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Connecticut Wildlife

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



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Eye on the Wild

Demystifying Joint Ventures and Celebrating 25 Years of Conservation

Meandering the main street in Charleston, South Carolina recently, I stopped in my tracks at a giant sign looming over my head that read “Joint Venture Estate Jewelers.” Weird, I thought to myself. Joint Ventures are jewelers? Then there was the time I read about a well-known criminal who police were trying to determine who he was in a “joint venture” with. No, no! This can’t be right! And, how many times have I read about a joint venture of a business or an investment banker?

As the communication coordinator for the Atlantic Coast Joint Venture (ACJV), it is not lost on me that “Joint Venture” is a confusing name for what we do. “Joint Venture” is a term adopted by wildlife conservationists in the late 1980s to describe the public-private partnerships for waterfowl conservation that sprang up after the North American Waterfowl Management Plan was signed in 1986. If we knew we were going to be competing with a jeweler for the name, the founders likely would have chosen a different one.

The ACJV is just one of 18 habitat and three species joint ventures. Migratory Bird Joint Ventures, or “JVs,” are partnerships of government agencies, non-profit organizations, corporations, tribes, academia, and individuals. They work together to conserve habitat for priority bird species within defined geographic areas. JVs share a vision of a landscape where native birds thrive.

The ACJV spans the entire Atlantic Coast, including Puerto Rico. The range of habitats and birds we aim to protect is as diverse as the people that live within our boundaries. From the mountains to the coast, we strive to protect the landscapes that birds -- and people -- rely on for survival.

Despite the confusing name, the ACJV has been held up as a model for cooperative conservation over the last 25 years. We use state-of-the-art science to ensure that diverse habitats are available to sustain migratory bird populations. Actions include: biological planning, conservation design, and prioritization; project development and implementation; monitoring, evaluation, and research; and communications, education, and outreach.

ACJV staff has worked with close to one thousand partners. Over the course of our 25-year history, the ACJV has leveraged every dollar of Congressional funds 35:1, helping to conserve nearly 8.5 million acres of critical habitat. The success of the ACJV is only as strong as our partnership. As we embark on our next 25 years of conservation, we welcome partners, new and old, to face the threats and challenges to migratory birds and their habitats. Maybe by then, when people hear the phrase “joint venture” they will think of bird conservation!

Find out more at www.acjv.org or www.facebook.com/AtlanticCoastJointVenture, or read the article on page 16.

Debra Reynolds, Communication Coordinator for the Atlantic Coast Joint Venture, U.S. Fish and Wildlife Service

Cover:

Two red efts navigate the terrain in a Connecticut forest. Efts are the terrestrial phase of the Eastern red-spotted newt, one of 12 Connecticut salamander species. Read about 2014 Year of the Salamander on page 18.

Photo courtesy of Paul J. Fusco

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Input Sought for Connecticut's Wildlife Action Plan

In 2005, Connecticut completed its Comprehensive Wildlife Conservation Strategy, now known as the Connecticut Wildlife Action Plan (WAP), creating a blueprint for the conservation of wildlife over a decade. The history leading up to this plan and its need was documented in an article written by Karen Terwilliger of Terwilliger Consulting, Inc. (TCI), that was published in the March/April 2004 issue of *Connecticut Wildlife*. TCI was contracted to assist the CT DEEP in completing the plan in 2005.

Connecticut, along with other states across the country, is currently working on revisions to the WAP that will establish both a state and national framework for proactively conserving our fish and wildlife, including their habitats, for the next 10 years. As part of this effort, the DEEP Wildlife Division, along with TCI again, will be revising Connecticut's list of Species of Greatest Conservation Need. This revision will take into account new information on climate change and its impacts to wildlife conservation, as well as involve updating resource mapping, refining conservation threats, and incorporating information gained through the implementation of the first WAP. New or revised conservation actions also will be identified to help advance wildlife conservation over the next decade.

Participation by conservation partners, academic institutions, municipalities, and the public is key to making the revised WAP an effective tool for conserving Connecticut's diverse wildlife resources for future generations. Now is the time to provide input. Help the DEEP with "creating a vision for the future of wildlife conservation." Take the opportunity to read through the original plan (called the Comprehensive Wildlife Conservation Strategy or CWCS) that was completed in October 2005 and approved by the U.S. Fish and Wildlife Service in January 2006. The entire plan can be downloaded or viewed from the DEEP website at www.ct.gov/deep/Wildlife-ActionPlan). Comments on the plan can be submitted to the DEEP Wildlife Division via email (deep.wildlifeactionplan@ct.gov) or online.



The saltmarsh sparrow (above) and the Eastern box turtle (below) are just two of the hundreds of species that are listed as Species of Greatest Conservation Need in Connecticut's Wildlife Action Plan. The plan is a roadmap for conserving wildlife species and their habitats in our state well into the future. These two state-listed species provide examples of the challenges faced by many of our state's wildlife.

The saltmarsh sparrow breeds only in saltmarsh habitat. Global climate change is its biggest threat. As ocean levels gradually rise, marshes will likely be flooded to the extent that these birds will not be able to nest successfully. Connecticut has a high responsibility for stewardship of this species of special concern because our state is in the heart of the bird's breeding range.

Loss of habitat is probably the greatest threat to Connecticut's turtles. Some turtles may be killed directly by construction activities, but many more are lost when habitat areas for shelter, feeding, hibernation, or nesting are destroyed. As remaining habitat is fragmented into smaller pieces, turtle populations can become small and isolated. Roads crossing through habitat can seriously deplete local populations. Most vehicle fatalities are females searching for nest sites.



Connecticut's Ruffed Grouse Project Enters Third Year

Written by Kelly Kubik, DEEP Wildlife Division, photos provided by author

Historically, ruffed grouse were quite common in Connecticut. Unfortunately, grouse populations have shown a long-term decline in the state. While a significant portion of the decline can be attributed to the lack of early successional habitat, it is possible that other factors are contributing to or exacerbating the decline. In an effort to obtain information on these factors, the DEEP Wildlife Division initiated a multi-year radio telemetry research project in 2012. Radio telemetry technology allows researchers to gather movement and survival information that would otherwise be impossible to attain.

For the past two years, researchers have live-captured grouse using lily-pad traps in late summer and early fall. This is the most productive time to trap grouse in significant numbers as populations are near their peak. A lily-pad trap consists of a 20 to 50-foot piece of drift fence constructed from chicken wire that is connected to a trap body on each end. Logs are placed at an angle in front of the trap entrance to funnel birds into the trap. The trap bodies are then covered in vegetation to simulate a loosely constructed brush pile that a grouse could easily transition through. Grouse walking through cover encounter the drift fence and proceed to follow it until they enter the trap. These traps take advantage of a grouse's tendency to follow obstructions in the woods rather than fly over them.

Wildlife Division researchers targeted the highest quality grouse habitat in the state. This was based on observations



A juvenile ruffed grouse is released after being fitted with a radio transmitter.

collected over five years of grouse sightings, the current management of the area, and current habitat condition. Researchers recorded the weight of each grouse that was caught and determined age and gender based on feather characteristics. Each captured bird was equipped with a leg band and necklace-type transmitter before being released. The transmitters were equipped with a sensor that alerted researchers to a potential mortality event. During the 2012 trapping season, 11 grouse were captured.

Trapping effort was increased in 2013 in an effort to bol-



(Left) In addition to a radio transmitter, each grouse is also fitted with an aluminum leg band.

(Above) The size of the harness used for each transmitter is determined by the grouse's sex.

The ruffed grouse is a medium-sized, fowl-like game bird best known for its courtship displays and thunderous takeoffs. This non-migratory, native Connecticut bird spends its entire life within a small area. It can be found in diverse forest habitat that contains a mixture of tree age classes and forest openings. Abandoned farmland that is in the process of reverting back to forestland provides excellent grouse habitat. However, as these young forests mature, their value to grouse decreases. Important grouse habitat will continue to decline without the help of forest management practices to create early successional habitat.

ster success. Unfortunately, less grouse were captured as only eight grouse were caught. This poor trapping success is due to the low density of grouse that persist in the state.

Radio-tagged grouse were monitored a minimum of twice a week during fall and winter and once a week during spring and summer. Telemetry fixes were verified by either circling the bird or triangulating its location. A total of 259 valid radio locations were obtained in 2012 and 550 were obtained in 2013. Telemetry data were used to calculate home range estimates for each bird that had a minimum of 20 valid radio fixes. Telemetry data also were used to examine the distance that each grouse moved between successive radio fixes.

Researchers attempted to determine the cause of death for each grouse that died based on carcass remains, predator signs in the immediate area, and markings on the transmitter. The six grouse mortalities that occurred in 2012 were attributed to avian predation (3), capture myopathy (1), hunter harvest (1), and mammalian predation (1). Of the two grouse mortalities that occurred in 2013, one was attributed to mammalian predation, while the cause of the other mortality was unknown. All eight of these mortalities occurred between September 1, 2012, and March 31, 2013 – the time period for our survival analysis. After excluding the grouse that died of capture myopathy from our analysis, it was found that mean sur-



(Top) Logs were used to help funnel grouse into the trap body.



(Bottom) Trap bodies were covered in vegetation to simulate a brush pile or shrub.

vival rates were approximately 29%.

At each location where grouse with radio transmitters were found, researchers used circular plots to help characterize and quantify the habitat. The distance from each telemetry point to the nearest opening was measured. A forestry tool, known as a clinometer, was used to determine overstory height of the trees and another tool, known as a prism, was used to calculate basal area. Researchers calculated understorey height and the number of stems per acre on randomly placed transects within the plots. The dominant herbaceous vegetation, shrub, sapling, and mature tree species also were calculated. This data will allow researchers to examine what habitat features may be influencing grouse survival in the state.

