

July/August 2016

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



The 150th anniversary of natural resource conservation in Connecticut has provided me the opportunity to recognize the hard work and dedication of the Division's Environmental Conservation Police Officers that I have the pleasure to work with every day. The Officers that work for our Division chose this profession to be outdoors proactively enforcing the fish and wildlife laws of our state. My father was a Conservation Officer for the state for 25 years and I celebrated my 30th anniversary with the Agency in February. In all those years, the core values of our officers – integrity, honesty, and public service – have not changed.

The responsibilities of our officers have changed over time. Since 1895, Conservation Officers primarily enforced fish and game laws, stocked fish and pheasants, worked with landowners on hunting leases, and assisted in the wood duck nest box program. Over the years, more and more law enforcement duties were added, such as in 1972 when boating enforcement became the Division's responsibility. In 1988, we took over the shellfish enforcement program and, in 1993, the Division became responsible for law enforcement and public safety in our state parks. After 9/11, our officers were called upon to perform homeland security details, primarily in the marine environment around Millstone Nuclear Power Station near New London.

While officers work hard to provide a safe and secure environment for our citizens to recreate on the waters of our state and in our parks, we have not lost sight of the important role we play in natural resource protection. Not only are officers still enforcing fish and wildlife laws, but they participate in over 120 public outreach events every year. These include teaching at Conservation Education/Firearms Safety and boating education classes, attending hunting and fishing shows, speaking at local Boy Scout meetings, and giving lectures at state universities. Officers have had to learn to respond safely to an increasing number of calls about non-native species or potentially dangerous animals, such as alligators. Our highly skilled chemical immobilization team is called upon regularly to handle the state's increasing black bear population and our K-9 unit has dogs specifically trained in fish and game detection. We work with our federal partners enforcing commercial marine fisheries laws and laws pertaining to endangered and protected species.

Every one of our officers understands the important role they play in ensuring that the fish and wildlife laws and regulations managed by other programs within DEEP are successful. Without a visible and effective enforcement presence, the populations of our state's wildlife would be in jeopardy. Officers are often the only contact the public has with a member of the Agency, so we strive to meet public expectations by providing consistent services of the highest quality and treating those we serve with dignity and respect. Every day, our officers work hard to fulfill the mission of the Division, which is to provide natural resource protection and public safety through education, outreach, and enforcement.

Colonel Kyle Overturf, State Environmental Conservation Police Division

Cover:

For the past two years, the DEEP Wildlife Division has been involved with a cooperative project focused on the conservation and recovery of the rare Puritan tiger beetle (see page 4).

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

Commissioner

Robert Klee

Deputy Commissioner

Susan Whalen

Chief, Bureau of Natural Resources

William Hyatt

Director, Wildlife Division

Rick Jacobson

Magazine Staff

Managing Editor Kathy Herz

Production Editor Paul Fusco

Contributing Editors: Mike Beauchene (Inland Fisheries)

Penny Howell (Marine Fisheries)

Christopher Martin (Forestry)

Circulation Trish Cernik

Wildlife Division

79 Elm Street, Hartford, CT 06106-5127 (860-424-3011)

Office of the Director, Recreation Management, Technical Assistance, Natural History Survey

Sessions Woods Wildlife Management Area

P.O. Box 1550, Burlington, CT 06013 (860-424-3011)

Wildlife Diversity, Birds, Furbearers, Outreach and Education, Habitat Management, Conservation Education/Firearms Safety, *Connecticut Wildlife* magazine

Franklin Wildlife Management Area

391 Route 32, N. Franklin, CT 06254 (860-424-3011)

Migratory Birds, Deer/Moose, Wild Turkey, Small Game, Wetlands Habitat and Mosquito Management, Conservation Education/Firearms Safety

Eastern District Area Headquarters

209 Hebron Road, Marlborough, CT 06047 (860-295-9523)

State Land and Private Land Habitat Management

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.

www.ct.gov/deep/wildlife www.facebook.com/CTFishandWildlife

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.



The Connecticut Department of Energy and Environmental Protection is an Affirmative Action/Equal Opportunity Employer that is committed to complying with the requirements of the Americans with Disabilities Act. Please contact us at 860-418-5910 or deep.accommodations@ct.gov if you have a disability and need a communication aid or service; have limited proficiency in English and may need information in another language; or if you wish to file an ADA or Title VI discrimination complaint.

Copyright 2016 by the Connecticut Wildlife Division. The Wildlife Division grants permission to reprint text, **not artwork or photos**, provided the Wildlife Division is credited. Artwork and photographs printed in this publication are copyrighted by the CT DEEP Wildlife Division. Any unauthorized use of artwork and photos is prohibited. Please contact the managing editor to obtain permission for reprinting articles (deep.ctwildlife@ct.gov or 860-424-3011).

Printed on recycled paper

A Misunderstood Turtle

Written by Brendan Zielinski, DEEP Wildlife Division

1928: “At the Shade Swamp Sanctuary in Farmington, broods of young ducks hatched under natural conditions steadily decreased in numbers... the waters within the sanctuary were infested with black snapping turtles... As proof of efficiency of the trap net (a special device used to capture snapping turtles) and the abundance of these destructive reptiles, more than three thousand pounds of snapping turtles were caught during a period of two months in the summer of 1928. These turtles not only are destructive to ducks, but to the muskrats which constitute a very valuable asset of the sanctuary.”

The attitude that predators were the “bad guys” during the early 1900s is evident from this excerpt from the 1928 report of the Connecticut Board of Fisheries and Game. Snapping turtles were considered vermin and destroyed by sportsmen and conservationists alike. For over half a century, countless snapping turtles were trapped and destroyed throughout the state in an effort to “protect” game fish and ducklings in waterfowl breeding areas.

In Connecticut and elsewhere, snapping turtles had an inaccurate reputation for decimating game fish and waterfowl populations because scientific research indicates that this is rarely the case. A 1940s study in Connecticut found that not only fish, but also aquatic plants and crayfish, are dominant food items in a snapping turtle’s diet. Other studies also have shown that snapping turtles do not eat significant amounts of game fish, and that mammalian nest predators and large fish kill far more waterfowl than do snapping turtles. In natural situations, snapping turtles have no significant impact on fish or waterfowl populations.

Throughout history, and partially due to misunderstanding, snapping turtles could be harvested without any limits or restrictions. However, state regulations passed in 2013 established specific protections for the harvest of snapping turtles by designating seasons, size and bag limits, gear restrictions, and other measures designed to ensure the long-term viability of Connecticut’s population. Additionally, eggs cannot be taken and nests cannot be disturbed without DEEP authorization. In 2016, the regulations were tightened further from a possession and season limit of 30 turtles to

10, further sustaining the state’s snapping turtle population.

In 2015, researchers from Arcadia University, Mystic Aquarium, National Geographic Society, and DEEP began a new study on snapping turtles using a CritterCam attached to a turtle’s shell to record audio, video, depth, and temperature (see the Sept./Oct. 2015 issue of *Connecticut Wildlife*). The study hopes to answer questions about how underwater behaviors affect how often snapping turtles breathe, how long they stay at the surface, how long they dive, and how they interact with other animals. Researchers also are trying to determine how the turtles can alert us to the presence of pollution and contamination. Snapping turtles are more tolerant of human disturbance and contamination in the environment than many other aquatic species, and these long-lived omnivores may consume and accumulate large amounts of contamination throughout their lives. This study will provide a better understanding of the current types and amounts of contaminants in snapping turtles and also help biologists understand the biological effects of these contaminants in wildlife populations. Researchers also hope that snapping turtles can be an indicator species, alerting us to contaminants that may threaten humans or other members of the aquatic ecosystem. Information from these studies will be essential to ensuring that this iconic reptile remains part of Connecticut’s wildlife heritage.

