September/October 2015

Connecticut Wildlife

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

From the Director's Desk

On Friday, September 11, 2015, I joined U.S. Department of the Interior Secretary Sally Jewell, U.S. Fish and Wildlife Service Director Dan Ashe, Natural Resources Conservation Service Chief Jason Weller, and U.S. Senator Jeanne Shaheen of New Hampshire in announcing that, due to the remarkable achievements to restore the abundance of New England cottontails within their native range, the species does not warrant listing under the Federal Endangered Species Act. This is wonderful news for Connecticut's only native rabbit.

The news has been over 10 years in the making. Soon after the turn of the millennium, the Connecticut DEEP Wildlife Division and the fish and wildlife agencies from surrounding states turned their attention to the plight of the cottontail. By 2005, the New England cottontail was listed as a priority species in the Wildlife Action Plan of every state within the species' range; more than a year before the species became a candidate for federal protection. With the singular goal of "keeping common species common," Wildlife Action Plans, supported by State and Tribal Wildlife Grants, are the nation's primary means of conserving the more than 12,000 at risk species, including the New England cottontail. Coupled with funding from both the Natural Resources Conservation Service's Working Lands for Wildlife Program and the National Fish and Wildlife Foundation, implementation of a comprehensive, proactive strategy was possible.

Six states have been joined by two federal agencies, several non-governmental organizations, a collection of academic institutions, two zoos, and several private landowners to form the New England Cottontail Conservation Initiative with governance and technical support structures that will continue beyond the listing decision. Through this collaborative structure and sharing of resources, the successes we have enjoyed with New England cottontails are sure to continue. Even more exciting is that this is a proven model that is sure to serve as a foundation for future collaborations to advance the conservation of other species, like wood turtles, golden-winged warblers, and the American woodcock. This is an exciting time for regional conservation and we are just getting started.

Rick Jacobson, DEEP Wildlife Division Director

Read more about the New England cottontail decision starting on page 10.

Cover:

This New England cottontail rabbit is ready to be released at a site that contains appropriate habitat (young forest). Biologists will monitor the rabbit through the use of radio telemetry.

Photo by Paul J. Fusco

Connecticut Wildlife

Published bimonthly by

Connecticut Department of Energy and Environmental Protection
Bureau of Natural Resources
Wildlife Division
www.ct.gov/deep

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Connecticut Wildlife magazine (ISSN 1087-7525) is published bimonthly by the Connecticut Department of Energy & Environmental Protection Wildlife Division. Send all subscription orders and address changes to *Connecticut Wildlife*, Sessions Woods WMA, P.O. Box 1550, Burlington, CT 06013. Subscription rates are $8 for one year, $15 for two years, and $20 for three years. No refunds. Periodical postage paid at Bristol, CT. Postmaster: Please send all address changes to *Connecticut Wildlife*, P.O. Box 1550, Burlington, CT 06013.

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E-mail: deep.ctwildlife@ct.gov Phone: 860-424-3011

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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Using CritterCam to Learn About Snapping Turtles

Written by Brian Hess, DEEP Wildlife Division

Though they often do not get the attention they deserve, common snapping turtles are an important part of the aquatic ecosystem. Most eggs and hatchlings serve as food for birds, mammals, fish, frogs, and snakes. Those few that survive to adulthood grow into important herbivores, predators, and scavengers. DEEP, along with Mystic Aquarium, Arcadia University, and National Geographic Society, are undertaking research to learn more about snapping turtles and their environment.

CritterCam

Snapping turtles are one of the most commonly seen reptiles in Connecticut. They are often seen when they are on or close to land. They may be crossing a road, moving between water bodies, laying eggs, or sitting just below the water surface on the edge of a pond.

What do snapping turtles do when we are not watching? Answering this question means silently and secretly following a turtle for hours and hours, somehow eluding its attention. This task is practically impossible for any human tracker, but thanks to a clever electronic device called CritterCam, researchers from Arcadia University, Mystic Aquarium, National Geographic Society, and DEEP are able to ride along on a turtle's back and see what it sees.

CritterCam is a small pack of sensors that records audio, video, depth, and temperature. The technology was developed by Greg Marshall and National Geographic's Remote Imaging Team, including Chris Luginbuhl. The team has created many different models of the CritterCam and applied them to over 50 species, including sharks, whales, turtles, seals, and penguins over the past 25 years. Smaller and lighter cameras and batteries have enabled application to terrestrial animals, including lions, hyenas, grizzly bears, and domestic cats (KittyCam). Aquatic models of CritterCam record data for a period of time defined by battery life or data storage, then detach from the animal and float to the surface where a radio signal guides a retrieval team.

P. RAYCRAFT, HARTFORD COURANT (2)

Dr. Tobias Landberg of Arcadia University prepares to release an adult snapping turtle equipped with a CritterCam into Mill Brook in Old Lyme.

The footage taken by the CritterCams on Connecticut snapping turtles is being analyzed by a team led by Dr. Tobias Landberg of Arcadia University. He is interested in answering questions about how underwater behavior affects how often snapping turtles breathe, how long they stay at the surface, how long they dive, and how they interact with other animals.

Contaminant Testing

In addition to finding out about the secret lives of snapping turtles, researchers are trying to figure out how the turtles can alert us to the presence of pollution and contamination in the environment. Snapping turtles are more tolerant of human disturbance and environmental contamination than many other aquatic species. Because they are long-lived omnivores, snapping turtles may consume and accumulate a large amount of contamination throughout their lives. Researchers Dr. Tracy Romano and Dr. Allison Tuttle, along with their veterinary team from Mystic Aquarium, are collecting toenail and blood samples, which will be tested for heavy metal contamination by DEEP and the Mystic Aquarium.

Researchers hope that snapping turtles can be a sentinel species, alerting wildlife biologists to contaminants that may threaten humans or other members of the aquatic ecosystem. In the future, biologists hope to expand the sampling to include the entire state and the testing to include polychlorinated byphenyl (PCB) and organochlorine contaminants.

CritterCam allows researchers and biologists to monitor the underwater behavior of snapping turtles to aid in conservation efforts. The camera is programmed to detach when the battery or data storage space have been exhausted and float to the surface where a radio signal guides a retrieval team.

Monarchs in the News

Written by Laura Saucier, DEEP Wildlife Division

The monarch butterfly is one of the most recognizable insects in North America. This handsome orange, white, and black butterfly migrates to warmer climates to spend the winter. Monarchs are a marvel to scientists and nature lovers alike because they know which direction to migrate even though those particular individuals have never made the journey before. They seem to follow a hardwired internal "compass" that guides them in the correct direction each spring and fall. The monarch migration is considered to be one of the greatest natural phenomena in the world.

The monarch butterfly is one of the most recognizable insects in North America. Its migration is considered to be one of the greatest natural phenomena in the world.

Monarchs that breed east of the Rocky Mountains over-winter in the mountains of central Mexico while monarchs that breed west of the Rockies migrate to the forests of coastal California where temperatures may get cool but do not reach freezing. For our eastern population, monarchs begin to make the journey north from Mexico in early spring. Soon after leaving Mexico, pairs of monarchs will mate. As they reach the southern United States, females look for milkweed plants where they can deposit their eggs. After hatching, the caterpillars will eat the milkweed plant where they hatched and grow very quickly over a short period of time. When large enough, each caterpillar will transform (known as metamorphosis) into a butterfly. These adult monarchs will continue the journey north that was left unfinished by their parents. Most monarchs only live a few weeks. Each year, it takes from three to five generations to complete the migration north. It is only the last generation, born in late summer, that delays breeding and migrates back to Mexico to spend the winter. These butterflies can live up to nine months and breed first thing in the spring. It is their progeny that will start the cycle over again.

Threats to Monarchs

The monarch butterfly has undergone a drastic population decline over a short period of time. Many people, including scientists, are concerned about this once common, widespread species as populations are a fraction of what they once were. Scientists believe that the biggest threats to monarchs are habitat loss, herbicide and pesticide use, and the effects of global climate change. Habitat loss in the winter range is primarily due to logging of trees at over-wintering sites. Habitat loss and degradation due to human development and agricultural practices in the summer range of monarch butterflies are thought to be large contributors to documented population declines.

Preferred breeding habitats of monarchs are fields, meadows, and open and edge habitats where flowers (which provide nectar for adults) and milkweed plants (which provide food for monarch caterpillars) grow. In the northeastern United States, these open habitats are easily built upon and quickly lost to suburban development. This type of development encourages intensive landscaping and manicured lawns, which replace habitats that were once fallow. Monarch caterpillars feed on milkweed species in the wild. These plants are considered to be weeds by some people and are actively removed. Milkweeds and other "weedy" flowering plants are vulnerable to commercially available herbicides when applied indiscriminately by homeowners, landscapers, farmers, and gardeners. Efforts that increase habitat for monarchs – larval and migratory adults – will help bolster declining eastern monarch populations.

In Connecticut, anecdotally, the numbers of monarchs observed at coastal staging sites during migration have dwindled. Numbers of monarchs observed during summer are less than in previous years. While no formal monitoring program exists in Connecticut, information on the monarch's distribution is documented in *The Connecticut Butterfly Atlas (1994-1999)*, records of the Connecticut Butterfly Association, Fourth of July butterfly surveys, monarch tagging stations, and a rich history of accomplished lepidopterists, academics, and hobbyist collections and checklists. These past efforts indicate that the majority of towns in Connecticut have records of monarchs, therefore this species was previously considered secure and common.

