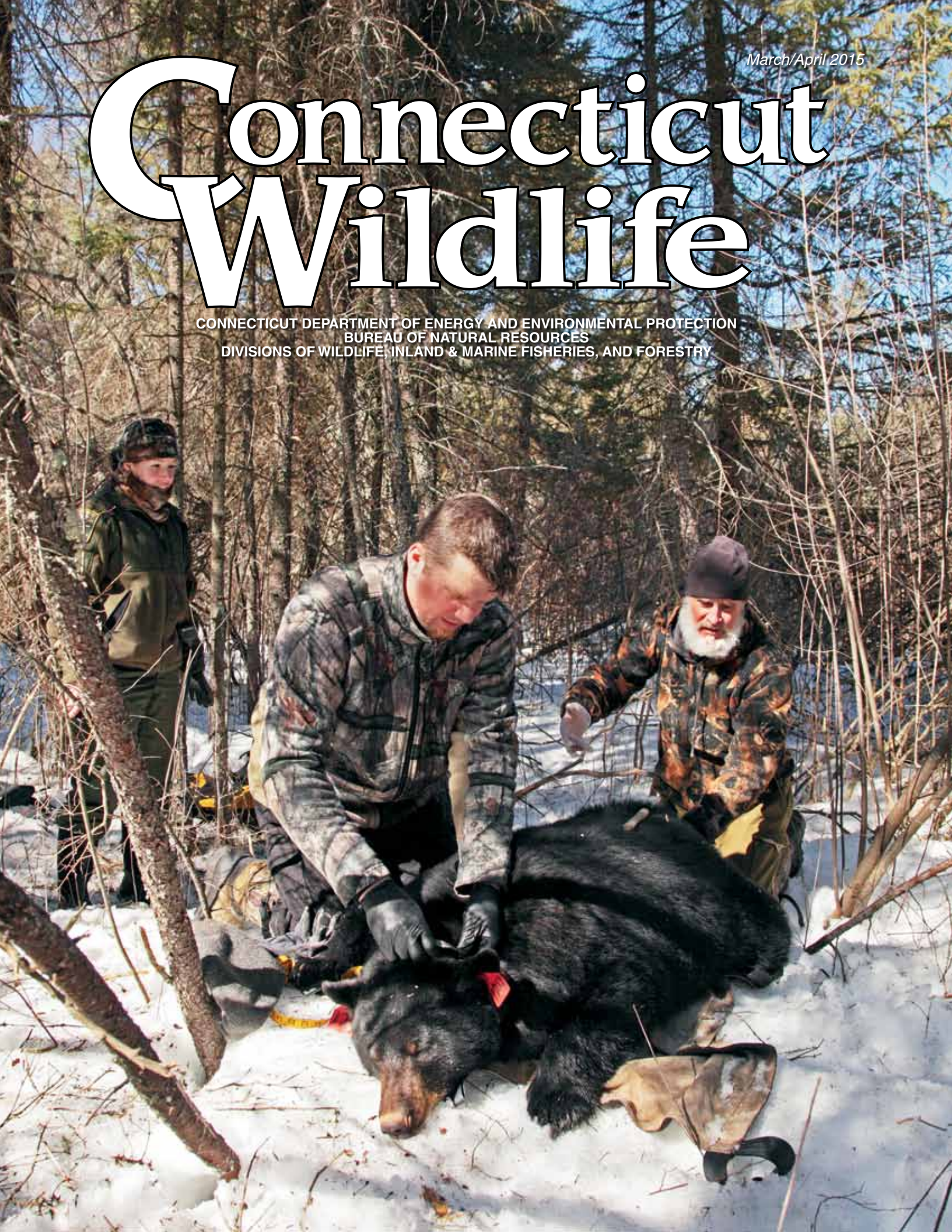
March/April 2015

Connecticut Wildlife

CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
BUREAU OF NATURAL RESOURCES
DIVISIONS OF WILDLIFE, INLAND & MARINE FISHERIES, AND FORESTRY



Eye on the Wild

Why the Focus on Insects?

As you read through this issue of Connecticut Wildlife*, you will probably notice that several of the articles focus on insects, and even mention insects as a source of food for wildlife. Sometimes, insects are the forgotten species. Maybe it's because they are typically so small and not always seen. Or, maybe it's because some insects are considered annoying pests. But, as you read through the articles, you will discover that insects play important roles in our ecosystem.*

Two years ago, Connecticut residents were intrigued and excited about the emergence of the 17-year periodical cicada. The DEEP Wildlife Division provided funding for a monitoring effort that was coordinated by the Connecticut Agricultural Experiment Station. Lead researcher (and cicada expert) Chris Maier spent countless hours documenting and monitoring the emergence (with the help of several volunteer monitors). His final report (page 14) describes where these amazing insects were found in our state and how their range has declined.

In the cases of the emerald ash borer (page 6) and southern pine beetle (page 19), these two destructive insects are not native to Connecticut and pose a serious threat to the composition of our state's forest habitats. As native ash trees and now pitch pine succumb to these insect infestations, there will be serious consequences for the wildlife that depend on these trees. Efforts are underway to monitor and hopefully control the spread of these insects, but it is a huge task. Claire Rutledge, of the Connecticut Agricultural Experiment Station, details an interesting biocontrol project for the emerald ash borer that is currently going on in our state.

Two other non-native insects – the Asian bush mosquito and Asian tiger mosquito – are the topic of another article that highlights the importance of properly storing and covering scrap tires to prevent the proliferation of these pests (page 16). Both of these mosquitoes can transmit West Nile virus and other mosquito-borne disease pathogens. We all can play a role in reducing the number of mosquitoes around our homes just by taking a few small actions.

Recent research on chimney swifts (page 3) found that these birds may be declining – not necessarily because of a lack of appropriate chimneys for nesting – but possibly because of dietary shifts in their invertebrate foods due to pesticide use. More research is needed to understand what has changed in the diet of chimney swifts and other aerial insectivores.

You will continue to see more focus on insects in the near future. Scientists are concerned about the decline in native pollinators (like bees) and efforts are underway to figure out what is contributing to these declines and what can be done to help these animals. Monarch butterflies are also in the forefront as the population has suffered a steep decline. Much of the focus will be on providing habitat and encouraging the planting of milkweeds and other native butterfly plants. Look for more to come in future issues of Connecticut Wildlife*, on our Facebook page (www.facebook.com/CTFishandWildlife), and on our website (www.ct.gov/deep/wildlife).*

Kathy Herz, Editor

Cover:

The DEEP Wildlife Division has been conducting a research project on black bears to determine the growth and movements of Connecticut's bear population. See article on page 22.

Photo by Paul J. Fusco

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The Federal Aid in Wildlife Restoration Program was initiated by sportsmen and conservationists to provide states with funding for wildlife management and research programs, habitat acquisition, wildlife management area development, and hunter education programs. Connecticut Wildlife *contains articles reporting on Wildlife Division projects funded entirely or in part with federal aid monies.*

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A Decade of Swift Conservation with the Wildlife Action Plan

Written by Shannon Kearney-McGee, DEEP Wildlife Division

Chimney swifts, also known as "flying cigars," are a common sight in the skies of the Northeast throughout spring and summer. However, populations have declined steadily over the last several decades across their entire range.

In 2005, DEEP issued Connecticut's Comprehensive Wildlife Conservation Strategy (now called Wildlife Action Plan) aimed at guiding the state's conservation efforts over a decade. A main tenet of this document is to "keep common species common," encouraging a proactive approach to managing wildlife species that may become threatened in the future. The chimney swift was a particularly interesting and accessible species to focus on in Connecticut because the state is in the core of this bird's range with plenty of towns full of chimneys.

At the start of Wildlife Division investigations, it was assumed that chimneys were limiting swift populations. Initial efforts focused on this problem through a coordinated regional monitoring effort called "Chimney Watch." This effort included a standardized inventory to assess local areas for their capacity to support chimney swift populations, as well as quantify the occupancy rates of each area. Essentially, we counted chimneys and then determined just how many chimneys were being used by swifts. Surprisingly, it was discovered that there are more than enough available chimneys for chimney swifts in the Northeast. What we clearly thought would be a simple conservation action – creating more chimneys for nesting – turned into a mystery. It was discovered that we need to look more closely at these birds' whole life cycle to understand and stop their decline.

The biggest breakthrough came when the Wildlife Division coordinated with colleagues in Canada to confirm dietary shifts in response to pesticide use. This was discovered through identification of invertebrate remains in over 30 years of accumulated guano from a roost in Willimantic, Connecticut. Guano remains exhibited the same decrease in relative proportions of remains for *Coleoptera* (beetles) to *Hemiptera* (true bugs) species as was observed in Ontario, and this change coincided with the use of the pesticide DDT and the documented decline of swifts in the U.S. Geological Survey Breeding Bird Survey. With the research, there now was indirect evidence that food may be part of the driving cause of the swift decline. Still far from a direct link, researchers are in need of good monitoring protocols to track the birds and their invertebrate food source, with the goal of prescribing measures to stop the swifts' decline.

Through various trial and error efforts, researchers and citizen scientists have been refining protocols to monitor biological rates, like productivity and survival, with the ultimate plan of linking these metrics with information about invertebrate abundance and availability:

- Citizen scientists piloted nest monitoring efforts, but results were unreliable. It is clear that camera systems are required for accurate monitoring of nests.
- Roost monitoring has also proven to be an ineffective index of productivity, but counts of chimney swifts in June at consistent summer roosts will serve as a useful population index to detect trends over time.
- Preliminary efforts to mark-recapture birds have laid the framework for a process that could quantify survival rates and movement of swifts, but are hampered by difficult trapping conditions, trap savvy birds, and low sample size.

We still have not definitively solved or put a stop to the chimney swift decline, but we know more and can set some conservation actions. Chimneys are not limited in Connecticut, but if the capping of chimneys continues at the current rate, nesting chimneys may become scarce. We can use our knowledge of preferred chimney structural characteristics to focus conservation on these chimneys to keep swift roosts and nests common!

Chimney Swift Roost Watching events and public outreach at key roosting locations have increased awareness and appreciation for swifts. These efforts have resulted in conservation of multiple roost chimneys that were slated for demolition.

JUDY GRUND, MASTER WILDLIFE CONSERVATIONIST

Chimney swift roost watching events and public outreach at key roosting locations have increased awareness and appreciation for swifts.