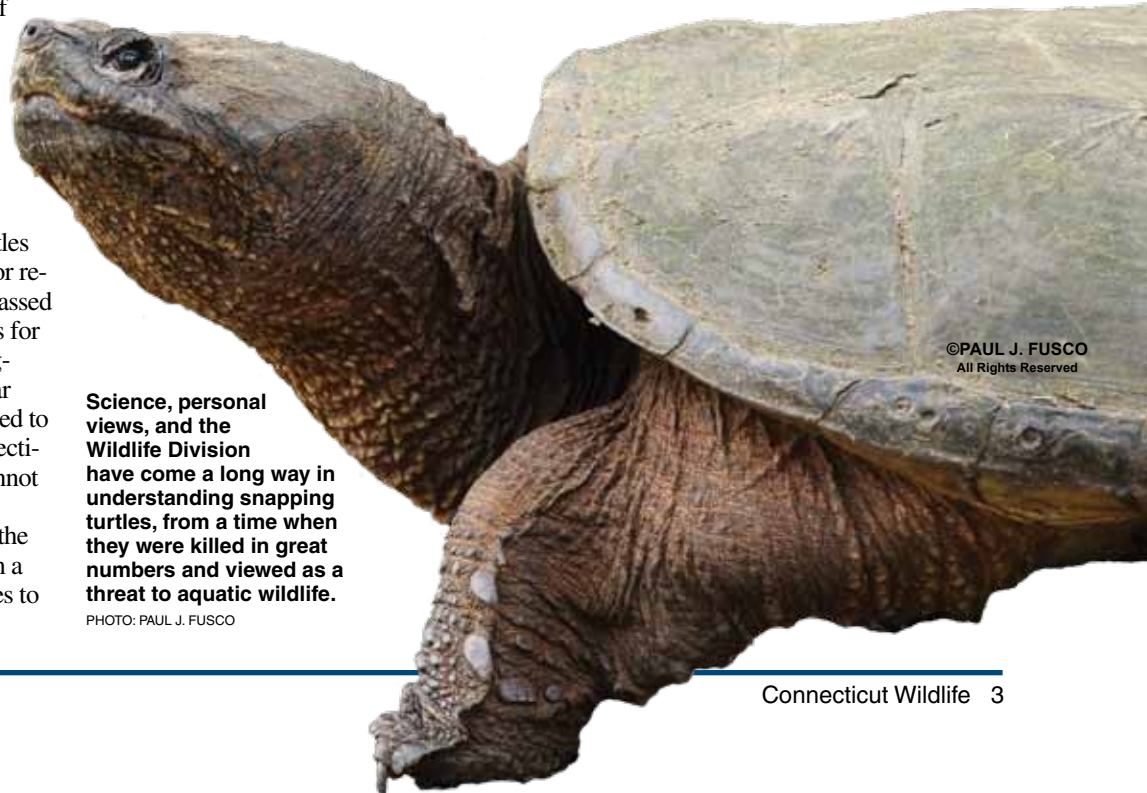
According to Wildlife Division biolo-



CT DEEP HISTORICAL ARCHIVES

gist Brian Hess, “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.

Science, personal views, and the Wildlife Division have come a long way in understanding this essential species, from a time when they were killed in great numbers and viewed as a threat to wildlife and the health of ecosystems. Today, people are more concerned about observing and protecting snapping turtles rather than killing them, even helping females cross roads during the breeding season.



©PAUL J. FUSCO
All Rights Reserved

Science, personal views, and the Wildlife Division have come a long way in understanding snapping turtles, from a time when they were killed in great numbers and viewed as a threat to aquatic wildlife.

PHOTO: PAUL J. FUSCO

Saving the Puritan Tiger Beetle in Connecticut

Written by Laura Saucier, DEEP Wildlife Division; photography by Paul Fusco, DEEP Wildlife Division

Tiger beetles are a fascinating group of animals. There are over 100 different species of tiger beetles in North America and over 2,000 species worldwide. In their adult form, tiger beetles are hunters that chase down prey with their long legs, much like the cheetahs of the plains of Africa. They have impressive mandibles (jaws) for their small size. Tiger beetles are often the top invertebrate predator in the open habitats where they occur. Fifteen species of tiger beetles occur in Connecticut; eight are on Connecticut's Endangered, Threatened and Special Concern Species list due to perceived declines in their populations or habitats.

The Puritan tiger beetle (*Cicindela puritana*) occurs on sandy beaches in New England along the Connecticut River and in the Chesapeake Bay region of Maryland. Historically, *C. puritana* was documented at 11 distinct areas along the Connecticut River from New Hampshire to Connecticut, generally on beaches where large river bends result in regular deposition of sediments. Unfortunately, human-caused changes to the flow of the Connecticut River and surrounding land uses resulted in the extirpation (elimination) of Puritan tiger beetles from nine of those 11 sites by the early 1900s. Today, the New England population is comprised of the only two remaining sites in Hadley, Massachusetts, and Cromwell, Connecticut. The now small New England population is estimated



New England's Puritan tiger beetle population is estimated at just over 500 individuals located at two sites along the Connecticut River, one in Massachusetts and the other in Connecticut.

to have just over 500 individuals. *C. puritana* also is struggling in the Chesapeake Bay region, but populations are more robust (over 1,000 individuals) and spread out over more sites.

In August 1990, the U.S. Fish and Wildlife Service (US-FWS) included the Puritan tiger beetle for protection under the federal Endangered Species Act as a threatened species. Connecticut included the beetle under our state Endangered Species Act, listing the species as endangered in 1992. The reasons cited for listing *C. puritana* are: 1) within New England, only two populations remain within the former range on the Connecticut River, and 2) the Chesapeake Bay populations are under great threat due to human-caused habitat alteration.

In New England, the decline of *C. puritana* is primarily the result of 17 dams built on the Connecticut River above Hartford for flood control and hydroelectric power. The beetle has evolved to live in a dynamic habitat, relying on natural river processes to deposit and erode sediments, keeping areas of shoreline sandy and relatively free of vegetation. Hydropower dams especially affect suitable habitat because they artificially maintain steady flows, and the river no longer experiences periods of high flooding or natural periods of low flow. In ad-



The beach-like terrain of this small stretch of sandy riverside habitat along the Connecticut River is the domain of the federally threatened and state endangered Puritan tiger beetle.

dition to damming, shoreline stabilization (building retaining walls along the shoreline, adding rip-rap to the river bank, etc.) and recreational activities, such as extended camping on these beaches and excessive wakes created by jet-skis and speed boats, have also been cited as exacerbating stressors.

A close look at the life cycle of *C. puritana* reveals why they are so sensitive to changes in the hydrology of the river. From July to August, larvae hatch from eggs buried in shallow sand and excavate vertical burrows a few inches deep in sand located somewhere between the high-tide line and sparse vegetation near the crest of the riverbank. The larvae feed by anchoring themselves in their burrow with specialized abdominal hooks and waiting for prey to pass by the burrow. The larvae will grab the prey when it walks by, pulling it into the burrow. After two to four weeks, the larvae molt from their first instar to the second instar stage and deepen their burrows up to two feet down. In October, they close their burrows for an overwintering period that lasts until April. The larvae emerge in April-May and feed for a couple of months before closing the burrows again until September when they molt into the third and final larval stage. In fall, they again close their burrows to overwinter until the next spring and, in late June, adult tiger beetles emerge from their pupal burrows to feed and mate. As an adult, *C. puritana* is an aggressive predator, often hunting down insects and other invertebrates with surprising speed and agility. By mid-August, two years after hatching from the egg-stage, the adults begin to die off.