What You Can Do

While it is difficult to address large-scale problems, such as the effects of global climate change and suburban development, you can initiate efforts on your property to improve

Monarch butterflies feed on nectar from many flowers, including Joe pye weed (above), during breeding and migrating seasons. Monarch caterpillars, however, depend on milkweed. You can help monarch butterflies by planting milkweed and other native wildflowers in your yard or garden.

habitat for monarchs.

- Plant native milkweed species to provide food for monarch caterpillars.
- Plant a variety of native wildflowers that bloom from May to October to provide nectar for adults.
- Eliminate or minimize herbicide and pesticide applications around flowers. While it may not always be possible to completely eliminate pesticides from your yard, you can reduce impacts on monarchs and other insects with a few simple steps. Chemicals should not be applied when these insects are active – most insects rest during the night. Similarly, pesticides should be applied to the parts of the plant without flowers so that insects are not exposed to chemicals while visiting the flowers.
- Naturalize your yard by minimizing mowing and allowing areas to become fallow.

Learn more about monarch butterflies and how you can help by checking out the following websites:

- DEEP Wildlife Division (www.ct.gov/deep/pollinators)
- Monarch Joint Venture (www.monarchjointventure.org)
- U.S. Fish and Wildlife Service (www.fws.gov/savethemonarch)
- National Wildlife Federation (www.nwf.org)
- Connecticut Butterfly Association (www.ctbutterfly.org)
- North American Butterfly Association (www.naba.org)
- The Xerces Society (www.xerces.org)

Monarchs and Milkweed

The monarch butterfly is one of North America's most iconic insects due to its large size, brilliant coloration, and its long migratory journey each year. The monarch's wintering population, however, was at its lowest recorded levels in history during 2014 and 2015. Experts estimate that the eastern population of monarchs has diminished by 90% over the past 20 years and is still declining. One of the main reasons behind its decline is deforestation and loss of the butterfly's host plant, milkweed. Monarchs depend on milkweed for their survival. They deposit their eggs on milkweed plants which provide nutrition for the caterpillar phase of the butterfly's life cycle. Milkweed contains toxins called cardiac glycosides that make the plant unpalatable to most insects. Monarch caterpillars and some other insects have evolved the ability to assimilate milkweed toxins. As the caterpillars, and subsequently the butterflies, consume the plant, they become toxic and distasteful to potential predators.

You can help the monarch population by planting milkweed in your yard or garden! Monarchs depend on many different species of milkweed that come in a variety of colors. Species that are native to the northeastern United States include common milkweed, swamp milkweed, butterfly weed, whorled milkweed, and poke milkweed. These native plants are easy to grow. Milkweed prefers full sun, is drought resistant, and does not need fertilizers. Some plants may not be labeled as milkweed in a nursery but you can check the scientific name for the genus *Asclepias*. Planting milkweed is a great way to help other pollinators too, as the plant provides nectar resources to many bees and butterflies.

Plant milkweed to support monarch populations and their incredible migration!

Do Not Call Me a "Dace"

Written by Mike Beauchene, DEEP Inland Fisheries Division

Have you ever experienced the thrill of the strike and fight only to find a large silvery-looking fish at the end of the line and wondered, "What did I catch?" You are not alone. Many anglers have sworn that they have a nice trout on the line only to be puzzled by a large silver fish (up to 12 inches or more) looking back at them instead.

So, what Connecticut freshwater fish is bright silver; eagerly strikes at almost everything, including a dry fly, worm, or small lure; provides a sporting fight; and confuses anglers with its identity? If you guessed "dace," you are not alone but technically incorrect (unless you are fishing in Europe).

The description above matches the fallfish (*Semotilus corporalis*), which has common names of chub, corporal, whitefish, or, most commonly, dace. In Europe, the name "dace" refers to several different large (10- to 20-inch) silver-bodied minnows. One, the "common dace" (*Leuciscus leuciscus*), is strikingly similar to our fallfish, so it is easy to understand how the first Old World anglers fishing the waters of northeastern North America found a familiar-looking fish, the "dace," in their creel.

M. BEAUCHENE, INLAND FISHERIES (2)

Places to "fallfish" – Just about every medium to large river has catchable size fallfish. Some of the best waters include the Farmington River (Farmington to Tarriffville), Housatonic River (Cornwall to Kent), Willimantic River (Stafford Springs to Windham), Little River (Canterbury), Shetucket River (Windham to Sprague), Yantic River (Bozrah), Coginchaug River (Middlefield), West River (Guilford), and Eightmile River (Lyme).

About the Fallfish

The fallfish is our largest native minnow (family Cyprinidae). Fallfish commonly reach a catchable size of 10-12 inches, with some very large fish exceeding 16 inches. The state record was caught in 2012 by Chad Tessman and weighed in at 2.25 pounds (Farmington River in Simsbury). Small fallfish (those less than 2-4 inches) are easily confused with similar looking silver-bodied minnows, including the common shiner (*Luxilus cornutus*), creek chub (*Semotilus atromaculatus*), and spottail shiner (*Notropis hudsonius*).

The native range of the fallfish is from northeastern Canada south to about Virginia. In Connecticut, the fallfish can be found statewide in many of our

R. JACOBS, INLAND FISHERIES

Capable of reaching 10-12 inches in length, adult fallfish should garner more attention from anglers. They take strike at a variety of offerings, provide a decent fight, and are tasty table fare.

M. BEAUCHENE, INLAND FISHERIES

Fallfish nests are built by the male which carries each piece of gravel by its mouth. These nests can be quite impressive, with a two to three foot circumference at the base and a height of 15 inches or more. Each male will defend his nest from other male fallfish.

M. BEAUCHENE, INLAND FISHERIES

medium to large streams and rivers that are characterized by having a rocky bottom and a mixture of riffles and pools.

The presence of plenty of small gravel is important as each spring the male fallfish will carry stones, one by one, in its mouth to build a cone-shaped nest. The male also develops deep shades of purple around the head and belly, the fins become bright red-orange, and small pointy knobs (tubercles) develop on the head, giving the fish a battle-ready appearance. If his nest architecture and body coloration are attractive, a female will join him, and together they release eggs and milt (sperm) upstream of the nest. The fertilized eggs drift safely downstream into the nest, safe from hungry fishes.

Fallfish feed on mayflies, stoneflies, and caddisflies, and will take other natural baits like worms, crayfish, and small minnows, as well as a variety of artificial offerings. Some flyfishers appreciate the willingness of fallfish to take dryflies as this provides plenty of opportunity to hone casting and hook setting skills. Fallfish also provide plenty of great action on ultralight tackle throughout summer when trout are hard to come by.

In his 1881 publication *The Practical Fisherman: Dealing with the Natural History, the Legendary Lore, the Capture of British Freshwater Fish, and Tackle and Tackle Making*, J.H. Keene offers a glimpse into the favorable qualities of the dace, "*…whatever the origin of its name, it is a miniature salmon in symmetry and sporting power.*"

R. JACOBS, INLAND FISHERIES (2)

So then, what are dace? In North America, dace means several species of small minnows (adults average 3-5 inches) that belong to the genus *Phoxinus* or *Rhinichthys*. In Connecticut, there are two species of dace, the longnose (left; *Rhinichthys cataractae*) and blacknose (right; *Rhinichthys atratulus*). Both have streamlined bodies, are brown to dark brown with a light colored belly, and are common and abundant in almost every brook, stream, and river.

Fallfish are described to be as tasty, if not more so, than trout. The meat is firm, white, and slightly sweet. The only complaint is the presence of many fine rib bones, but this is overcome if the fish is deep fried (the fine bones melt away). Many people have brought home fallfish, assuming they were trout, and have had a delicious meal.

I once had the pleasure to interview an angler on the Housatonic River in Kent who thanked me for such great fishing. He had made many trips to his favorite fishing hole and, that day like always, his creel was full of large fallfish. "Tastiest fish in the river," he boasted. "And fights great!"

Fallfish, like their close relative the common carp, seem to get little respect from the angling community as a whole, despite the fact that they are readily available and offer great sport. With prime trout fishing a few months away, how about hitting the streams again, this time in search of a silver beauty? But do not call it a "dace."

The fallfish can be found in many of Connecticut's medium to large streams and rivers that have rocky bottoms and a mixture of riffles and pools.

2015 Update to Connecticut's Endangered, Threatened and Special Concern Species List

Written by Karen Zyko, DEEP Wildlife Division

The Department of Energy & Environmental Protection (DEEP) is required to review, at least every five years, the designation of native species as endangered, threatened, or of special concern. DEEP is grateful for the time and expertise provided by the Taxonomic Advisory Committee members who reviewed and provided data on over 600 species of plants, mammals, amphibians, reptiles, birds, fish, insects, and other invertebrates. After evaluating population trends and threats, a number of changes have been adopted. The updated list and a summary of the changes can be found on the DEEP website at www.ct.gov/deep/endangeredspecies.

A major change of note is the addition of three endangered bat species (little brown, tri-color, and northern long-eared bats) that have suffered dramatic population declines due to the spread of white-nose syndrome.