With the knowledge that the chimney swift decline is echoed by other aerial insectivore declines in the Northeast, a more comprehensive effort is warranted to understand what has changed in these birds' diet and what can be done to keep all of these declining species common. Activities in the next decade should focus on the lack of knowledge about the aerial invertebrate/bird interface and, if warranted, what is causing the aerial invertebrate food shortage.

The Wildlife Action Plan is currently under revision and will best serve Connecticut's wildlife with input from the public. You are encouraged to provide input via email at deep.wildlifeactionplan@ct.gov. Visit the DEEP website at www.ct.gov/deep/wildlifeactionplan to learn more and also get involved.

State Wildlife Grants

Nest Boxes Making a Difference for American Kestrels

Article and Photography by Min Huang, DEEP Wildlife Division

Due to the diligent and tireless work of several people throughout Connecticut, the American kestrel is making a comeback in our state. This bird's status will soon be downgraded from "threatened" to "species of special concern" on Connecticut's List of Endangered, Threatened and Special Concern Species List. There is hope that in five years, when the mandatory status update of the List is again upon us, that the kestrel can be removed from the list entirely.

Although kestrel habitat (open grassy or shrubby areas with short vegetation and natural tree cavities or nest boxes) is relatively limited in the state, the Northeast Kestrel Project, headed by Tom Sayers and John Stake, demonstrated that kestrels will occupy nest boxes in much closer proximity to one another than previously thought. In fact, in many instances, territory size for successful pairs is more than 70% less than that reported in the literature. This, in effect, greatly increases the amount of available habitat in the state for these pretty little falcons.

Another valuable nugget of information learned is that once kestrels become established in a locale and are successful, increasingly less European starling management is needed. In essence, once kestrels reach a critical mass or threshold, they seem to be able to fend off starlings on their own. This can greatly increase occupancy rates and, in turn, increase productivity.

2014 Breeding and Nesting Season

The 2014 kestrel breeding season in eastern Connecticut was another banner year. Within the Northeast Kestrel Project study area (Tolland County and eastern Hartford County), 71 nest boxes were available to breeding kestrels. A total of 31 pairs nested, resulting in a 42% occupancy rate. Of these, 25 successfully fledged young (81%). The 31 occupied boxes is an all-time high for the study area and the third consecutive increase from a low of 18 in 2011. A total of 97 young were banded out of the 25 successful boxes.

Andy Rezeznikiewicz of Connecticut Audubon in Pomfret monitors 25 boxes in Windham County and had four occupied boxes with a 75% fledgling success rate and 13 young produced. Several of the boxes were over-run by squirrels and starlings, reducing the occupancy rate.

Art Gingert and Mike Dudek manage and monitor a large number of nest boxes, predominantly in Litchfield and Hartford Counties. In 2014, 88 boxes were available for kestrels to use. Of those, 28 boxes were occupied by kestrel pairs, for an occupancy rate of 32%. Fledgling success was 61%. A total of 64 fledglings was produced, with all but two of the fledglings banded by bird banders.

All together, the three main contributors to kestrel production in the state had a total of 184 available nest boxes in the spring of 2014. Of these, 63 boxes were occupied by kestrel pairs (34% occupancy rate). A total of 45 pairs successfully raised young, for a fledging success rate of 71% and 174 fledglings produced. A minimum mean 30% fledgling survival rate translates to a minimum of 52 kestrels added to the population in 2014.

The 2014 nesting season results are, once again, testament to the tireless efforts of the three main kestrel projects and the fledgling (excuse the pun) stewardship program. The efforts of these volunteers are a shining example of how great conservation results can be realized with a concerted effort.

Plans are already in motion by the main contributors to expand the number of available nest boxes for the 2015 breeding season. There will likely be a 10% or more increase in availability throughout the scope of the three main project areas in the 2015 breeding season.

Research

Within the Northeast Kestrel Project area, 2014 marked the final year of a radio telemetry project to assess fledgling survival rates, dispersal behavior, and habitat use. Fledgling survival rates over three years were in the range of about 30%, which is similar to most raptors. Most chick mortality occurs within two weeks of leaving the nest box, although

This clutch of young kestrels is close to fledging from their nest box.

Conservation Concerns

According to Hawk Mountain Sanctuary, data from raptor migration counts, Breeding Bird Surveys, and Christmas Bird Counts indicate that American kestrel populations have declined in much of northeastern North America (including Connecticut) since 1974. Loss of habitat is the most likely cause of the kestrel decline in Connecticut. The number of farms in the state has been decreasing, many old agricultural fields are returning to forest, and suburban development has replaced suitable habitat.

predation events occur throughout the period before migration.

In addition, 15 geo-locators were attached to adult females to obtain an understanding of migration timing, stopover hotspots, and wintering affiliations. The hope is to recapture these birds in spring 2015 to download the data from the geo-locators.

As part of the banding program, 53 adults and 97 fledglings were banded in 2014. Bird banders also had 13 recaptures of previously banded birds. As the number of recaptures increases over the years, researchers will get a better estimate of adult survival rates. The banding program also is providing critical information on occupancy of boxes – where certain kestrels nest and whether or not they return year after year to the same box. So far, the answer to the latter question seems to be no.

Stewardship Program

An article in the January/February 2014 issue of *Connecticut Wildlife* requested the help of citizens who might be interested in becoming American kestrel nest box stewards. Steward responsibilities include identification of possible kestrel habitat and routine monitoring of any nest boxes that might be put up in those areas. This effort requires dedication and intensive, regular monitoring to ensure the survival of young kestrels year after year.

Six citizens in eastern Connecticut, under the supervision of the Northeast Connecticut Kestrel Project, actively participated in the stewardship program during the 2014 breeding season: Ray Hardy, Dave Stevens, Randy Dill, Lance Magnuson, Scott McCall, and Gary Crump. Efforts by the dedicated stewards resulted in the installation of 10 new kestrel nest boxes. Of those new boxes, two boxes were successful, resulting in the fledging of eight young kestrels.

The results of this initial year of the stewardship program are promising. As volunteers learn more about the rigors of being a kestrel steward, success rates will increase and new kestrel hotspots will be created. In western Connecticut, at least two or three potential sites will receive stewardship nest boxes in 2015. In addition, Art Gingert will be installing a number of new nest boxes in that part of the state.

Collaborators continue to seek willing participants in the stewardship program. The more sites that can be "saturated" with kestrels, the more optimistic the long-term outlook will be!

A fledgling kestrel with a radio transmitter attached. The radio telemetry project assessed fledgling survival rates, dispersal behavior, and habitat use.

Geo-locators were attached to adult female kestrels to obtain an understanding of migration timing, stopover hotspots, and wintering affiliations. The hope is to recapture these birds in spring 2015 to download the data from the geo-locators.

Become a Kestrel Nest Box Steward

Citizen scientists are needed to identify potential areas of good kestrel habitat, as well as "adopt" and monitor kestrel nest boxes. Those ready to take on the commitment of being a Nest Box Steward should contact Art Gingert (for locations west of the Connecticut River; artgingert@optonline.net) or Tom Sayers (for locations east of the Connecticut River; sayers.tom@gmail.com).

What is involved with being a Nest Box Steward?

- **Nest boxes must be monitored faithfully one to two times a week during late March to mid-May. Monitoring mostly involves visual checks to see if European starlings are using the boxes. You may need to use a stepladder or short extension ladder to check the inside of boxes.**
- **Any starlings that begin to use a kestrel box must be removed and euthanized. (As an exotic, invasive species, starlings are not protected by law.)**
- **Once you learn the habitat requirements for kestrels, you should be able to identify potential areas to place nest boxes. Kestrels need a minimum of 20 acres of open, grassland type habitat. Parcels with weedy, overgrown edges, hedgerows, or fencerows, or unmowed grassy sites are best. Ideally, nest boxes should be placed in the open, away from shrubs and small trees.**
- **Art, Tom, or another experienced kestrel researcher will be available to help you by visiting potential nest box sites you have identified. If the site is suitable and the landowner is willing to have a box or boxes installed on the property, poles and nest boxes will be provided and installed, and you will soon be on your way to assisting in the recovery of Connecticut's American kestrels.**
- **Once kestrels become established in your boxes, Art or Tom will be available for advice and mentoring as needed, especially when the time comes to develop a schedule for banding the nestlings.**

Biological Control of Emerald Ash Borer in Connecticut

Written by Claire Rutledge, Connecticut Agricultural Experiment Station

The emerald ash borer (EAB) is an invasive beetle that kills all species of North American ash trees. First detected in Detroit, Michigan, in 2002, it has since spread widely. It was first detected in Connecticut in 2012.

This beetle has decimated ash tree populations; 99% of trees above two centimeters in diameter die within eight years of EAB infesting an area. Native species dependent on ash trees also are decimated, and the larger toll on the ecosystem is still being discovered. Due to the rapid spread of EAB, eradication is impossible. The impact of EAB on ash trees is likely to be as devastating as the impact of chestnut blight on American chestnut and Dutch-elm disease on American elm.

Identifying Biological Control Agents

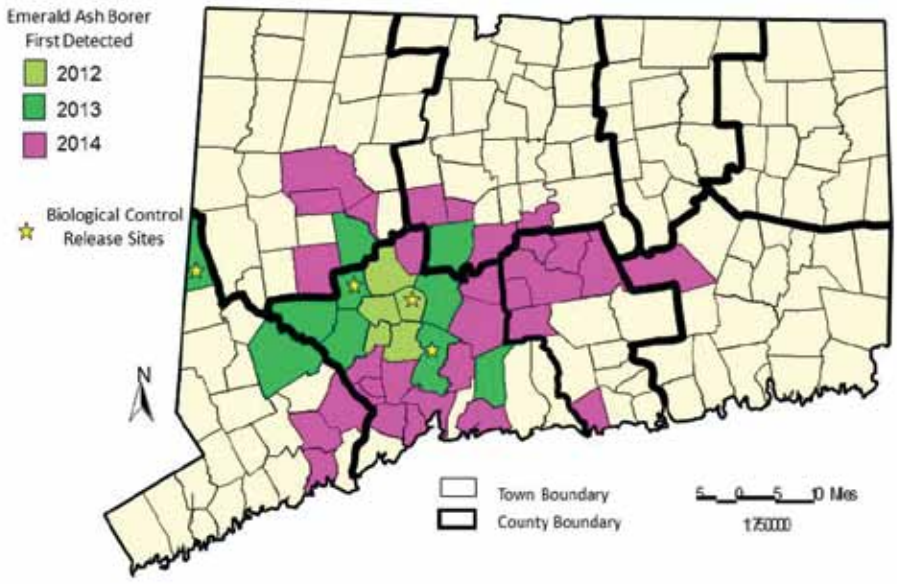
Biological control – the introduction of a natural enemy from the native region of the invading organism – is key to the long-term management of EAB. Shortly after EAB was identified, scientists from the U.S. Department of Agriculture Animal and Plant Health Inspection Service/Plant Protection and Quarantine (USDA APHIS/PPQ) went to EAB's home countries of China and South Korea to identify potential biological control agents. The primary focus of the search was parasitic wasps, or parasitoids. These small, stingless wasps lay their eggs within a host insect, and the larvae then consume the host from the inside. Parasitoids are often ideal biological control agents due to their fidelity to a single host and a high reproductive rate. Several wasp species were brought into quarantine in the United States for further testing to ensure host specificity and suitability to the various climatic zones of North America.