2014 will be the third and final field season for this project. Researchers anticipate that the results of this work will be used to guide future management programs for ruffed grouse in Connecticut.



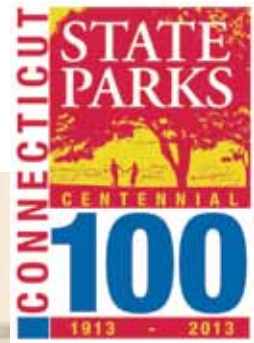
Age and sex composition for captured ruffed grouse in Connecticut, 2012 – 2013.

Age and Sex	2012	2013
Adult Female	4	4*
Adult Male	4	0
Juvenile Female	2	3
Juvenile Male	1	1
Pooled	11	8

* includes a recaptured grouse from 2012

Connecticut State Parks – The Postwar Years

Written by Alan Levere, State Parks Division



In the years that followed the end of World War II, many aspects of Connecticut's state park system had changed compared to the halcyon days of the late 1920s. The entire nation, weary of 15 years of Depression and conflict, was ready to move on, loosen the purse strings, and bring an end to their constrained lifestyle.

Wrapping up the 1940s

Before the Park and Forest Commission could begin the postwar era in earnest, certain chores needed to be completed to get the house in order. The steady infrastructure improvements of the previous 15 years were now paying dividends. During the Depression, the Civilian Conservation Corps (CCC) brought lasting changes to many state forestry areas, especially where the CCC had created recreational water bodies. By 1949, with the Corps long since gone and the parking areas filling with an appreciative public, the "Forest" branch of the Park and Forest Commission transferred four locations, 1,345 acres in all, to "Parks."

The largest of these was in Torrington's Paugnut State Forest where the CCC had enlarged a dam to impound the now 80-acre Burr Pond. The Corps also removed underbrush, created a sand beach, and cleared a generous parking area – all of the ingredients needed for a popular state park locale.

The Burr Pond model of enhanced water bodies, created shorelines, and suitable parking was the template for three other areas. The design worked successfully at Bigelow Hollow in Union with its access to Bigelow Pond and 500 surrounding acres; at Chatfield Hollow in Killingworth where a new four-acre pond enhanced the 400 adjacent acres; and at Simsbury's Stratton Brook where a small pond attracted visitors to the 190-acre park.

When the 1940s ended, Parks had added four outstanding recreational locations and Forestry was free to manage the state's public woodlands.

The 1950s

As the 1940s rolled over into the



This 1904 view from atop the Groton Monument at Fort Griswold State Park shows the remains of the fort and its defensive position along the Thames River.

1950s, the Park Commission received, just as it had in previous decades, new properties as gifts. The first was the largest. In April 1950, 694 acres of roll-

ing hills and small ponds in the towns of Redding and Bethel were given to "Parks" by Archer M. Huntington and his wife Anna Hyatt, the noted sculptor.



This war-era photograph captured the first swimming pond at what would become Stratton Brook State Park in Simsbury. Today's newer, larger pond was completed in 1964.



The Osborne homestead is the last building of the family farmstead in Derby. Frances Osborne Kellogg deeded her 350 acres of meadow, woodlands, and small ponds for use as a state park upon her death.



Rows of crumbled chimneys, today's "firebacks," are the landmarks of the Putnam Memorial Campground. Each marks the location of an individual hut.

Archer's stepfather, Collis P. Huntington, had acquired massive wealth as a post-civil war railroad magnate. Much of that wealth transferred to his stepson who settled, after a very social, city-based life, with wife Anna on the estate in 1939. In 1950, they deeded their 694 acres to the State, retained life use, and stipulated that the property ultimately be named for Archer's stepfather, Collis P. Huntington. Anna continued her famous sculpting after Archer's passing in 1955 and, today, two of her original pieces guard the entrance to Collis P. Huntington State Park and bear silent testimony to Anna's sculpting excellence and Archer's dedication to his stepfather's memory.

Osbornedale Gift

Nine months after the Huntington's gifted their property, Mrs. Frances Osborne Kellogg did the same with her 350-acre family farm in Derby. Born in the house that still stands, Frances stepped into the "man's world" of business upon her father's death in 1907 and never looked back. Her self-determined approach to life led her to hold multiple positions, including treasurer, vice president, and president of various manufacturing companies. When she married in 1919, she and husband Waldo Kellogg began improving their dairy herd, an interest she continued for the next 39 years, making the name "Osborne" famous for excellence in Holstein-Friesian dairy bloodlines. Upon her death in 1956, the 350-acre family farm became today's Osbornedale State Park and, years later, home to the Kellogg Environmental Center.

"New" Parks for the Ages

In early 1953, the State Legislature

continued its occasional, though ongoing, practice of merging state commissions. By mid-year, rumors became reality and two remarkably historic properties, the Groton Monument & Fort Griswold Commission in Groton and the Putnam Memorial Campground Commission in Redding, both tied to the American Revolution, were merged into the state park system.

The Putnam Memorial Campground was established to honor the Redding encampment of General Israel Putnam's troops during the trying winter of 1778-1779. Strategically positioned to deter a British inland invasion into southwest Connecticut, Israel Putnam directed operations and oversaw the construction of 116 huts on the site. At 12 men to a hut, the troops endured crowded conditions, cold, and deprivation through the winter months.

The men departed over a two-month period ending in May 1779. The encampment then began to revert back to its forested heritage, first as a grassland, then as a thicket, and finally a forest of trees, eventually hiding the piles of rubble that were once stone chimneys. After being "rediscovered" in the 19th century, a wonderful reclamation history followed that preserved the camp and made it possible to become part of the state park system in 1954.

Fort Griswold brought the remarkable distinction of having a Revolutionary War fort within the park system. It was there, on September 6, 1781 that Norwich, Connecticut native and American traitor Benedict Arnold sent British troops to simultaneously attack New London and storm the fort at Groton. The fort was commanded by Colonel William Ledyard and defended by 164 men. But, outnumbered five to one, 88

Americans, including Colonel Ledyard, lost their lives in the British attack.

In 1825, the 135-foot tall Groton Monument was raised to honor the fallen. Today, as it has for nearly 200 years, the monument still looks over the fort and battlefield that have been hallowed ground since the day of the conflict.

By the close of the decade, 17 new parks had been added, annual visitation had set a new record high of nearly five million, and the park commissioners were ready to meet the challenges of the 1960s head on.

[Read more about the State Parks Centennial at www.ct.gov/deep/stateparks100.](http://www.ct.gov/deep/stateparks100)



Tandem sculptures of wolves and bears stand as silent sentinels of the Huntington era at the state park grounds in Redding.

Don Hopkins: Keeping Watch Over CT's Bald Eagles

Written by Julie Victoria, Retired Wildlife Division Biologist; photos by Paul Fusco, DEEP Wildlife Division

Every year since 1979, the annual *Bald Eagles of Connecticut* report has been compiled by the Bald Eagle Study Group and distributed to contributors or people interested in eagles. The Study Group announced in the 2013 report that it would be the final one published. According to Don Hopkins and Mike O'Leary,



Don Hopkins has been heavily involved with raptor conservation for decades in Connecticut. He started the Bald Eagle Study Group in 1975.

the report authors, their purpose has been accomplished. The original premise for initiating the annual report 35 years ago was to provide state and federal agencies with accurate bald eagle data from Connecticut so that the endangered population would be safe. Study Group members will continue to keep records and exchange data, but they hope that information will be published in *Connecticut Wildlife* magazine or other appropriate Connecticut publications.

In a recent interview, Don Hopkins responded to some questions about how the *Bald Eagles of Connecticut* report and his interest in eagles began. Don has always been interested in rap-

tors. In 1971, he started a group called the New England Hawk Watch to document bird migration numbers and patterns. At that time, hawk watch organizations were increasing in number nationwide but the communication between them wasn't always there. In 1974, at a gathering in Syracuse, New York participants decided

to unify many individual organizations and the Hawk Migration Association of North America (HMANA) was formed. The conference, which was attended by Don and many prominent and active birders, established HMANA as a volunteer, non-profit organization of field birders, research scientists, bird banders, and conservationists.

In the beginning, Don's main interest was monitoring wintering and migrating bald eagles. That is until 1975 when he was told about an eagle seen flying over Route 8 in the summer. The presence of an eagle or eagles in summer meant there could be a possible breeding pair, and Don wanted to document it. He recalled that summer as being miserably hot as he searched reservoirs in Colebrook and Barkhamsted until he also observed that summer bald eagle. Les Mehrhoff, a former Department of Environmental Protection supervising biologist and botanist, was able to convince the Metropolitan District Commission (MDC) to give Don access to their reservoir properties to observe eagles. That permission was eventually granted to other members of Don's Bald Eagle Study Group



Years of meticulous data collection by Don Hopkins have provided the DEEP Wildlife Division with invaluable information about nesting bald eagles in Connecticut.

(Stuart and Jan Mitchell, Jerry Mersereau, and Mike O’Leary). The MDC allowed eagle nesting platforms to be erected near the Barkhamsted and Nepaug reservoirs by Hank Golet. These platforms were later modified by Larry Fischer. Finally, in 1990, a bald eagle pair began nest building, but was unsuccessful in raising young until 1992. That historic moment gave the Study Group a new task, monitoring nesting pairs of bald eagles.

When asked “what is the biggest issue facing bald eagles in Connecticut today,” Don replied “people.” Bald eagles can become accustomed to all kinds of human disturbance, but people getting close to the birds or active nests to take photographs or for viewing is not tolerated. Don realized this was a problem years ago and, in response, he wrote an article entitled “An Interpretation of Bald Eagle Nesting Biology in Connecticut” that was published in *The Connecticut Warbler* in April 2006 (Issue 2, pp 65-71, www.ctbirding.org/Warbler/CTWarblerVolume26.pdf). Don gives an excellent summary of eagle nesting activities and how to observe eagles from a safe distance causing little or no impact.

