APIPP HIGHLIGHTS



2023 APIPP HIGHLIGHTS

More than 30 organizations and 100 volunteers share their ideas, time, and resources to advance the mission of the Adirondack Partnership for Regional Invasive Species Management (PRISM), which is supported by the Adirondack Park Invasive Plant Program (APIPP), hosted by The Nature Conservancy. Together, as these highlights of our collaborative 2023 work show, APIPP and its partners are making major advances in reducing the threats that invasive species pose to the Adirondack region.

INNOVATION AND PARTNERSHIPS



APIPP ASSISTED the New York State Hemlock Initiative at Cornell University (NYSHI) with two research projects. One study is evaluating how imidacloprid, a pesticide used to treat hemlock woolly adelgid (*Adelges tsugae*) (HWA), moves within a tree and its roots. Another study is testing the use of environmental DNA (eDNA) to detect the presence of HWA.

APIPP ALSO COLLECTED hemlock branch samples for a study of the hemlock genome that the University of Connecticut is undertaking.

TO ADDRESS THE THREAT of Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*) to the Adirondack environment and economy, APIPP completed the second year of a pilot project on Lake Champlain. The study is assessing whether strategic removal of these plants at boat launches will reduce the number of boats leaving the lake with aquatic invasive species (AIS) on them.

APIPP ALSO COMPLETED the second year of a research project that evaluated mechanical and chemical treatment alternatives to glyphosate for the control of invasive knotweed species (*Reynoutria spp.*).

A TWO-YEAR CONTRACT with Tetra Tech also wrapped up in 2023, with the completion of the Adirondack Within-Lake AIS Vulnerability Prediction Tool.

AQUATIC INVASIVE SPECIES DETECTION



VOLUNTEERS, PARTNERS, CONTRACTORS, AND

STAFF submitted 184 monitoring reports for 141 lakes. APIPP also collected 70 water samples from 22 lakes to test for AIS eDNA.

SEVENTEEN NEW AIS OBSERVATIONS were

found across the PRISM. Some of these were

on waterbodies with other existing AIS populations, but seven waterbodies with no previously known AIS observations were found to have AIS.

THE PERCENTAGE OF WATERBODIES surveyed with AIS observed in 2023 was 37.6%. That figure is higher than the five-year average but it was the result of APIPP staff using past data to target the most probable areas of infestation. To date, 75% of the 499 Adirondack waterways monitored over the last 22 years remain AIS free.

75% OF LAKES ARE FREE OF AQUATIC INVASIVE SPECIES

NITH AIS

TERRESTRIAL INVASIVE SPECIES DETECTION



STAFF, PARTNERS, VOLUNTEERS, AND CONTRACTORS surveyed 41 New York State Department of Environmental Conservation (NYSDEC) campgrounds, over 150 recreational access points (such as trailheads and boat launches), sections of over 30 Forest Preserve units, and part or all of approximately 30 state and county road corridors for invasive species..

NO NEW TERRESTRIAL INVASIVE PLANT SPECIES were identified in the PRISM in 2023; however, nearly 350 new infestations of terrestrial invasive plants were found, bringing the total number of mapped infestations in the Adirondack region to 7,566.

THE PROFESSIONAL EARLY DETECTION AND RAPID RESPONSE (EDRR) CREW from Invasive Plant Control, Inc. (IPC) assessed over 1,100 sites and found approximately 400 that no longer had the target plants present. This is great evidence of the success of past treatments. The crew treated roughly 300 sites.

APIPP'S SEASONAL FOREST PEST RESEARCH ASSISTANT monitored 35 sites to survey for six forest pests. In addition, they released 4,500 biological controls for emerald ash borer (*Agrilus planipennis*) (EAB) and, with NYSHI, over 1,900 biocontrols for HWA.

INVASIVE SPECIES MANAGEMENT



APIPP MANAGES 14 terrestrial species and has 721 infestations under active management.

DESPITE PREVIOUS EFFORTS TO REMOVE TREE-OF-HEAVEN (*Ailanthus altissima*) from the few sites where it was found in the Adirondack PRISM, 13 new sites were identified in 2023. There are now at least 31 known sites, and this species has been moved to a Tier 3 status. APIPP is helping private landowners manage 19 of the sites. Tree-of-heaven is a favorite of spotted lanternfly (*Lycorma delicatula*), an invasive insect that has not yet become established in our region.

THANKS TO SEVERAL YEARS OF COLLABORATION with private landowners, giant hogweed (*Heracleum mantegazzianum*) is now present in only two locations in the Adirondack PRISM.

THANKS TO THE WORK OF APIPP PARTNERS, five species of AIS are being managed in Adirondack waterbodies. Seven lakes are also participating in APIPP's Lake Management Tracker program to assess the effectiveness of management actions on invasive milfoil populations.

COMMUNITY ENGAGEMENT



APIPP RAISED AWARENESS ABOUT INVASIVE SPECIES identification, prevention, and management by partnering with more than two dozen organizations in over 50 workshops and events that reached over 2,400 people.