After seven years of testing by the USDA, three species of wasps were approved. The USDA began mass rearing the parasitoids in a custom-built facility in Brighton, Michigan. Two of these species are suited to Connecticut's chilly climate. The first wasp, *Tetrasticus planipennisi*, attacks the larvae of EAB. The female drills through tree bark with her ovipositor (egg-laying tube) to place eggs within EAB larvae. One EAB larva can play host to up to 125 wasp larvae. After depleting the host, the wasp larvae emerge from the tree as adults, flying off to parasitize new EAB victims. *T. planipennisi* have up to four generations a year, quickly building in population to suppress EAB populations.

P. PICONE, DEEP WILDLIFE DIVISION HABITAT MANAGEMENT PROGRAM

Connecticut ash tree showing "blonding" damage from woodpeckers hunting for emerald ash borer larvae to eat.

Current known distribution of emerald ash borer, and 2013-2014 parasitoid release sites.



The other parasitoid being released in Connecticut is an egg parasitoid, *Oobius agrili*. This minute wasp completes its entire larval development within a single EAB egg, with each EAB egg producing one *O. agrili* adult. These wasps produce two generations a year, less than *T. planipennisi*, but twice as many as EAB with its one- to two-year life cycle.

Biological Control in Action

In summer 2013, the Connecticut Agricultural Experiment Station partnered with USDA APHIS to begin parasitoid releases in Connecticut. That year, we released 10,245 *T. planipennisi* and 2,878 *O. agrili* over nine release dates in two different locations, Prospect and Middlebury. In 2014, two release sites (Hamden and Sherman) were added and 45,568 *T. planipennisi* and 13,650 *O. agrili* were

D. CAPPEART

An adult parasitoid, *Tetrastichus planipennisi*.

released over 15 dates at these four sites. Releases will continue in summer 2015 with at least two additional sites.

For each release date, the parasitoids are shipped overnight in a cooler from the rearing facility in Michigan. The

enough to get through the mesh and head out to seek fresh EAB eggs to parasitize. These release techniques ensure that the parasitoids emerge in a natural habitat, undamaged by their trip through the mail and ready to go.

Determining the impact of the parasitoids on the EAB population will be a long-term process. First, it must be verified that the wasps have become established in their "new home" by recovering wasps that have overwintered. This is a tricky task given the small size of the wasps. Methods, such as setting out sentinel eggs and larvae, peeling trees to look for parasitized larvae, and placing out yellow-pan

Biological control – the introduction of a natural enemy from the native region of the invading organism – is key to the long-term management of the emerald ash borer.

T. planipennisi are reared in small ash bolts. The bolts are infested with EAB larvae, and then adult female parasitoids are allowed to parasitize the larvae. The bolts are shipped out and when nailed to ash trees, the parasitoids are in the bolt, ready to emerge and hunt for EAB larvae. The *O. agrili* arrive in a device nicknamed the "Oobinator," which consists of two, nested plastic drink cups with a mesh bottom. The cup is filled with parasitized EAB eggs, which are protected from rain and predation until adult parasitoids emerge. The adults are tiny

traps that attract adult wasps, are used. Research conducted in Michigan, where the first releases were done in 2009, showed that the wasps readily established. At those sites, the percentage of trees with parasitized EAB, as well as the percentage of EAB in each tree that was parasitized, has been rising steadily each year. It will be several years until we know how well the wasps are performing in Connecticut.

Unfortunately, because EAB populations grow exponentially when they move into a new area, it is not expected that the parasitoids will be able to halt the first wave of ash tree deaths. The timeline is too short for the parasitoid populations to build-up to the levels needed to have an impact. However, once the first wave of destruction is accomplished, EAB populations will drop. They will have eaten themselves out of house and home. The parasitoids, being specialists, will continue to attack the remaining small populations of EAB, hopefully suppressing them to the extent that young ash trees will be able to survive, grow, and eventually replace the ash trees that were casualties of the initial EAB invasion.

More information about biological control of emerald ash borer can be found at www.emeraldashborer.info (look for the biological control tab).

J. HANSEN

Emerald ash borer eggs. Two contain nearly mature parasitoids *Oobius agrili*, and two contain EAB larvae ready to hatch.

C. RUTLEDGE, CONNECTICUT AGRICULTURAL EXPERIMENT STATION (2)

(Top) "Oobinator" for the release of *Oobius agrilli*. Parasitized EAB eggs are in an inner cup protected from rain and predators. *O. agrilli* will emerge in one to two days of deployment. Note that trees are tagged for future reference

(Bottom) Release mechanism for *Tetrastichus planipennisi*. Adult parasitoids will soon emerge from parasitized EAB larvae within the bolt.

Recent Connecticut Deer Program Activities

Written by Andy LaBonte, DEEP Wildlife Division, and Bill Embacher, Wildlife Management Institute

The DEEP Wildlife Division's Deer Program has been busy with a variety of projects and activities.

P. J. FUSCO

Adult male deer have a two to four times higher prevalence rate of CWD than females. It is theorized that male breeding behavior increases risk exposure.

Chronic Wasting Disease Sampling

Chronic wasting disease (CWD) is a neurological disease found in deer and elk, similar to mad cow disease. However, there is no known relationship between CWD and any other neurological disease.

Currently, CWD has been detected in 22 states and two Canadian Provinces. The disease has not been documented in Connecticut or New England. However, in 2005, CWD was documented in captive and wild white-tailed deer herds in New York, not far from the Connecticut border.

In response to the detection of CWD to the west of Connecticut in New York, a surveillance program approved by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS) was implemented from 2005-2011 to focus sampling efforts in western areas of Connecticut that were considered high and moderate risk. During this seven-year period, 4,384 testable samples were collected from deer harvested during Connecticut's archery, shotgun/rifle, and crop damage seasons and from vehicle-killed deer found throughout the state.

Funding provided by USDA-APHIS was eliminated from the federal budget in 2012, therefore no CWD testing was conducted in 2012 or 2013. However, a joint partnership between Connecticut DEEP and the Stewart B. McKinney National Wildlife Refuge, with financial assistance from the U.S. Fish and Wildlife Service, National Wildlife Refuge System, allowed for CWD testing to be conducted in 2014.

With the testing of over 32,000 deer in

R. HARDY, WILDLIFE DIVISION DEER MANAGEMENT PROGRAM

J. KILBURN, WILDLIFE DIVISION DEER MANAGEMENT PROGRAM

Adult does typically give birth to one to two fawns each year, and as many as three fawns were recorded in one doe during the fawn study in Northwest Connecticut.

(Above) Seasonal Resource Assistant Danny Marino holds two fawns that were part of the Wildlife Division's fawn study.

New York and no additional CWD cases being documented, the DEEP Wildlife Division no longer considers deer management zones 1, 6, and 11 (western Connecticut) to be high risk. Therefore, sampling during 2014 was stratified across all zones based on deer density. A total of 324 samples were collected during the 2014 hunting season. Samples have been sent out for testing and results should be available by the end of the summer.

Fawn Study

The Wildlife Division's Deer Program continued the third year of the Northwest Connecticut fawn mortality study this past spring.

Researchers captured 22 fawns in Sharon and Salisbury between May 19 and June 15, 2014. Fawns were fitted with expandable radio collars, enabling researchers to track movements and sources of mortality. Nine fawns were killed by predators (4 bobcat, 4 bear, 1 unknown); three were killed by poachers; one fawn was killed by haying activities; and three collars have stopped working. Survival rate was 50% after 90 days, and 26% as of March 2015 (5 surviving fawns), not including the collars no longer transmitting.

Researchers are currently capturing adult does in Cornwall and Canaan and fitting them with radio collars and vaginal implant transmitters in preparation for the final fawning season in deer management zone 1.

Unfavorable Fashion Trends

There has been an increasing trend in the white-tailed deer community. Over the past few years, Wildlife Division biologists have observed deer making fashion statements using foreign objects, such as PVC couplings and discarded weed-whacker spools. It is unclear as to where deer have been acquiring such impeding jewelry, but the consequences have all been quite similar; once a deer steps in one of these foreign objects, there is no way of removing them. In many cases, the objects become tighter, either as the deer grows if it acquired the object at a younger age or as the object simply causes irritation and swelling begins to occur, causing the deer to limp from discomfort.

Recently, the Wildlife Division received reports from a few residents in Branford about a deer with what appeared to be a plastic truck tire from a child's toy stuck on its hoof. In early March, Division biologists coordinated capture efforts at one resident's home where the deer had been observed frequently. The deer was successfully immobilized and the plastic tire was removed.

B. EMBACHER, WILDLIFE DIVISION DEER MANAGEMENT PROGRAM (2)

(Top) A PVC coupling was found on a deer harvested during the 2014 hunting season.

(Bottom) A plastic truck tire that was stuck on this deer's hoof was removed by Wildlife Division biologists during winter 2015.

These unfortunate occurrences likely occur more than one would think and often go undetected, usually resulting in injury and/or death of the affected animals. The best and most effective way to avoid such situations is the proper disposal of man-made items that can be hazardous to wildlife. These items include but are not limited to fishing line and tackle; plastic six pack rings; balloons and attached string; plastic bags, bottles, and containers; and more. It can take a great deal of effort to coordinate the capture of affected animals and the subsequent removal of harmful items. But, the residents who reach out on the animal's behalf are always appreciative of the efforts, making a successful end to the ordeal and providing a rewarding experience for all who participated.