When asked what the future holds for bald eagles in Connecticut, Don recalled when the U. S. Fish and Wildlife Service was considering updating the “1983 Northern States Bald Eagle Recovery Plan” in the mid-1990s. At that time, he thought that Connecticut had room for about 10 nesting bald eagle pairs and the Wildlife Division agreed. Now, 20 years and about 43 pairs later, Don thinks when the bald eagle population is finished expanding, less than (but close to) 100 bald eagle pairs will be nesting in Connecticut. He stated that with the growing number of nesting bald eagles and now a smaller DEEP Wildlife Division staff with little opportunity to place leg bands on chicks, it is time to discontinue the annual *Bald Eagles of Connecticut* report. Fortunately, there are ways to estimate population numbers without banding as there are more people interested in eagles now and more nests to observe.



The DEEP Wildlife Division is truly grateful to Don Hopkins for his long-time dedication and contributions to eagle conservation in Connecticut.

Bald Eagle Nesting 2014

Thanks to the efforts of Don Hopkins’ Bald Eagle Study Group and many other volunteers, 2014 turned out to be a banner year for bald eagles in Connecticut. There were 42 active bald eagle territories documented across the state, with 32 successful nests, 57 chicks, and only two failed nests. Eight pairs demonstrated territorial breeding behavior but did not reproduce. The 2014 nesting season represents a doubling of eagle territories since 2011, and it is likely that there are even more nests in the state that we don’t even know about! So, with 42 active territories this year, the population is nearly halfway to Don Hopkins’ vision of 100 eagle pairs in Connecticut.

Watershed	Active Territories	Territorial Only	Failed Nests	Successful Nests	No. of Chicks
Connecticut	23	2	2	19	37
Housatonic	7	3	-	4	6
South Central Coast	5	2	-	3	4
South East Coast	1	-	-	1	3
South West Coast	2	-	-	2	2
Thames	4	1	-	3	5
Total	42	8	2	32	57

CT’s Bald Eagle Study Group – Dedicated to Eagle Conservation

Don Hopkins started the Bald Eagle Study Group in 1975 with the purpose of enjoying bald eagles, educating others, and, most of all, providing timely information to the Wildlife Division on the location of eagle nests, egg laying, and hatching dates. Group members also help with the Midwinter Bald Eagle Survey, which is conducted every January. This informal group has a membership that has numbered up to almost 50 individuals, although a membership list is not maintained, dues are not collected, and there are no meetings. The only qualification for being a member is that you either show an interest in bald eagles or provide information on eagle sightings or nest locations.

Over the years, members of the Bald Eagle Study Group have

volunteered countless hours to locate bald eagle pairs and to then observe the nests throughout the nesting season to document egg laying, incubation, hatching, and the eventual fledging of the young eagles. The group’s observations, as well as the long-term data collected and submitted to the Wildlife Division, have been invaluable.

The Wildlife Division greatly appreciates the efforts of Don Hopkins and the rest of the Bald Eagle Study Group in monitoring Connecticut’s bald eagles. Their dedication to this species is apparent in the many hours they spend watching the birds and in helping with surveys, year after year.

How Bad is BADD - Assessing the Biological Effect of Hypoxia

Written by Penny Howell, DEEP Marine Fisheries

Long Island Sound has been given many nicknames by the more than seven million people who live and work within the counties that make up its borders. One of the best is the title of Tom Andersen's 2002 book, *A Fine Piece of Water*, which chronicles the environmental history of this estuary as "among the most heavily used waterways in the world."

Along with a wide range of recreational and commercial uses, Long Island Sound has unfortunately acted as the receiving water body for domestic, agricultural, and industrial waste for centuries. Decades ago, the effect of these practices was documented as the primary cause of chronic summer hypoxia, or low dissolved oxygen, due to excessive nutrient inputs. Sewage discharge and urban runoff stimulate large phytoplankton blooms which die off and, in decomposing, rob the Sound's bottom waters of oxygen needed to sustain the great variety of native and migratory fish and invertebrates found there.

Hypoxia in Long Island Sound

For Long Island Sound, dissolved oxygen (DO) levels below three milligrams per liter (3 mg/L) are considered hypoxic, causing mobile animals to leave and sessile (non-mobile) animals to die or be physically or behaviorally impaired. However, DO can become limiting below 5 mg/L for sensitive species, such as whiting and scup, while more tolerant species, such as butterfish, bluefish, lobster, and Atlantic herring, are not affected until DO falls below 2 mg/L.

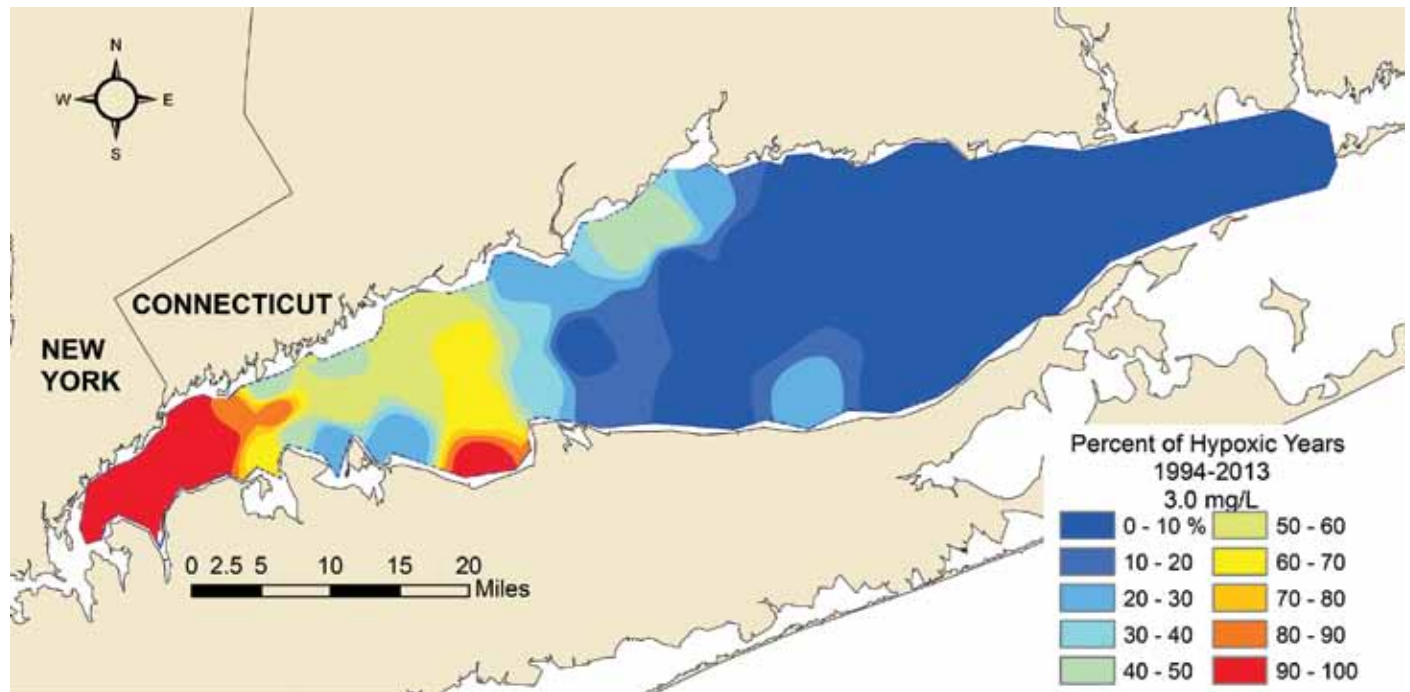
Hypoxia generally occurs to some extent every summer in the western half of the Sound, with severity increasing from mid-Sound westward to the Narrows. Similar conditions occur in upper Narragansett Bay to our north, while more serious depletion has occurred in Delaware Bay and Chesapeake Bay to our south. Chesapeake Bay has a history of over 10% of the bay area falling below 2 mg/L in summer. Those conditions rarely occur in more than 5% of the Sound's area. One major fac-

tor favoring better water quality in the Sound is the fact that the western end of the Sound is open to the Atlantic Ocean through Hells Gate and New York Harbor. Over the past 30 years, only a few incidents of abrupt or severe hypoxia (DO levels below 1 mg/L to near anoxic conditions) have resulted in significant die-off events in the Sound. Mortality of short-lived sessile invertebrate species is often quickly compensated by re-colonizing populations from adjacent grounds after oxygen levels are restored. Mobile species are usually able to move away from lethal DO levels; however, available habitat with suitable DO levels can become a limiting factor.

Habitat Impairment Associated with Hypoxia

Assessing the effect of hypoxia on living organisms in the Sound is not a simple task. The total impact of hypoxia is related not only to the sensitivity of animals to oxygen loss, but also depends on the size and location of the area affected and the duration of the event.

Frequency of Hypoxia in Long Island Sound Bottom Waters, 1994-2013



The frequency of summer hypoxia in different areas of Long Island Sound since 1991. The area in red (90-100%) shows bottom waters that are hypoxic (< 3mg/L DO) for some period almost every year.

An index of habitat impairment, known as “Biomass Area-Day Depletion” (BADD), was developed by Dave Simpson, Director of the DEEP Marine Fisheries Division, along with Marine Fisheries and Water Management Division staff, based on extensive sampling in the Sound from 1986-1993. Instead of individual species’ responses to low oxygen, a combined response of 18 bottom-dwelling finfish species was calculated as a general index of the impact on living resources to low oxygen conditions at or near the bottom of the Sound. The total weight, or biomass, of these finfish species captured in samples taken at various levels of low DO was calculated and the percent reduction in biomass from that captured in fully oxygenated water was computed.