Two lesser known plant species, the American reed (*Phragmites americanus*) and American bittersweet (*Celastrus scandens*), were added as species of special concern. Unlike their more common non-native counterparts, American reed and American bittersweet do not grow or spread aggressively. These species are actually threatened by competition and hybridization with their invasive relatives.

The northern dia-

P. J. FUSCO (2)

Several cave bat species, such as this northern long-eared bat, were added to Connecticut's Threatened and Endangered Species List due to the devastating impacts of white-nose syndrome.

Unfortunately, the spotted turtle, as well as many other North American turtles, face conservation challenges, such as habitat loss, disease, illegal collection, and road mortality.

mondback terrapin (*Malaclemys terrapin terrapin*) and spotted turtle (*Clemmys guttata*) were added as species of special concern. These two turtle species are threatened by the fragmentation and loss of suitable wetland habitats, collection for the pet trade, disease, and road mortality. Because both species are slow to reach sexual maturity (7 to 10 years) and can live for decades, the loss of mature adults can have a dramatic effect on populations and cripple recovery efforts. You can help these species by leaving turtles in the wild – a captive turtle is as good as dead to a wild population. Another way to help is to assist turtles crossing a road by moving them to the side in the direction they were heading (ONLY if it is safe for you to do so).

Two damselfly and one dragonfly species were added to the list. The pine barrens bluet (*Enallagma recurvatum*), which was added as a threatened species, is a damselfly that is restricted to coastal plain ponds and is only found in one location in Connecticut. The attenuated bluet (*Enallagma daeckii*), which was added as a species of special concern, is a damselfly that uses highly vegetated lakes and ponds and has been documented at only one location in Connecticut. The coppery emerald (*Somatochlora georgiana*), which was added as a threatened species, uses low-gradient streams, but little is known about the biology of this species.

The little 17-year periodical cicada (*Magicicada septendecula*) was documented for the first time in Connecticut in 2013. The species was discovered while research was being conducted on the emergence of *Magicicada septendecim*, Connecticut's other 17-year periodical cicada species. Given that the little 17-year periodical cicada was only found in one location within an uncommon habitat community, it was added to the list with a status of endangered. This Connecticut location is now the most northeastern location in this species' range. The little 17-year periodical cicada will not emerge again until 2030!

The Northern goshawk, which was added as a threatened species, was assessed to have a rapidly declining population since it was last inventoried by the Connecticut Breeding Bird Atlas in the mid-1980s. Especially startling was the absence of goshawks from the northwest corner of Connecticut, where they had previously been more numerous. The Wildlife Division is requesting assistance from birders and citizen scientists to help locate and protect goshawks that occur in our state. Nesting goshawks can be extremely territorial, so be sure to observe these birds and their nests from a healthy distance for your own safety, and to allow nesting birds to continue to successfully raise their young in our forests.

Residents are encouraged to report observations of any state-listed species by going to www.ct.gov/deep/endangered-species (look for the Contributing Data link) or email deep.nddbrequest@ct.gov.

Atlantic Coast Leopard Frog Monitoring

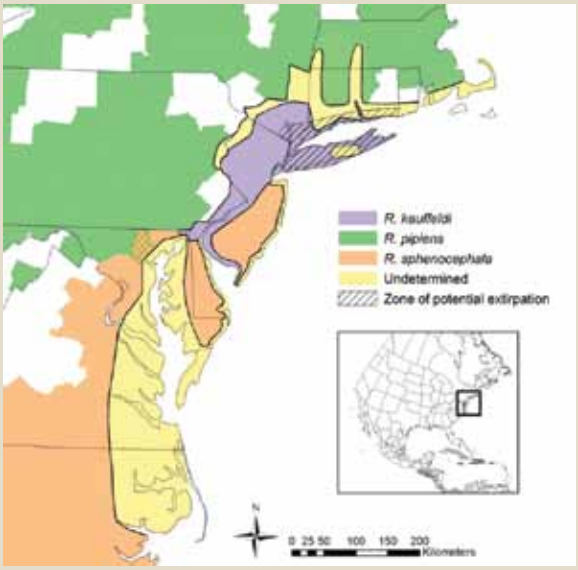
The Atlantic Coast leopard frog has always been a part of Connecticut's amphibian community. Herpetologists have long noticed that some leopard frogs along the East Coast sounded and looked just a bit different than others. Some suspected the odd-sounding frogs were a different species; however, the differences were generally regarded as normal variation in a wild population.

A recent study examining leopard frog DNA and bioacoustics has revealed that the odd-sounding leopard frogs are a unique and distinct species. As a response, DEEP is participating in a regional project to build baseline knowledge about this newly characterized species. This past spring 15 volunteers recorded five and a half hours of frog calls for analysis by DEEP biologists. The audio files recorded very few new leopard frog calls, but did provide valuable information about where the frogs were not found, along with information about the intensity and timing of choruses of other frogs.

In addition to audio recordings, biologists continue to collect genetic samples for continued testing. The regional project's goal is to determine the range and conservation status of the new frog so that it can continue to be a member of Connecticut's amphibian community.

P. J. FUSCO

Atlantic Coast Leopard Frog Range Map



MAP COURTESY FEINBERG JA, NEWMAN CE, WATKINS-COLWELL GJ, SCHLESINGER MD, ZARATE B

Volunteers recorded audio of frog calls in the "undetermined" portion of Connecticut to learn more about the range and conservation status of the Atlantic Coast leopard frog.

The Wildlife Division would like to thank the 15 volunteers who assisted with Atlantic Coast leopard frog data collection and monitoring during the 2015 field season.

New England Cottontail No Longer Under Consideration for Federal Endangered Species Listing

P. J. FUSCO

Wildlife Division Director Rick Jacobson (right) and Research Contractor Travis Goode evaluating a New England cottontail release site.

On September 11, 2015, U.S. Secretary of the Interior Sally Jewell announced that a public-private partnership that united foresters, farmers, birdwatchers, biologists, hunters, and other conservationists has saved the New England cottontail from needing protection under the federal Endangered Species Act. The partnership has also initiated conservation efforts for the cottontail that will benefit the rabbit into the future.

Jewell was joined by U.S. Senator Jeanne Shaheen of New Hampshire, U.S. Fish and Wildlife Service Director Dan Ashe, U.S. Department of Agriculture Natural Resources Conservation Service Chief Jason Weller, staff from the Connecticut DEEP Wildlife Division and other state wildlife agencies, and many conservation partners at the September event to celebrate the success of the multi-state effort.

Problems for the New England cottontail began in the 1960s when widespread habitat loss greatly impacted its population. The cottontail's range decreased by 86 percent as young forest habitat disappeared due to development and remaining forests matured into older and taller woods that provide little ground-level shelter and food for cottontails. This once-common native species only survives today in five isolated populations across Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Connecticut. Of all of those states, Connecticut contains the largest viable population of New England cottontails.

Unlike the more common and non-native eastern cottontail, the New England cottontail needs young forest habitat and thick cover to survive. This includes brush, shrubs, thickets, and densely growing young trees which are necessary for New England cottontails to find food and hide from potential predators. In the past, natural factors created plenty of young forest habitat. However, today, early successional forest habitat is in short supply because, in part, wildfires are suppressed and not allowed to burn and many people oppose timber harvests.

The New England cottontail was classified as a candidate for federal Endangered Species Act protection beginning in 2006. In 2008, state and federal biologists began a coordinated conservation effort that led to the species' recovery. That effort includes the development of a range-wide, science-based conservation strategy that has targeted ambitious but achievable goals.

Great strides have been made in making the strategy a success. Approximately 10,500 New England cottontails now live in a priority area, which brings the recovery effort three-quarters of the way towards the goal of 13,500 cottontails in healthy, young forest landscapes by 2030.

The U.S. Fish and Wildlife Service's decision to keep the New England cottontail off of the endangered species list was based on evaluations of ongoing and future conservation activities. The results showed high certainty that the New England cottontail conservation strategy would be carried out and would effectively recover the species without the need to formally protect it under the federal Endangered Species Act.

Voluntary habitat restoration efforts on private lands played a critical role in increasing and connecting young forest habitat. Over the past three years, the U.S. Department of Agriculture's Natural Resources Conservation Service has worked with owners and managers of private lands to restore over 4,400 acres of habitat by removing trees and invasive species, planting native shrubs, and creating brush piles.

Captive rearing and release of New England cottontails also have been critical to ensuring the rabbit's long-term survival. For the first time in history, 130 New England cottontails were successfully bred and raised in captivity in several locations.

The restoration effort has created and improved young forest habitat that is relied upon by at least 65 other species, including woodcocks, bobcats, snowshoe hares, a broad range of songbirds, box turtles, and frosted elfin butterflies. The initiative has united dozens of partners across the New England cottontail's range, from several state Audubon chapters, farmers, the National Wild Turkey Federation, and Connecticut's Wildlife Division, all seeking to preserve open space, benefit wildlife, and restore balance in New England's forests.

Creating and renewing young forest habitats can be time-consuming, expensive, and controversial, but this needs to be an ongoing task to keep New England cottontail populations healthy and to protect the many wildlife species that need young forests during part or all of their life cycles.