P. J. FUSCO

Monitoring the Pulse of River and Stream Fish Communities

Article and photography by Mike Beauchene, DEEP Inland Fisheries Division

Metaphorically, the phrase, "a canary in a coal mine" represents an auspicious future, one where the outcome could be troublesome. To the biologist, this phrase represents the foundation of biological monitoring – inferring environmental condition based on living organisms. As the canary was more sensitive to methane and carbon monoxide than the miner, watching the behavior of the bird provided the miner with an early warning system. If the bird perished, then it could be assumed that the surrounding atmosphere was toxic. For the miner, a hasty exit was in order.

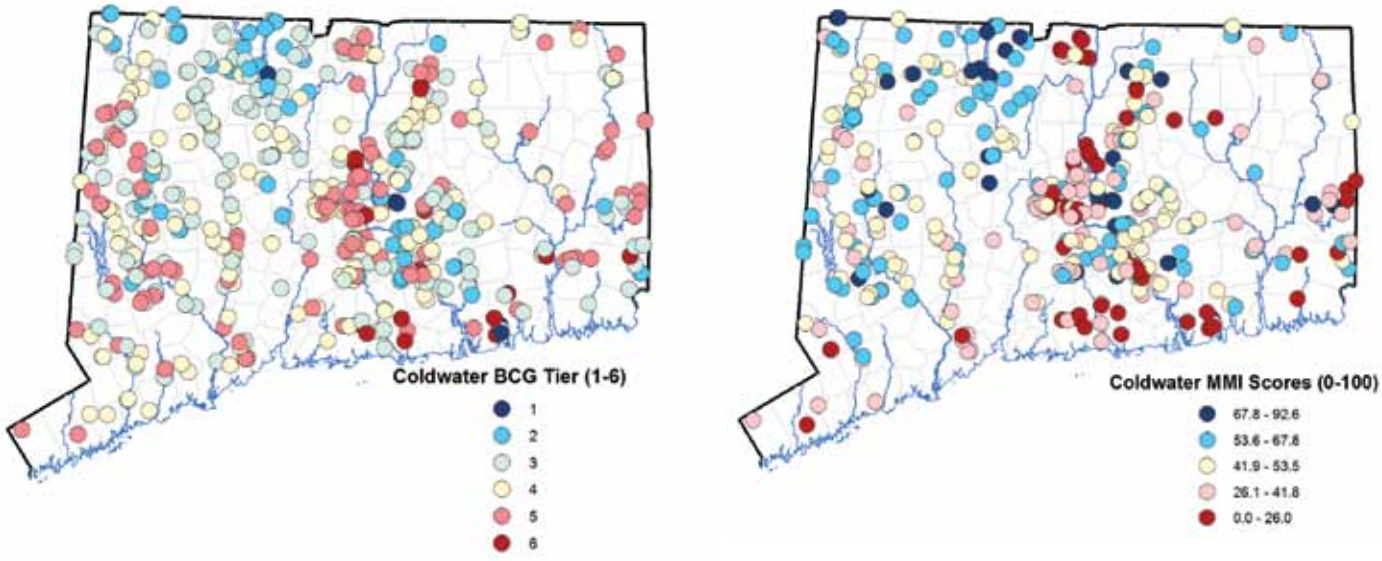
Fish community evaluation has been on-going since the late 1800s when Commissioners of the State Board of Fisheries and Game noted that many of Connecticut's once prolific trout streams were barren, having fallen prey to the negative effects of damming, deforestation, and other anthropogenic stressors.

Connecticut has a long history of monitoring fish populations. Lake and pond surveys conducted in the early to mid-1900s involved using a seine net to capture fish and determine population structure. With the advent of electrofishing – the controlled use of small amounts of electricity to induce swimming towards the electric probe – collection of fishes became much more efficient.

Electrofishing is a widely used method for the non-lethal collection of fish community data.

The Federal Clean Water Act (1972) requires states to monitor, assess, and report on the condition of life within its aquatic habitats. Since the early 1970s, DEEP has been evaluating Connecticut's rivers and streams using the aquatic insect community. Due to their small size, ease of collection, and the fact that Connecticut has several hundred aquatic

Figure 1. Fish community data collected during 2011-2012, evaluated using the Connecticut coldwater biological condition gradient model (left) and the Connecticut coldwater multi-metric index (right). Darker blue colors represent intact fish communities and darker red represents altered fish communities.



Similar to other evaluative indexes used in society, like the Gross Domestic Product Index, Unemployment Index, Dow Jones Index, or personal health related indices, such as body mass index or cholesterol levels, biological indices and calculations enable the fisheries manager to make informed management decisions based on the structure and composition of the fish community.

insect species whose pollution tolerance ranges from intolerant to tolerant, these organisms are the perfect "canary" for water quality.

To improve evaluation of aquatic life in Connecticut rivers and streams, the DEEP's Inland Fisheries Division and the Water Quality Monitoring Program within the Bureau of Water Protection and Land Reuse worked collaboratively to develop two complementary models: dual multi-metric indices (MMI) and the Biological Condition Gradient (BCG).

Both models are valuable tools for resource assessment and management as they provide information about the fish community sampled at various locations. Each model evaluates resident fish communities of coldwater and coolwater flowing water habitats (brooks, streams, and rivers) by using data generated by the collection, identification, and measurement of all the fish within a pre-determined sample area. The models differ in the type of output provided and how the output can used for effective natural resource management.

Connecticut's dual MMIs are a series of independent, non-correlated calculations (metrics). The calculated value for each metric is scored (0-100), with the average of all metrics representing the final community score. MMI scores help determine if the fish community is functionally intact – meaning, having a balance of feeding groups with obligate stream dwellers present.

Connecticut's BCG model is anchored by Tier 1, the "native" or "natural" condition and, as such, subsequent Tier assignments reflect the degree of deviation from natural. BCG tier assignments identify places where fish communities are relatively "pristine," as well as those significantly altered.

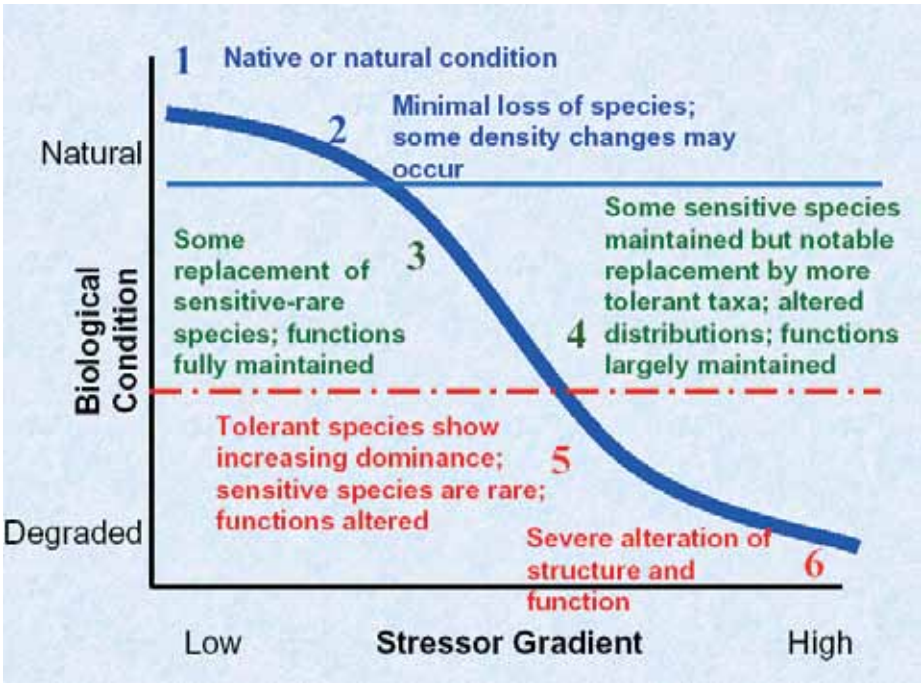
The MMI and BCG models both assess fish community structure, but differ in how data are evaluated. As an example, BCG and MMI scores were calculated for each fish community sample collected during the summers of 2011 and 2012 (Figure 1). In both graphics, dark blue is the upper end of the scale and red the lower end. Both show that the northwest corner of the state is represented with predominantly "blue" colors and central Connecticut with predominantly "red" colors. However, the MMI model produces more dark blue dots than the BCG. As each model treats the same fish community data slightly different, more informed decisions can be made by evaluating the output from both models.

Connecticut's landscape and, by default, its fish communities have experienced great change over the past 300 years. Restoration efforts in the late 1800s were based on angling success and direct observation, and included re-introduction of native fishes and the stocking of non-native fishes to fill empty habitat. With today's objective decision-making tools – the MMI and BCG – we are able to evaluate the effectiveness of various restoration and conservation projects, such as water quality improvement, habitat restoration, fish passage via dam removal, stream flow regulation, and water temperature modification. The models also are valuable in prioritizing conservation efforts by providing identification of the "best" of what Connecticut has to offer.

The presence of trout in a body of water is a discrete ecological fact that nevertheless signifies certain things. It signifies a particular complex of biotic and chemical and physical factors, a standard of richness and purity, without which that troutly presence is impossible.

– "Wild Thoughts from Wild Places," David Quammen.

The Biological Condition Gradient Model



The Biological Condition Gradient (BCG) is a conceptual model, based on the premise that biological communities form a continuous gradient from completely natural (Tier 1) to severely dysfunctional (Tier 6). The BCG can be applied to any type of biological community and provides a common framework for regional comparisons of biological communities.

Bringing Dead Wood Back to Life - The Pileated Woodpecker

Article and photography by Paul Fusco, DEEP Wildlife Division

The spectacular pileated woodpecker is Connecticut's largest member of the *Picidae* family. As big as a crow and black with a flaming red crest, the pileated woodpecker is unmistakable. When observed pounding away at a dead tree with wood chips flying, it is a stunning and memorable sight. It becomes easy to see how the pileated woodpecker got the nickname of "woodbutcher."

Pileated woodpeckers are non-migratory and found in Connecticut year-round. Within their large home range, they are able to communicate with one another by vocalizing and drumming on dead trees. Their loud, "jungle-bird" call rings through the forest, providing the landscape with a quality of wildness.

