Natural Resource Quarterly

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http://science.nature.nps.gov/im/units/ncrn/index.cfm

Inset: Hermit Thrush (NPS Photo)

How An Invasive Hemlock Pest Changed Bird Communities

When we try to pick out anything by itself, we find it hitched to everything else in the universe. –John Muir

Over the last several decades, hemlock trees have declined in the Mid-Atlantic due to an invasive insect pest—the hemlock woolly adelgid. For "hemlock specialist" birds that nest, feed, and breed in hemlock stands, this is a dire situation. These specialist birds include the Acadian flycatcher, Blackburnian warbler, blue headed vireo, hermit thrush, and the black-throated green warbler. All may be found breeding in parts of the National Capital Region, mostly in western, higher-elevation, coniferous habitats.

The hemlocks they depend on are pyramid-shaped evergreen trees with many low branches that provide dense, shady spots for birds. They are often found in stands on slopes and in river valleys where they shade water, even during winter.

Delaware Water Gap

Pennsylvania State University ecology graduate student Matt Toenies and his advisor, Dr. David Miller, worked with the neighboring Eastern Rivers and Mountains Inventory & Monitoring Network to study hemlock specialist bird communities at Delaware Water Gap National Recreation Area (NRA). Their study revisited park sites previously used to compare bird communities in hardwood versus hemlock stands, back in 2000 when hemlocks were still healthy.

Revisits in 2015 and 2016, showed that while many hemlocks were dead or dying, some persisted, especially those that were in less dense stands. Overall, the remaining and damaged hemlock stands had a more open forest canopy that let in more light. A dense shrub layer was coming in as well as many deciduous "pioneer" trees like birch.

When it came to birds, the team's bird counts revealed that hemlock specialists had indeed declined. The black-throated green warbler, a species with a very strong association to hemlock, had declined the most of all. But there were also higher

HEMLOCK SPECIALISTS Continued on p2

Before and after hemlock woolly adelgid at Delaware Water Gap NRA, the same location is dramatically changed. A mature hemlock stand with little understory (left), was flooded with light when hemlocks died and is now thick with new growth (right).

HEMLOCK SPECIALISTS From p1

numbers of birds that prefer forest edges, younger forest, and a dense shrub layer. For example, birds like the veery—a specialist of young forest within a larger forest landscape—were common. Forest edge species like blue jays (a nest predator) and brown headed cowbird (a nest parasite) were also more common, which could have negative implications for more sensitive bird species in the forest interior. The team also saw smaller increases in cavity nesting birds and birds that prefer mature deciduous (rather than evergreen) forest including the red eyed vireo, ovenbird, and wood thrush.

And Beyond

To make sure their findings weren't unique to Delaware Water Gap, the team looked to other places where pre-adelgid bird data was available. They found fairly consistent trends in state forest and public lands from central to coastal Connecticut, in the New River Gorge and Gauley River National Recreation Areas, and at Shenandoah National Park.

Management Implications

Changes in hemlock stands have had the most dramatic effect on hemlock specialist birds, reducing their presence in adelgid-affected areas. And ripple effects are evident in the growth of shrub, young forest, and edge-loving bird species.

Yet hemlock specialist birds still hang on in degraded hemlock patches with only a few trees, or in dying trees. This underlines the value of keeping even a few hemlocks on the landscape, so that these specialist birds can continue be a part of our forest communities.

Next Steps

Team lead Matt Toenies is preparing two articles for scientific journal publication and will hold a webinar to share results and findings with park staff at Delaware Water Gap, Shenendoah, and the NPS Northeast Region, as well as other collaborators.

This project includes faculty and students from Pennsylvania State University and is facilitated by the Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW CESU). The CW CESU promotes stewardship and integrated ecosystem management of natural and cultural resources in the Chesapeake Watershed through collaborative research, technical assistance, and education. To do research with CW CESU, please contact Danny Filer at 301-689-7108.

Trapping Matters Workshop

Scott Bates, NCR Wildlife Biologist

The NPS rarely uses trapping to manage wildlife, so why hold a trapping workshop?

Public attitudes towards trapping are changing as people realize that animal repellents, fencing, and contraception can have downsides of being either ineffective, expensive, or not meeting aesthetic requirements. So to learn more about trapping as a management tool, a "Trapping Matters" workshop was held at Monocacy National Battlefield on July 24.

Trapping is a management tool most often used by the US Department of Agriculture's Wildlife Services, and less often by the U.S. Fish and Wildlife Service (FWS) to remove predators of listed species or by state agencies to control invasive animals like nutria.

The workshop focused on the wildlife management benefits of trapping. (Typically, trapping workshops focus on the economic and management benefits of trapping and ways to communicate about trapping.)