2016 Efforts

For the past two years, the Wildlife Division has been working with the USFWS Region 5, Silvio O. Conte National Wildlife Refuge, tiger beetle experts, and academia to initiate recovery objectives in the USFWS Puritan Tiger Beetle Recovery Plan. Specifically, funding was secured to 1) reintroduce Puritan tiger beetles to sites within their historic range in Connecticut, and 2) initiate a captive rearing pilot program to determine if captive rearing is a viable tool for conserving this species.

This field season, third instar larvae were dug up and transplanted to two state-owned properties along the Connecticut River. The larvae were placed and monitored by tiger beetle experts to determine what percentage of the transplanted beetle larvae pupated into adults. Because this beetle requires two years to reach maturity, it will not be known until 2018 if these first transplants successfully mated and laid eggs. Researchers will dig and transplant larvae in



As part of the USFWS Puritan Tiger Beetle Recovery Plan, third instar larvae (right) were dug up (top photo) and transplanted to two state-owned properties along the Connecticut River. The larvae were placed and monitored by tiger beetle experts to determine what percentage of the transplanted beetle larvae pupated into adults (above). Also this field season, adult beetles of both sexes were captured and brought to Richard Cronin Aquatic Resource Center located in Sunderland, Massachusetts, where a laboratory has been created to rear and house these beetles.



2017 to establish a second cohort at these same sites that will not mature until 2019. If funding is available, a second wave of transplants will be conducted beyond 2018.

Also this field season, adult beetles of both sexes were captured and brought to Richard Cronin Aquatic Resource Center located in Sunderland, Massachusetts, where a laboratory has been created to rear and house these beetles. The captured individuals will be studied by tiger beetle experts and academics to try to answer some questions, such as details of larval development, habitat preferences for egg deposition, how many eggs each female lays, adult parasite loads, and more. Given the rarity of this insect, there is so much we still do not know. Efforts will shed some much needed light on the needs of this beetle, ultimately adding to our knowledge of tiger beetle biology and rare species conservation.

The Way We Were: Wardens Then and Now

Written by Officer Elise Bouthillier, DEEP Environmental Conservation Police Division

Over the past 120 years, the State of Connecticut Environmental Conservation Police have gone through many changes. We began as Special Game Protectors under the supervision of the State Board of Fisheries and Game, and in 1913

Fisheries and Game and its responsibilities. DEP maintained two separate law enforcement job series: Conservation Officers and Environmental Protection Law Enforcement Officers (state park police). While the department underwent a massive shift, the

Patrol was done by car, boat, or on foot and with a minimum of, if any, specialized gear. Vehicles with lights, sirens, and radios were unheard of and boats were wooden and rarely motorized. These early Wardens covered a much more rural patrol than that

of modern officers and their duties focused on working with wildlife possibly more often than with people. They hiked to remote locations to band and stock pheasants; trapped and removed “nuisance wildlife,” such as snapping turtles and bobcats; and stocked trout from simple, non-motorized wooden boats. Not only was the technology of the day much more simplistic, but the attitudes of the public in regards to natural resources and police officers was a far cry from the environmental and public safety concerns of the modern era.

In 1993, a significant shift in the role and responsibilities of Game Wardens occurred – Conservation Officers and Environmental Protection Law Enforcement Officers were merged to become Conservation Enforcement Officers. In addition to the traditional enforcement of hunting, fishing, and trapping, Conservation Enforcement Officers were responsible for patrolling all DEP-owned properties and the inherent law enforcement

issues that came with them. This merge has proven to be a pivotal point in the history of the Environmental Conservation Police and has shaped the job into what it is today. This was the turning point at which the department began to adopt more modern policing techniques and the job description began to include more aspects of traditional police work as opposed to being singularly focused on fish and game.

This transition is not only reflected in the change of titles, Game Warden to the current Environmental Conservation Police Officer, but it can be physically seen in the outward appearance of our modern officers. Gone are the days of wool uniforms, shiny brass badges, and leather puttees. The modern Game Warden is outfitted in gore-tex and rip stop BDU (military slang for battle

COURTESY OF W. MYERS, CURATOR CT CONSERVATION OFFICERS ASSOCIATION ARCHIVES



Part-time Deputy Warden Holden (left) and Full-time Country Warden Seth Monroe (right) on the bank of the Farmington River, April 19, 1934. Note the black bow ties, “cross draw” style holster, and black shoulder patches, which were the first to be issued for Connecticut Game Wardens.

a more structured system of County Game Wardens and Deputy Wardens was put in place. That system remained for the next 40 years and our duties included the traditional enforcement of hunting, fishing, and trapping laws. These first Wardens stocked fish, pheasant, and even rabbits; educated sportsmen; and patrolled the state by whatever means necessary. In 1953, another name change was enacted, and the title of Game Warden was replaced with Conservation Officer. Regardless of the name change, our duties continued to encompass much of what one traditionally thinks of as the activities of a Game Warden, and business continued as usual.

In 1971, the Department of Environmental Protection (DEP) was created, effectively absorbing the State Board of

duties and job description of the Conservation Officers remained largely unchanged.

The uniform and gear of early Wardens reflected the requirements of the job, but also the different social mind set of the era. Uniforms consisted of green wool breeches and coats worn with white shirts and formal black ties. Leather boots with black leather puttees were standard issue footwear.

The very first Wardens were identified only by a single metal badge and hat pin, with shoulder patches being introduced in 1934. They wore simple black leather belts with cross chest bandoliers, and while some did carry firearms, they were not required to until 1974. Wardens were trained in firearms use, most often with the “Police Colt” .38 caliber revolver, which was carried in a reverse cross draw leather flapped holster.



Environmental Conservation Police staff in 2016. Note the modern BDU style uniform, full duty belt, and green and gold shoulder and badge patches.

PHOTO: T. RICARDI, U.S. FISH AND WILDLIFE SERVICE



A. BLACKWELL, DEEP ENCON POLICE

A 1978 four door Plymouth Fury station wagon (left), which was the assigned patrol vehicle for Conservation Officer Randolph Dill in 1980. Note the dash emergency light and front marker plate. The current style of assigned patrol vehicle (right), a 2014 Chevrolet Silverado pickup truck, with light bar, double cab, and 4-wheel drive.



COURTESY OF W. MYERS, CURATOR CT CONSERVATION OFFICERS ASSOCIATION ARCHIVES

dress uniform) style uniforms, complete with Kevlar vests and weather resistant nylon duty belts, filled with a plethora of tools always close at hand. This drastic juxtaposition of dress style not only reflects the change in fashion morays over the last century, but also highlights just how greatly the job itself has transformed. As our title, uniform, and equipment evolve, so do our duties and responsibilities.