Connecticut's Role

Connecticut has been engaged in all facets of the New England Cottontail Regional Initiative since its inception in 2009. The collaboration between state and federal natural resource agencies, non-governmental organizations, land trusts, and private landowners has set a new standard for wildlife conservation. To date, habitat on approximately 700 acres of public land and 600 acres of private land have been enhanced in patches ranging from six to 100 acres in size. These projects benefit not only the New England cottontail, but also 47 other high priority species that are dependent upon young forest habitat identified in Connecticut's Wildlife Action Plan. Although we are celebrating the success of our efforts to date, work will continue for many years to ensure the long-term stability of the New England cottontail.

New England's only native rabbit, the New England cottontail, faced significant habitat loss over half a century. Its range was reduced by about 86 percent to five smaller populations across New England and eastern New York. A strong partnership of state and federal biologists, private landowners, tribes, foresters, hunters, conservation organizations and others began implementing science-based conservation actions that have halted the decline and allowed the rabbit to rebound. Learn more about New England cottontail conservation at www.fws.gov/northeast/newenglandcottontail/.

P. J. FUSCO (4)

(Above) Equipment used in studying New England cottontail movement patterns. Top to bottom: radio collar, receiver, and ear tag, all used to identify individual rabbits.

(Left) DEEP Wildlife Division Director Rick Jacobson releases a captive-bred New England cottontail as part of a pilot reintroduction study at the Roraback Wildlife Management Area in Harwinton.

A True Long Distance Migrant - The American Golden Plover

Article and photography by Paul Fusco, DEEP Wildlife Division

Five species of plovers can be found in Connecticut – two breed here, and three, the black-bellied, American golden, and semi-palmated plovers, are migrants that pass through. The three migrants are all powerful and long distance flyers that breed in the Arctic tundra region. They travel in flocks making incredibly long journeys, including enduring flights over water. Such is the case with the American golden plover, one of the longest-distance migrants in the Western Hemisphere.

Small numbers of juvenile American golden plovers migrate through parts of Connecticut in late summer and early fall. Look for them in farm fields, short grass fields, and coastal sandbars.

With a length of about 11 inches and a wingspan of 22 inches, the American golden plover is considered a medium-sized shorebird. The long, pointed wings, short tail, and compact body are built for strong and swift flight. Like all plovers, golden plovers have proportionally large eyes and thick necks. Their short, pigeon-like bills are used to capture prey of small invertebrates, including worms, insects, and crustaceans. Migrating plovers are often seen along the shoreline and in short-grass fields exhibiting their distinctive behavior of alternately running, then standing still while searching for food. All plovers nest on the ground and use distraction displays, such as feigning a broken wing and flapping on the ground, to lure predators away from their nests or young.

The American golden plover's nest consists of a shallow scrape that may be lined with lichens. The normal clutch of four cream-colored eggs, with boldly marked dark brown and black splotches, fit together tightly in the nest. Both adults share incubation duties. The eggs hatch after about 26 days and young can fly after 24 days.

On the breeding grounds, in sub-arctic tundra, an adult male American golden plover exhibits spectacular plumage.

Description and Migration

In its breeding plumage of black and spangled gold, the American golden plover is regarded as one of North America's most beautiful birds. This finest plumage is worn by the male during the spring breeding season. Adult American golden plovers are dark overall with a speckling of golden spots on the back and black face, throat, and belly. They have a broad white stripe that extends from above the bill, around the face, and down the sides of the neck.

The American golden plover's vocalizations include a complex series of calls and whistles that are indications of behavior. The typical and often-heard flight call is a loud, short, and whistly *queedle* or *quee-e-a*, or *quee-del*, lower at the end. Vocalizations also include aggression, alarm, and courtship calls.

American golden plovers have an elliptical migration. In spring, their flocks come north from wintering grounds in southern South America moving up the prairie and agricultural areas of the Great Plains before dispersing out to their Arctic tundra breeding grounds

across northern Canada and Alaska. In late summer, they will flock in northern areas to begin their southward journey, which will take them east to the Canadian Maritimes, then remarkably, most will fly out over the open Atlantic Ocean, flying nonstop to the northern coast of South America. That is a distance of over 2,000 miles. Large numbers of American golden plovers are not seen in Connecticut because the state is not part of the regular migration path. Migration may take place by day or night.

By late summer, small numbers of golden plovers make a stop in Connecticut on their fall migration. At this time of year, the adults are showing worn and molting feathers which may look patchy and dull. Juveniles are similar to winter plumaged adults, but have crisp light barring on the underside and distinct yellow edges and spots on the crown, back, and wing feathers. Adults in winter plumage and juveniles transitioning into winter plumage may be present in Connecticut into early November.

Habitats used during migration include upland areas with sparse, low vegetation, such as prairie, pastures, sod farms, and plowed fields. Along the coast they will use tidal flats, sand bars, salt marsh pannes (shallow pools), and beaches.

Conservation

Plovers, along with other shorebirds, have a storied history. Their large migrating flocks were among the favorite targets of sport and market gunners before the turn of the 20th century during a time of unregulated take. Once the great flocks of passenger pigeons disappeared, the market hunters turned to the Eskimo curlew and American golden plover, whose flocks during migration were so numerous they were said to sometimes darken the sky. By the time protective measures were put in place, the once abundant American golden plover was at the edge of extinction. Today its numbers are still recovering, a full century after the shooting was stopped. Because of habitat limitations, they will likely never reach their pre-exploitive numbers. The Eskimo curlew did not fare as well; it never recovered and is now widely thought to be extinct.

Today, the American golden plover faces the threat of habitat loss, primarily along its migration route. The loss of critical stopover habitat is a major concern for all migratory species. Other factors that may impact the golden plover population include climate change, which may alter vegetation growth on the nesting grounds; wind farms along migration paths, which may increase turbine collisions; and pesticide exposure, which may be occurring on the wintering grounds and along migration paths. The birds are still hunted in the Caribbean Islands during their fall migration.

Because of their extremely long migration, American golden plovers are considered somewhat at risk. Their population status is unclear, but generally it is thought to have a decreasing trend. The best estimates put the total population at 150,000 to 200,000 birds. More study is needed to determine certainty in population trends and numbers. Habitat preservation, population monitoring, and educational programs will be of increasing importance into the future.

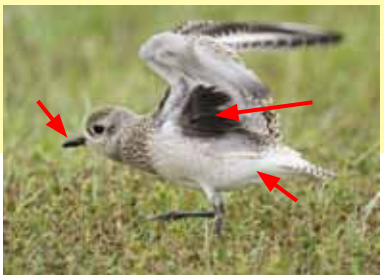
Identification of Juvenile Large Plovers: American Golden vs. Black-bellied Plover

Correctly identifying these two similar large plovers in juvenile plumage can be difficult at times. While the black-bellied has a grayer appearance on average, some juveniles can show some yellowish color on their backs, making plumage color an unreliable field mark by itself.

The black-bellied is slightly larger and has a bigger, heavier bill. The clear, white patch on the lower flank area of the black-bellied plover is diagnostic.

The American golden plover has a higher forehead profile, smaller bill and the lower flank is dusky. The golden plover also has a pronounced white eyebrow stripe.

If possible, look for the color of the axillar (under arm) feathers, which are black on the black-bellied plover and pale on the golden. This field mark can be seen when the bird is flying or when it stretches its wings, and is relevant for adults as well as juveniles.



Black-bellied plover, juvenile

American golden plover, juvenile

American golden plovers as seen in Connecticut during late summer migration. (Top) An adult molting out of breeding plumage compared to (bottom) a juvenile with fresh, crisp plumage. In both birds, note the small, thin bill, high forehead, and distinct white eyebrow stripe.

UConn BioBlitz 2015 Post-Blitz Report

Written by Tim Farkas, Karolina Fucikova, Amanda Caskenette, Laura Cisneros, Rafael Medina, Uzay Sezen, and Elizabeth J. Wade, University of Connecticut

The UConn Storrs campus saw its first ever bioblitz this past July, and it was a resounding success. What is a bioblitz? It is a 24-hour marathon of biodiversity inventory, driven by expert, amateur, and aspiring naturalists alike, that focuses on a given geographical area. For us biophiles, it is about the most fun you can expect to have in the outdoors, and its value for environmental public outreach is unparalleled.

In celebration of the UConn Department of Ecology and Evolutionary Biology's 30th anniversary, and with generous funds from our many invaluable donors, we amassed a horde of 75 regional naturalists with expertise spanning the Tree of Life, and scoured a 15-mi^2 area centered around the Storrs campus for anything wild and alive.

After a coffee-drenched all-nighter in the field and at the microscopes, we identified a whopping 1,181 species of plants, animals, and fungi. The breakdown of diversity by taxon (Figure 1) is largely consistent with past bioblitzes in Connecticut, which have been increasing in popularity over the past 15 years.

Figure 1 shows that species richness totals for most taxa were on par with or greater than the nine previous bioblitzes in Connecticut. Especially notable taxa were fungi and plants (including algae and lichens), each of which just barely fell short of breaking Connecticut bioblitz records. Also exciting were observations of Connecticut listed species of special concern: wood turtle (*Glyptemys insculpta*), bobolink (*Dolichonyx oryzivorus*), savannah sparrow (*Passerculus sandwichensis*), eastern red bat (*Lasiurus cinereus*), hoary bat (*Lasiurus borealis*) and silver-haired bat (*Lasionycteris noctivagans*). We also found a very uncommon lichen species, *Parmeliella triptophylla*, which is an indicator of old-growth forest. Taken together, our findings highlight the conservation

ELIZABETH JOCKUSCH

A wood turtle (*Glyptemys insculpta*), a Connecticut species of special concern, was found near the Fenton River by Hannah Relicki.