These studies showed that the finfish biomass is reduced by 100% (total avoidance) in waters with DO less than 1.0 mg/L. In waters with 1.0-1.9 mg/L DO, biomass is reduced by 82%, while a 41% reduction occurs at 2.0-2.9 mg/L DO and a 4% reduction occurs at 3.0-3.9 mg/L DO. These depletion rates are applied to oxygen levels measured in the Sound by the CT DEEP Long Island Sound Water Quality Monitoring Program. Beginning in 1991, this monitoring program has gathered Sound-wide DO and other water quality data in monthly and summer biweekly surveys. Although about 20% of the Sound’s bottom water falls below 3 mg/L for some period in many years, less than 2% fall below 1 mg/L in an average year. Complete anoxia, or a true “dead zone,” has been extremely rare and limited to the far western Narrows.

For each Water Quality Survey, the total area of the Sound encompassing each 1-mg interval of DO is calculated and the depletion percentage applied. These area depletions are summed over the number of days they persist during the designated hypoxia season (July 8-September 7, or 62 days). The summed area-day depletion is then expressed as a percentage of the total available area (total sample area of 2,723 km²) multiplied by the total season (62 days). A maximum BADD index of 100% would result from severe hypoxia occurring over the entire study area for the entire hypoxia season.

In an average year, hypoxic waters cover 464 km² (179 miles²) for 55 days and result in a BADD impairment index of 4%. In the worst years, hypoxia spread over 1,000 km² (395 miles²) for the entire season, resulting in a BADD index of almost 9%.

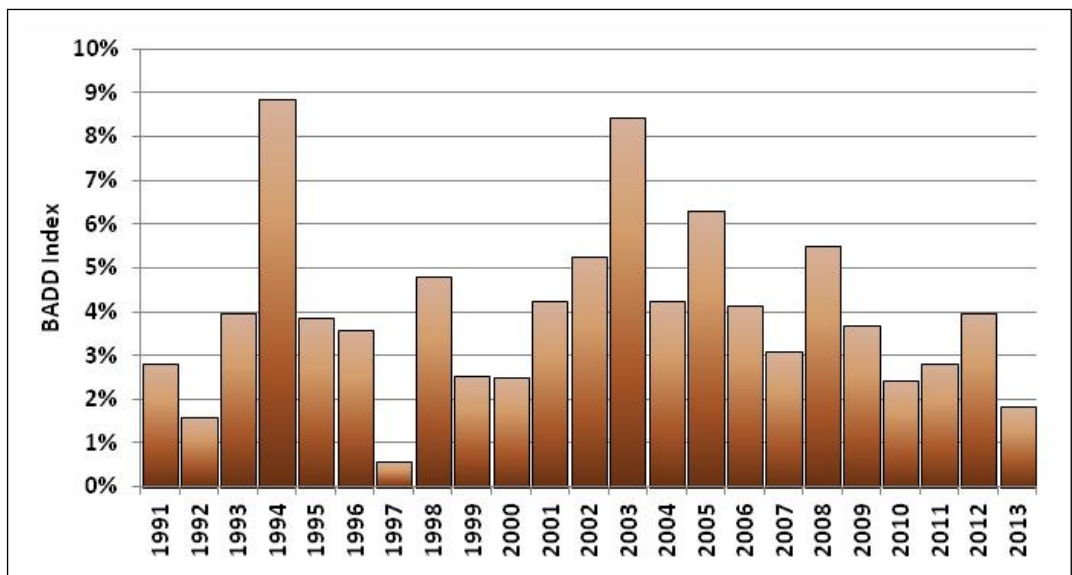
The good news is that all of our efforts to keep the Sound clean have kept this impairment index below 10% of the maximum area-day depletion value, even in the worst weather years. There is a downward trend in the BADD index over the last decade, with indices below 4% for the last five years. This long-term monitoring database is a powerful tool we can use to detect changing conditions due to management actions, climate change, or the natural productivity of Long Island Sound so it can remain a “fine piece of water.”



CT DEEP LONG ISLAND SOUND TRAWL SURVEY

The Water Quality Survey team deploying an instrument array off the CT DEEP research vessel *John Dempsey*. A summary of the data gathered in the Survey is available on the DEEP website at www.ct.gov/deep/lib/deep/water/lis_water_quality/hypoxia/2013_season_review.pdf.

The Biomass Area-Day Depletion (BADD) Index for Long Island Sound has been below the long-term average of 4% in recent years.



The Ups and Downs of Connecticut's Cliff Swallow

Article and photography by Paul Fusco, DEEP Wildlife Division

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Cliff swallows build gourd-shaped nests made of mud and straw, which they attach to the vertical sides of man-made structures or natural cliffs. The birds often nest in large colonies.

Alongside the gentle flowing water of the sometimes turbulent Housatonic River in northwestern Connecticut sits a large, old cottonwood tree. Over the course of its many years, the majestic tree has grown toward the openness of the blue sky above the water. Not far from the behemoth's trunk is a small mud puddle, about three feet in diameter and not much more than a couple of inches deep. A closer look at the puddle reveals many tiny impressions in the otherwise smooth mud around the edges. Those tiny marks are the telltale sign that there was some recent, curious activity.

A small bird flies in to the stillness of the puddle, alighting at the edge. Almost immediately, the tranquility of this riverside oasis becomes shattered. First the one bird, then quickly two more, then six, and 20 more birds come to the mud puddle, all jousting with one another with wings flapping. The twittering calls turn to loud chattering and then to fighting as they all vie for what to them is life's necessity. They pick up bill-fuls of mud to build and repair their nests, which are located a short distance away affixed to a sheltered surface under the concrete overhangs on the side of a bridge. Back and forth they fly, carrying such small amounts of mud that it makes one wonder how many trips it must take to complete a nest. The puddle is ravaged, but it gives the birds what they need to carry on their kind.

These birds are cliff swallows, a highly sociable species that nests in colonies, sometimes very large ones. However, cliff swallows do not occur in large numbers in Connecticut as they only are found in scattered locations, primarily in western portions of the state.

Description

Cliff swallows are small, about the size of a sparrow. In flight, they can be identified by long pointed wings and a medium-length squared tail. The plumage is dark on the topside and light on the underside. Other distinguishing marks include a light buffy rump patch, pale forehead, and dark throat. Cliff

swallows have short legs and a small bill that opens into a wide gape. They feed on the wing, catching many types of flying insects, such as flies, wasps, bees, winged ants, beetles, and dragonflies. Foraging swallows will gather, following each other to places where insects are swarming. They will often forage higher than other swallows. A typical cliff swallow flight pattern would be a long soaring glide that culminates in a steep roller coaster climb.

Behavior

These birds are highly gregarious, sometimes nesting in very large colonies. In other parts of the country, cliff swallow colonies with up to 1,000 nests are a regular occurrence, with one midwestern colony being documented at well over 3,500 nests. Connecticut colonies do not hold such large numbers.

Cliff swallow nests are built out of mud pellets and straw. They are gourd-shaped and sometimes have an elongated entrance tube. Nests are affixed to the sides of human made structures, including bridges, barns, dams, and culverts, or natural substrates like cliffs, caves, or large trees. Nest placement usually includes a horizontal overhang that provides shelter for the nest. Females will lay three to six creamy or whitish eggs marked with fine spots of various shades of brown. Incubation lasts 12 to 14 days and young will fledge after about 23 days. Cliff swallows may have either one or two broods per season.

Habitat and Range

Cliff swallows breed throughout large areas of North America, from mid-latitude Alaska and Canada to southern Mexico, and from the Pacific coast to New England. They are not found in desert or heavily forested areas. Like all swallows, and unlike most other passerine migrants, cliff swallows migrate during the day. As such, they are able to feed as they travel, but their migration takes longer to complete than the night migrants. They avoid flying over large bodies of water during migration, preferring to take routes over land. Their wintering range includes most of South America.

Traditionally, cliff swallows have been found in remote canyons and river valleys with rocky cliffs and overhangs. They have expanded their range over the past 100 or more years, taking advantage of buildings, bridges, and dams for suitable nest building. During that time, a majority of the population has developed a close association with humans. Colonies are usually found in open places that are close to water, where the birds use the sky above nearby lakes, marshes, grasslands, farmlands, and river valleys for foraging.

Conservation

Historic records indicate that in the early to mid-1800s, the cliff swallow was an increasingly abundant summer resident in our state. But, by the late 1800s, the species was in noticeable decline. The major reason for this decline can likely be attributed to changes in habitat that occurred at the time. In the early 1800s, Connecticut was largely cleared of forests for farming. Expan-



Cliff swallows will not only gather at insect swarms to feed, but they also will gather at favored mud puddles when nest building. It may take over 1,000 mud pellets to build a single cliff swallow nest.

sive open fields with barns perfect for building nests provided ideal habitat for the swallow, and the population grew. As the late 1800s approached, many farm fields became overgrown, eventually succeeding into forestland. Combined with this habitat change was the explosive increase in house sparrows, which are known to usurp the nests of cliff swallows.

According to breeding bird surveys, cliff swallows have been experiencing a moderate population increase in Connecticut over the past 10 years. Still, aside from the purple martin, the cliff swallow is the least common of our swallow species. These birds are found mostly in the western portion of the state, with the Housatonic River Valley being a great place to look.



Cliff swallows can become quite aggressive toward one another. Rather than pick up its own bill full of mud, one swallow attempts to pirate it from another.

