:50 pm – 2:10 pm
Terry Doss, Biohabitats
Restoration in the Post-Super Storm World
In the 3.8 billion years that life has existed on Earth, nature has developed brilliant solutions to its own challenges. When it comes to protecting shoreline communities of plants and animals, nature's solutions have included dunes, wetlands, reefs, floodplains and other vegetated habitats. Ever evolving and adapting to changing conditions, nature's solutions typically deliver stacked benefits like habitat, erosion control, and filtration.

To protect human communities and threatened habitats, many have taken inspiration from nature's genius to create "living infrastructure" that attempts to deliver the same kind of benefits. When viewed and treated as a living system that is not separate from humans, nature-based designs deliver much more than you ask of them. But these living systems are amazingly complex; attempts to recreate them are often not well understood and can suffer from budget or time constraints. In addition, these nature-based tools can be very expensive, difficult to maintain, and, in some instances, may not be resilient in the long term. Many are beginning to look at "coastal green infrastructure" tools as a panacea for what ails our threatened coasts.

AFTERNOON CONCURRENT SESSIONS (continued)

This presentation focuses on constructed coastal green infrastructure project experiences from the past 30 years, showing what works and what should be avoided. Projects examined include living shorelines, floating wetlands, tidal wetlands, oyster reefs, dune habitats, and floodplain management. The goal of the session is to provide practitioners with practical knowledge that will help them hone in on the tools that are most appropriate and effective for specific coastal situations.

2:10 pm – 2:30pm

Geoffrey Goll, P.E., Princeton Hydro

Restoration of Natural Stream Function and Fish Passage on Darby Creek, Delaware County, PA The Darby Creek watershed, located in an urban satellite of Philadelphia in Delaware County, Pennsylvania, is nearly 100% developed and has significantly high percentage of impervious cover. Development has encroached into the floodplain and riparian areas of the watershed, leaving little opportunity for watershed enhancement projects. In particular, the lower reaches of the Darby Creek had received national attention during Hurricane Floyd in 1999 and is regionally known for being flood prone. The creek's water quality and ecology has been degraded as a result of urbanization. American Rivers in cooperation with Delaware County sought to restore the creeks functions and values to reduce the impact of floods, and restore historic routes for migratory fish such as American eel and river herring.

The targeted sites included the removal of bridge pier remnants and three dams along a 4 mile reach starting at the head of tide. Each project involved a different approach to restoration, from a simple removal of a structure to the modification of a straightened channel to a meander and lengthened 800 foot section of the creek. Funding for the project included both state available grants for design and natural resources damages settlement monies from the Athos I oil spill on the Delaware River in 2004 for construction. The project included a variety of restoration techniques including the use of large woody debris, natural stone, and bio-engineering techniques. The post construction portion of this project revealed significant lessons regarding the implementation of such projects in highly urbanized settings, including high pedestrian traffic areas and coordination with other anthropogenic activities in or near the riparian corridor.

HABITAT RESTORATION II – ROOM 120

1:30 pm – 1:50 pm

Jonas Hamberg, Environmental Science/Ecological Restoration, SUNY – ESF

Modeling Restoration Potential of Aquatic Plants in the Hudson River after Loss Due to Storm Events

Two storm events in 2011 (Hurricane Irene and Tropical Storm Lee) caused a loss of over 90 % of the stock of the dominant submerged aquatic vegetation (SAV) species, Vallisneria americana in the Hudson River Estuary (HRE). Recovery in the 2012, 2013 and 2014 seasons have been slow, leading to scientists and managers connected to the river discussing if restoration should be conducted. If large scale restoration were to take place hundreds of hectares of SAV beds would need to be restored through seeding, transplanting or other techniques with investments of hundreds of thousands of dollars and thousands of manhours of work.

With potentially damaging storm events recurring decadally and potentially becoming stronger due to climate change (IPCC 2013) there is a need to look into how long we can expect restoration to sustain the plant population and if it is long enough that the benefits outweigh the investment cost. I use STELLA modeling software to look at long term loss dynamics of a species of submerged aquatic vegetation in the Hudson River to determine if large scale restoration could be feasible and sustainable. The work incorporates data from experiments done during the summer in the river as well as data from monitoring systems and predicted climate change data.

AFTERNOON CONCURRENT SESSIONS (continued)

1:50 pm – 2:10 pm

Sarah Lumban Tobing, Project Manager, Wetlands and Riparian Restoration, Forestry, Horticulture, and Natural Resources, NYC Parks and Recreation

Anadromous Fish Restoration on the Bronx River

NYC Parks & Recreation, Natural Resources Group, and the Bronx River Alliance work to restore the ecological integrity, function, and social value of the Bronx River. River Herring, an important forage fish for predators in streams, estuaries and the ocean, have been targeted for restoration in the Bronx River for the last decade, after we determined that water quality and habitat were suitable for these species. River herring, which include alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), are anadromous fish whose populations are declining; they mature and overwinter in the North Atlantic Ocean and return to freshwater streams from Maine to North Carolina each spring to spawn. Dams have drastically impacted access to river herring spawning habitat. On the Bronx River, dams for agriculture and industry have blocked access to fish migration since the 1600s. After years of planning, monitoring and design, fish passage was restored in 2014 to the furthest downstream dam on the river. The passageway will provide access to approximately 12 acres of spawning habitat and 0.8 stream miles, up to the next dam. Fish passage design and construction on the Bronx River faces particular challenges not only due to its ultra-urban setting, but also because these dams are viewed as valuable historic architectural features in the landscape. Our success in achieveing fish passage as a part of ecological restoration and transformation of the river from a sewer to a rallying cause for environtmatal justice has to be understood in this context. This first passageway integrates viewing points, opportunities for stewardship and citizen science, canoe access and portage, and is the first milestone towards establishing a sustainiable river herring population in NUC. Two additional fish passageways on historical dams have been designed and are partly funded.

2:10 pm – 2:30pm

Zachary Ladin, University of Delaware

Plugging the Urban Sink: Metapopulation Simulations suggest Coincident Regional and Local Conservation Efforts could Help Stem Declines of Forest-Breeding Songbirds

Declines in forest-breeding songbird populations have been exacerbated by the continuing urbanization of landscapes, resulting in reduced availability of suitable breeding habitat. We used an integrative approach linking 40 years of demographic data with contemporary metapopulation model simulations of a declining forest-breeding songbird, the wood thrush (Hylocichla mustelina), to predict population responses under differing conservation scenarios. We compared four model simulations that ran for 30 years into the future representing 1) current observed state (null model), 2) reduced impervious surface, 3) reduced Brown-headed cowbird (Molothrus ater) parasitism pressure, and 4) simultaneous reduction in both impervious surface and cowbird pressure. Compared to the null model, mean annual population trends increased by 54 % in the reduced impervious surface model, 38 % in the reduced cowbird pressure model, and by 98% in the combined model with reductions in both impervious surface and cowbird pressure. Mean annual growth rates (λ) per patch were greater in models with reductions of impervious surface (0.94) and cowbird pressure (0.92) compared to the null model (0.88). However, only in our model combining both reductions in impervious surface and cowbird pressure did mean annual growth rates reach 1.00. Results from our model simulations suggest that independently reducing the proportion of impervious surface around forest patches and cowbird parasitism pressure may slow current negative population trends. However, conservation efforts that combine reductions in impervious surface and cowbird parasitism, at both regional and local scales, respectively, can potentially stabilize populations of breeding wood thrushes within urbanized fragmented landscapes that typify the Northeastern and mid-Atlantic United States..