KUMSAL D. SEZEN

Expert and amateur entomologists blacklighting for insects in the Fenton Tract under a bright, midnight moon.

value of the greater Storrs area.

Looking closely at Figure 1, however, also shows an alarming under-representation of insects (including other animal invertebrates), the species total for which was two-thirds lower than average. Fishes showed a similar depression in richness. Is the Storrs area bereft of insects and fishes? Almost certainly not.

For both insects and fishes, sampling effort was simply not as high as it needed to be to find most resident species. For insects, properly collecting and identifying species requires specialized expertise with insect subgroups. Experts in flies and wasps were absent from the event, and both groups can easily add hundreds of species each to the insect total. Without electrofishing equipment, and with too few experts in the water, many fish species similarly went unobserved.

But lack of expertise cannot be the whole story, at least not for insects. Dedicated experts for moths and beetles were present; moths and beetles regularly total over 200 species in Connecticut bioblitzes. Nevertheless, species richness totalled 79 for moths and butterflies, and only 18 for beetles. As UConn entomologist Brigette Zacharczenko explains, these low numbers were clearly due to unseasonably cool and moist weather for late July, compounded by a bright moon, both of which hinder the ability of insect traps to attract their targets.

KUMSAL D. SEZEN

(Left to right) Experts Marta Wells, Katherine Urban-Mead, and Julie Henry working on the identification of a puzzling spider as the bioblitz deadline approaches.

In addition to plants, animals, and fungi, this year's bioblitz also saw a survey of bacteria. Most bacterial species are impossible to tell apart by eye, so microbial biologists often resort to genetics. The UConn Microbial Analysis, Resources and Services facility sampled a wetland on the Storrs campus, and revealed over 6,000 species of bacteria and 800 species of Archaea, a lesser-known microbial group. In sampling just one wetland, they obtained a microbial species richness that was almost six times greater than the diversity of all other taxa observed during the bioblitz combined!

Most of the species records (bacteria excluded), along with many photographs, are freely available in the iNaturalist database, where anyone can access them on the internet, and even print off a field guide to the Storrs area (www.inaturalist.org/projects/uconn-bioblitz-2015). iNaturalist isn't just for experts – we encourage readers of *Connecticut Wildlife* to upload pictures of species using the smartphone app and join a worldwide effort to increase knowledge about species occurrence. Don't worry if you do not know the exact species – a community of experts is ready and waiting to identify your specimens!

Although the effort and enthusiasm of the naturalists was truly incredible, the fun did not stop with them. Members of the greater Mansfield community and beyond dropped by to mingle with scientists and participate in organized tours, nature walks, and workshops. Horizon Wings showed off their incredible birds-of-prey, kids built their own microscopes, and we watched ants do some strange things in captivity. Night-time activities proved es-

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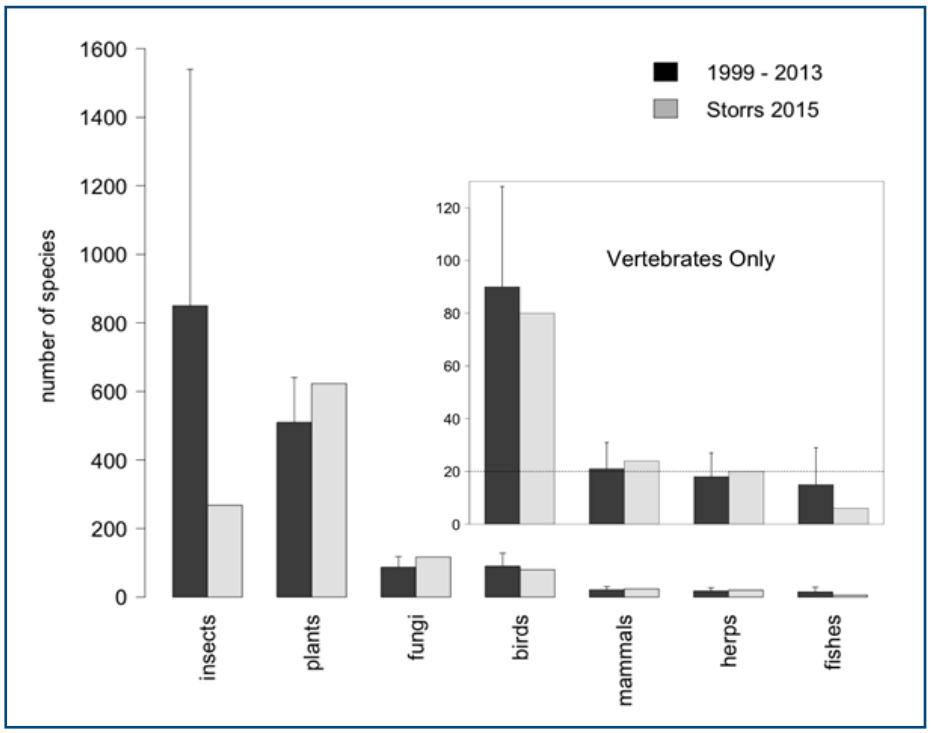
Figure 1. Breakdown of species totals by taxon for the UConn BioBlitz 2015.



Black bars show averages and maxima for nine previous bioblitzes between 1999 and 2013. Grey bars show totals for UConn BioBlitz 2015. Insects include non-insect invertebrate animals, and "herps" includes reptiles and amphibians combined. Inset shows close-up of vertebrate totals, and the dashed horizontal line highlights a count of 20. *Data from: <http://web.uconn.edu/mnh/bioblitz/> , <www.inaturalist.org/projects/uconn-bioblitz-2015>*

UConn BioBlitz

continued from page 15

pecially exciting, including acoustic bat monitoring, blacklighting for nocturnal insects, and a spooky owl prowl.

There was also a new addition to the typical bioblitz we called the Science Exposé. A group of amateur scientists, ages five and up, trekked across campus with nets, field guides, hypotheses, and predictions to compare the diversity of aquatic insects in artificial and natural wetlands on campus to see which had higher water quality.

All in all, the bioblitz offered up a useful survey of summer biodiversity near the UConn Storrs campus, gave the naturalists a perfect opportunity to exercise their skills, and exposed members of the community to the diverse wonders of the natural world. This last point is extra important, especially for local youth, since valuable natural history expertise is on the decline and in need of continued enthusiasm in future generations. We are confident that this bioblitz and similar events help to create a community that cares about the environment and about their neighbors, human or otherwise.

Appreciation is extended to the following donors that made the UConn Bioblitz 2015 possible: UConn's Center for Conservation and Biodiversity, Department of Ecology and Evolutionary Biology, the Joshua's Tract Conservation and Historic Trust, Willimantic River Alliance, UConn Microbial Analysis and Resource Services, UConn Center for Environmental Science and Engineering, Illumina®, Connecticut Museum of Natural History, UConn Dining Services, Randy's Wooster St. Pizza, Willimantic Food Co-op, Baja Café, and Dunkin' Donuts.

DEEP Surveys Capture Migrating Sea Turtles

Written by Penny Howell, DEEP Marine Fisheries Division

This summer marked the first time DEEP Marine Fisheries Division survey crews encountered two species of sea turtle: one the most common and one the most rare. Although sea turtles, dead and alive, have been reported in Long Island Sound for years, a single loggerhead sea turtle had been the only one captured in the semi-annual Sound-wide Trawl Survey. An 18-kilogram (40 lbs.) loggerhead had been caught and released, alive and well, when the Survey was sampling off Hempstead, New York, in the Sound's western Narrows in 1989, just five years after the Survey began. This species is the most abundant of all the marine turtle species in United States' waters although it has remained on the federal threatened species list since 1978.

R. ST. AMAND

A juvenile loggerhead turtle is released after being captured in the Deep River section of the Connecticut River in August.

In August this year, the DEEP Sturgeon Project Team, led by Tom Savoy, captured and released a second loggerhead sea turtle in the Deep River section of the Connecticut River. The lack of rain this summer increased the breadth and reach of the salt wedge in the river, allowing many marine species to venture upriver for new food sources. Although adventurous curiosity may have played a role in the turtle's presence. The captured turtle was the size of an older juvenile; the movements of these young turtles remain a mystery. The time between hatchlings crawling off their spawning beach and when they return to these beaches to reproduce are referred to as "the lost years."

A second surprise came this September when the Trawl Survey crew pulled in a Kemp's ridley sea turtle from waters off Guilford. The young turtle measured 31 centimeters square (1 foot in length and width) and weighed in at 8.3 kilograms (18 lbs.). When released, the sea turtle swam away vigorously.

The Kemp's ridley is the world's most endangered sea turtle, with a worldwide female nesting population estimated at just 1,000 individuals. Although these turtles are found primarily in the Gulf of Mexico, they have been spotted as far north as Nova Scotia. Their demise is attributed primarily to the popular harvest of their eggs during the last century; eggs are still being taken despite legal protection of their nesting beaches. Additional protection of the adults came in recent decades with the development of turtle excluder devices in the nets of most commercial fishing

fleets. Even with these protections, the turtles have not been able to rebuild their numbers. Common causes of mortality in northern waters are cold stunning and damage from boat propellers and boat strikes.