Ubiquitously Common, the Blacknose Dace

Written by Mike Beauchene, DEEP Inland Fisheries Division

I am quick to acknowledge native brookies for nurturing my lifelong passion for fishes. It is easy to understand why – their colored spots, sparkling like jewels, and maze-like vermiculations cast a mythical spell on almost everyone who lays eyes upon them. But, there is one other fish, drab in comparison to the brookie, which has captured my attention almost as much. While sitting streamside stalking wild brookies, it is impossible not to notice the bustling activity of dozens of small fish, acting like a group of free-ranging hens scratching around looking for a bite to eat. On days when the brookies are not so interested in my attention, I find myself captivated by the dynamic behavior of these small fishes.

Reaching a whopping maximum length of 55-80 centimeters (3-4 inches) over the course of a three-year life span,

the blacknose dace (*Rhinichthys atratulus*) is not a fish one is going to catch with hook, line, and sinker. Blacknose dace, which are one of our native minnow species, are found in small to medium-sized brooks and streams where they prefer pockets of slowly moving water, such as runs and pools. As their namesake suggests, the fish have a continuous dark band running from one eye to the other across the bridge of the snout. At first glance, their bodies appear to be smooth as the scales are extremely small and difficult to see. Typically, the body is an olive green/tan or brown (dorsal surface) and creamy white (ventral surface), separated by a dark brown lateral horizontal line. Male blacknose dace develop rich, bright red-orange coloration on the pectoral and pelvic fins and sides during the spring spawning season.

While sitting streamside, blacknose dace are easy to observe as they form small schools actively nosing around the stream bottom, feeding on small invertebrates, diatoms, and other micro algae. However, in my experience, they have a particular fondness for tiny rolled balls of white bread. In turn, blacknose dace are an important food source for larger predatory fish, like trout, and fish-eating birds, like mergansers and herons. While these fish are readily visible to anyone who is around or in a stream, they often go unnoticed,



B. JACOBS, DEEP INLAND FISHERIES DIVISION

The blacknose dace, a native minnow species, is broadly distributed across Connecticut. Almost every flowing water has a robust population.

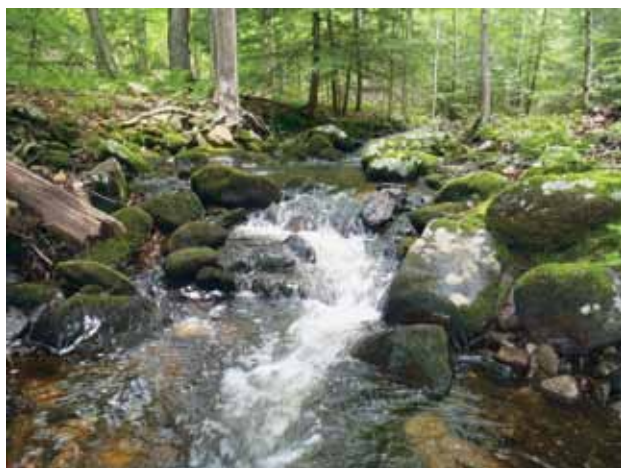
hidden in plain sight, except during the occasional visit by DEEP fisheries biologists conducting routine fish population monitoring.

Stream fish population monitoring involves electrofishing a set length of stream, often 100 to 150 meters, and netting each and every fish possible within the study zone. All species are identified and the first 100 individuals of each species are measured (in centimeters). Blacknose dace can be particularly abundant, with hundreds of individuals per square meter, especially in shallow, warm streams that have moderate to high nutrient concentrations and plenty of sunlight. When this is the case while electrofishing, it doesn't take long to perfect the technique of mass-measuring blacknose dace. Echoes of 5-5-5-6-6-6-7 can be heard over and over.

In my encounters with the public while conducting fish population monitoring, I am often asked to identify the fish we are handling. I have encountered many puzzled looks when I answer "blacknose dace" to their query. For many, "dace" sometimes refers to the fallfish, a large and bright silver-colored minnow that can reach 10 to 12 inches in length and is frequently caught while fishing in larger streams and rivers.

While not sought after by anglers, blacknose dace are an important component of Connecticut's stream fish community. A ubiquitous species tolerant of a wider range of environmental conditions, the blacknose dace can be found from the smallest of headwater streams, side by side with the esteemed native brookie, to warm, wide, shallow channelized streams of highly urban landscapes. As such, the ubiquity of blacknose dace is an important feature of the DEEP Inland Fisheries Division's mission to conserve and enhance fish populations. The next time you are out in a stream, take a look around your feet and introduce yourself to the blacknose dace.

M. BEAUCHENE, DEEP INLAND FISHERIES DIVISION (2)



Populations of blacknose dace can be found in every type of shallow-flowing water habitat, from the smallest pristine headwater streams (above) to trapezoidal flood control channels of urban landscapes (bottom).

Connecticut's Native Minnows (Family Cyprinidae)

Blacknose Dace
Bridle Shiner
Common Shiner
Creek Chub
Cutlip Minnow
Fallfish
Golden Shiner
Longnose Dace
Spottail Shiner

Connecticut's Waters Harbor an Invasive Clam

Written by Erica Clark and Patrick Pennarola, DEEP Wildlife Division

The Asiatic clam (*Corbicula fluminea*) is a small, olive or yellowish to dark brown colored mollusk. Reaching up to five centimeters (2 inches) in length, it has concentric rings on its rounded triangular shell. Native to eastern and southern Asia, as well as parts of Africa, this freshwater clam was first documented in Washington state in the late 1930s, purportedly introduced as a food source by Asian immigrants to the Northwest. This clam has since found its way throughout the nation's waterways, dispersed both intentionally and unintentionally, often spread by boats in bait buckets and bilge water.

Once Asiatic clams become established in a body of water, they are difficult to eradicate.

The Asiatic clam is a filter feeder; it takes in water from its siphon and strains out microscopic plants and animals. If food supplies in the water column become scarce, they also can function as deposit feeders and extract food from the sediment in which they live. This prolific invader can tolerate low pH and water temperatures between 36 and 86 degrees Fahrenheit. It lives in the shallows of lakes and well-oxygenated streams and rivers. The clam has a great need for dissolved oxygen, especially during reproduction, which occurs when water temperatures are between 63 and 82 degrees Fahrenheit. Adults are hermaphroditic and can self-fertilize to produce hundreds of larvae per day. The larvae are suspended in the water column and use the current to drift to new locations. After settling to the bottom, the fast-growing larvae become fully mature in three to six months and continue the cycle.

The Asiatic clam was first found in Connecticut in 1990 in the lower Connecticut River. A 10-year study revealed that the clam could survive the state's otherwise fatally cold winters in specific places in the river. These sites where the clams could survive were located near power plant out-take pipes. It also has been suggested that warmer ground water seeping into the river might provide microclimates suitable for sustaining clams

over winter. Even though one of the power plants where samples were collected closed down during the duration of the study, clams were still found near its out-take pipes, indicating that these areas might

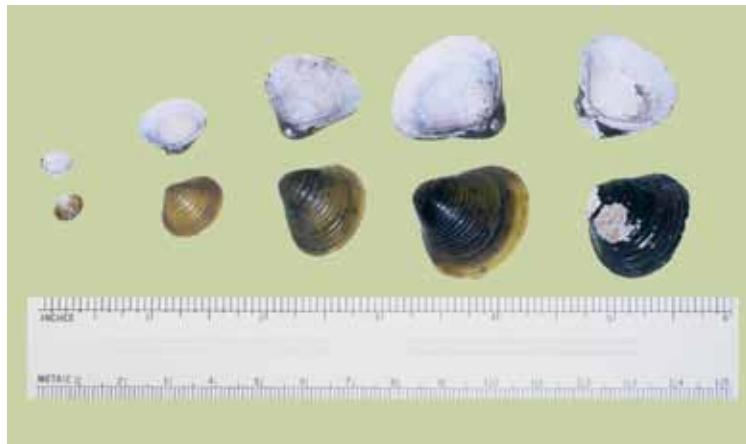
serve as refugia for reasons beyond water temperature alone. It is suspected that water current may also play an important role, as the clams at this site seemed to be protected from the impacts of high spring water flow, another source of fatality for this species. More recently, the clam has been found in many rivers in the state, including the Farmington, Housatonic, Norwalk, Podunk, Quinebaug, Quinnipiac, Salmon, Scantic, and Thames. Clams also have been collected in several lakes and ponds across the state.

It Is Here, but Is It a Problem?

While the Asiatic clam is not a native species, it is not clear if it is detrimental to our native bivalves, or to what extent it may be. Biologists are concerned about potential competition for resources between native freshwater mussels and Asiatic clams, primarily because half of Connecticut's freshwater mussel species are listed as state endangered or threatened.

In one study in a Texas reservoir, even though Asiatic clams claimed the highest animal biomass in the water body, there was not an associated decline in freshwater mussel abundance.

It is difficult to directly correlate impacts from Asiatic clam invasions to declining freshwater mussel populations because pre-invasion data are often limited. Native mussels have been experiencing declines due to land use changes within watersheds, such as the conversion of forest to urban development, increased water pollution, and armoring of stream banks with rip-rap. More studies that monitor



Asiatic clams can range in size from under one centimeter up to five centimeters. Coloration can range from a yellow-tan to black.

changes in mussel populations and their habitats over time are needed to determine if Asiatic clams are negatively impacting native freshwater mussel populations.

A known problem related to Asiatic clams occurs when there are large-scale die-offs. There could be changes in water chemistry due to the decomposition of high numbers of clams. These changes in water quality can be detrimental to other fauna in a waterbody. The clam also can serve as a nuisance simply by its physical presence, clogging water intake structures and impacting water flow at water treatment facilities.