Typical calls include a series of 10 or more "*cuk, cuk*" calls. The loud "*kek, kek, kek*" call is a rapid series of six or more notes at the same pitch, followed by the last note being lower in pitch. This is long distance call that allows pairs to communicate and also sound an alarm. The pileated's call may be similar to that of the northern flicker, but much deeper and louder.

With a blazing red crest, the pileated woodpecker is an unmistakable bird in Connecticut's forest habitats.

Description

A long neck, long tail, and long bill give the pileated woodpecker a streamlined appearance. The bill is heavy, thick, and chisel-like. The pileated woodpecker uses strong legs and feet to grip the sides of trees, and stiff tail feathers to brace itself.

At first glance, the plumage is solid black, but when wings are raised the white underwing linings become visible. A white stripe extends up both sides of the neck to the bill, and there is a black stripe through the eyes. A white wing patch flashes at the base of the primaries when the bird is in flight. When the bird is at rest, the white patch is small but visible at the base of the primaries on the folded wings. Both males and females have a bright flame-red crest. Females have a black forehead and lack the red mustache mark of the male.

Pileateds are strong fliers with slow, deep wingbeats. They have an undulating flight pattern similar to other woodpeckers but not as pronounced.

Habitat

Look for pileated woodpeckers in mature deciduous and mixed coniferous forests that have a component of large trees. These large, older trees are a habitat requirement. In Connecticut, pileated woodpeckers also may be found in suburban backyards that have mature trees with nearby woodlands. This woodpecker is most common in northwestern and western parts of the state as these areas have extensive tracts of mature forest. A typical home range or territory may be up to 1,000 acres in size.

Large oval or rectangular tree holes are the distinctive sign of this bird's presence in the forest. Newly-excavated holes will have fresh wood chips at the base of the tree. Some holes in live trees show sap bleeds.

Nest cavities are excavated in large tree limbs or standing snag trees, usually in a shaded location and anywhere from 10 to 80 feet off the ground. The same nest cavity may be used in successive years. A typical nest cavity is approximately 8 inches in diameter and up to 30 inches deep, and the entrance hole is usually 3.5 to 5 inches wide. A normal clutch is 3 to 5 white eggs, which are incubated for about 18 days. Young fledge after 26 to 28 days, and may stay with the adults for up to 3 months.

Behavior

Often foraging low to the ground, pileated woodpeckers may be seen at close range as they chisel into fallen logs looking for carpenter ants, which are their favorite food. They also will consume other ants, wood boring beetles and their larvae, termites, budworms, caterpillars, and other insects. Fruits, including berries, acorns, and beechnuts, also may make up part of their diet. Pileateds will occasionally come to backyard feeders for suet.

When chopping on logs, a pileated woodpecker's long neck is reared back giving maximum power to the heavy bill when it strikes. Hammering is forceful and deliberate, enabling the woodpecker to excavate huge, deep holes in trees, both dead and alive. Pileateds will use their long, barbed tongue to probe deep

into crevices and bore tunnels to retrieve food.

Woodpeckers do not have the ability to communicate by singing as songbirds do. Instead, they vocalize with non-musical calls or they drum. Drumming is done to attract a mate and claim a territory. By rapidly pecking on a resonant object, such as a hollow tree limb, woodpeckers create a pattern of sound. Patterns vary by species and may have differences in tempo, rhythm, and length. Drumming is most commonly heard in spring when birds are trying to attract mates and establish territories.

In pileated woodpeckers, drumming is a rapid, rolling, and powerful burst of pecking that accelerates, then trails off at the end. Both sexes will drum, although males drum more frequently and vigorously. Drumming bursts may last for about 3 seconds with 1 or 2 bursts per minute. Bursts may be done up to 7 times in a row.

A fledgling pileated woodpecker peers out of its nest hole. The red moustache is a field mark that indicates this bird is a male.

Conservation

Pileated woodpecker population dynamics show an unmistakable link to the availability of mature forest habitat. Over the years, this large woodpecker has undergone radical changes in population. Historically, populations declined with the clearing of the great Eastern forests and the advent of agriculture through the late 1800s. As farmland was abandoned and forests regrew into the 1930s, the pileated woodpecker rebounded. In more recent years, as forests have matured, there has been a dramatic increase in populations. North American Breeding Bird Survey (BBS) data indicate an increase of 33% in North America between 1966 and 1993. The rate of increase has slowed since that time. In Connecticut, forest habitat maturation continues at a rate of 2-3% per year.

The biggest conservation concern is the potential for habitat loss and conversion away from mature forest ecosystems. While this may be applicable in other parts of the woodpecker's range, the population is stable or slightly increasing in Connecticut due, in large part, to our extensive forests that continue to provide decaying material.

Other possible concerns include forest fragmentation, monoculture/even-aged forestry practices, removal of downed wood, and, to a smaller extent, deliberate killing and irresponsible use of toxic chemicals. Large standing dead trees and fallen logs are important habitat components for these birds. Forest management practices in Connecticut have standards for leaving a certain number of snags per acre in managed forests. Forest fragmentation and removal of downed wood have implications that may impact moisture balance of the forest floor, resulting in a drier environment and making it less suitable for the food organisms that the woodpecker relies on.

By consuming large amounts of wood-boring pests, pileated woodpeckers provide a beneficial service to the health of our forests. They also provide benefits to a wide range of other wildlife species that use their holes. Old nest and roost holes are used by owls, ducks, bluebirds, bats, squirrels, and fisher, just to name a few. This impressive bird that brings a sense of wildness to our forests is one of Connecticut's great avian residents.

When a pileated woodpecker hammers away at a tree, the wood chips frequently go flying in all directions.

Mapping Populations of 17-Year Periodical Cicadas

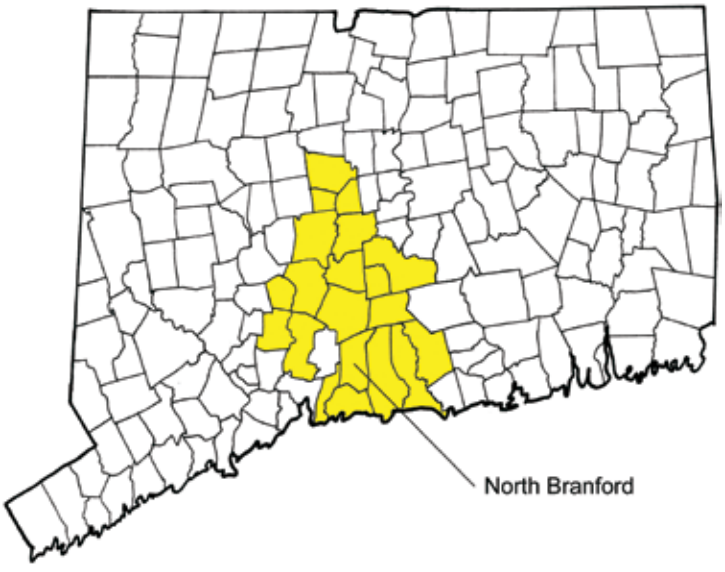
Written by Chris Maier, Connecticut Agricultural Experiment Station

In the eastern United States, the synchronous mass emergence, lengthy life cycle, and large male choruses of 17-year periodical cicadas have intrigued scientists and laypeople for centuries. These unusual insects live underground for most of their life cycle, but every 17 years their nymphs emerge from the soil, climb vegetation, and transform into short-lived adults. The males attract mates by producing sound with special organs, or tymbals, located at the base of the abdomen. Over a few weeks, the adults mate, the females lay eggs in small branches, and then both sexes die. In late July and August, tiny nymphs hatch from the eggs and enter the soil to feed upon xylem fluid in the roots of woody plants. In spring 2013, Connecticut citizens were treated to one of these mass emergences of 17-year periodical cicadas.

P. J. FUSCO

An adult of the 17-year periodical cicada, *Magicada septendecim*. This cicada had a mass emergence in late spring 2013.

Distribution of Periodical Cicadas 2013



Towns (in yellow) in which periodical cicadas emerged in 2013. In all, cicadas appeared in a total of 20 towns, with *Magicicada septendecim* in all and with *M. septendecula* (a newly-discovered population) only in North Branford.

Connecticut has the easternmost populations of brood II of the 17-year periodical cicada, *Magicicada septendecim*. These populations have been surveyed either informally or formally since 1911. In the 1911 survey, W.E. Britton of the Connecticut Agricultural Experiment Station reported cicadas in 25 towns, but he did not verify records or deposit voucher specimens for every positive town.

In 1945, R. G. Cooper, who also worked at the Experiment Station, made maps of the locations of populations; but, he did not formally publish his results. The first formal attempt to map the one species of periodical cicada known from Connecticut was made by Chris Maier (the author) in 1978 and 1979. He deposited voucher specimens for each recorded population at the Connecticut Agricultural Experiment Station in New Haven. Again, in 1996, Maier repeated the effort, finding that cicadas occurred in 22 towns (2 new ones) but that they had disappeared from 5 others where development was prevalent. This last study and, to a lesser extent, the previous ones were used as guides to assist in finding populations in 2013.

During the last few decades, there has been increasing concern that populations of periodical cicadas are declining or disappearing. Indeed, in 1979 when Maier examined 75 sites that had populations in 1945, he found that 5.3% of the populations had disappeared. With declines suspected and disappearances documented, the DEEP Wildlife Division decided it would be valuable to obtain baseline data on the locations of extant populations in 2013 by recording the coordinates where populations occur with hand-held GPS units and by estimating abundance.

Methods

This project formally began with a workshop for survey

volunteers held at the Wildlife Division's Sessions Woods Conservation Education Center in Burlington on May 13, 2013. The workshop was conducted by the author, with assistance from Wildlife Division biologist Laura Saucier. The workshop covered the biology of periodical cicadas and procedures for documenting cicada populations. Maps, a handout of survey procedures, various collecting supplies, and survey routes were distributed at the workshop. Use of a GPS unit was briefly reviewed and the song of *M. septendecim* was played to assist in accurately recording the whereabouts of cicada populations. In all, 16 people attended the workshop; the number of volunteers that eventually contributed one or more records during the survey was 13.