Kemp's ridleys are among the smallest sea turtles, reaching a maximum size of only 65 centimeters (2 feet) in shell length and weighing up to 45 kilograms (100 lbs.). Loggerhead sea turtles are the largest of all hard-shelled turtles (leatherbacks are bigger but have soft shells), which can reach nearly one meter (3 feet) in shell length and weigh more than 454 kilograms (1,000 lbs.), with a massive head and strong jaws. Despite this difference in size, these turtles have much in common. Their natural life span is about 50 years and they do not reproduce until they are about 10 to 12 years of age. Mature females of both species have been known to return thousands of miles to the beach where they were hatched to lay their eggs. Both species feed on crabs and other shellfish, and they both enjoy munching on jellyfish. Unfortunately, sometimes what looks like jellyfish turns out to be plastic bags or balloons, and when these items are eaten by sea turtles, the turtles often end up dying from strangulation or starvation.

DEEP MARINE FISHERIES

A juvenile Kemp's ridley sea turtle rests in a sea water tank aboard the research vessel John Dempsey after capture in Long Island Sound off Guilford in September 2015.

The life strategy of sea turtles exposes them to considerable mortality from egg, to hatchling scrambling across the spawning beach, to adults dodging fishing nets and boat propellers. Summers in Long Island Sound should provide a needed refuge for the loggerhead and Kemp's ridley sea turtles if we all look out for them and keep our waters free of plastic debris.

Sea Turtles that May Be Found in Long Island Sound Waters

Leatherback sea turtle
Most commonly encountered

Loggerhead sea turtle
Rarely documented

Green sea turtle
May be an occasional migrant

Kemp's ridley sea turtle
Most endangered of all sea turtles

If you catch a sea turtle while fishing, call NOAA Fisheries Marine Animal Reporting Hotline at:

866-755-6622

WHILE FISHING, HELP SAVE SEA TURTLES

Recommendations for reducing injuries to turtles caught by hook-and-line gear

REMEMBER - SAFETY FIRST!

While you wait for a response team:

- Keep hands away from the turtle's mouth and flippers.
- Use a net or lift the turtle by the shell to bring it on the pier or land. Do NOT lift by the hook or by pulling on the line. If the turtle is too large to net/lift, try to walk it to shore. When you have control of the sea turtle, use blunt scissors/knife to cut the line, leaving at least two feet of line to aid the responders in dehooking.
- Leave the hook in place as removing it could cause more harm.
- Keep the turtle out of direct sunlight, and cover the shell with a damp towel.

If you cannot reach a response team and are unable to bring the turtle to shore, cut the line as short as possible to release the turtle.

For more information, visit NOAA Fisheries Service at www.nero.noaa.gov/protected/seaturtles/

Credit: Virginia Aquarium

CT Forest Products and Recreation Contribute $3.3 Billion Annually to the State's Economy

A recent study shows that Connecticut's forests are making a major contribution to the state's economy – in addition to providing scenic beauty, habitat for wildlife, protection of resources, and abundant outdoor recreation opportunities for residents and visitors alike.

The study conducted by the North East State Foresters Association concluded that Connecticut's and the greater Northeast's forests contribute $3.3 billion annually to the state's economy, with the annual gross state output of Connecticut's forest products industry accounting for over $2.1 billion of the total and the forest-based recreation economy generating another $1.2 billion a year. The report also calculated that 8,200 workers are employed in the production of forest products, while forest-based recreation supports another 4,600 jobs.

The North East Foresters Association report is a first of its kind for Connecticut and is similar to a series of reports published for Maine, Massachusetts, New York, New Hampshire, Rhode Island, and Vermont. The report analyzes trends for key economic indicators related to forestry, including logging, related trucking, wood products manufacturing, wood furniture, and related products manufacturing, pulp and paper, and wood energy, as well as forest based recreation, including camping, hiking, hunting, skiing, and fall foliage and wildlife viewing. The study concurs with 2010 findings of the value of Connecticut's Agriculture Industry reported by the Connecticut Center for Economic Analysis at the University of Connecticut and a 2011 report commissioned by DEEP on the economic contribution of State Parks and Forests.

With approximately 1.8 million acres of forest land – 73% of which is family-owned – Connecticut grows approximately 96 million cubic feet of timber annually with approximately 13.7 million cubic feet of timber harvested annually. The forest-based economy report highlights forests as a significant contributor to Connecticut's overall economic health, one that is often overshadowed by the traditionally viewed economic giants, such as the defense and insurance sectors.

Among the Report's other findings:

- The net volume of standing trees that are sawtimber size, the most valuable forest product, increased 94% from 1985 to 2013.
- Approximately 14% (13,703,316 cubic feet) of Connecticut's net annual growth is removed (harvested) annually, meaning the State is adding over 82 million cubic feet to its tree inventory each year. Understanding this helps explain Connecticut's mature forest canopy and susceptibility to inclement weather, such as hurricanes and load-bearing snowfalls.
- Secondary wood product sales where logs are transformed into products, such as furniture, cabinetry, and flooring, accounted for an annual economic output of $418 million supported by a $118 million payroll in Connecticut.
- The 2012 U.S. Census Bureau's American Community Survey showed Connecticut experienced a 120% increase from 2005 to 2012 in the number of homes that primarily heat with wood. These 29,000 homes used either firewood or wood pellets.
- 2014 combined wholesale and retail value of Christmas trees and maple syrup sales exceeded $4 million.
- Annual fall foliage viewing is the largest forest-based recreation contributor comprising 25% of the $1.2 billion sales annually for the Connecticut economy.
- Overall economic numbers from 2000 to 2013 trend downward due to the recent recession. With continued economic recovery, some sectors are expected to recover and possibly exceed historical values.

The data and information that form the backbone of this report come from key credible sources, such as the U.S. Departments of Commerce, Agriculture and Interior. These agencies have been collecting these data for decades, which demonstrate the trends that are so important to understanding how the forest-based economy in Connecticut is doing. With the completion of the Connecticut, Massachusetts and Rhode Island reports, key information is available for all of New England and New York, demonstrating the regional aspects how harvested trees and forest products constantly cross state lines in their various forms of value added manufacturing.

The report does not use economic multipliers for the forest products industry, which typically can increase the value of employment and other economic outputs by 1.4 to 1.6 times. Data for the report came from federal, state and private sources. The entire report can be viewed on the DEEP website at www.ct.gov/deep/forestry.

P. J. FUSCO

Fall foliage viewing is the largest forest-based recreation contributor to the Connecticut economy, followed by camping, hiking, wildlife viewing, snowmobiling, and downhill skiing.

A Look Back at the 2014 Deer Hunting Season

Written by Andy Labonte, DEEP Wildlife Division

Annual deer harvest in Connecticut has ranged between 11,000 and 13,000 since 2000, while permit issuance has exceeded 60,000 up until the past five years. Since the Online Sportsmen Licensing System went into effect in 2009, permit issuance has been slowly declining, with this past year's permit issuance numbers (49,523) similar to those in the late 1980s (47,829). Reasons for the decline may be due to increased cost for licenses and permits and the ability to purchase permits at any time. Although permit issuance has declined, harvest numbers have held strong, indicating that plenty of opportunities still exist for Connecticut deer hunters.

Several changes in the deer seasons throughout the years are possibly offsetting the decline in permits. Since crossbows became legal to use in the urban deer management zones (zones 11 and 12) in 2010, the proportion of deer harvested with crossbows in those zones has steadily increased from one percent to 62 percent in 2014. Crossbows became legal statewide for archery hunting in 2013, with 26 percent of bowhunters reportedly harvesting deer with them. This percentage increased to 36 percent in 2014. Crossbows allow a wider variety of hunters (young and old) the opportunity to archery hunt because less physical strength is required to maintain proficiency than traditional archery equipment. Excluding the landowner season, just over half (53%) of the deer taken during the hunting seasons were harvested by a bowhunter. For the past four years (2011, 2012, 2013, and 2014), record bow harvests have been recorded (5,211; 5,413; 6,046; and 5,433 respectively), and for the second consecutive year, the bow harvest exceeded the shotgun/rifle harvest. A complete summary of Connecticut's deer harvest information for 2014 is on the DEEP website at www.ct.gov/deep/hunting (select the link for the 2014 Connecticut Deer Program Summary).

B. EMBACHER, DEER PROGRAM

Over the last 10 years, the deer harvest in most deer management zones has remained relatively stable. However, with increased opportunities and incentives to harvest deer in urban deer management zones 11 and 12, the harvest has more than doubled, while roadkills have been exhibiting a steady downward trend. Increased harvest efforts appear to have stabilized deer populations in many areas of Connecticut.

Deer harvested during CT's regulated hunting seasons, 2013-2014.

