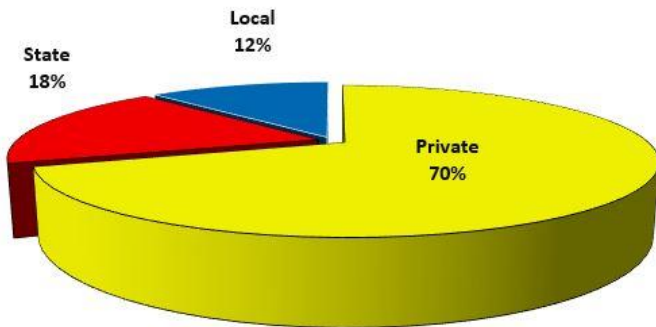# 2022 Forest Health *highlights*
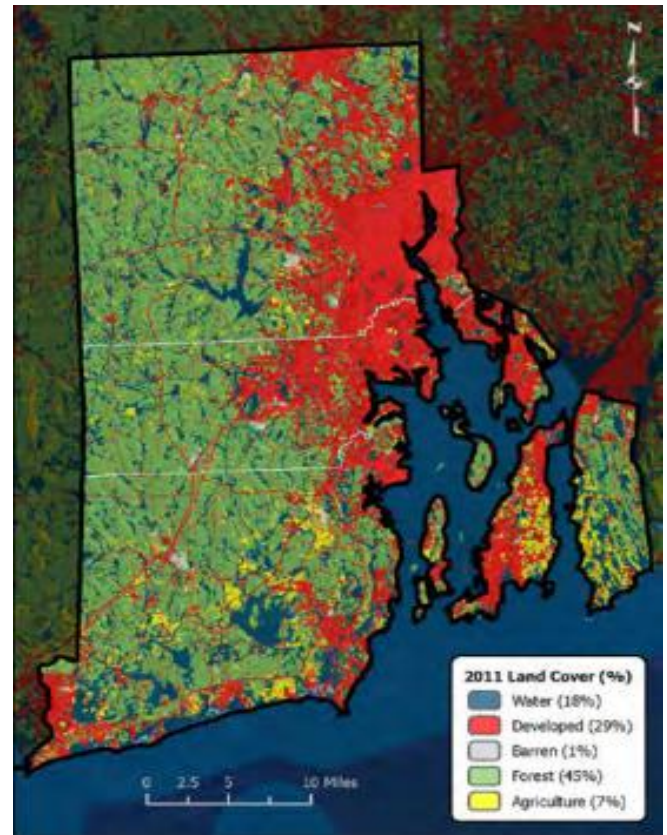
RHODE ISLAND

Forest Resource Summary

Rhode Island's forests are 70 percent privately owned, largely by families and individuals who view their land as a source of enjoyment and a resource to be protected. Other private ownerships include corporate, tribal, conservation groups and clubs. The remainder of the forest land is in State or local town ownership.

Forest Land Ownership in Rhode Island, 2021

Local 12%
State 18%
Private 70%

2011 Land Cover (%)
- Water (18%)
- Developed (29%)
- Barren (1%)
- Forest (45%)
- Agriculture (7%)

0   2.5   5   10 Miles

The most recently available Rhode Island forest inventory estimated that there are approximately 361,000 forested acres in the State. Rhode Island's forests are considered second growth and approximately 96% is classified as timberland, forest land that exceeds the minimum level of productivity and is technically available to harvest. The most common species include red, eastern white pine, black birch, scarlet oak, and yellow birch with Oak-Hickory forest type comprising over 60% of the forest land.