Robert Colona of FWS, discussed his efforts to reduce predators of the least tern, piping plover, and bog turtle. Harry Spiker from Maryland Department of Natural Resources, talked about communicating to the public about trapping. NPS National Capital Region (NCR) Wildlife Biologist Scott Bates, spoke about park service compliance and policy concerning trapping, and how the NPS animal care and use committee differentiates between research and management projects when reviewing proposals.

The afternoon session consisted of demonstrations of foothold, dogproof raccoon, conibear, and box traps. Of the 22 attendees, 13 were from NCR, 5 from the Northeast Region, and 4 were from Montgomery County, MD.

NPS Photo

Robert Fey, USDA-Wildlife Services, preparing to dig a dirt hole set for a foothold trap at the former swimming pool site next to the Thomas House. Park archaeologist Alex Vindas Cruz approved the site location.

Hemlock Hideout at Prince William Forest Park & New Resource Briefs

Because they often grow in patches along streambanks, Eastern hemlocks are some of the only trees providing cooling shade in winter and spring when other trees have no leaves. They are also crucial to several species of "hemlock specialist" birds (as described in our cover article).

Those are just a few of the reasons why NCRN inventoried hemlock trees across the region in 2015. We wanted to find out how many had survived or succumbed to the hemlock woolly adelgid invading the northeast, and what other tree species might eventually replace those hemlocks.

Sadly, the loss of hemlock trees in the National Capital Region has been profound. This despite hemlocks being less common here—this is the southern end of their range. Across the region, most were dead, and the remaining living trees were infected with the adelgid and elongate hemlock scale. However, in one small area of Prince William Forest Park, hemlocks miraculously remain unscathed and, in 2015, showed no signs of infection by the adelgid or scale.

Resource briefs on the hemlocks of Catoctin, Harpers Ferry, and Prince William are available at: https://irma.nps.gov/DataStore/Reference/Profile/2224947

NPS Photos

Left: a dead hemlock patch at Catoctin Mountain Park. **Right:** part of a healthy hemlock patch at Prince William Forest Park.

Boost Your Park's Nature Web Content

Did you know there is a series of online articles on NCR natural resource topics that are available to use on your park's webpage? Each is a free-standing NPS webpage that can be shared through any park website with a listing tool.

NCRN I&M has created articles on a wide variety of topics including forest regeneration, air quality & lichens, pawpaw trees, freshwater sponges, eels, and birds in battlefields. All use the tags "NCRN" and the park abbreviations of relevant NCR parks.

To see these articles, and what a listing tool looks like in action, visit GWMP's nature page: https://www.nps.gov/gwmp/learn/nature/index.htm

Questions about NCR natural resource articles? Contact Megan Nortrup at NPS email or at 202-339-8314.

Park Acronyms

ANTI = Antietam National Battlefield
CATO = Catoctin Mountain Park
CHOH = Chesapeake & Ohio Canal National Historical Park
GWMP = George Washington Memorial Parkway
HAFE = Harpers Ferry National Historical Park
MANA = Manassas National Battlefield Park
MONO = Monocacy National Battlefield
NACE = National Capital Parks - East
NAMA = National Mall and Memorial Parks
PRWI = Prince William Forest Park
ROCR = Rock Creek Park
WOTR = Wolf Trap National Park for the Performing Arts

Management Decisions Based on Amphibian Monitoring and Modelling

At the last Natural Resource Advisory Team meeting in Harpers Ferry, Alex Wright updated the group on the planned NCR decision making framework for managing amphibians and their habitat.

Alex is part of the USGS team that carries out the National Capital Region Inventory & Monitoring Network's amphibian monitoring protocol. He's also a grad student at Michigan State University and is leading the management decisions project. The USGS team has monitored amphibians as a vital sign in NCR parks since 2005. This data will be incorporated into a model used to evaluate the effectiveness of different management actions.

NPS Photo

During 2017 I&M amphibian monitoring, crews found eastern spadefoot toads at Monocacy National Battlefield.

The Model

The NCRN I&M amphibian monitoring does not occur in all parks and not all monitored parks are visited every year. Yet, the data we have can still be fed into a model to predict how amphibian populations might change in the future, even for parks where there's only a small amount of data (and therefore more uncertainty). The model Alex and his team have created does this by leveraging community data across parks (in a process they describe as hierarchical modelling) to model the lesser sampled parks and infrequently observed species.

Many factors (also called model covariates) affect amphibian populations. These covariates, include things like the presence of fish in vernal pools and precipitation levels, which affect how long water stays in a vernal pool, and the size of the pool. These covariates are included in the modelling exercise to help pinpoint the actions that might most affect the occupancy rates of individual amphibian species or overall species diversity.

Next Steps

Expect a phone or email survey in the next 3-6 months. Alex will be gathering information in preparation for a network-level workshop, particularly concerning the organizational structure of park decision-making and park constraints and opportunities for managing amphibians.