APIPP'S NEW FIELD GUIDE TO TERRESTRIAL INVASIVE SPECIES OF THE

ADIRONDACKS was widely distributed at events and new boot brush stations were installed at the Adirondack Mountain Club's Adirondack Loj and Cascade Welcome Center, and at Point Au Roche State Park.

APIPP WAS MENTIONED OVER 50 TIMES in print, digital, radio, and television news stories and its social media reach continued to expand. APIPP's YouTube views soared, with over 6,500 views and 3,100 "watch hours" in 2023.

NINE NEW PARTNERS joined the Adirondack PRISM: Adirondack Botanical Society, Adirondack Land Trust, Canada Lakes Conservation Association, Chateaugay Lake Foundation, East Shore Schroon Lake Association, Rainbow Lake Association, Raquette Lake Preservation Foundation, Schroon Lake Association, and Upper Saranac Foundation.

SPECIAL INITIATIVES

DEVELOPING TOOLS TO SEARCH FOR "LINGERING" HEMLOCK



APIPP PROGRAM DIRECTOR TAMMARA VAN RYN TAKES A HEMLOCK BRANCH SAMPLE IMAGE: JERRY AND MARCY MONKMAN/ECOPHOTOGRAPHY

EASTERN HEMLOCK (*TSUGA CANADENSIS*) AND CAROLINA HEMLOCK (*TSUGA CAROLINIANA*) are severely threatened by several non-native pests and pathogens. The Nature Conservancy's North America Program is undertaking a threeyear "Trees Species in Peril" project with public agencies, research institutions, and nonprofit partners to advance tree breeding programs and genetic research for five of the most imperiled tree species in the Northeast—including eastern and Carolina hemlock. Breeding pest- and pathogen-resistant trees is essential for long-term climateresilience restoration efforts.

Identifying hemlock trees that remain healthy despite long-term exposure to HWA and elongate hemlock scale (*Fiorinia externa*) (EHS) is a necessary step for advancing hemlock breeding programs. APIPP Program Director Tammara Van Ryn is working with the Tree Species in Peril team to advance the search for "lingering" hemlock, trees that remain healthy despite intense pest pressure.

Tammara convened a working group of 12 researchers, land trusts,

and public agency representatives from across the range of eastern hemlock to develop systems for identifying and reporting lingering hemlock trees. Two protocols were developed, one for individual lingering trees and one for long-term hemlock health monitoring. Community scientists and forest professionals can now report lingering hemlocks via a new TreeSnap app. An app for collecting long-term monitoring data will be developed next year.

In a related project, APIPP staff collected 40 samples of hemlock branches from a wide variety of sites across the Adirondack Park for a University of Connecticut hemlock genome mapping project. Projects like this offer hope for finding eastern hemlocks that are resistant to HWA and EHS so this foundational tree species can remain a part of the Adirondack landscape.

PARTNER ACCOMPLISHMENTS DASHBOARD

APIPP'S ANNUAL REPORT provides a great summary of all the work APIPP staff and volunteers do throughout the year but it does not come close to capturing all of the invasive species prevention, monitoring, and management work conducted within the Adirondack PRISM. APIPP's more than 30 partners also contribute greatly to meeting the PRISM's mission to work together to minimize the impact of invasive species on the Adirondack region's communities, lands, and waters.

To address this gap, APIPP piloted a new Partner Accomplishments Dashboard. APIPP surveyed partners early in 2023 to gather data about their 2022 contributions to the PRISM and 17 partners responded!

This is the first time collective information for activities across the PRISM was gathered and analyzed. For example, a tally of all of the boat steward programs operated by various partners had never been compiled before. Six partners submitted their data, reporting nearly 89,000 boats inspected.

The Partner Accomplishments Dashboard tells an important story of how important partners are to addressing invasive species in the Adirondacks. A survey to gather 2023 accomplishments will be sent to all APIPP partners in early 2024 and the 2023 Partner Accomplishments Dashboard will be posted on www.adkinvasives.com.



SPECIAL INITIATIVES

EMERALD ASH BORER BIOCONTROL

TO HELP REDUCE THE THREAT OF EAB to Adirondack forests, APIPP added a new biocontrol tool to its toolbox. EAB was first identified within the Adirondack PRISM in 2017 and within the Adirondack Park in 2020. While APIPP monitored the spread of this species, there were few options for management. This year APIPP staff released three stingless wasp species on a central Adirondack property infested with EAB to serve as a biological control for the invasive beetle.

The wasps are specialized organisms introduced for the purpose of preying on EAB larvae and eggs, with the goal of reducing the invasive species' population over time. APIPP applied to the Animal and Plant Health Inspection Service's (APHIS) Plant Protection and Quarantine (PPQ) program to receive parasitoids for release at a



APIPP FOREST PEST RESEARCH ASSISTANT LEAH SMISLOFF

site in Warren County in 2022. The site was not selected in 2022 due to a limited supply of wasps. Fortunately, the site was approved for 2023 and 2024 releases. APHIS is an agency of the United States Department of Agriculture (USDA).