Season	Harvest 2013	Harvest 2014	% of Total 2014	% Change of 3-year Average to 2014
Archery				
State Land	722	626	5.5%	-13.3%
Private Land (*includes January*)	5,324	4,807	42.2%	-9.7%
Subtotal	**6,046**	**5,433**	**47.7%**	**-10.1%**
Muzzleloader				
State Land	125	103	0.9%	-17.6%
Private Land	822	667	5.9%	-18.9%
Subtotal	**947**	**770**	**6.8%**	**-18.7%**
Shotgun/Rifle				
State Land A	625	567	5.0%	-9.3%
State Land B	71	76	0.7%	-7.0%
Private Land	3,644	3,461	30.4%	-5.0%
Subtotal	**4,340**	**4,104**	**36.0%**	**-5.4%**
Landowner	1,216	1,087	9.5%	-10.6%
Total	**12,549**	**11,394**	**100.0%**	**-9.2%**

FROM THE FIELD

Silvio O. Conte National Wildlife Refuge Proposed Plan

PHOTO BY P. J. FUSCO

The U.S. Fish and Wildlife Service (USFWS) has released a draft comprehensive plan and environmental impact statement for the Silvio O. Conte National Fish and Wildlife Refuge, the nation's first watershed-based, landscape-scale refuge which conserves more than 36,000 acres throughout the 7.2 million acre Connecticut River watershed in New Hampshire, Vermont, Massachusetts, and Connecticut. The plan, when final, will guide management of the refuge for a period of 15 years. It is available for public review and comment through November 16, 2015. The draft plan can be found at www.fws.gov/refuge/silvio_o_conte/what_we_do/conservation.html. Several informal public informational meetings were held during August and September. In November, four formal public hearings will be held to provide an opportunity for individuals to present oral comments. One of the public hearings will be held at the DEEP Wildlife Division's Sessions Woods Wildlife Management Area on November 12, from 6:00 PM-8:00 PM. Sessions Woods is located at 341 Milford Street (Route 69) in Burlington.

The plan describes four alternatives that have been evaluated for management of the refuge. The USFWS has identified "Alternative C" as the preferred alternative for refuge management. This alternative balances habitat management with public use and access. Actions that would best meet refuge purposes, goals, and a balanced management approach include wildlife and habitat conservation, recreational and public use access, and expanding the refuge boundary.

The Conte Refuge is a national model for conserving wildlife at a landscape scale. It was established in 1991 to protect the diversity of native species of plants, fish, and wildlife and their ecosystems within the Connecticut River watershed. The natural environment of the 7.2 million acre watershed is extremely diverse and expansive. Refuge lands are managed to support wildlife and habitats of conservation concern, such as federal-listed species, migratory birds and fish, and wetlands. The vast natural area also provides for an array of outdoor recreational opportunities for the public.

Hunters for the Hungry 20th Anniversary

On September 5, 2015, Connecticut's Hunters for the Hungry Program celebrated its 20th anniversary. Through the efforts of a group of dedicated sportsmen and representatives from charitable food organizations, a program was developed that allows hunters to donate their legally harvested game to the food organizations. This program has provided a nutritious source of protein to people who seldom have the opportunity to get a good meal. As specified by the law, all donated meat must be legally taken by hunting and must be prepared and packaged with labels indicating license/permit numbers and type of game. To ensure safe handling, most of the charitable organizations prefer that the meat be frozen.

Hikers and Other Outdoor Users: Be Bear Aware

The DEEP Wildlife Division has developed new informative signs that are directed at hikers and other outdoor users who frequent state wildlife management areas, parks, and forests that have regular reports of bear activity. The signs give advice on what you should do during a visit to these areas to alert bears of your presence and what to do if you actually see a bear.

A more general "Be Bear Aware" poster has been available for several years on the DEEP website for towns, businesses, organizations, and others to use to inform people about the "Do's and Don'ts" of black bears encountered near homes and in the outdoors. This poster can be downloaded and printed from the website at www.ct.gov/deep/blackbear.

CT Artists Encouraged to Enter the 2016 Duck Stamp Art Contest

The DEEP Wildlife Division is once again encouraging artists, particularly Connecticut artists, to enter their waterfowl artwork in the annual Migratory Bird Conservation (Duck) Stamp Art Contest. The artwork should depict a waterfowl species (duck or goose) that occurs in Connecticut, and images that include a Connecticut scene or landmark in the background are preferred. The winning entry will be featured on the 2017 Connecticut Migratory Bird Conservation Stamp. The contest is open to all artists (including Junior Duck Stamp artists), regardless of residence, age, or experience. Artwork may be in any full-color medium, including acrylic, oil, colored pencil, and watercolor. Entries will be judged on originality, artistic composition, anatomical accuracy, general rendering, and suitability for reproduction.

Full contest rules, judging criteria, and an official entry certificate are available on the DEEP website at www.ct.gov/deep/ctduckstamp or by calling the DEEP Wildlife Division's Franklin office at 860-418-5952.

The Duck Stamp Program was initiated in the early 1990s when concerned sportsmen worked with the DEEP to develop legislation that would generate revenue for wetland conservation. Funds generated through the program have been responsible for restoring and enhancing over 3,545 acres of critical wetlands. Modeled after the federal Duck Stamp Program, the Connecticut program requires the purchase of a state Duck Stamp, along with a hunting license, to legally hunt waterfowl in the state.

Be Bear Aware

When visiting state lands

- **Make noise while hiking.**
- **Hike in groups.**
- **Leash dogs.**

If you see a bear:

- **Make enough noise so the bear is aware of your presence.**
- **Never approach a bear.**

If the bear does not leave:

- **Back away slowly.**
- **Never run or climb a tree.**

If the bear approaches, be offensive:

- **Make more noise, wave your arms, and throw objects at the bear.**
- **Black bears rarely attack humans. If you are attacked, do not play dead. Fight back with anything available.**

Snake Fungal Disease in Connecticut

When snakes across eastern North America started turning up with crusty scales, opaque eyes, skin lesions, and other symptoms of fungal dermatitis, researchers took note. Microbiologists demonstrated that the syndrome, snake fungal disease (SFD), is connected with the fungus *Ophidiomyces ophiodiicola*, though it is unclear if the fungus acts alone or in conjunction with other pathogens. Although not clinically confirmed, many Connecticut species, including the northern black racer, eastern ratsnake, eastern milksnake, northern watersnake, eastern gartersnake, eastern ribbonsnake, and timber rattlesnake, were discovered showing signs of SFD. It is suspected that fatal infections have occurred in the milksnake and timber rattlesnake.

The history, origin, and distribution of the disease still remains unknown, and many organizations across the Northeast, including DEEP, are monitoring the health of the region's snakes both to establish baseline infection levels and to watch for outbreaks of the disease. DEEP and Dennis Quinn of CTHerpConsultant, LLC have collected timber rattlesnakes, northern black racers, and northern watersnakes to test for the presence of SFD. Rattlesnakes were swabbed for the fungus, and skin lesions were biopsied at Roger Williams Park Zoo in Rhode Island. Veterinarians at Mystic Aquarium similarly processed samples from non-venomous snakes, including the northern watersnake and eastern black racer.

Though samples are still being analyzed, initial results show that SFD is in Connecticut and affecting at least two native species, the timber rattlesnake and northern watersnake. To date, a total of 33 rattlesnakes have been sampled, with 14 snakes (42%) testing positive for SFD. Seasonal differences in fungal presence were observed between spring and fall, with higher presence rates occurring during the spring sampling, likely influenced by reduced fitness of hibernating snakes and the extreme cold and wet conditions snakes are exposed to during this period. Although this incident rate may seem high, Connecticut has seen far fewer cases of SFD in rattlesnakes when compared to populations sampled across the Northeast.

To date, seven non-venomous snakes have been sampled for SFD, with only one snake (14.2%) testing positive for *Ophidiomyces ophiodiicola*. Although intensive sampling occurred during the 2015 field season, limited encounters with snakes were made. This is likely a result of the hot and dry conditions this past field season, reducing the overall activity of snakes. It is expected that during the cooler fall sampling period, a higher sample size will be achieved to shed light on the occurrence rate of SFD in non-venomous snake species.

One rattlesnake exhibiting severe skin lesions was treated for fungal dermatitis by veterinarians at the Roger Williams Park Zoo using antibiotics. While the treatment was time consuming, the snake recovered (see photo) and was released where it was originally captured in Connecticut.

Other fungal epidemics, especially Chytrid fungus in amphibians and white-nose syndrome in bats, have demonstrated the damage that wildlife diseases can cause. Their sudden and destructive emergence has underscored the importance of early detection and development of appropriate responses. While SFD has the potential to damage snake populations, DEEP hopes that this research can help the agency understand, monitor, and counter this threat to wildlife.

Brian Hess, DEEP Wildlife Division, and Dennis Quinn, CTHerpConsultant, LLC

Crotalus horridus: Central Population Treated for Snake Fungal Disease May - July 2014

PHOTOS BY DENNIS P. QUINN

Before ***After***

Sunday Deer Hunting on Private Land During Archery Season in Most Parts of the State

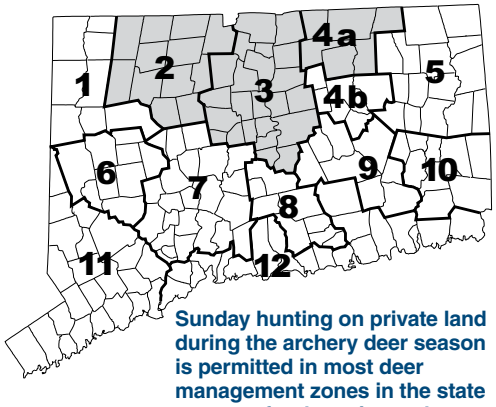
Beginning October 1, 2015, bowhunting on Sundays during the private land archery deer season is permitted in most deer management zones in the state – except for those in north central Connecticut. The past session of the General Assembly approved Public Act 15-204, *An Act Authorizing Bow and Arrow Hunting on Certain Private Property on Sundays*. This law authorizes DEEP to establish a season for Sunday bowhunting on private properties during the fall archery season in areas of the state with an overpopulation of deer. The law also requires that all such hunting must take place at least 40 yards away from blazed hiking trails. As with all deer or turkey hunting on private lands, hunters must have written permission from the landowner.