The workshop will be an in-person gathering of staff from all NCR parks that will help to determine the top regional amphibian management objectives and discuss how these objectives may differ between parks. Regional objectives could include: increasing the proportion of wetlands or streams occupied by each amphibian species (occupancy rate), or increasing species richness of the amphibian community.

Once regional objectives are determined, the group will use the structured decision making (SDM) framework and the USGS model to decide upon the best actions to take to support amphibians and their habitat. The SDM process yields a number of action options, which are scored, ranked, and prioritized. This leads to transparent, robust, and defensible decisions while incorporating uncertainty.

Following the workshop, optional, individual follow-up meetings with parks will be available.

I&M in Your Park - September, October, & November 2017

To join NCRN I&M in the field, or for more specific monitoring dates please contact Megan Nortrup at 202-339-8314.

As of October 2017, NCRN water monitoring increases in frequency from quarterly to bi-monthly. Continuous water loggers are currently deployed in Antietam Creek, Owens Creek, North and South Forks of Quantico Creek, and Rock Creek.

NCRN I&M Monitoring	Forest Vegetation	Water Continuous	Water (bi-monthly)
Antietam National Battlefield	X	X	X
Catoctin Mountain Park	X	X	X
Chesapeake & Ohio Canal NHP	X		
George Washington Memorial Parkway	X		X
Harpers Ferry NHP	X		X
Manassas National Battlefield Park	X		X
Monocacy National Battlefield	X		X
National Capital Parks - East	X		X
Prince William Forest Park	X	X	X
Rock Creek Park	X	X	X
Wolf Trap NP for the Performing Arts	X		X

Bird Visualizer

Did you know you can look at bird monitoring data for National Capital Region parks through an interactive data visualizer? The NCRN "bird visualizer" joins existing online data viewing tools for NCR parks including a water and a forest vegetation visualizer.

Even eBird is Included!

Every year since 2007, bird crews sponsored by NCRN Inventory & Monitoring have monitored forest birds in more than 400 plots throughout NCR parks.

The bird visualizer uses this data, and displays where species of interest have been observed, the full species list for each park or monitoring site in a given year, and a measure of habitat quality at each site (the Bird Community Index score).

In addition to mapping data, there are also functions to display data as graphs, download raw data, and view species lists. There is even an option to display the last 30 days of bird data from the citizen science bird observation application eBird. (The eBird data is meant to supplement NCRN data and is only available when searching for individual species.) Grassland bird data is not included on the site.

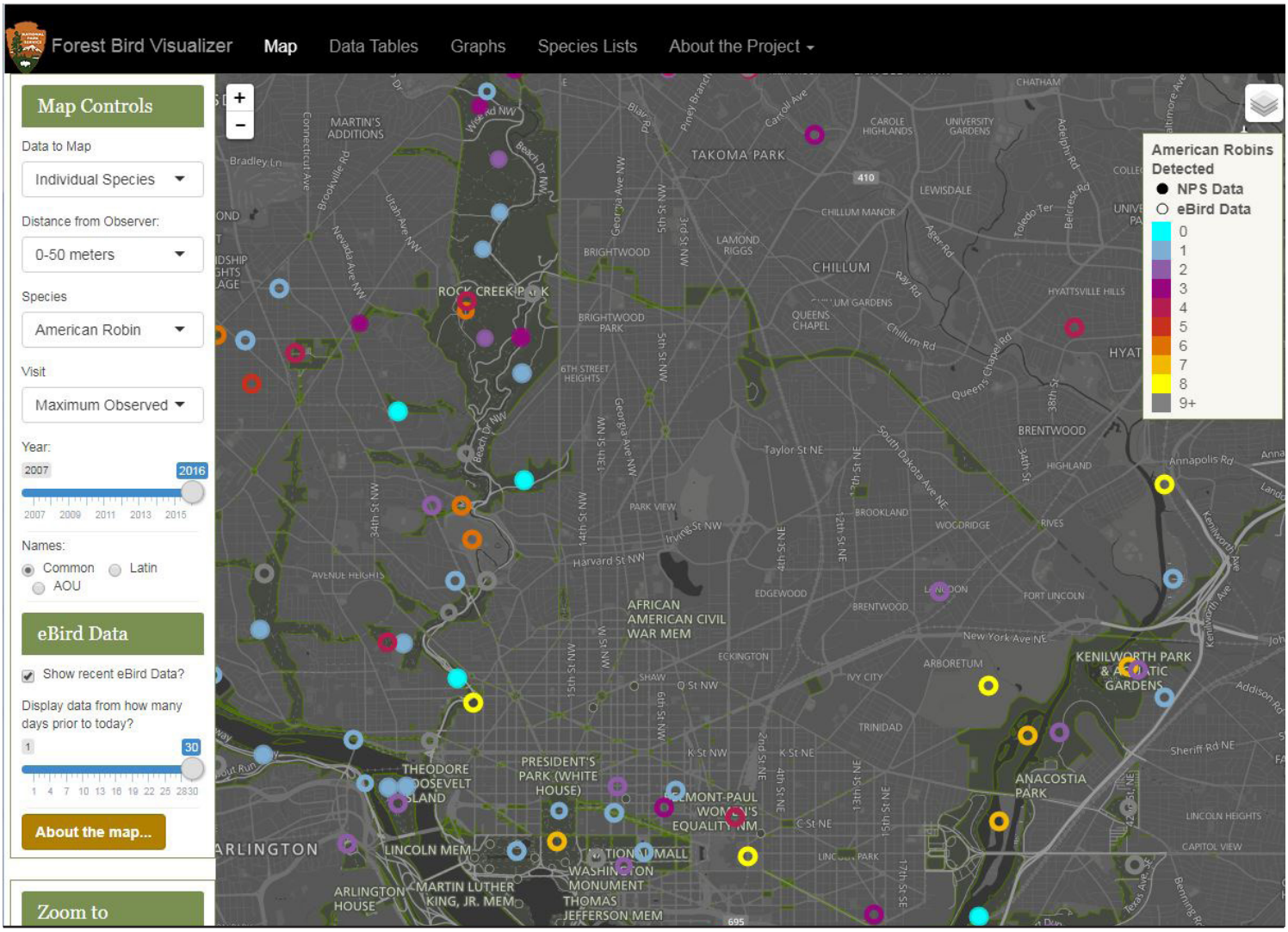
Monitoring sites appear as dots on the map, and hovering over any dot displays details about that site. The map background can be set to show satellite imagery or set to "slate" for a high-contrast display suitable for individuals with low vision.