APIPP released a total of 4,535 individual EAB biological controls during 2023 including 1,400 *Oobius agrili*, 1,611 *Tetrastichus planipennisi*, and 1,524 *Spathius galinae*. Each of the species target EAB in different ways. *Oobius agrili* parasitize EAB eggs, while *Tetrastichus planipennisi* and *Spathius galinae* target EAB larvae. In addition, *Spathius galinae* has a longer ovipositor and can target EAB larvae in trees up to 23 inches diameter at breast height (DBH), while *Tetrastichus planipennisi's* shorter ovipositor is ideal for targeting larvae in smaller trees up to 6 inches DBH.

According to APHIS, these biological controls can kill between 20% and 80% of the EAB in trees up to 8 inches DBH. Ash trees have regenerated in areas where the biological controls have been released. The parasitoids released by APIPP were produced and supplied from the USDA APHIS PPQ EAB Parasitoid Rearing Facility in Brighton, MI. For information about the parasitoids, you can call APHIS at (866) 322-4512.

KNOTWEED MANAGEMENT PARTNERSHIP

APIPP WRAPPED UP ITS FOUR-YEAR COMMITMENT to oversee the Knotweed Management Partnership. The Nature Conservancy was proud to host this program, started by Doug Johnson in 2008 as the Regional Inlet Invasive Plant Program (RIIPP), from 2020-2023.

In the 15 years since RIIPP was founded, hundreds of landowners learned about knotweed and were able to have the knotweed on their properties treated with herbicides. The Nature Conservancy agreed to administer the program in 2020 with the specific goal of reducing the size of infestations on former RIIPP sites over the next four years to make them more manageable for the individual private landowner. Under the Conservancy's tenure this goal was met.

From 2020-2023, with continued support from Doug Johnson and long-time RIIPP regional coordinator volunteers, 214 knotweed infestations were inspected at least once by Ryan Burkum, a licensed pesticide applicator. At Ryan's most recent visit to each site, he treated 123 of these infestations with herbicides to control the growth of knotweed. Impressively, 40% of the sites Ryan inspected no longer had knotweed present by 2023.



JAPANESE KNOTWEED IN FLOWER

The majority of the sites Ryan treated were on private property, and as the Knotweed Management Partnership sunsets, most of the infestations are now small enough for the landowners to reasonably assume management responsibility. APIPP will continue to manage knotweed hot spots on public lands that threaten high-priority ecological resources or on sites that may serve as likely sources of the spread of this invasive plant, such as town highway garage lands.

ADIRONDACK WITHIN-LAKE AIS VULNERABILITY PREDICTION TOOL

FIVE YEARS AGO, APIPP STARTED COLLECTING AIS DATA to use for a special project. For four years APIPP staff and the early detection team from Adirondack Research surveyed lakes, mapped AIS presence, and collected sonar data about the lakes' depth, sediment composition, and height of plant growth in the water. Data was collected from over 170 lakes across the Adirondack PRISM.

APIPP planned to use this data to see if a statistical model could be built to predict where, within a lake, invasive plants would be most likely to establish. The project was designed to build on past research that identified landscape-level characteristics such as elevation, distance to roads, and public boat launches, that make lakes more likely to be invaded. The goal of this project was to help lake associations and others target their survey efforts to the most vulnerable locations, and to increase the likelihood that invasive plant populations can be found when they are small and there is a greater chance of management success.

APIPP worked with data scientists from Tetra Tech to design a model to predict the probability of AIS plant presence. Over 50 different variables were considered, including AIS presence, plant height, lake depth, sediment composition, and landscape features around the lakes such as forests, development, boat launches, and campgrounds.

Tetra Tech built three different test models and "trained" the models with data from 33 lakes. The models were then tested on nine lakes to compare how accurate the models were. A machine learning model was found to be the best predictor with an overall accuracy of 71%. This model used the data inputs of distance to shoreline, distance to forest, amount of development in the area, and amount of agriculture in the area to predict the proability of invasive plant presence. Input data came from national sources and allowed for the modeling of predictions across all the lakes in the Adirondack Park, not only lakes that APIPP had collected data on.

The model predicts and graphically displays areas within lakes that have the highest probability for AIS presence. An online mapping application will be available to the public in 2024 to help partners and volunteers better identify sections of lakes that require extra diligence when searching for invasive plants. More diligent search methods could include conducting extra rake tosses, collecting eDNA samples, or surveying with scuba gear or snorkels.



FIGURE 1: DATA COLECTED FOR THE ADIRONDACK WITHIN-LAKE AIS VULNERABILITY PROJECT CAN BE USED TO DISPLAY AIS PROBABLITY WITHIN A GIVEN LAKE

APIPP SERVES AS THE ADIRONDACK PARTNERSHIP FOR REGIONAL INVASIVE SPECIES MANAGEMENT (PRISM), ONE OF EIGHT PARTNERSHIPS ACROSS NEW YORK STATE (NYS). APIPP IS A PROGRAM FOUNDED BY THE NATURE CONSERVANCY (TNC), THE NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC), THE NYS DEPARTMENT OF TRANSPORTATION (NYSDOT), AND THE ADIRONDACK PARK AGENCY (APA). FUNDING IS PROVIDED FROM THE ENVIRONMENTAL PROTECTION FUND AS ADMINISTERED BY NYSDEC.

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