Whenever possible, surveyors collected voucher specimens of nymphal exuviae ("cast skins"), nymphs, or adults to document a positive site where a GPS reading had been taken. Some distributional records were based on the male calling song alone. Abundance was estimated by using four categories: 1) cicadas absent (no nymphal exuviae, adults, or singing); 2) low (scattered or single exuviae or adults, or isolated singing males); (3) moderate (exuviae or adults easily found, or light chorusing); and 4) high (exuviae and adults very common, or loud chorusing). The principal investigator visited most of the sites where cicadas were reported to ensure accuracy of reporting. Voucher specimens of periodical cicadas are deposited in the insect collection in the Department of Entomology at the Connecticut Agricultural Experiment Station, New Haven, Connecticut.

Results and Discussion

Periodical cicadas of brood II were concentrated in central and south-central Connecticut. Populations, especially large ones, were clustered in three or possibly four regions of the state. The largest northern cluster was closely associated with the trap-rock ridge system that ran approximately from Rattlesnake Mountain in Farmington to the Hanging Hills in Meriden and Southington. The largest southern cluster of populations was mostly on the Totoket Mountain and adjacent ridge systems between Durham and Branford. Minor centers with at least two high populations were near the ridge with Sleeping Giant and in an area near the Killingworth-Madison border.

Based on searches of forested areas north of Farmington and along the eastern border of the 2013 emergence, the range of periodical cicadas has decreased from that recorded in 1911 and in 1996. In all, the survey team recorded periodical cicadas in 20 towns, two less than in 1996. Because survey methods differed between 1996 and 2013, it is not possible to determine if the populations are truly gone from North Haven and Cromwell where they were documented in 1996. Populations in these two towns were extremely small in 1996 (a few exuviae; no male singing).

The principal investigator documented cicadas at 154 locations, and the volunteers at 67 sites. Some of the 221 records, however, may be the same or may simply be ones at the edge of the large populations that were recorded. Notably, several large populations that were not recorded in 1996 or earlier were found in Cheshire, Guilford, Hamden, Madison, Meriden, and Wallingford. Finally, the survey team compiled 134 negative records.

Perhaps, the most significant find in 2013 (although not formally a part of this study) was the discovery of a second species of periodical cicada in Connecticut. This species, known as *Magicicada septendecula*, usually is the least common of the three 17-year species and is smaller than *M. septendecim*. The new cicada species was found while the author was servicing traps to capture longhorned beetles near Lake Gaillard in North Branford. At least two chorusing centers of *M. septendecula* occurred on Totoket Mountain on the property of the South Central Connecticut Regional Water Authority. These finds are the northeasternmost ones for this uncommon species. In June, males of this species sang mainly in trees of pignut hickory, *Carya glabra*. This species is currently in the process of being listed as endangered in Connecticut.

C. MAIER, CONNECTICUTT AGRICULTURAL EXPERIMENT STATION

A nymph of the 17-year periodical cicada emerging from the ground.

The principal problems encountered during this survey were the inclement weather (many days with heavy rain) and inconsistency of volunteers in following the survey protocol. The protocol for evaluating population size, in particular, was not strictly followed by several volunteers; but, it is not surprising due to their inexperience. Follow-up visits by the author to many sites recorded by volunteers helped to improve the accuracy of the survey, not only for distributional records, but also for assessments of population size.

Acknowledgments

The DEEP Wildlife Division provided funding for this project. The author greatly appreciates the efforts of the volunteer surveyors: Kate Abbott, Susan Andrle, Laura Rogers-Castro, Paul Fusco, Katherine Herz, Connor Hilbie, Rachael Hyland, Josh Kelly, Cindy King, Andy Kiszewski, Kate Moran, Laura Saucier, and Karen Zyko.

The author also thanks the South Central Connecticut Regional Water Authority, the New Britain Water Company, and many fruitgrowers for allowing access to their property.

Discarded Tires and Mosquitoes:

A Quality of Life and Public Health Perspective

Written by Roger Wolfe, DEEP Wildlife Division

Improperly stored or discarded scrap tires are not only unsightly, but also can be unhealthy when they provide ample habitat for mosquitoes and other pests.

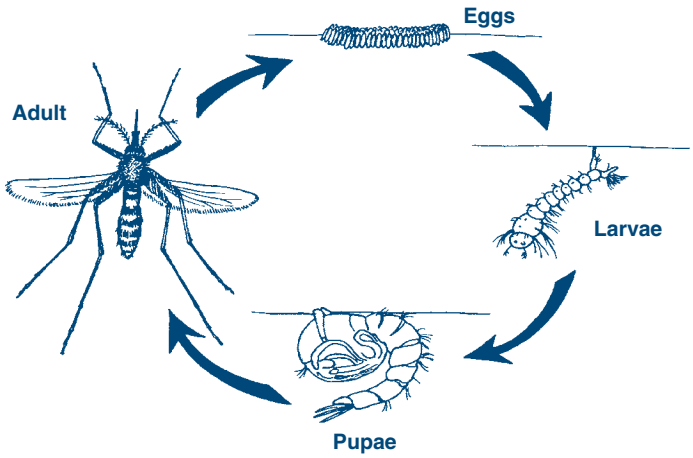
Of the nearly 3,000 species of mosquitoes worldwide, 176 species are known to occur in the United States. Currently, Connecticut has 52 mosquito species; two of these are exotic (non-native) species which allegedly were imported into the United States in shipments of used tires. The good news is that only about half of our mosquito species are of public health importance. However, the sporadic hordes that we encounter or even that one mosquito buzzing in your bedroom at night can affect your quality of life.

P. J. FUSCO

Scrap tires that are not covered and stored properly collect rain water and can produce hordes of mosquitoes.

Mosquitoes have a life cycle known as "complete metamorphosis." That is, they have a distinct egg, larvae, pupae, and adult stage. They can be broadly categorized into two groups: 1) those which lay eggs, either individually or clustered in an "egg raft," that float on a stagnant water surface, and 2) those that lay individual eggs on a moist surface, such as mud and wet leaf litter, or above the waterline in a tree hole or used tire casings. When the eggs of these "floodwater" mosquitoes are flooded by melting snow, heavy rain, or high lunar tides along the coast, they hatch and grow through their aquatic larval and pupal stages before emerging as adults. This process can take as long as a month and a half in early spring or as little as five to seven days during summer.

Mosquito Life Cycle



Mosquitoes can be found in almost any natural and artificial still-water environment. Tire casings readily mimic natural tree cavities, providing an effective incubator for mosquito larvae, free from predators. While both male and female mosquitoes feed on plant nectar for nutrition, only the females feed on us for a blood meal to obtain protein for egg production. A female mosquito that has not had a blood meal can lay about a dozen eggs. However, with a blood meal, that same mosquito can lay up to 250 eggs at one time. Depending on the species, this can occur only once in an adult female's lifetime (called univoltine) or several times per season (called multi-voltine). This latter strategy increases the risk of the mosquito picking up a pathogen and passing it on to a bird, mammal, or other host. Furthermore, some species are particular in their feeding preference (i.e., amphibians or birds), while others are not as selective, feeding on both birds and mammals. This also increases the risk of picking up and transmitting pathogens, such as West Nile virus (WNV) or eastern equine encephalitis (EEE).

Connecticut's two exotic mosquitoes, the Asian bush mosquito (*Ochlerotatus japonicus*) and Asian tiger mosquito (*Aedes albopictus*), were most likely imported into the United States in shipments of tires and quickly expanded their range by means of the used tire trade. Both species are native to Japan, Korea, Taiwan, and parts of Asia. They are aggressive mammal-feeders and have been shown to displace native mosquito species from their natural habitats, including rock pools, tree holes, and artificial containers such as scrap tires. The Asian tiger mosquito

R. WOLFE, DEEP WILDLIFE DIVISIONMOSQUITO MANAGEMENT PROGRAM

Natural cavities, like tree holes, can provide homes for several species of mosquitoes.

M. THOMAS, CONNECTICUTT AGRICULTURAL EXPERIMENT STATION (2)

Asian bush mosquito (*Ochlerotatus japonicus*)

Asian tiger mosquito (*Aedes albopictus*)

was first discovered in the United States in Texas in 1985 and has spread its range throughout the eastern half of the country as far north as Maine. This mosquito is now considered the number one pest species in several states. It also is an effective vector of WNV, malaria, dengue, and dengue hemorrhagic fever. More recently, Chikungunya virus, another debilitating mosquito-borne disease, was discovered for the first time in the western hemisphere in 2013 on St. Martin in the Caribbean and has since spread throughout the region, resulting in over 738,000 human cases of this disease. Several cases of Chikungunya have been documented in Connecticut from travelers returning from the Caribbean, demonstrating how quickly and easily certain vector-borne diseases can spread. In addition, the long-term effects of climate change will likely increase the northward expansion of some of the more southern mosquito species, some being effective vectors of disease.

Improperly stored or discarded scrap tires provide ample habitat for mosquitoes and other pests.

The Connecticut Mosquito Management Program is a multi-agency collaboration of the Department of Energy and Environmental Protection, Connecticut Agricultural Experiment Station, Department of Public Health, Department of Agriculture, and the University of Connecticut. The Program is founded on surveillance and testing of mosquito populations; monitoring of human and veterinary disease cases; educating the public on source reduction of mosquito-breeding habitats and personal protective measures against mosquito bites; focused wetland restoration and management; and judicious use of registered mosquito pesticides. The Connecticut General Statutes (Sections 22a-45b and 19a-213) allow for the elimination or prevention of mosquitoes and natural or man-made mosquito-breeding habitats as is necessary to abate a threat of disease to humans or animals from insect vectors.

In 1999, and again in 2005, a survey was conducted of abandoned tire piles and tire facilities around the state to document the presence and extent of Asian bush and Asian tiger mosquitoes. A number of scrap yards, abandoned tire piles, and collection facilities were found to be producing mosquitoes. Often, the facilities piled uncovered used tires for a period of time before having them hauled to other locations, demonstrating how frequently and easily scrap tires (and the mosquito eggs they may be harboring) can be moved from place to place. Scrap tires should be disposed of promptly and properly through a licensed tire hauler. It is illegal in most states, including Connecticut, to landfill scrap tires or dispose of them improperly. At a minimum, tires should be stored under cover (i.e., roof, awning, trailer, storage container) or stacked and covered with plywood or other flat cover to prevent rainwater from entering (if covered with a tarp, make sure that doesn't collect rainwater as well). If used, for example, on a farm to hold down tarps, only tire sidewalls should be used or the tires should have holes punched or drilled in them to prevent rainwater from accumulating.