Today's Environmental Conservation Officer is practically overloaded with modern equipment and gear. We are outfitted in breathable tactical uniforms with an abundance of pockets capable of storing away pocket knives, compasses, magnesium fire starters, note pads, lobster gages, several cell phones, and a digital radio capable of transmitting signals across the state. Formal ties, stiff wool, and leather have

been replaced with modern Kevlar vests fitted with ceramic or steel plates, and flexible nylon duty belts loaded down with almost every tool imaginable. The average duty belt can weigh upwards of 20 pounds and includes a standard issue service hand gun, extra ammunition, pepper spray, Taser, baton, and handcuffs. In addition, many officers carry extra gear as they see fit, most commonly emergency medical kits and a variety of outdoor gear, to include snowshoes or even skis. Additional equipment can also include life jackets, catch poles, waders, binoculars, spotting scopes, and layers of fleece, gore-tex, and cotton clothing suitable for New England's ever unpredictable climate. Standard issued patrol vehicles are equipped with lights, sirens, radios, and a full computer terminal capable of retrieving information almost instantly. This apparent overabundance of gear is not simply a result of better access to a wider

variety of resources, but more accurately a reflection of just how drastically the job has evolved. Officers now cover enormous areas of the state and are expected to respond to calls within minutes, not hours or days. Not only do officers continue to perform many of the historical duties of previous Wardens, such as stocking trout and pheasants, they also fulfill the role of traditional law enforcement. On any given day, an Environmental Conservation Police Officer might begin hiking in the woods checking deer hunters, transition into a search and rescue operation by land or on water, and finish by enforcing motor vehicle regulations in a state park or forest. We operate almost completely out of our vehicles and must be prepared for nearly any eventuality, including issuing paperwork, rescuing and transporting injured wildlife, and being constantly on alert for threats made against ourselves and the public we serve.

Changes and Challenges: History of Bass Management in CT

Written by Bob Jacobs, DEEP Inland Fisheries Division

In the Beginning

The Connecticut Fisheries Commissioners first stocked the two bass species, smallmouth and largemouth bass, sometime in the late 1800s during an era when the goal was to stock as many different kinds of fish as possible, both for sport and to eat. Soon after bass were introduced, it was apparent that they needed special protection. Market fishing (the practice of harvesting as many fish as possible of any size to sell) for bass and other species was commonplace in the 1800s. Thus in 1870, the first bass regulations were implemented starting with gear restrictions – fishing was limited to “hook-and-line” and soon followed by closed seasons to protect newly stocked fish. The first minimum size limit was instituted in 1901 (6 inches) and the first creel (harvest) limit followed in 1927 (10 fish per person per day). Bass regulations were periodically tweaked during the

early 1900s until 1953, when a 12-inch minimum length limit and a six-bass creel limit was implemented (this is still our current statewide regulation).

The Renaissance

Thirty years later, due to the rising popularity of bass fishing and concerns that fishing quality was not “what it used to be,” the Inland Fisheries Division launched an intensive five-year (1980-84) study of a cross-section of Connecticut lakes to determine the status of our bass populations. It was discovered that bass growth, harvest, and recruitment (the numbers of fish that hatch and survive to catchable size) varied considerably among lakes and that the existing statewide regulation was not adequate to promote optimal bass growth in many waterbodies. It also was found that a higher minimum length limit should enhance fishing quality in some lakes, while

other lakes had too many small bass, a condition known as “stockpiling.”

Stockpiling occurs when there are too many fish in a lake and not enough food for the fish to grow to a large size. In these situations, the fish have less than optimal growth rates and remain small for their entire life (stunted), dying of natural causes before reaching a catchable size.

To reduce stockpiling, managers use a “slot length limit” regulation (allow anglers to harvest smaller fish) to thin out numbers of small fish and improve growth rates, while protecting the larger fish that are more desirable to anglers. An example of this is a “12-16 inch slot” where anglers may harvest bass under 12 inches or typically one or two over 16 inches, but must release any bass between 12 and 16 inches.

Into High Gear

Connecticut bass research swung into



DEEP INLAND FISHERIES

Lake and pond electrofishing samples indicate that Connecticut’s bass populations are healthier than ever. Yet many anglers complain that they are not catching as many large bass as they used to. The reason is simple – the fish are getting harder to catch. Research indicates that bass are capable of learning to avoid lures. However, recent studies have also shown that the fish have changed in a more fundamental way – that fishing itself has caused a change in the fish’s biology and behavior (more to come in the next issue).



Bass are collectively the most popular gamefish in Connecticut, and the state's most ubiquitous fish species – with self-sustaining populations of one or both species found in almost every lake, pond, and larger river in the state. Besides being popular with anglers, bass are the primary predators in Connecticut lakes and ponds, thus playing a key role in keeping our fisheries in balance.

high gear after the Wallop-Bureau Act (1984) increased federal funding to states for the purpose of sport fish restoration. This new phase of bass study (1988-1994) had two components. The first was a statewide electrofishing survey of over 100 lakes, ponds, and large rivers to collect data on warmwater fish populations. The second was implementation of experimental, more conservative length limits in three lakes (12-16 inch slot limit in two lakes and a 16 inch minimum length limit in the third).

The result of these initial length limit experiments was that the number of bass (over 12 inches) increased by as much as 40% within five years of changing the regulation. These encouraging results led to the creation, in 2002, of 30 “Bass Management Lakes” where conservative length and creel limits tailored to each lake were implemented. Five years after the change in regulations on these 30 lakes (2007), data indicated some bass populations improved and some declined slightly, while others remained unchanged. The average result was – no effect. What happened?

Present Challenges

Over the past 30 years, anglers have become increasingly interested in fishing

A recent cooperative study conducted by UConn and the DEEP Inland Fisheries Division revealed that in our most heavily fished public lakes, on average, each catchable size bass is caught two to three times per year.

for sport and much less so in harvesting bass. Nowadays, over 85% of bass anglers practice strict catch-and-release fishing. Typical annual bass exploitation rates (the proportion of a fish population that is harvested per year) declined from around 40% in the 1980s to below five percent at present. Once fish harvest rates become very low, traditional fisheries management strategies, such as length limits and creel limits, start to become irrelevant (i.e., protecting fish from harvest has little effect if anglers are not taking many

of them anyway). Thus, the significant change in bass angler attitudes over time greatly reduced the beneficial effects of the special Bass Management Lake regulations soon after they were implemented.

Challenge for the Future

The advent of the “catch-and-release” era in Connecticut bass fisheries has created a new set of challenges for fisheries managers. Survival of caught and released bass is very high – generally less than five percent die as a result of being caught once. However, due to the cumulative effect of so much angling, modelling has indicated that catch-and-release related mortality is the greatest factor affecting our bass populations, even more than harvest. For this reason, to maintain quality bass fisheries, emphasis should be on practices that optimize fish survival (after being caught) and less on



Smallmouth Bass



Largemouth Bass

creating new fishing regulations. It has become obvious that new and creative ways of managing bass fisheries need to be developed. As we move forward, we encourage greater communication and collaboration with everyone who is interested in improving bass fishing for the next 150 years and beyond.