What You Can Do

Once Asiatic clams become established in a body of water, they are difficult to eradicate. The best tactic is to educate people on how to prevent the introduction of the clam into new bodies of water. Boaters should always remove debris, such as plant matter and mud, from their vehicles, trailers, and gear before leaving the launch as invasive species may be transported between bodies of water. Draining all water from the boat before leaving may help stop the spread of larvae from one body of water to another. In addition, live fish and bait water should never be introduced into a different body of water than where they were collected. Not only will these practices help stop the Asiatic clam from impacting more of Connecticut's waters, they also will serve to protect our rivers and lakes from other invasive species, both those that we know about and those that may pose a threat in the future.

Banding of Resident Canada Geese Continues

Written by Kelly Kubik, DEEP Wildlife Division

Each year, the Wildlife Division captures and bands resident Canada geese during their annual molt. Waterfowl, such as Canada geese, are unique because unlike other birds, they simultaneously shed their primary feathers and become temporarily flightless for approximately one month each year. In Connecticut, geese typically molt from mid-June to mid-July. During this time, they will congregate at water bodies that provide a safe place to loaf, feed, and avoid danger. Biologists take advantage of this flightless period by driving molting geese across land and/or water and corralling them into a portable net where they are aged, sexed, banded, and released. The information derived from banding is used by researchers for various purposes, including assessing distribution of harvest, productivity, population size, and survival rates.

A total of 1,723 geese were captured during banding efforts this past season. This included 1,256 unmarked and 467 previously banded geese. Geese were banded at 36 different sites throughout

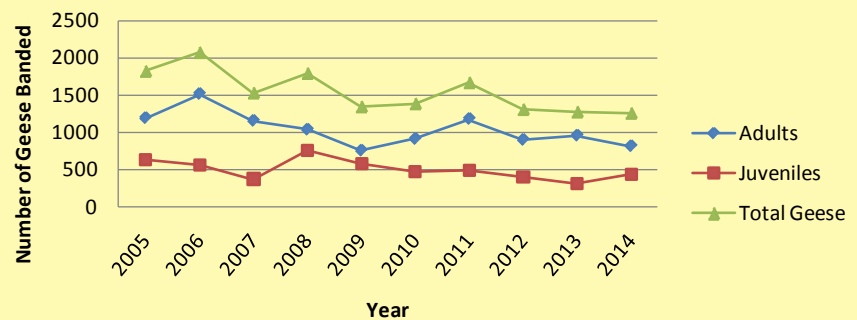
the state and capture size at each location ranged from 11 to 185 geese. Banding sites were distributed statewide, with a minimum of two sites per county. While the majority of this year's recaptures were originally banded in Connecticut, several were banded in other states or Canadian provinces. Some of these recaptures were originally banded in Maryland, Pennsylvania, New Jersey, New York, Ontario, and Quebec. A pair of geese originally banded in 1998 was recaptured this year

in Hartford County, demonstrating that resident geese can be particularly long-lived species, especially in urban areas.

Anyone who encounters a banded bird is urged to report it to the Bird Banding Laboratory at 1-800-327-BAND (2263) or on the web at www.reportband.gov. Those interested in volunteering for next year's goose banding project should contact Kelly Kubik at kelly.kubik@ct.gov or at 860-642-7239.



Canada Geese Banded in Connecticut, 2005-2014



DEEP's Role As a Partner in the Atlantic Coast Joint Venture

Written by Min Huang, DEEP Wildlife Division

The Migratory Bird Joint Venture system has seen more than 25 years of fruitful partnerships and numerous success stories. Originally focused solely on waterfowl conservation, the Joint Ventures have now embraced all bird conservation. One of the major partners within the various Joint Ventures are the state agencies, like DEEP, that are responsible for conservation within their state jurisdictions. As a government agency, DEEP participates in the Joint Ventures on many levels.

Representatives from DEEP sit on the Game Bird Technical Committee and the Nongame Bird Technical Committee of the Atlantic Coast Joint Venture (ACJV) and the Management Board of the ACJV. In this capacity, DEEP plays a critical role in guiding biological planning, conservation design, and implementation of various projects that benefit habitats and birds, not only in Connecticut, but throughout the Atlantic Coast. A representative from DEEP also sits on the Black Duck Joint Venture (BDJV) Technical Committee as the liaison from the Atlantic Flyway Council. The aim of the BDJV is to restore black duck populations and habitats to their North American Waterfowl Management Plan goal.

Partnerships with the ACJV and BDJV have garnered several substantive grants for Connecticut that have resulted in over 5,000 acres of critical wetland and upland habitat being either protected in perpetuity or restored within the state. The projects



Many wetland birds benefit from the habitat conservation projects accomplished by Joint Venture partnerships, including the Virginia rail.

funded by these North American Wetlands Conservation Act grants have brought together over \$13 million dollars for habitat conservation. Connecticut will remain a strong partner with the habitat and species Joint Ventures. As scarce conservation resources become scarcer, strong partnerships are the key to achieving our conservation goals.

Choosing a Career as a Wildlife Biologist

Written by Andrew LaBonte, DEEP Wildlife Division

Often one's fascination with nature and a passion for the outdoors is what fuels a desire to become a wildlife biologist. However, taking that desire and turning it into a career can be challenging. In simple terms, the definition of a wildlife biologist is "someone who studies and/or manages wild animals and their habits." Wildlife management is, by definition, "the art and science of applying ecological knowledge to populations of animals and their plant and animal associates in a manner that strikes a balance between the needs of those populations and the needs of public." These definitions help identify the three main aspects of a wildlife biologist's job. First is conducting research to find answers to questions that are unknown, such as the number of deer in a Deer Management Zone or public attitudes toward deer management on state and public lands. Second is taking the information learned from research to make wise wildlife management decisions, such as whether or not efforts should be made to increase or decrease wildlife populations and what methods will best meet that goal. The third aspect is providing education and information. Probably one of the least known, yet very important aspects, of a wildlife biologist's job is how much time is spent providing public presentations, preparing publications, and answering questions from the public and media.

Becoming a wildlife biologist requires a strong academic background in biological sciences. The requirement to become a wildlife biologist in Connecticut is a minimum of six years of experience in wildlife management, of which four years can be substituted with a Bachelor of Science degree in wildlife ecology or a closely related biological field. An additional year of experience can be substituted with a Master of Science degree in wildlife management. Also required is knowledge of and experience with animal ecology and habits, wildlife and habitat management, capturing and handling of animals, wildlife and human dimensions surveys, and statistical procedures. Strong interpersonal skills, as well as oral and written communication skills, are a must. Biologists that have gone through rigorous course work and on-the-job training,



B. EMBACHER, DEEP WILDLIFE DIVISION

DEEP Wildlife Division biologist Andrew LaBonte with a pair of shed moose antlers from a moose currently being monitored by biologists.

and also meet the qualifications required by a certification review board, can become certified as a professional wildlife biologist through The Wildlife Society, an international organization of wildlife scientists.

As mentioned previously, people who choose this career path have a passion for the outdoors. A career as a wildlife biologist can be highly enjoyable and satisfying, and for that reason there is a very low turnover rate in jobs. Nearly everyone who is gainfully employed as a biologist in the state or private sector probably has endured a struggle to make ends meet by taking seasonal employment opportunities (short-term jobs with no benefits). A person may have to work many seasonal jobs to gain enough experience to qualify for a full-time, permanent position as a wildlife biologist. To maximize the opportunity to obtain a position as a biologist, you should seriously consider how flexible you are willing to be to find employment and where you will find this employment. If you are not willing to accept a position that may require lengthy travel in state or a complete relocation out of state, it may be very difficult to find a job. Currently, the Connecticut Wildlife Division's biological staff is comprised of about 25 seasonal (temporary) research assistants, three permanent wildlife technicians,

14 permanent field biologists, and five supervisory biologists.

As former Wildlife Division Director Dale May once stated, "one becomes a wildlife biologist through training, experience, dedication, and persistence, fostering a strong sense of pride in the profession and a commitment to science-based wildlife stewardship." Anyone who has an interest in working in the wildlife profession should start as early as possible, teaching themselves about the outdoors, learning from others who can teach them more, and applying themselves throughout their educational development and career.

Author Andrew LaBonte graduated from Unity College in Maine with a B.S. degree in Environmental Science with an emphasis in Wildlife and from the University of Connecticut with an M.S. degree in Natural Resources: Land, Water, and Air with an emphasis in Wildlife Management. He was hired as a general worker for the Wildlife Division's Deer Program in 1998. He relocated to California to work with endangered Peninsular bighorn sheep in 1999, returning to work with Connecticut's Deer Program as a seasonal resource assistant and independent contractor from 2000-2004, before being hired as a permanent wildlife technician in 2005. Andrew was promoted to a full-time wildlife biologist with the Deer Program in 2008. He is a certified wildlife biologist.

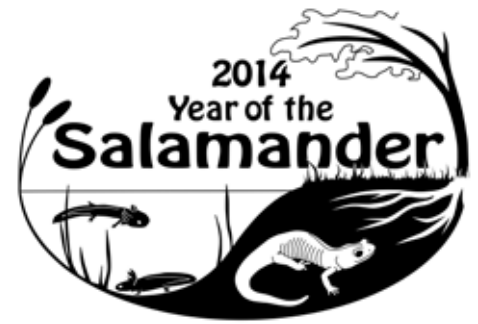
Salamander Art Contest a Hit

The DEEP Wildlife Division has been participating in the 2014 Year of the Salamander celebration (spearheaded by the Partners in Amphibian and Reptile Conservation) by informing Connecticut residents about the state's 12 native salamanders through a variety of activities. One of these activities was a Salamander Art Contest for Kids, in which children from kindergarten through the fifth grade were invited to submit original artwork of salamanders native to Connecticut. We received 275 entries from children throughout the state. The entries were judged in three categories: K-1st grade, 2nd-3rd grade, and 4th-5th grade. The judges (all with art or salamander experience) did a fantastic job of selecting first, second, third, and most creative winners in each category.