Although not readily apparent, discarded tires play a role in public health as a source of mosquitoes, and their importation and interstate movement can have significant impacts on the health, ecology, and economy of our state and country.

More information on mosquitoes and their control:

Connecticut Mosquito Management Program: www.ct.gov/mosquito
American Mosquito Control Association: www.mosquito.org
Northeastern Mosquito Control Association: www.nmca.org
National Centers for Disease Control and Prevention: www.cdc.gov

Atlantic Sturgeon of the Connecticut River?

Written by Tom Savoy, DEEP Marine Fisheries Division, photos by DEEP Marine Fisheries Division staff

Connecticut was once host to at least a couple spawning stocks of the now federally endangered Atlantic sturgeon. Speculation remains as to how many stocks (1, 2, or 3) since it is possible that the Connecticut, Housatonic, and Thames River systems each had their own populations. However, it also was long thought that Atlantic sturgeon native to Connecticut waters were completely gone 100 years ago or more, victims of overfishing, dam construction, and water pollution.

Immature Atlantic sturgeon (size 6 inches fork length) collected in May 2014.

In a previous article in *Connecticut Wildlife* (March/April 2014), we had reported on interesting movements of immature Atlantic sturgeon in Connecticut waters based on collections and acoustic detections of fish with implanted ultrasonic transmitters. Genetic materials from some of the sturgeon collected were analyzed and demonstrated presence of Atlantic sturgeon from several states (NY, MD, DE, VA, and GA) in Connecticut waters as these fish migrate long distances along the Atlantic coast. Other information gathered more recently has led to speculation that maybe a few native Atlantic sturgeon remained.

Telemetry studies confirmed a seasonal presence in Connecticut waters but these fish migrated to warmer waters off the southern United States in fall and winter. More recent information showed that some Atlantic sturgeon lingered longer in our waters than previously thought, so their seasonal presence formerly described as "May through October" needed to accommodate some fish arriving as early as March and some staying until December. Individual fish have been observed returning to Connecticut waters for three, four, and five consecutive years. Researchers have seen sturgeon moving well up the Connecticut River beyond the salt wedge, some moving far up river to the Hartford area and beyond. Telemetry efforts also documented the first known year round presence of Atlantic sturgeon in Connecticut waters with a couple of fish overwintering within the river.

Fall 2014 collection of several immature Atlantic sturgeon.

Some astute television news watchers (or followers of DEEP's Connecticut Fish and Wildlife Facebook page) may remember the report of a six-foot Atlantic sturgeon washing up on a beach along the Connecticut River in Lyme in late April 2014. While the Department could not make any assumptions about the significance of the one fish given that Atlantic sturgeon make extensive travels along the entire East Coast of the United States, the timing and location of the fish were interesting. Wandering juveniles and adult sturgeon do not confirm presence of a spawning stock. Age zero or one-year-old fish need to be found to know that successful spawning has occurred.

And so the mystery unfolded . . . one immature six-inch sturgeon was collected in October 2010. Genetic testing of a tissue clip confirmed that it was an Atlantic sturgeon. While

extremely interesting, the collection of a single, age one fish can raise more questions than provide answers. Was it a native fish? Did someone dump it in the water from somewhere else?

Then, in May and June of 2014, a total of eight small Atlantic sturgeon were collected in the lower Connecticut River while Marine Fisheries Division biologists were conducting studies of the smaller shortnose sturgeon. The shortnose sturgeon is also endangered but it has an increasing spawning stock in the Connecticut River. All of the young Atlantic sturgeon were uniquely tagged with PIT tags (similar to the microchips that people place in their pets) and a piece of fin was clipped for future genetic analysis.

Most of the Atlantic sturgeon were collected as single fish each day the Marine Fisheries Division was out sampling with a skiff trawl; one red letter day produced three. Then one day in late September, 21 of 32 sturgeon collected were small Atlantic sturgeon. Over the next five weeks, 31 additional fish were collected for a total of 62 small, immature Atlantic sturgeon collected in 2014. Four of these small fish were recaptures of fish captured and tagged earlier in the year, documenting survival and growth rates.

A final, necessary step before declaring spawning of Atlantic sturgeon in the Connecticut River is an analysis of the genetic material collected and a determination of whether these fish are genetically different from other known river stocks (i.e., the Hudson River to our west and south, and the Kennebunk system to our north). However, prospects are good that the Connecticut River will be put back on the map of spawning grounds for this endangered species.

An Atlantic sturgeon recovered from a beach in the Connecticut River in March 2014 (size 6.2 feet fork length).

Destructive Southern Pine Beetle Found in Connecticut

The southern pine beetle, a destructive insect native to the Southeastern United States, has been confirmed in Connecticut. This beetle is capable of infesting and killing large stands of pine trees. Connecticut's native white pine (a "soft" pine) is potentially not at risk, but pitch pine and other "hard" pines are. The potential loss of pitch pine to an infestation of southern pine beetle is of grave concern. This native tree was once abundant in our state, but due to development of its preferred habitat (the sand-plain ecosystem), it now remains in scattered patches. Unique and highly-valued pitch pine habitat is critical for rare and endangered species dependent on pine-oak sandy barrens.

The southern pine beetle is not a species of federal regulatory concern, which is different from the emerald ash borer and Asian longhorned beetle. The extensive regulatory restrictions associated with these non-native, invasive insects do not apply to the southern pine beetle. The DEEP Division of Forestry and Connecticut Agricultural Experiment Station (CAES) want to limit the spread and discourage any population increase of this detrimental insect.

Currently, CAES is in the process of ascertaining how widespread this insect is in the state by encouraging any reports of infestation, and through trapping and field surveys. Sensitive habitats, such as extensive stands of pitch pine, will be a high priority for monitoring. As southern pine beetles are found, this information will be shared so that natural resource professionals can be aware of their presence.

The experience of foresters in the Southeastern United States will be of great value in providing guidance relative to forest management for southern pine beetle. Generally speaking, managing a stand for the health of individual trees appears to be the best way to keep this destructive insect in check. Thinning to release pitch pine crowns from competition might best protect stands from outbreak attacks.

Report Suspected Infestations

Infested pine trees attempt to push out attacking beetles with a flow of resin. Attacked trees become covered with small popcorn-like blobs of dried resin. If the attack is successful, beetles lay eggs under the bark and larvae then feed on the circulatory system of the tree, killing it in one to two years.

The CAES is encouraging Connecticut residents to be on the lookout for the popcorn resin on pine trees. Any suspected finds should be reported to the CAES at 203-974-8474 or ctstateentomologist@ct.gov.

More information on the southern pine beetle is available at www.ct.gov/deep/forestry and www.ct.gov/cases.

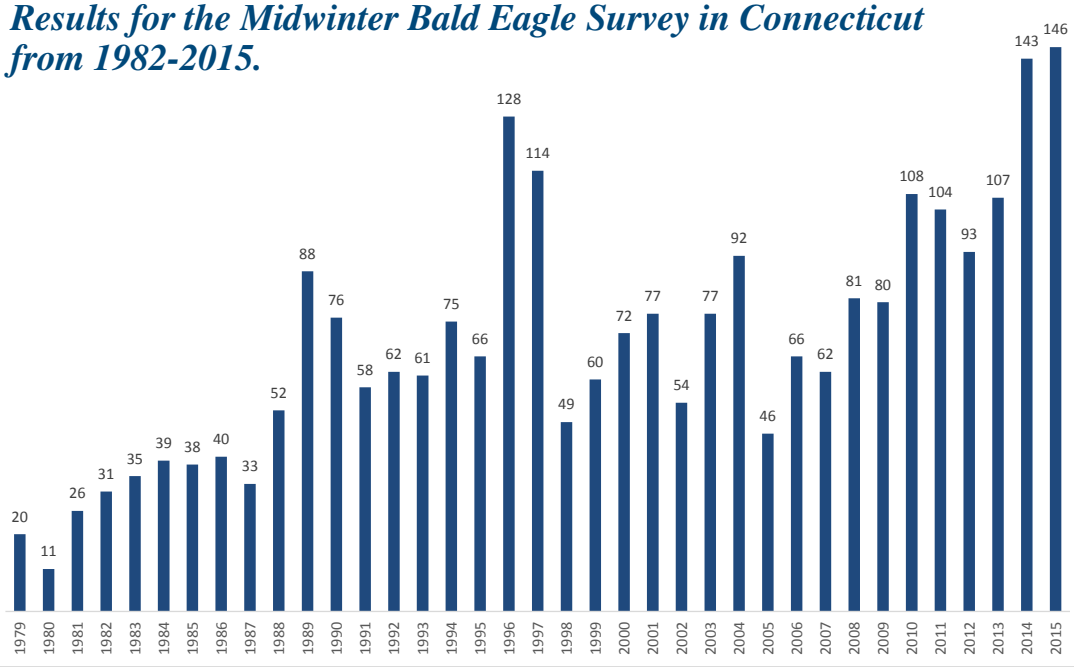
2015 a Banner Year for the Midwinter Bald Eagle Survey

Dozens of volunteer observers headed out into the cold on Saturday, January 10, 2015, to look for eagles during the annual Midwinter Bald Eagle Survey. Vol unteers checked various lake and river locations along standard survey routes to record the number of bald eagles observed during a speci fied period of time.

Temperatures were cold, but the skies were clear and no snow was falling. However, most lakes were almost completely covered with ice. Despite the ice conditions, more eagles were observed in 2015 than in any other Con necticut Midwinter Eagle Survey (surveys began in 1979). A total of 146 eagles were observed, which included 85 adults, 57 immature eagles, and four of unknown age. In 2014, 143 eagles were counted.

The DEEP Wildlife Division would like to thank all of the volunteers who braved the cold to search for eagles during the survey.

Results for the Midwinter Bald Eagle Survey in Connecticut from 1982-2015.



2015 Nesting Season

The adult bald eagles counted in the Midwinter Eagle Survey headed back to their breeding territories in February. While most winter visitors left Connecticut to breed, some stayed behind to nest.

Since 1992, eagles have nested in the state and, as their population continues to rebound, our rivers, lakes, and shorelines host an increasing number of nesting pairs of eagles. Twenty years ago, Connecticut had one active nesting territory. This year, we are monitoring 40 active territories in all corners of the state. DEEP works with a network of volunteers to monitor progress as the birds mate and lay eggs, and then as the eagle chicks hatch and grow.