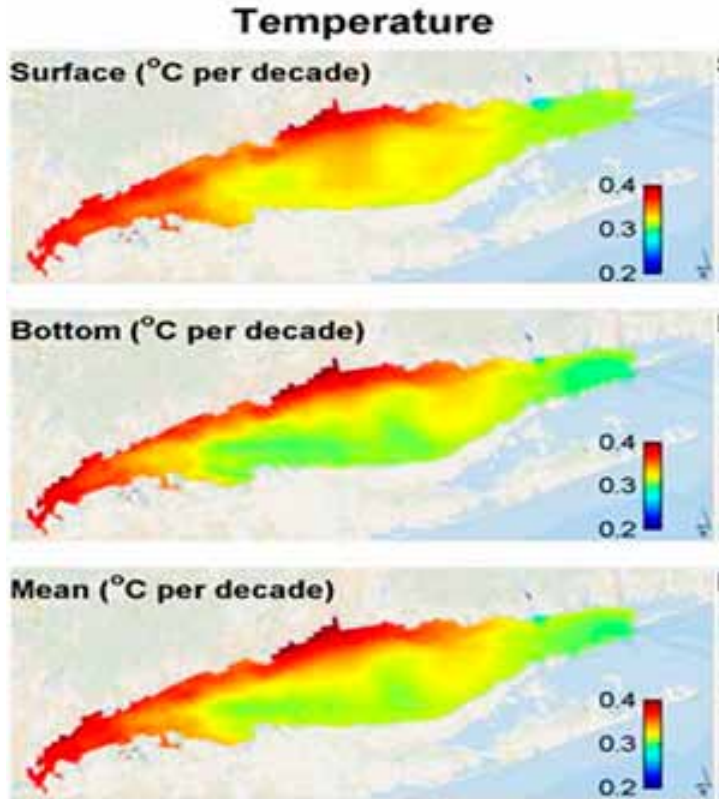
Climate Change Here and Now in Long Island Sound

Written by Penny Howell, DEEP Marine Fisheries Division

DEEP Marine Fisheries Division staff just completed a collaboration with the Stevens Institute of Technology in New Jersey and the federal National Marine Fisheries Service to develop a high resolution model that tracked past changes and simulates potential future changes in the climate of the Long Island Sound ecosystem. The project was funded through both New York and Connecticut Sea Grants because the Sound is essentially left out of larger coast-wide climate models developed by the Intergovernmental Panel on Climate Change (IPCC), a concern for both states that share the Sound. This modeling exercise was novel in that it was structured around successfully “predicting” the past 35 years (1979-2013) in terms of water temperature, salinity, wind and tidal patterns, storm events, sewage and industrial water discharge, and several other variables for the entire Sound, New York Harbor, and the southern end of adjacent rivers. Once the model was deemed “skillful” at recreating the past, it was then used to predict what would happen if atmospheric carbon dioxide increased one percent each year for 20 years, essentially doubling current levels (an intermediate IPCC scenario).

Both direct observation and model results show an upward temperature trend. The Sound is warming at a rate of 0.3-0.4° Celsius per decade, which is much faster than the oceans of the world. Warming is most evident along the more shallow parts of the Connecticut coastline and western Narrows. The physical oceanographers at Stevens Institute working with this model were able to directly relate this warming trend to atmospheric events in the Pacific Ocean and Alaska which have strong influence over the path of the jet stream. These results showed that the Sound’s physical environment is influenced primarily by global forces in the Pacific, and only marginally by events in the Atlantic.

The next step was to assess the effect of these changes on the Sound’s marine populations. Physical data and fish abundance trends from the Connecticut DEEP Water Quality



Model results showing the average increase in water temperature from 1979-2013 throughout Long Island Sound. The greatest increase (red) is in shallower areas along the Connecticut coast and in the western Narrows.

Survey and Long Island Sound Trawl Survey were used to generate “Habitat Suitability Indices” for fish species common in the Sound. Species not targeted by either sport or commercial fishers were grouped into two temperature tolerance guilds, one preferring colder temperatures and one preferring warmer temperatures.

Analysis of the historical data showed a significant upward trend in the frequency of occurrence of preferred temperatures for the warm guild over the past 35 years. In fact, the modelers showed that the abundance trend of warm tolerant species in the Sound in the last 35 years was very closely related to changes in an index of Pacific Ocean atmospheric events (called the Pacific Decadal Oscillation or PDO). There was no trend in the frequency of preferred temperatures for the

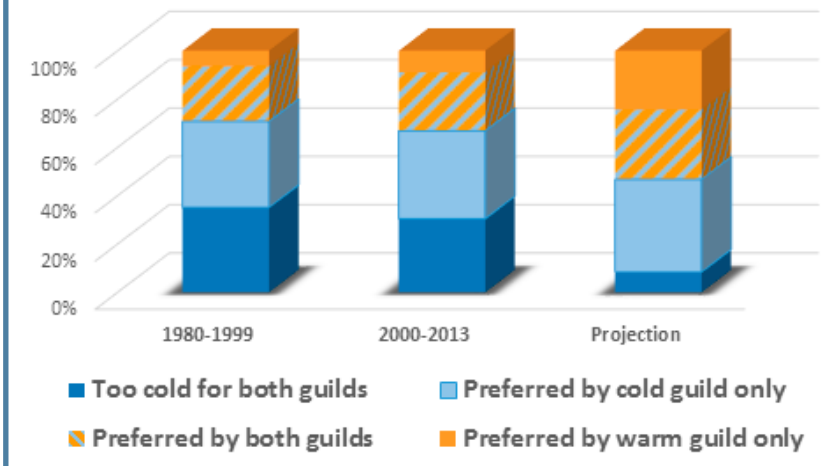
P. J. FUSCO



©PAUL J. FUSCO
All Rights Reserved

The lobster is the “poster child” for climate change. The species is very sensitive to temperature variation and has distinct temperature thresholds which dictate its behavior and survival.

Fish Guilds: Percent Spring Area*Days



This graph shows the percent of the Sound area totalled over spring (April-June) days within two historic time periods and a 20-year future projection where bottom water temperature is within the preferred range for a cold tolerant fish guild versus a warm tolerant fish guild. Although the total for both guilds increases, the occurrence of overlap and therefore competition between the two also increases.

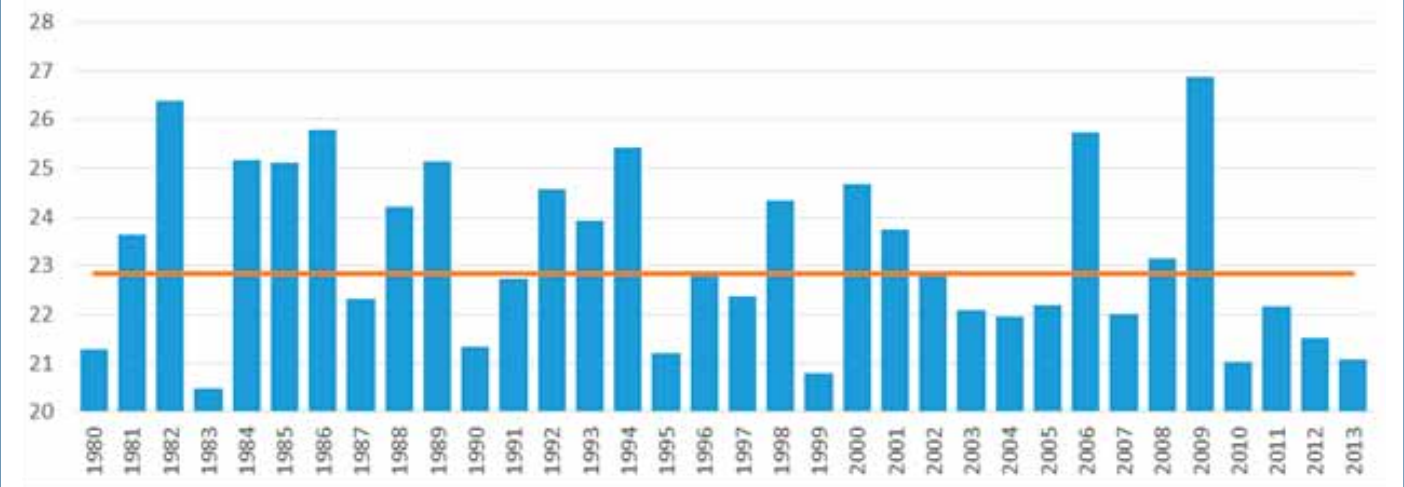
cold guild, only a calendar shift forward in spring. The result has been an increase in the diversity of species captured in the Trawl Survey over the last decades with no consistent change in overall abundance.