Forest composition has been affected in the past by widespread pests and diseases, including chestnut blight (*Cryphonectria parasitica*) and Dutch elm disease (*Ophiostoma ulmi*) and faces new challenges with the widespread impact of Emerald Ash Borer (*Agrilus planipennis*) and Beech Leaf Disease (associated with the nematode *Litylenchus crenatae mccannii*).
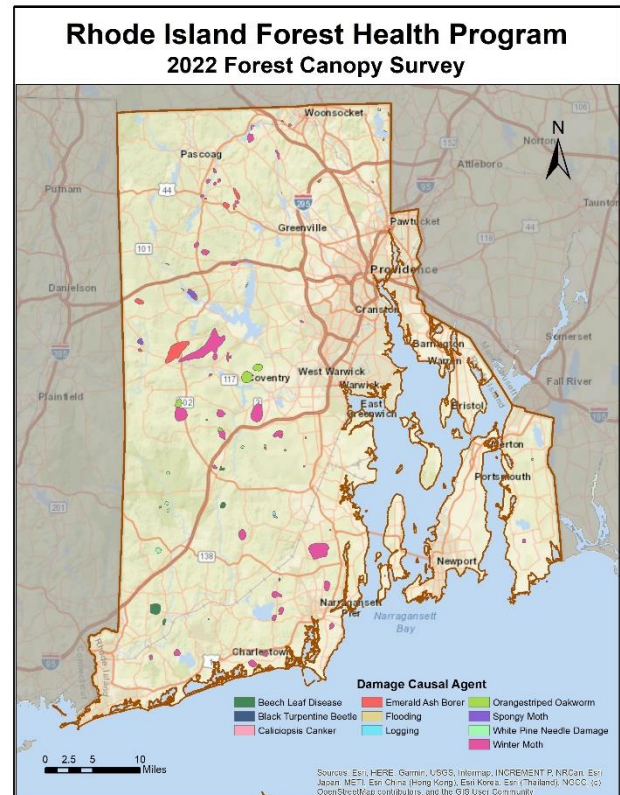
Forest Canopy Surveys

Aerial Survey

A flight was undertaken in mid-June to assess damage to the forest canopy from insects, diseases, or abiotic causes such windstorms, wildland fires, floods, etc. Data was collected using sketch-mapping tablets, and then processed using Desktop GIS software. As needed, polygons of damage identified in the aerial survey were ground-truthed. Finalized data of the acreage affected, and the damage causing agent were submitted to the U.S. Forest Service Field Office in Durham, NH.

The aerial survey (as well as the ground survey) was enhanced by using a pre-loaded map of ForWarn II satellite imagery indicating areas where a significant (>50%) change of canopy "greenness" had occurred. Each polygon of change was assessed from the air, and through ground-truthing.

This year there was a *significant* increase in damage to the forest canopy from winter moth (WM). More than

Polygons of forest canopy damage and mortality. (Map: RIDEM Forest Health Program).

12,500 acres (combined aerial and ground surveys) were affected (compared to 148 acres in 2021). Only Bristol county was spared. WM damage was by far, the single largest damage causal agent to affect RI's forest canopy in 2022. Egg mass surveys conducted by URI's Plant clinic did not indicate this result, and the cause remains unknown.

For the first time in RI, mappable Ash mortality due to emerald ash borer (EAB) was observed (3,392 ac.). Ninety-nine percent of the mortality has occurred in Providence County in the vicinity of the "first find". This is a substantial increase from the initial mortality reported last year (63 acres).

Black turpentine beetle (BLTB), while ever present, has rarely caused mappable damage. However, this year severe crown discoloration occurred in a single 34 acre stand of pitch pine in Washington County.

Coincidentally, Caliciopsis canker also caused (moderate) crown discoloration in a single 48 acre stand of Eastern white pine in Washington County.

White pine needle damage caused 50 acres of mortality (one site). An additional 386 combined acres experienced moderate to severe crown discoloration.

Damage from agromyzid fly (a native forest pest first reported last year) was not seen this year.

Ground Survey

Ground surveys were undertaken to verify the "Damage Causal Agents" in polygons identified during the aerial detection survey (ADS), and to determine possible reasons for the change of greenness identified by the satellite imagery. The use of satellite imagery is *instrumental* in this regard as there were many areas where damage was not apparent from the air. During the course of conducting ground surveys, additional forest health related issues are sometimes observed.

Beech Leaf Disease (BLD) continues to be found throughout Rhode Island echoing the rapid spread of BLD in other states. An estimated 1,064 acres of American beech treeshave become moderately to severely infected. In 2021 URI Plant Pathologist Heather Faubert, and URI's Nathaniel Mitkowski, along with collaborators from the CT Ag Experiment Station, and Rainbow Tree Care, began a pesticide trial to study the efficacy of various pesticides to manage BLD. One product (PolyPhosphite 30) showed positive results thus the study will continue in at least a few of the experimental plots.