The fall archery deer season runs from September 15 through December 31 in most zones, and through the end of January 2016 in Deer Management Zones 11 and 12. DEEP determined that Sunday archery deer hunting on private lands will be permitted in all but three of the state's Deer Management Zones (DMZs) based on its assessment of the deer population in each of the zones. The three zones where Sunday hunting is NOT permitted – DMZs 2, 3, and 4A – are in north central Connecticut, including portions of Hartford, Litchfield, and Tolland Counties. The DMZs where Sunday hunting on private land is permitted include 1, 4b, 5, 6, 7, 8, 9, 10, 11, and 12.

The Deer Program administered by DEEP's Wildlife Division has focused on stabilizing or reducing deer population growth for the best long-term interest of the deer resource, native plant and animal communities, and the public. Allowing deer hunting on Sundays also provides more opportunity for hunters to go out in the field during multiple days on the weekend, instead of just on Saturdays. Hunters are reminded that all deer harvested must be reported through DEEP's online harvest (www.ct.wildlifelicense.com/HunterReporting/Login.aspx) or telephone reporting system (1-877-337-4868).

Information on hunting seasons – including Sunday bowhunting on private lands – can be found at www.ct.gov/deep/hunting. Please note that the new Sunday bowhunting opportunity is not be reflected in the printed 2015 Connecticut Hunting and Trapping Guide, as that guide was produced before the new law was approved.

Deer and Turkey Management Zone Map



Sunday hunting on private land during the archery deer season is permitted in most deer management zones in the state – except for those in north central Connecticut (shaded).

A Blue Frog in Connecticut

Written by Dennis P. Quinn, consulting herpetologist for the DEEP Wildlife Division, and John H. Malone, University of Connecticut

The green frog (*Lithobates clamitans*) is one of Connecticut's most commonly encountered amphibians. Occurring in most freshwater habitats across the state, it spends the majority of its time basking along the water's edge. When startled, it quickly retreats by producing a loud escape call while leaping into the water. Large in size, green frogs measure two to four inches in length and have a green dorsum (back) variably mottled with light brown with white ventral (bottom) coloration. Although often confused with the bullfrog (*Lithobates catesbeiana*), green frogs are easily distinguished by dorsal folds or ridges. Adult male green frogs differ from females by having tympanums (the ears) which are twice as large as the eyes and yellow throats; the throat coloration in females remains white and the tympanum is similar in size to the eye.

In June, while performing a species inventory survey in southeastern Connecticut, researcher Dennis Quinn observed a strangely colored frog. It was a sunny and relatively hot afternoon for early June with temperatures reaching into the mid-80s. While finishing up the survey in a forested wetland, he caught a quick flash of blue out of the corner of his eye. Quickly turning his head, he was bewildered to see what appeared to be a blue frog. He had read about this very rare color morph, but never anticipated seeing one in the wild. Wondering if maybe the heat had been getting to him, he took a few steps closer and to his astonishment he saw, for the first time in a 15-year career, a blue-colored green frog. He quickly pulled out a camera and snapped a few pictures to document this individual before it vanished into the wetland. The following week, Dennis posted this image on his social media account, sharing it with Connecticut's Fish and Wildlife Facebook page (www.Facebook.com/CTFishandWildlife), and to his surprise the reaction from the general public and scientific community was astounding. This post prompted so much interest that Dennis reached out to John Malone, a geneticist at the University of Connecticut who studies frogs to better understand the potential mechanisms that might explain blue coloration in a green frog.

How Common Are "Blue" Green Frogs?

"Blue" green frogs are rare and the frequency of the blue morph varies among different areas of the United States. One study showed that of more than two million green frogs examined in the midwestern United States, only 0.003% (69/2,000,000) were blue. At one site, 0.2% (2/1,000) frogs had blue coloration, whereas 0.3% (22/7,000) frogs were blue at a different locality. During the 1960s in the New England area, researchers M. Berns and L. Uhler found 15 blue frogs in a series of ponds in Massachusetts, and four blue frogs in a small stream near Rochester, New York. These dramatic differences in the frequency of blue frogs suggest either complex genetics associated with blue coloration, variation in the environment that might produce blue-colored frogs, or a combination of genetic and environmental interactions.

Very little is known about the genetics of the blue color morph, why it is so rare in the population, and whether the blue coloration could be induced by changes in the environment. One could imagine that a blue-colored frog would be easy for predators to observe. If so, blue frogs would be rare because they would be eaten more often than the more camouflaged green-colored frogs. For frogs in Connecticut, this might be true, but for a closely related species in Europe (the Balkan Moor frog, *Rana arvalis*), males turn blue during the breeding season and the blue coloration serves as a breeding signal. The blue coloration develops with changes in hormones as males become sexually mature. Green frogs in Connecticut do not turn blue during the breeding season, but perhaps changes in hormone concentrations might be associated with blue-colored frogs.

DENNIS P. QUINN (2)

Photos comparing the typical green-colored (top) and rare blue-colored (bottom) *Lithobates clamitans* (green frog).

How Does a Green Frog Become "Blue?"

Coloration is often associated with the presence or absence of cells containing pigment molecules in the skin. In humans, the presence of more or less melanin pigment found in melanocyte cells leads to darker or lighter skin coloration. In frog skin, there is a layer of melanophore cells that contain melanin, a layer of iridiophore cells which reflect light, and a layer of xanthophore cells which contain yellow carotenoid and pteridine pigment molecules. The normal green coloration found in green frogs is likely caused by light scattered in the iridiophore cells which then is absorbed by the yellow xanothophores, which filters blue and permits green to pass through the skin.

According to researchers M. Berns and K. Narayan, analysis of the cells and pigment molecules in blue frogs has shown that the yellow pigment molecules (carotenoids and pteridines) are missing from blue frog skin. The absence of

continued next page

Blue Frog

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these molecules occurs only where there is "blue" skin and not in other areas of the frog where there is normal green coloration. Breeding two blue frogs together does not result in blue offspring, suggesting the blue color morph is not produced by simple genetics, and perhaps is the result of environmental changes. It would be interesting to know if there are changes in hormone concentrations associated with blue-colored frogs, because changes in hormone concentration are correlated with changes in color, especially in closely related species that turn blue during the breeding season.

It is hard to know what produces the blue color morph but it is interesting to wonder whether the blue frog in Connecticut may indicate changes in the environment. If so, perhaps we will start seeing more "blue" green frogs.

Conservation Calendar

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.

Nov. 14.....**Wintering Over**, 1:30 PM. Every year, our part of the world freezes over and becomes barren and frigid. Come learn about how the forest and the animals that live there prepare for the chilly months ahead! This event entails an indoor lesson, as well as the opportunity to explore the Sessions Woods trails afterwards. Be sure to bring warm clothing for this mile-long walk.

Dec. 12 .....**Wildlife in Winter Walk**, 1:30 PM. Enjoy some time outdoors during the busy holiday season and take a walk with Natural Resource Educator Laura Rogers-Castro. We will explore winter wildlife foods and important habitat features in the winter landscape. The length of the walk will be determined by the weather conditions.

Hunting Season Dates

Sept. 15-Nov. 17 .....First portion of the deer and turkey bowhunting season on state land

Sept. 15-Dec. 31 .....Deer and turkey bowhunting season on private land and state land bowhunting only areas

Nov. 7-14.....Youth Deer Hunter Training Days (Go to www.ct.gov/deep/JuniorHunter to learn more about Junior Hunter Training Days).

Nov. 18-Dec. 8 .....Statewide firearms deer hunting season on private land. Consult the 2015 Hunting & Trapping Guide for specific dates for the shotgun season on state lands.

Dec. 9-22 .....Muzzleloader deer hunting season on state land.

Dec. 9-31 .....Muzzleloader deer hunting season on private land.

Dec. 23-31 .....Second portion of the turkey bowhunting season on state land.

Consult the 2015 Connecticut Hunting & Trapping Guide and the 2015-2016 Migratory Bird Hunting 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). 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**

Connecticut Wildlife

PERIODICALS
POSTAGE PAID AT
BURLINGTON, CT,
AND ADDITIONAL
OFFICES

Connecticut Department of Energy and Environmental Protection
Bureau of Natural Resources / Wildlife Division
Sessions Woods Wildlife Management Area
P.O. Box 1550
Burlington, CT 06013-1550

P. J. FUSCO

On September 19, 2015, a full day youth pheasant hunt was held at the Bozrah Rod & Gun Club. Youth hunters were given expert training by volunteers from Connecticut's Conservation Education/Firearms Safety Program on the range and in the field.