Projected future water temperatures, based on a doubling of atmospheric CO₂ over 20 years, showed that unsuitable temperatures for warm guild fish species will decrease to half the historic values. This change will continue to open the door to mid-Atlantic species, such as scup, black sea bass, and butterfish, allowing them to migrate sooner into the Sound in greater numbers to feed and reproduce. Competition between these fish and the Sound's iconic cold tolerate species, including winter flounder and rainbow smelt, will most likely increase and result in several winners and several losers.

Everybody's favorite invertebrate, the American lobster, also was included in this exercise because of its commercial value and the fact that the Sound's population experienced a dramatic die-off in 1999. Model results showed that the occurrence of its preferred temperature range in time and space has decreased, especially in 1999 and 2010-2012. Research prompted by the die-off revealed that lobsters have a fairly distinct upper limit to their physiological tolerance of warm temperatures. Model results showed that the occurrence of stressfully high temperatures above this threshold have increased since the mid-1990s and the future projection showed that the frequency of occurrence of stressful temperatures will nearly double. These results cast real doubt on the prospect of the lobster population rebuilding in the near future.

The results of this modeling exercise have several other management implications. As the "suitability window" shifts forward on the calendar for cold tolerant species, it creates problems with fishing season restrictions that were worked out between the states based on historic harvest patterns that no longer hold true. The same can be said for the widening of the "suitability window" for warm tolerant species which should give local anglers and commercial harvesters greater opportunity to target newly abundant species. However, we are not the only predator in the ocean. Temperature and salinity changes will bring new predators into the Sound sooner and for longer seasons. For some species, these physical changes also could disrupt the critical timing between the hatching of young and their food sources. Together these changes result in lower survival of vulnerable life stages for some of our traditional favorite species. So, we will need to keep a close eye on this brave new world of changing climate which is now upon us.

LOBSTER: Percent Area*Days within Ideal Temperature Range



This graph shows the percent of the Sound area totalled over the days of each year where bottom water temperatures are within the preferred range for lobster. Only three years since 2002 have been above average (yellow line). The occurrence of preferred temperature in 1999, the year of the die-off, was particularly low. (Area*Days is the product of area times days that fall into a category of temperature.)

Common Loon - The Great Northern Diver

Article and photography by Paul Fusco, DEEP Wildlife Division

As day turns to night and darkness reveals a star-studded sky, the eerie call of a common loon is heard echoing across the still water of a quiet lake. Often described as wailing, yodeling, or tremolo, the active calling of the common loon is both enchanting and mystical. Common loons are esoteric in that they represent a sense of the north woods and true wildness that has escaped the perceptions of the common populace. Loons provide a connection to the outdoors that many people appreciate and admire.

Summertime loons are a rare sight in Connecticut. One or two may be present in some summers at large isolated inland lakes, or perhaps a non-breeder might spend the summer along the coast. Generally speaking, common loons are rarely found in our state as a breeding species.

At the size of a small goose, loons are large, powerful swimming birds. Their bodies are designed for swimming and propelling underwater, with strong legs that are set well to the back of the body, making walking on land difficult and awkward. Loons take flight by flapping their narrow wings while running along the surface of the water. It may take over 100 yards before they become airborne. In fact, most loons cannot take flight from land. Once airborne, flight is strong and direct. The birds have rapid wingbeats and a hunched posture as they hold their neck and head lower than the body. The large webbed feet trail behind, acting as rudders.

The most notable features of the summer plumage include an elegant black and white pattern on the back, dark green and white patterned neck collar, and a white underside. The head is dark green and the bill is black. In winter, the plumage is dark gray above and white below. When seen at a distance during winter, the birds may be difficult to separate from other loon species that are very rare in our area, which would include the yellow-billed and Pacific.

Habitat

While loons are rarely found in Connecticut during summer, they are commonly seen outside of the breeding season. Large inland lakes and Long Island Sound are favored habitats and great



places to look for them during migration and in winter. At times, they may be seen in the company of red-throated loons, which are smaller.

Common loons require clear water to be able to see and pursue their food as they swim underwater. Because of their reliance on clean water, the presence of loons on a body of water is considered to be an indication of water quality. The diet consists primarily of small fish and crustaceans. In summer, other invertebrates, frogs, and salamanders are also on the menu. Prey is caught with their pointed, dagger-like bill.

Behavior

During the breeding season, common loons have their greatest success nesting at large, deep lakes that offer quiet isolation from development and especially from power boats. Small islands of vegetation are often used as nest sites or resting places. Nests are built by piling dead vegetation into mounds at the water's edge. Loons only come out of the water to nest. The typical clutch size is two. In Connecticut, the most likely places for possible nesting are on access restricted water company properties, including Barkhamsted, Nepaug, and Colebrook Reservoirs in the northwestern part of the state.

Common loons are accomplished divers. They have the ability to remain un-

derwater for extended periods of 15 minutes or more and can cover long distances before having to resurface. In fact, some dives may reach depths of more than 200 feet.

To facilitate underwater swimming and diving, loons can control buoyancy by compressing their bodies and flattening their feathers to release air pockets, which makes them more streamlined and less buoyant. Loons also have denser bones than most other birds, reducing buoyancy for swimming and underwater diving.

Loons also have the physiological ability to change oxygen levels and blood flow to different parts of the body when making dives. They are able to maximize the use of oxygen in their blood to where it is needed most during a dive, such as to the nervous system and heart.

Oxygen flow to other body parts is reduced to anaerobic metabolism until the bird surfaces to breathe. This enables loons to make extensive and deep dives.

Conservation

So few common loons occur in Connecticut during the breeding season that they are on the state's list of special concern species. Connecticut is on the southern edge of the common loon's breeding range. The birds are much more plentiful to our north in northern New England and Canada.

DEEP records indicate that there have been at least five confirmed occurrences of successful breeding since the 1950s. Most of those were in the northwestern part of the state. The most recent record is from 2015. Prior to the 1950s, data are spotty and incomplete with no other confirmed records.

In the Northeast region, common loon populations are subject to many pressures, including acid rain, mercury pollution, lead ingestion, and high levels of disturbance on nesting lakes. Despite these threats, the population is considered stable, thanks in large part to conservation measures, including lake management, nest monitoring, and public outreach. Loon conservationists must remain diligent to keep threats minimized and protect loons into the future.



While common loons are rarely encountered in Connecticut during the breeding season, they are fairly common in winter on large bodies of open water and in Long Island Sound.

The Triple Threat Facing Common Loons

Lead Poisoning

Lead poisoning occurs when loons pick up grit from lake bottoms to aid in digestion. Many loons pick up lead sinkers and jigs instead of stones, which end up slowly poisoning the birds. Lead sinkers and jigs cause fatal lead poisoning if ingested. All it takes is one lead sinker or jig to kill a loon or other water bird if it is swallowed.

Lead poisoning is the leading cause of mortality in adult common loons in Maine.

Widespread public outreach in loon breeding areas helps to protect the birds.