To get to the bird visualizer, follow quicklinks from NCRN I&M's homepage (http://science.nature.nps.gov/im/units/ncrn/index.cfm) or go directly to: https://irmadev.nps.gov/reports/NCRN/Birds.

The visualizer is only available through a Department of the Interior computer. The host site can be slow. If a "Server Error" appears, Refresh your browser or try again in a little while.

Comments or questions on the visualizer may be sent to John Paul Schmit by NPS email or at 202-339-8321.

The mapping feature of NCRN I&M's Bird Visualizer showing observations of American robins in National Parks in Washington, DC. Solid dots show I&M data. Open dots show eBird observations.



NPS Screenshot

Emerald Ash Borer on the Radio

NCRN Botanist Liz Matthews appeared on the well-known Washington, DC radio news broadcast, the Kojo Nnamdi show recently to talk about ash trees and emerald ash borer.

She shared the show with Michael Raupp, a.k.a., the "Bug Guy," a Professor of Entomology at University of Maryland, and two living emerald ash borer beetles (in a safely closed petri dish) that Raupp brought with him.

During the show, Liz highlighted how forests in capital region parks are stressed by urban storm water, air quality, and invasive species of plants and animals, including the emerald ash borer. She talked about the importance of native species to forest health, and encouraged listeners to use native plants in landscaping and not to move firewood that could spread insect pests.

The show, broadcast July 13 from WAMU studios in Washington, was pre-empted by breaking news and later rebroadcast on July 18. Luckily for listeners on the 13th, video cameras at the station continued broadcasting live through Facebook during the breaking news event.

An audio recording of the broadcast is available at: http://thekojonnamdishow.org/audio/#/shows/2017-07-13/how-an-invasive-bug-is-killing-off-our-regions-ash-trees. The video recording is available at: http://thekojonnamdishow.org/shows/2017-07-13/how-an-invasive-bug-is-killing-off-our-regions-ash-trees.

Video still: WAMU

Photo: NPS/Nortrup

Above: Liz Matthews and Michael Raupp on the Kojo Nnamdi Show.
Below: These live emerald ash borer beetles were also guests of the show, chaperoned by "Bug Guy" Michael Raupp.

Calendar

SEPTEMBER

8. Walk to Explore Natural and Cultural Resources at Fort DeRussy/ROCR. RSVP to Elizabeth Matthews by NPS email.

OCTOBER

12. Cultural Resources Advisory Team (CAT) Meeting. NACE.
19. Natural Resources Advisory Team (NAT) Meeting. ROCR.

NOVEMBER

1. Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW CESU) Meeting. Shepherd University. 10:**30** am - 12:**30** pm. Contact Danny Filer by NPS email.

DECEMBER

8. Maryland Water Monitoring Council Meeting. 8:30 am - 4:30 pm. Maritime Institue, North Linthicum, MD. http://dnr.maryland.gov/streams/Pages/MWMC/conference.aspx

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NCRN Natural Resource Quarterly offers updates on the status of park natural resources and Inventory and Monitoring (I&M) "vital signs" for the NPS National Capital Region Network (NCRN).

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