For the second consecutive year, orangestriped oakworm was present in many locations checked during ground surveys (nineteen municipalities). While little defoliation occurred, acres affected increased from last year's 44 acres of light, defoliation to 1,468 acres of light to moderate defoliation, portending increased probability of a significant outbreak in the near future.

A survey for spongy moth (*Lymantria dispar dispar* or "LDD") egg masses of 104 plots within the areas of the greatest infestation in prior years yielded three plots with egg masses: one egg mass each in two adjacent plots in Coventry, and 2 egg masses in a single plot in Richmond not too far from the Coventry sites. These finds are a reminder that LDD remains present in the environment and that the possibility of an outbreak remains.

Forest Health Special Projects

Southern Pine Beetle

2022 was the 7th season of trapping Southern Pine Beetle (SPB, *Dendroctonus frontalis*) in Rhode Island. As in 2021 DFE and URI each set and maintained 5-black Lindgren funnel traps and 229 SPB adults were collected from 10 sites compared to 117 adults from the same 10 sites in 2021. This is a marked increase from 2019 (1 capture), and supports our belief that there remains an endemic population present.
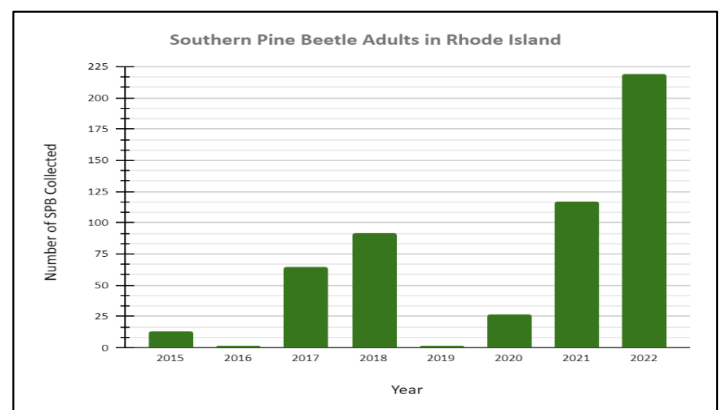
Number of Southern pine beetles caught by year. (Graph: Lisa Tewksbury, URI).

For the second year in a row there was a decrease in the number of SPB predators captured in 2022 (as found in SPB bycatch), which may be contributing to the increase in adult SPB trapped. We remain concerned that this trend indicates a pending future outbreak.

Emerald Ash Borer

Multiple monitoring efforts for detection of Emerald Ash Borer (EAB) are conducted in cooperation between the RIDEM - Division of Forest Environment (DFE) and the University of Rhode Island (URI). The original intent of the monitoring program was to detect where and when EAB would arrive, which occurred in 2018.

Since then, the program's goals have changed somewhat. While DFE's survey goal is to establish the limits of the area considered "infested", URI's goal has been to monitor population densities in known sites, and identify locations for bio-control release efforts. URI has also taken this opportunity to monitor populations of non- target by- catch obtained in the capture process.
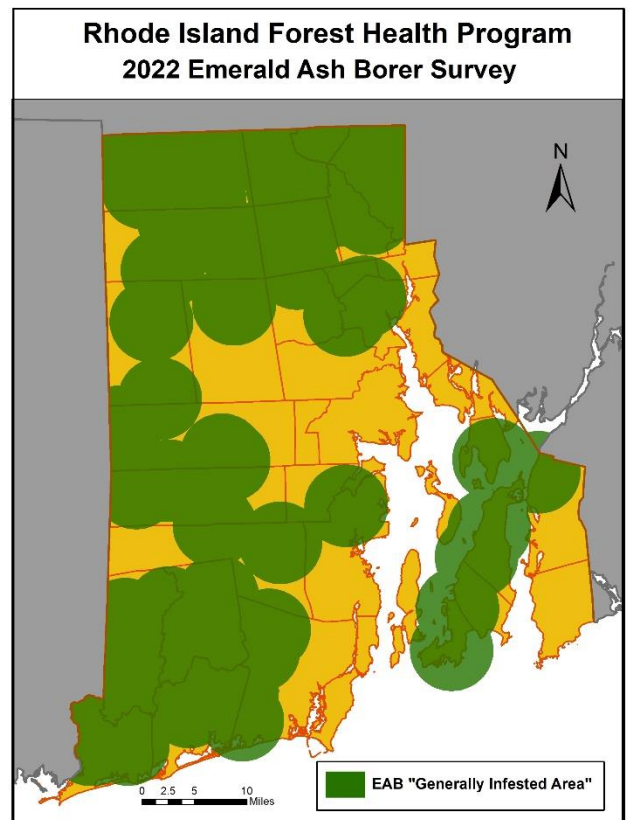
Biosurveillance Survey: *Cerceris fumipennis*