The use of loon-friendly, lead-free fishing tackle, which is made of bismuth or plastic, and properly disposing of monofilament line will go a long way to help protect loons. Also, use biodegradable line whenever possible. These recommendations are good not only for loon nesting areas, but also for wintering areas, and will help protect other wildlife from needless perils as well.

Acid Rain

Acid rain is primarily caused by fossil fuel combustion and vehicle and power plant emissions. Due to the west to east flow of our weather pattern, acid rain that is deposited in the Northeast originates from air pollution generated by coal-burning power plants in the Midwest.

Acid rain can be deposited by rain, snow, and fog. Sulfur dioxide and nitrogen oxide pollutants in the air combine with atmospheric moisture to create sulfuric acid and nitric acid. These acidic compounds change the chemistry of water and soils. Acidity also causes heavy metals to be unleashed into the environment by breaking down the chemical bonds keeping those metals in place. Once these contaminants get into the environment, the consequences are often deadly for fish in ponds and lakes. In addition, wildlife higher on the food chain, such as loons, may be poisoned.

Mercury Pollution

Coal-fired power plants are the largest source of mercury pollution. Trace amounts of mercury found naturally in coal are released into the atmosphere when coal is burned to produce electricity. Once in the air, mercury returns to earth with rain and snow, or as dry particles that then end up in rivers, lakes, and coastal waters. Over time, mercury may settle in sediment on the bottom of water bodies. However, in acidic lakes, it becomes more water soluble and can be released back into the water from the sediment. Northeastern states and Maritime provinces of Canada have the worst mercury pollution in North America.

Because mercury accumulates in the aquatic food chain, top predators that eat a lot of fish, such as loons, are the first victims to show signs of mercury poisoning. Scientific studies conducted in the northeastern United States and Canadian Maritimes have shown that loons breeding in these areas are experiencing reproductive problems consistent with mercury poisoning.

Loons with high levels of mercury may suffer reproductive failure, where no young are able to survive. Being a neurotoxin, mercury affects the nervous system and can debilitate young loon chicks, leaving them with a lack of motor coordination and leading to death.

Loon populations from our region are considered seriously at risk from mercury pollution. In some areas, the recruitment of young birds is not high enough to sustain the population.



©PAUL J. FUSCO
All Rights Reserved

Forest Fires and their Absence in Connecticut

Written by Emery Gluck, DEEP Division of Forestry

When you think of forest fires, Connecticut does not usually come to mind. But it wasn't too long ago that fires were fairly common. DEEP Forestry Division staff recently digitized fire maps of Pachaug State Forest from 1937 to 1968 into Arc Map Geographical Information System (GIS). Pachaug, which is Connecticut's largest state forest, is located along the Connecticut/Rhode Island border. The maps reveal that conflagrations (destructive fires) were frequent in at least that locale. An additional 5,000-acre forest fire was reported on May 4, 1930, which occurred prior to the years included in the mapping effort. If the 1930 fire was added, it would be more than double the largest mapped fire and paint an additional sizeable chunk of the map red.

From 1917 to 1922, an average of 49,000 acres or about three percent of the forest in Connecticut was reportedly burned annually. 1915 was a record year with 115,000 acres burned. For a frame of reference, the average size of a Connecticut town is just over 18,000 acres.

On one of the worst fire days recorded – May 4, 1930 – there were seven ongoing fires each burning over 1,000 acres. According to then State Forester Austin Hawes in his *History of Forestry in Connecticut*, “Two swept in from New York, one in Kent burning 1400 acres in Connecticut beside an estimated 6000 acres in New York; the other came into Salisbury, burning 4460 acres in Connecticut; 1950 acres in New York and 3300 acres in southwestern Massachusetts. In the center of the state in the Ten Curves section of Marlboro burned 2300 acres; while in the east-ern section, one in Ledyard and Groton burned 1000 acres; one in Montville and Waterford 1200 acres; one in North Stonington 1170 acres; and one in Voluntown burned 5000 acres in Connecticut and 5500 acres in Rhode Island.”

Because there was a good chance that a forest was going to burn sooner or later, the fires probably influenced private landowners to cut their trees before they were burned and while the trees still had value. In those days, the great demand for wood and widespread fire encouraged extensive clear-cutting of young forests. The clearcutting and chestnut blight (chestnut trees accounted for an estimated one-quarter of the trees in the state) were adding massive amounts of brush and downed

wood that fueled the fires. Connecticut forests were repeatedly clearcut as wood and charcoal (along with hydropower) were the main sources of energy for the state's industries prior to the 1920s. An enormous amount of wood also was used for heating homes and buildings.

At the urging of the Connecticut Forestry Association (now Connecticut Forest and Park Association), the state legislature charged the State Forester in 1905 with suppression of all wildfires in the state. The State Forester also became the State Fire

ready-made pasture for livestock and land available to cultivate immediately without the arduous task of removing trees. Many of these areas were abandoned as the Native American population was decimated by smallpox and other European diseases.

The forests just inland from the openings were reportedly park-like with well-spaced overstory trees and a grassy understory often punctuated by oak and chestnut sprouts. The fires knocked back the thick woody understory that is prevalent in today's forests. These conditions

“Fire once to clear the brush. Fire twice to burn the trunks. And again to make a cindery bed.”

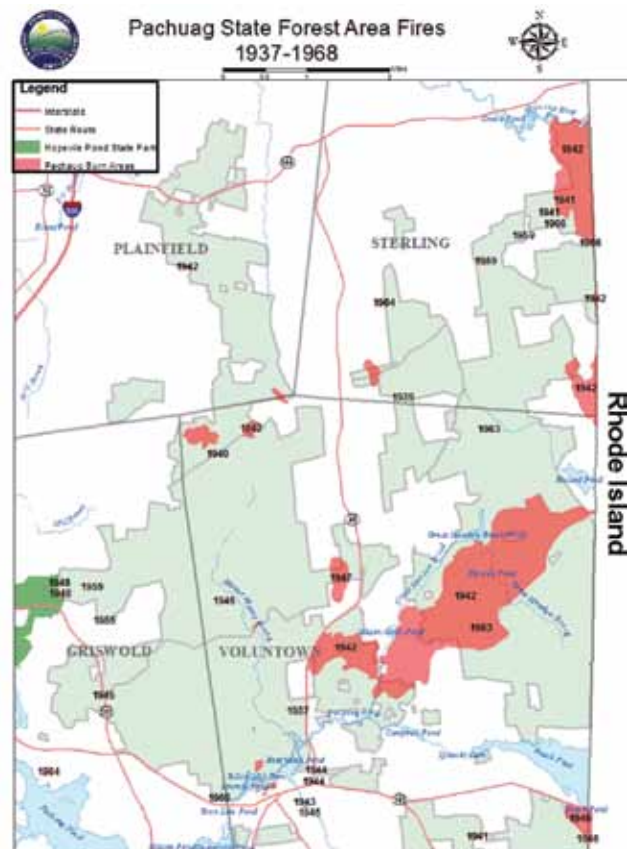
Jane Brox, Clearing Land

Warden in charge of Deputy Wardens who hired patrolmen and fire warden crews. A network of 44 fire towers facilitated detection. Fires were located by triangulating from two or more towers. Use of most towers was discontinued in the 1960s and 1970s. Information about Connecticut's fire towers can be found at www.firelookout.org/lookouts/ct/ct.htm.

Fire was previously ingrained in the fabric of rural Connecticut, as well as the rest of the country. It was a common practice for Native Americans to clear land for agriculture and probably increase field habitat for deer.