All of the contestants, along with the general public, were invited to attend Salamander Day on Sunday, July 20, at the Wildlife Division's Sessions Woods Conservation Education Center in Burlington to learn about salamanders and also participate in fun and free activities. The art contest winners were presented with ribbons and various prizes, which were graciously donated by the Paul Petersen Memorial Fund of the Friends of Sessions Woods and the Connecticut Science Center.

The artwork submitted for the contest is currently on display at the Sessions Woods Conservation Education Center throughout the summer. The winning artwork in all three categories can be viewed as a slideshow on the Year of the Salamander webpage (www.ct.gov/deep/salamanders). Congratulations to all of the winners of the contest. But, most importantly, the Division is pleased that so many children made the effort to learn about Connecticut's salamanders and also create such beautiful artwork. Year of the Salamander has been well received and also has generated a lot of interest in salamanders.

Thank you to the Paul Petersen Memorial Fund of the Friends of Sessions Woods and the Connecticut Science Center for their support of the 2014 Salamander Art Contest for Kids, and to Connecticut's Beardsley Zoo for its support of Salamander Day!



Celebrate Salamanders!
Learn all about Connecticut's salamanders and find out about upcoming salamander events on the DEEP website at www.ct.gov/deep/salamanders.



First Place in the Fourth/Fifth Grade category – Northern Two-lined Salamander by Hartmut Andreas Doerwaldt



First Place in the Kindergarten/First Grade category – Red-spotted Newt by Corinne Chadwick



First Place in the Second/Third Grade category – Blue-spotted Salamander by Cayla Cayer-McCarthy

Northern Redback Salamander

Plethodon cinereus

Background and Range

The redback salamander is Connecticut's most ubiquitous amphibian. It is found in forested areas throughout the state, sometimes in high numbers. This small amphibian is a vital component of the forest food chain as it is both a predator on a variety of macroinvertebrates and prey for a variety of small vertebrates. Even with its small size, nocturnal behavior and lack of vocalizations, the redback is commonly encountered under leaf litter and woody debris on the forest floor.

A member of the lungless salamander family (Plethodontidae), this salamander lacks lungs, absorbing oxygen through its skin.

The redback salamander is widely distributed over the northeastern United States and southeastern Canada south to North Carolina and eastern Tennessee. This species ranges westward along the northern shores of the Great Lakes through Ontario and around the western end of Lake Superior to eastern Minnesota and northern Wisconsin, and south around Lake Michigan to eastern Illinois.

Description

This highly variable, small salamander measures about 2 to 4 inches long. It has short legs and a cylindrical tail. The redback salamander occurs in two color phases: striped or "redback" and unstriped or "leadback" phases. The "redback" phase has a reddish stripe that runs down its back from the base of the head to the tail. The "leadback" phase is uniformly dark gray to black. Another color variation found with some regularity in northwestern Connecticut displays bright red or pink on the back, sides, legs, and tail. It is cream-colored underneath.

Habitat and Diet

Redback salamanders are found in a wide variety of elevations and habitats, although they prefer moist forests, especially forested rocky hillsides. They are tolerant of urbanization, and can be found wherever a small patch of woodland remains. These salamanders spend much of their life underground or underneath rocks, logs, fallen bark, or moist leaf litter. During rainy nights, they may climb vegetation in search of their prey of mites, insects, and other invertebrates.

Life History

The redback salamander typically lays 3 to 14 eggs in June and July, suspended like a small cluster of grapes within a rotting log or under a rock. The female stays with this nest and will defend it aggressively. Redback salamanders do not have an aquatic larval stage. Instead, the larval stage occurs within the egg, and the young hatch into fully developed miniature adults after 6 to 8 weeks. The young redbacks are able to leave the nest at about four weeks of age. They become sexually mature 2 years later.

Interesting Facts

The redback salamander is entirely land-dwelling and usually will not go to water, even to breed. This lack of dependence



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P. J. FUSCO

on standing water has enabled these salamanders to survive in fragmented patches of forest and in wooded parks surrounded by urban development.

Large numbers of redback salamanders can sometimes be located in an area. During wet weather, they can be found near the ground surface or crossing roads at night. Redbacks hibernate underground in decaying root systems.

This salamander is often confused with the northern two-lined and four-toed salamanders.

Conservation Concerns

Redback salamanders are tied to moist forest habitats. Destruction of these habitats is the greatest threat to populations.

Pollutants, including herbicides and pesticides, are easily absorbed and toxic to all salamanders, including the redback.

Redback salamander populations also experience declines as a result of non-native invasive species, such as Japanese barberry (*Berberis thunbergii*), garlic mustard (*Alliaria petiolata*), and earthworms.



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Red-backed salamanders can be found in three color phases: (top) typical "redback" phase; (middle) fairly common "leadback" phase; and the much less common red phase (bottom).

Northern Two-lined Salamander

Gyrinophilus p. porphyriticus

Background and Range

The northern two-lined salamander is Connecticut's most common stream salamander. It inhabits a wider range of habitats than the dusky salamander (another stream dweller), including streams that are scoured on a regular basis. At many sites in southwestern Connecticut and adjacent New York, where dusky and two-lined salamanders once occurred together, only two-lined salamanders remain. Two-lined salamander populations have increased due to the extirpation of dusky salamanders.

The two-lined salamander is found from northern Virginia, northern West Virginia, and northeastern Ohio north through Delaware, Maryland, and the northern and central portions of New Jersey, Pennsylvania, New York, and New England, and on north into Canada.

Description

This small to medium-sized salamander ranges in length from 2.75-4.5 inches. It is slender with thin, delicate limbs. The upper or back surface varies in color from bright yellow, olive green, or bronze to light gray. As its name implies, the two-lined salamander has two dark lines, one along each side, which may be broken up into a speckled pattern. The underside of this salamander is translucent, pale yellow, or white. An orange or yellow wash usually occurs on the underside of the laterally flattened tail. Individuals found in upland areas are more boldly patterned than individuals from lowland, sandy, and coastal areas (they are more darkly pigmented).

Two-lined salamander larvae are quite large, measuring between 2.5 to 2.75 inches long. They exhibit a pattern of spots and mottling on the upper surface, often causing them to be confused with larval dusky salamanders. However, two-lined salamanders can be distinguished by their smaller, more delicate build, equally proportioned front and hind limbs, and the orange coloration under the tail.

Habitat and Diet

Two-lined salamanders have been found in swift flowing rocky streams and brooks; muddy meandering flood plain rivers; wooded swamps, springs, and seepage areas; at the edge of vernal pools; and in damp moist woodlands – sometimes several hundred feet from the nearest stream. They are somewhat tolerant of urbanization. These salamanders will hide under flat rocks, logs, and leaf litter at the water's edge. Insects, annelids, arachnids, sow bugs, mites, and even an occasional salamander make up the diet of the two-lined salamander.

Life History

Two-lined salamanders lay 30 or more eggs in April through July. The eggs are submerged underwater and



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attached to the underside of a rock. Females have been found guarding their eggs. The eggs hatch approximately one month later into aquatic larvae that take 1-3 years to transform into adults. Because of this lengthy larval period, different age classes of two-lined salamanders are often found in the same stream.

The two-lined salamander may remain active during winter underground near streams.

Conservation Concerns

Populations of two-lined salamanders are impacted by the destruction, disturbance, or pollution of their small aquatic habitats, including streams and seeps. Pollution, runoff, and stream channelization and scouring are all major threats to these habitats. Removal of forests around streams and seeps increases siltation, water temperature, and evaporation, and alters the prey base and foraging opportunities for this species.

What You Can Do

Awareness and education of the two-lined salamander's life history and habits are invaluable tools for conservation. Consider the conservation of important stream, spring, and seepage habitat types. Not only are the salamanders important, but their presence indicates a healthy wetland.

If you happen to find a two-lined salamander, leave it where you found it and only take photographs. Salamanders should never be collected from the wild. Every individual salamander is vitally important to its local population.

Help conserve water purity and adequate above ground habitat in your area of Connecticut to allow this widespread species of salamander to remain common throughout the state.

Avoid the use of fertilizers, herbicides, and pesticides in your yard. If you need to use these products, purchase ones that are natural and organic.

Additional information about salamanders is available on the DEEP website at www.ct.gov/deep/salamanders.

A Challenging Spring for Wild Turkey Hunters

Written by Michael Gregonis, DEEP Wildlife Division

The 2014 spring wild turkey season was challenging for many hunters. Cool temperatures, wet weather, and several years of reduced productivity made for fewer birds and limited gobbling activity. Despite these hurdles, many hunters were successful in harvesting Connecticut's elusive wild turkey.

This year, the junior turkey hunter training days started on April 19 and ran through April 26, and the traditional season began on April 30 and continued until May 31. A total of 8,850 permits were issued and 1,118 birds were harvested. At least one turkey was harvested by 744 hunters for an 8.4% statewide success rate. In total, 477 hunters harvested one bird, 185 hunters harvested two birds, 67 hunters harvested three birds, five hunters took four birds, and 10 hunters reported five turkeys. The harvest consisted of 765 adult males, 349 juvenile males, and four bearded females. During the junior turkey hunter training days, 71 birds were taken by youth hunters ranging from 12 to 15 years of age.