For the second year in a row, it was very difficult for either partner to capture EAB using the biosurveillance method. Colony sizes were down significantly from 2021. DFE surveyed 5 sites, and collected 19 EAB adults from 3 sites, but did not come close to closing a single site. The number of EAB collected was half the number caught in 2021.
This year URI surveyed 13 sites, closing 1, and collected a total of 15 EAB adults from 10 of the sites.
URI found 2 new species in the family Buprestidae in RI in

Rhode Island Forest Health Program
2022 Emerald Ash Borer Survey

EAB "Generally Infested Area"

Areas considered "generally infested" are within a three-mile buffer of where an emerald ash borer had been trapped, captured, or collected. (Map: Rhode Island Forest Health Program).

2022: *Chrysobothris rotundicollis* and *C. scabripennis*, both of which are native to North America. The larvae of both of these species' feed on pines. They also found two infrequently collected species of native Buprestids: *Chrysobothris harrisi* (last collected in 2019) and *Eupristocerus cogitans* (last collected in 2015). *Chrysobothris harrisi* larvae feed on Eastern white pine. The increase in new or infrequently collected pine-hosting Buprestids this year is of note, and could be an indication of increased Buprestid activity in our pine forests.

Funnel Trap Program

DFE continued to use the Green lindgren funnel trap to aid in delimiting the spread of EAB. 12 traps were set on the periphery of the known area of general infestation. During the trapping season, EAB were captured in 4 of the sites. A total of 6 adult EAB were captured, including one in Bristol County (a county first).
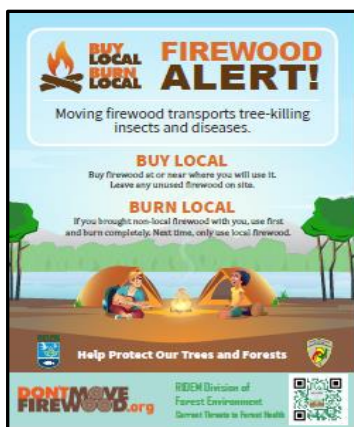
URI cut back on the number of sites they survey focusing instead on their biocontrol program. Nevertheless, they surveyed 12 sites and captured 15 EAB; a far cry from the 53 EAB captured in 2021. URI also assisted the Newport Conservancy set traps in 2 locations in Newport. No EAB were trapped.

Emerald Ash Borer Biocontrol Program

Since 2019 URI has set up six EAB parasitoid release sites (the first in Hopkinton, then three in Burrillville, and two in Cumberland), and released nearly 41,500 parasitic wasps. The releases included *Oobius agrili*, an egg parasitoid, and *Tetrastichus planipennisi*, a larval parasitoid. Data collection to determine the establishment of a population of the parasitoid at the Hopkinton site began in 2021. One wasp was collected, a hopeful sign. In 2022 URI initiated a seventh site in Coventry and continued to release in all other sites except for the Hopkinton site.

Slow the Spread/Don't Move Firewood Outreach

DFE continued its yearly distribution of information and posters about EAB and other invasive wood boring insects, promoting the "Don't Move Firewood" message, visiting 36 campgrounds, RV resorts, and other facilities where the movement of firewood was a concern. In addition, RIDEM added its own "branding" to the outreach material, including DEM logos and a QR code directing users to online resources. DEM also updated its online and social media sites.

"Don't Move Firewood" poster. Courtesy RIDEM Forest Health Program.