Mid- to late spring is a particularly sensitive time for bald eagles. Temperatures are warming, but spring weather can be volatile. Increased human traffic can flush the parents, and time away from the nest can be hazardous for developing eggs and eaglets. If you see nesting eagles, observe them from a distance and enjoy watching a great wildlife success story unfold.

Wintering eagles tend to congregate along Connecticut's major rivers in places where the water remains ice-free.

The Wildlife Observer

Do you have an interesting wildlife observation to report?

Please send your story with photos to:

Wildlife Observations, Wildlife Division, P.O. Box 1550, Burlington, CT 06013, or email: deep.ctwildlife@ct.gov

Foxes on the Patio!

Homeowners Fred and Myrna Blum spotted these red foxes on their patio in January. Fred, an avid amateur photographer, grabbed his camera and started taking pictures through the sliding glass door, so as not to scare them off. "While we have had deer, bobcat, and bear in the backyard, this is the first time we have seen anything larger this close to the house. Normally, we see a lot of chipmunks and squirrels right on the patio, but nothing else has ever come right up to the back door!" The pair stuck around for about 10 or 15 minutes. "They looked at us while we looked at them, then they seemed to play a little bit before heading off into the woods behind our house." While generally solitary creatures, it is not unusual for foxes to be seen in pairs during winter. They are common in suburban areas, such as this neighborhood, where they feed on small rodents, squirrels, and amphibians, as well as eggs, fruits, nuts, and garbage.

The Backstory: A Lesson from Above

The snow on the ground is long gone and I am carefully working my way toward the far end of the swamp. I am a wildlife photographer that is hoping to get some photographs of a nesting pair of wood ducks. These particular ducks I know well. I had spent quite a bit of time with them last year watching them raise their young. They are shy and elusive. Give them the slightest hint you are around and they will disappear into the reeds. An hour will go by before they chance a return. So, there I sit, waiting, chastising myself for making a careless move. That's all it took.

The wood duck . . . *Aix sponsa.* Your attention is initially drawn to the spectacular colors of the adult male. Green, blue, orange, black, white, the chestnut breast, and those red eyes. The female, although not as colorful as the male, also has unique markings. The beauty of these birds would be enough, but much more sets them apart from other ducks. My first lesson occurred when I was trying to sneak up on this pair. So proud of myself as I quietly moved through the swamp, convinced they would never see me coming. Something caused me to look up. High above, sitting on the branch of a dead tree, was a male wood duck staring down at the foolish human below.

It turns out that, not only do they perch in trees from time to time, but they also nest in tree cavities about five to 15 feet above the ground. When the eggs hatch, the ducklings jump out of the nest and make their way to water. At this point, the common routine of raising ducklings takes over. The young are virtually on their own and the next stage of their life is a dangerous one. When I first saw the female's brood, there were seven ducklings following her around the swamp. Four weeks later I could only find three. Danger can come from any direction, whether it is an owl swooping down, a fox from the shore, or a snapping turtle from below. The survivors will move on and start their own families. Nature's plan I guess.

The next time you are ambling toward a hidden pond or working the edges of a local swamp, take notice. With a little luck, you might just get the chance to witness an inspiring bit of nature. And don't forget . . . look up in those trees.

Article and photography by J. H. Clery, Wildlife Photographer (Check out his blog at jhclerynaturephotography.wordpress.com)

FROM THE FIELD

Black Bear Research

The Wildlife Division is currently monitoring 35 radio-collared female black bears, with increased emphasis on "suburban bears" that reside in such towns as Bristol, Plainville, Avon, Torrington, and Canton. With the help of radio telemetry equipment, biologists located the winter dens of these collared females from January through early April. The adult females were given an immobilizing drug so that each bear and any yearlings or cubs could be examined and data collected. Most of the collars on the bears are GPS-equipped, meaning that the collars obtain and store thousands of locations where these bears have travelled over the previous year. During this field work, biologists are able to retrieve the collars and download the stored data, as well as replace them with collars that have fresh batteries.

Wildlife Resource Assistant Scott Reinhardt uses telemetry equipment to pinpoint the location of a female black bear outfitted with a radio-transmitting collar.

Data from these den visits help biologists predict the growth of Connecticut's bear population and also determine the expansion of the population. Habitat selection by bears is also being examined.

Northern Long-eared Bat Gets ESA Protection

The U.S. Fish and Wildlife Service (USFWS) is protecting the northern long-eared bat as a threatened species under the federal Endangered Species Act (ESA), primarily due to the threat posed by white-nose syndrome, a fungal disease that has devastated many bat populations.

In the United States, the northern long-eared bat is found from Maine to North Carolina (including Connecticut) on the Atlantic Coast, westward to eastern Oklahoma and north through the Dakotas, reaching into eastern Montana and Wyoming. Throughout the bat's range, states and local stakeholders have been some of the leading partners in both conserving the long-eared bat and addressing the challenge presented by white-nose syndrome.

In making this decision, the USFWS reviewed the best available scientific information on the northern long-eared bat, including information gathered from more than 100,000 public comments. This species is being listed because white-nose syndrome is spreading and decimating its populations. Along with this listing, the USFWS issued an interim special rule that eliminates unnecessary regulatory requirements for landowners, land managers, government agencies, and others in the range of the northern long-eared bat. The rule provides appropriate protection within the area where the disease occurs for the remaining individuals during their most sensitive life stages, but otherwise eliminates unnecessary regulation.

For more information on the final rule listing the northern long-eared bat as threatened, and the interim rule, go to www.fws.gov/midwest/nleb.

P. J. FUSCO (3)

Blue-gray gnatcatcher

International Migratory Bird Day 2015

The theme for International Migratory Bird Day (IMBD) 2015, which was celebrated on May 9, is "Restore Habitat, Restore Birds." Loss and degradation of habitat are primary threats to bird populations. The theme considers threats, such as urbanization and climate change, and suggests ways for people to get involved in habitat restoration projects at home, in communities, and further afield. The IMBD website (www.migratorybirdday.org) contains a variety of resources, such as fact sheets, games, activities, PowerPoint presentations, curriculum, and more.

The 2015 IMBD poster provides a colorful view of a few of the habitats migratory birds seek for nesting, wintering, or as stopover sites during migration. This beautifully illustrated poster can be ordered from the IMBD website for $8.00 a piece (bulk orders are also available).

Conservation Calendar

Late April-August.....Respect fenced and posted shorebird and waterbird nesting areas when visiting the Connecticut coastline. Also, keep dogs and cats off shoreline beaches to avoid disturbing nesting birds.

May 9.....**International Migratory Bird Day** – Celebrate this special day that highlights "Restore Habitat, Restore Birds." See page 22 to learn more.

May 15.....Endangered Species Day, which was initiated by Congress in 2006, is an opportunity for people of all ages to learn about the importance of protecting endangered species and the everyday actions they can take to protect our nation's disappearing wildlife and last remaining open spaces. Learn more at www.endangeredspecies.org.

Programs at the Sessions Woods Conservation Education Center

Programs are a cooperative venture between the Wildlife Division and the Friends of Sessions Woods. Please pre-register by emailing laura.rogers-castro@ct.gov or calling 860-424-3011 (Mon.-Fri., 8:30 AM-4:30 PM). Programs are free unless noted. An adult must accompany children under 12 years old. No pets allowed! Sessions Woods is located at 341 Milford St. (Route 69) in Burlington.

May 23.....**Open Center Day**, from 9:00 AM-3:00 PM. The Sessions Woods Conservation Education Center will be open as part of the No Child Left Inside "Open Center Day." There will be a full day of outdoor activities for families and other participants. Check the DEEP website (www.ct.gov/deep/wildlife) or the Connecticut Fish and Wildlife Facebook page (www.Facebook.com/CTFishandWildlife) for a full list of activities.

June 6.....**Trails Day Hikes:** Since 1993, the first Saturday of every June has been designated "National Trails Day." Sessions Woods will host two hikes designed for participants to learn about the unique habitats at this wildlife management area. The first hike is a 5.5-mile excursion that begins at 9:00 AM and is being led by Jan Gatzura and Jeff O'Donnell. The second hike, beginning at 1:30 PM, is 3 miles roundtrip and will be led by Karen Geitz and Wildlife Division biologist Peter Picone. Meet the hike leaders in front of the Education Center. Bring water, a snack, and wear proper walking shoes.

July 18 .....**Butterfly Walk**, starting at 1:30 PM. Wildlife Division Natural Resource Educator Laura Rogers-Castro will provide participants with a lesson on the basics of butterfly identification, including tips on distinguishing the various butterfly families. Following a brief indoor program, Laura will guide the group on a walk to identify the local butterfly fauna at Sessions Woods. Meet in the classroom located in the exhibit room of the Education Center.

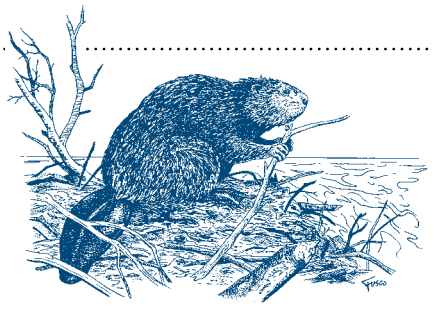
Hunting & Fishing Season Dates

April 29-May 30 ..... Spring Turkey Hunting Season

Jun. 21 & Aug. 15....**Free Fishing License Days:** Anyone can fish for free provided they have obtained a one-day free fishing license. These licenses will be available approximately three weeks prior to each date through the DEEP's convenient online licensing system (www.ct.gov/deep/sportsmenlicensing) – now mobile friendly!

Consult the 2015 Connecticut Hunting & Trapping Guide and 2015 Angler's Guide for specific season dates and details. Printed guides can be found at DEEP facilities, town halls, bait and tackle shops, and outdoor equipment stores. Guides also are available on the DEEP website (www.ct.gov/deep/hunting and www.ct.gov/deep/fishing). Go to www.ct.gov/deep/sportsmenlicensing to purchase Connecticut hunting, trapping, and fishing licenses, as well as required deer, turkey, and migratory bird permits and stamps. The system accepts payment by VISA or MasterCard.

Find us on Facebook **www.facebook.com/CTFishandWildlife**



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P. J. FUSCO

Pileated woodpeckers will often search for food in downed logs within the forest. They will chip away at the log to find carpenter ants, wood boring beetles, and other invertebrates.