Permit issuance and harvest trends remained similar to past years. Permit issuance declined by 1.9% and harvest



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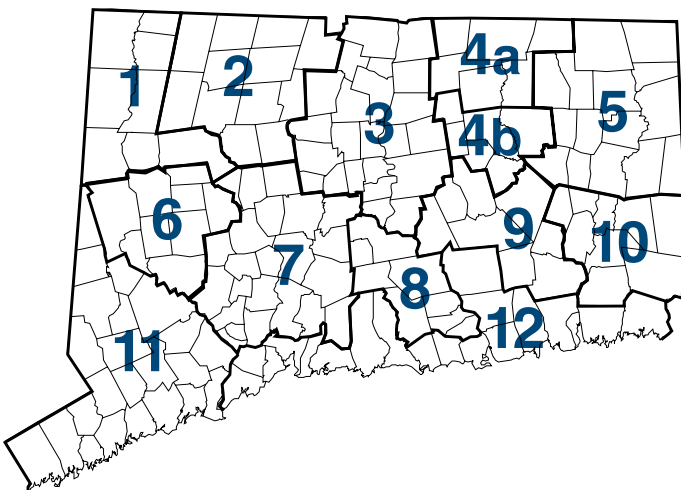
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decreased by 10.4%. In general, the highest harvest occurs on opening day and the five Saturdays of the season. This year was a little different – opening day was exceptionally rainy over the majority of the state, which reduced harvest to 8.5% (95 birds) of the total harvest. This was much lower than opening day during the past two years. In 2012, opening day harvest was 18% of the total harvest and in 2013 it was 15% of the total harvest. Saturday harvest levels for the past spring season remained fairly consistent with other years at 25% (279 birds). (In 2012, it was 26%, while it was 23% in 2013.) The majority of turkeys were harvested by private land permit holders (920 birds), followed by state land (198 birds) permittees.

At least one turkey was harvested from 143 of Connecticut's 169 towns. Suffield (28), Lebanon (27), and Cornwall (24) recorded the highest harvest. State land hunters reported the highest harvest from Pachaug State Forest (16), Meshomasic State Forest (16), and Cockaponset State Forest (15). On a regional basis, the highest harvests occurred in wild turkey management zone 5 (156 birds), zone 2 (138 birds), and zone 3 (103 birds).

Although less than one in 10 spring turkey hunters harvested a bird in 2014, all individuals who participated in "The Hunt" were successful. Spring turkey hunting is much more than just harvesting a bird. This pursuit gives participants a chance to slow down and enjoy the outdoors. It also allows seasoned hunters to pass on hard learned knowledge to novice hunters and provides an opportunity to appreciate and marvel at the remarkable survival instincts of the wild turkey.

Deer and Turkey Management Zones





Emerald Ash Borer Expanding in Connecticut

According to the Connecticut Agricultural Experiment Station, the emerald ash borer (EAB) infestation, largely centered in New Haven County, has rapidly expanded into Fairfield, Hartford, Litchfield, and Middlesex Counties and has now been detected in 38 towns. The new towns where the beetle has been detected this year include: Ansonia, Branford, Bristol, Clinton, Cromwell, Derby, Durham, Litchfield, Meriden, New Haven, North Haven, Orange, Plainville, Rocky Hill, Seymour, Shelton, Thomaston, Trumbull, Wallingford, West Haven, Wolcott, Woodbridge, and Woodbury. The insects were previously found in 2012 and 2013 in Beacon Falls, Bethany, Cheshire, Hamden, Middlebury, Naugatuck, Newtown, North Branford, Oxford, Prospect, Sherman, Southbury, Southington, and Waterbury. Additional detections are anticipated.

The emerald ash borer is a destructive insect that has been responsible for the death and decline of tens of millions of ash trees from Colorado and the Midwest to New England and south to Georgia. Ash makes up about four percent to 15% of Connecticut's forests and represents about two to three percent of the urban trees in many communities.

When EAB is found, municipalities and homeowners can assess their ash trees and plan for the impact of this beetle. High value trees and lightly infested trees can be treated with systemic insecticides to protect them against EAB. Untreated ash trees will be lost and can die within two to three years once infested. Ash trees quickly decline and become hazardous, requiring removal, depending upon their location and risk to people and property.

Many EAB detections have been made by monitoring the ground nests of a native wasp (*Cerceris fumipennis*), which hunts many wood-boring beetles, including EAB, and brings them back to their nests. The wasp is an effective "biological surveillance" survey tool. In addition, purple detection traps have been set across Middlesex, Tolland, Windham, and New London counties. These surveillance programs are supported by the USDA-APHIS-PPQ.

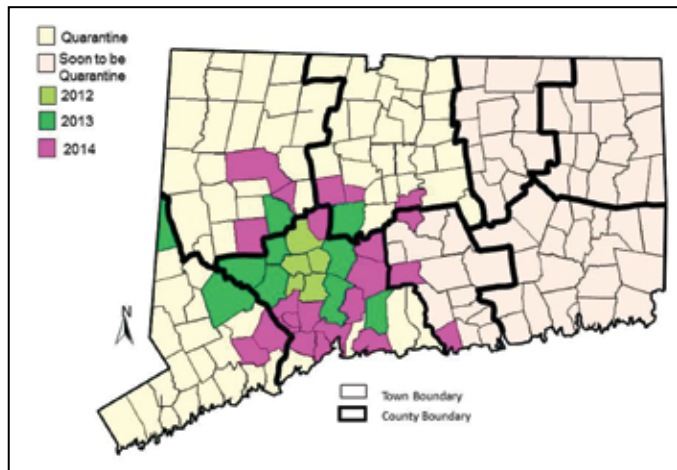
In Connecticut, a quarantine had previously been established that regulates the movement of ash logs, ash materials, ash nursery stock, and hardwood firewood from within Fairfield, Hartford, Litchfield and New Haven Counties to any area outside of those counties to help slow the spread of the beetle. The quarantine currently applies to only those four counties and mirrors a federal quarantine also imposed on the four counties.

With the detection of EAB in Middlesex County and rapid expansion of the EAB infestation to five of the state's eight counties, CAES plans to remove the state internal quarantine by adding Middlesex, New London, Tolland, and Windham counties to the existing EAB quarantine. Until that time, the current state and federal EAB quarantine is still in effect.

Regulations also are in effect regulating the movement of firewood from out-of-state into Connecticut or within Connecticut. These regulations were put in place to ensure that other invasive insects, not just the emerald ash borer, are not carried into Connecticut through the shipment of firewood. These regulations are not influenced by the new EAB detections.

Detailed information about the current quarantine and firewood regulations can be found at www.ct.gov/deep/eab or www.ct.gov/caes.

The emerald ash borer is a regulated plant pest under federal (7 CFR 301.53) and state (CT Gen. Statute Sec. 22-84-5d, e, and f) regulations. For more information about the EAB, please visit the following website: www.emeraldashborer.info. A fact sheet providing guidelines on the treatment of ash trees to protect them from EAB also is available at www.ct.gov/caes.



Map Courtesy of Connecticut Agricultural Experiment Station

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For more information about SmartWay Certified vehicles and tips on how to drive clean, you can watch video clips at <http://epa.gov/smartway/foryou/documents/little-flower-video-large.wmv> and <http://epa.gov/smartway/foryou/documents/smiling-epacar.wmv>. Then log onto EPA's Green Vehicle Guide or EPA/DOE's www.fueleconomy.gov and look for SmartWay Certified vehicles that satisfy your personal or fleet needs. Drive clean and save green!

Conservation Calendar

- May-AugustRespect fenced and posted shorebird and waterbird nesting areas when visiting the Connecticut coastline. Keep dogs and cats off shoreline beaches to avoid disturbing nesting birds. Herons and egrets are nesting on offshore islands in Long Island Sound. Refrain from visiting these areas during the nesting season.
- Sept. 27**National Hunting and Fishing Day** – Go to www.nhfd.org for more information.

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 calling 860-675-8130 (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.

- August 19**Beaver Marsh Evening Hike**, starting at 6:00 PM. Join Wildlife Division Natural Resource Educator Laura Rogers-Castro on an evening walk to the beaver marsh at Sessions Woods. Learn about beavers and other marsh animals as we explore this beautiful and serene location in the wildlife management area. Dress appropriately and bring water for the two-mile roundtrip trek.
- September 13.....**Stream and Marsh Exploration**, starting at 10:00 AM. Explore the streams and beaver marsh at Sessions Woods with Wildlife Division Outreach Program Assistant Hillary Clifton. Hillary will introduce participants to the animals, including salamanders, discovered in a freshwater stream. Then, the group will walk to the marsh to identify the wildlife found in this unique habitat. The hike will total over two miles roundtrip. Please bring water and wear appropriate shoes as there is a possibility of getting wet feet!

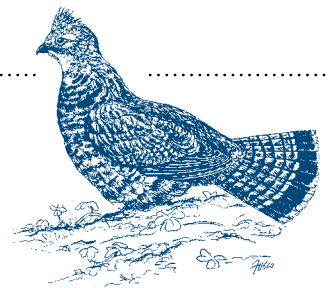
Hunting Season Dates

- Sept. 2-30..... September Early Goose Season in the north zone (north of Interstate 95)
- Sept. 15-30..... September Early Goose Season in the south zone (south of Interstate 95)
- Sept. 15-Nov. 18..... 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
- Oct. 4-31 Fall Firearms Turkey Season
- Oct. 11..... Youth Pheasant Hunter Training Day on private land only
- Oct. 4 and Nov. 1..... Youth Waterfowl Hunter Training Days
- Oct. 18..... Opening Day for the small game hunting season
- Nov. 8 through 15 Youth Deer Hunter Training Days

Consult the 2014 Connecticut Hunting & Trapping 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. The guide also is 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.



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Readers of *Connecticut Wildlife* are aware of the habitat management projects undertaken by the DEEP Wildlife Division to restore and enhance early successional habitats for the New England cottontail. Many other species are benefitting from these efforts, including the indigo bunting.