Early Detection, Early Assessment, Rapid Response (EDRR)

Non-native bark and ambrosia beetles are a serious threat to our nation's forests. In 2007, USDA Forest Health Protection began implementation of an early detection and rapid response project for non-native bark and ambrosia beetles. An Early Detection and Rapid Response (EDRR) Team developed a framework for implementing a national, interagency detection, monitoring, and response system for these insects. This framework involves the cooperation of state partners, regional taxonomists and regional Forest Service staff.

RIDEM installed baited Lindgren funnel traps on 10 sites (3 traps/site) in locations in close proximity to potential points of introduction (facilities that frequently move or manufacture

Forest technician Tatum Pelletier installing baited Lindgren funnel trap.
(Photo: Rhode Island Forest Health Program).

wood or wood products). Traps were monitored for 12 weeks, and all collected specimens were shipped to a certified federal identifier.

The survey resulted in 24 new species being added to the Rhode Island records. Most species were fairly common within our range. However, several species were not that common, and one considered "Rare" in the northeast. (subject to confirmation).

Abiotic Factors

Weather/Climatological (10/1/21-9/30/22)

Like last year, "highly variable" would be the best words to describe the weather/climate for the reporting period. Last year Rhode Island finally received enough precipitation to break a three-year drought.

During this reporting period, RI received below average amounts of precipitation in 8 of 12 months. Closer examination of those rainfall events shows that when the precipitation did come, for the most part it came in torrents, with prolonged dry spells between. Once again trees had less than optimal time to absorb moisture. While there was little evidence of trees exhibiting drought related stress, one must assume that it has occurred and that trees may begin to exhibit stress next year should the pattern of rainfall continue. Ironically, 76 acres of trees suffered at least some damage from flooding.

Warmer than normal conditions occurred in ten of twelve months, finishing the twelve-month cycle 2.03°F above the ten-year mean average. As with the precipitation data, temperatures fluctuated dramatically throughout the year.

In 2022, 78 wildland fires were reported with 46.3 acres of forestland burned. The number of fires this year is roughly 2/3 the number reported last year (99 fires), and 1/4 the number of acres burned (from 187).

During the aerial survey, minor damage to trees caused by salt spray, flooding, and wildland fires was identified.

Other

Spotted lanternfly

In August, a population of Spotted lanternfly (*Lycorma delicatula*) (SLF) was detected for the first time in Rhode Island along Route 7 in Smithfield. Subsequent outreach by DEM through press releases and social media resulted in additional reports (verified) of SLF in nearby communities (North Smithfield, Providence, Pawtucket, and Lincoln).
As SLF is primarily a pest of agricultural products, DEM's Division of Agriculture (DAG) is the State lead agency for SLF related activities, and DFE plays a supporting role in assisting DAG in the implementation of DEM's "Spotted Lanternfly Response Plan". DFE provided support for delimiting surveys, treatment activities (14 sites), and egg mass surveys/scraping. It was DEM's preparedness for the eventual introduction of this pest that provided the opportunity for the rapid response, thus providing more time next year to repeat the survey and treat process.

Human Related Activities

Threats to our forest's health come in many forms and often result in either short or term impacts, some irreversible. While technically not a typical threat to "forest health", the rapid proliferation of solar farms/arrays being built in rural landscapes impact the myriad values that forests provide, and *may* cause secondary impacts that only time will reveal.

For this reason, data on the location of solar/arrays was collected during the aerial survey, and via desktop survey of Google Earth imagery. From 2014-2022, solar arrays/farms occupied 2,129 acres of properties including rooftops, parking lots, industrial sites, disturbed lands, agricultural land, and of course forestland. Forestland accounted for approximately 800 acres of that total, roughly 30%.

Forest Service Assistance

The aerial survey was aided by the use of "Change of Greeness" data collected by USDA FHAAST using satellite imagery. This imagery was also essential to ground truthing canopy damage determinations, and finding smaller polygons of damage that were not identified during the flight.

U.S. Forest Service Remote Sensing Specialist Bill Frament provided significant assistance to the Rhode Island Forest Health Program Coordinator in the analysis, development, and interpretation of ForWarn satellite imagery.

Cameron McIntyre assisted URI Plant Pathologist Heather Faubert in monitoring 6 plots for Beech Leaf Disease.

Marc DiGirolomo identified all species collected in in the EDRR survey.

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Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.

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