Early historical accounts suggest that large swaths of open land occurred along the Connecticut coast and major rivers. The first 15 miles along the Quinnipiac River were reportedly a savanna (grassy with scattered trees). Prior to settlement, Hartford, Farmington, and at least 15 other Connecticut towns had open areas already cultivated or at least cleared by the Native Americans. The colonists sought out these fields for settlement because there was

made travel and the collection of acorns (an important food source for Native Americans) and firewood easier. They also encouraged berry production and provided good habitat for game animals. Some fires killed thin barked trees, thus thinning out the forest. Older oaks and chestnuts had thick bark that insulated them from low



and moderate intensity fires. The open understory provided enough light for acorns to germinate. If the fires ceased for a while, oak seedlings and sprouts could shoot up, possibly growing into the overstory through gaps in the canopy. Fires, combined with pest infestations or hurricanes, could kill significant groups of canopy trees, allowing a thicket of young oak and chestnut to take their place. Over time, a mosaic of different aged forests probably developed, along with a suite of different habitats.

The settlers “picked up the torch” as the Natives started to have a smaller role in using fire to change the habitat.

In 1665, John Kilburne was employed to burn the woods from Wethersfield to Middletown to knock back the forest and facilitate land clearing. Farmers continued to burn their fields and woods to improve pasture for livestock. Firing the woods became so prolific that in 1713 Waterbury had to forbid burning for



This photo taken in Barkhamsted in 1917 shows how chestnut oaks sprouted from trunks of trees killed by a fire.

CONNECTICUT AGRICULTURAL EXPERIMENT STATION (2)

unusual for much more than 700 acres to burn annually now in Connecticut) and the fires are usually less intense; therefore, oaks and pitch pine are not sustaining themselves under current natural conditions. Thickets of shade-tolerant birch, beech, and maple

slowly die out or suddenly meet their demise after severe drought, hurricanes, or pest outbreaks. The slow loss of oak forests has been called an impending ecological crisis. Climate change should potentially be more conducive for oak. However, oak trees continue to lose ground in the southern and mid-Atlantic states, which Connecticut's climate will purportedly soon be like as climate change progresses.

“Forests are always waiting to overrun the fields.”
Wendell Berry, *The Unsettling of America*

seven years to let young trees get a start. Later, sparks from trains and probably charcoal mounds became significant ignition sources. The vast amount of logging slash most likely created more intense and severe fires than usual.

Trees that coexist with fire had to develop survival mechanisms, like bark thickness, for their species to survive for thousands of years. Most native hardwoods often persevere after fire kills their stems and crowns, as they commonly re-sprout at their base. Oak and chestnut appear to be the most persistent sprouters after repeated fire. Oaks, pines, aspen, cherry, and red cedar also were able to seed in land cleared by fire and after fields were abandoned.

Land management practices of Native Americans and European settlers favored forests dominated by oak and chestnut with a significant pitch pine component. With the demise of chestnut due to the chestnut blight, oaks became the most important trees for wildlife as their acorns are the best plant-based source of protein.

Currently, fire burns only a tiny fraction of the forestland that it historically did (it is

have surged, crowding out shade-sensitive oak in the understory. In addition, much of the present harvesting on private land removes the best timber (often oak), leaving the less ecologically desirable species and smaller trees.

This regressive practice (called high-grading), the lack of fire, and increased deer browsing speed up the transition from forests dominated by oaks to ones with less ecologically valuable birch, beech, and maple trees. Even without high-grading, the current trajectory of our forests is of great concern as the oaks and pitch pines



Sparks from trains were once a significant cause of fires in Connecticut, as seen in this photo (date unknown).

The interplay between fire and its absence historically laid the ground work for a continuum of diverse plant and animal communities. Some plant and animal communities thrive in recently disturbed forests, while others find their niche in undisturbed

continued on page 16

Forest Fires

continued from page 15

areas. Young forests develop in the void left after older forests are destroyed by severe disturbances. Newly established forests provide important habitat for about 60 species of mammals and birds. Many of these are on Connecticut's Endangered, Threatened, and Special Concern Species List. The greatest biological diversity occurs in an upland forest when all successional stages of a forest (from newly established to old growth) are present in adequate amounts to support viable populations of all the species that depend upon the different stages of forest.

About 100 years ago, there was too much disturbance in Connecticut due to the numerous clearcuts and severe fires that left very few old forests. A forest inventory of Litchfield County conducted by the Connecticut Agricultural Experiment Station in 1909 revealed that 95% of the forest was less than 40 years old because of tree-cutting and recent farmland abandonment. Today, the opposite is true, with the landscape dominated by maturing forests and a lack of young forests due to the absence of recent severe disturbances.

Because fire and other disturbances have historically been an intrinsic part of establishing new forests and maintaining oak and pitch pine forests, DEEP's Division of Forestry is implementing forestry operations on state forests that include commercial tree harvests and occasionally

Demand for Charcoal Changed Connecticut's Forests

Charcoal was usually made by piling 30 cords of wood in a dome shape about 30 feet across, and covering it with a layer of dirt so it could be burned with minimal oxygen, thus driving out the moisture and leaving a pure form carbon. The charcoal was needed to fuel Connecticut's 19 iron forges, as wood fires were not hot enough to smelt iron. At the peak of Connecticut's iron industry, an estimated 23 square miles of forests were clearcut annually to feed the furnaces. Railroads, the brass industry, and lime and brick kilns also used an immense amount of wood. Many trees were also cut for lumber, fences, shingles, and chemicals derived from wood.



Connecticut colliers on top of their charcoal mound in the early 1900s.

PHOTO: CONNECTICUT AGRICULTURAL EXPERIMENT STATION

prescribed fires as a proxy for wildfires. The removal of small trees mimics a low-severity fire. The harvest of overstory trees imitates natural disturbance, such as

severe fires, mortality from infestations, and blowdown from hurricanes and microbursts. Though most pre-settlement fires were human caused, Native American fire can be considered a natural disturbance as some ecologists classify aboriginal management activities as part of the natural disturbance regime.

It may be considered counter-intuitive, but sustaining oak and pitch pine forests under current conditions means that concentrations of under- and overstory trees (including oak) must periodically die. Most of the forestland in our state forests are maintained as maturing forest, but relatively small and frequent infusions of young forest are needed to maintain critical habitat and habitat diversity. The DEEP Forestry Division employs forest management as a tool, partly because it is the most economical way to sustain biological diversity in upland forests. The Division works with natural systems to promote and sustain all the different types of forests. It especially goes to bat for the "underdogs," those forest types on a downward trajectory that are not sustaining themselves under current natural conditions.

E. GLUCK, DEEP FORESTRY



Early Native Americans promoted park-like woodlands with lower intensity fires. After the DEEP Forestry Division implemented a shelterwood harvest and prescribed burn in Nehantic State Forest in East Lyme, native grasses seeded and grew on the forest floor.

Recent Retirement: Paul Rothbart, District/Habitat Program

Supervising Wildlife Biologist Paul Rothbart recently retired after more than 33 years with the Wildlife Division. Paul took with him a vast amount of knowledge and experience that will be impossible to replace, and his accomplishments and contributions have been numerous. This is Paul's opportunity to describe his legacy in his own words. The Wildlife Division thanks Paul for his years of dedicated service and we wish him well!

Why did you pursue in a career in wildlife?

From an early age, I always had an interest in wildlife. Whether it was watching a nature show, or taking a trip to the zoo or a walk in a park, wild animals always piqued my interest. My time as an undergraduate at UConn, and later working on my master's degree at Louisiana State University, exposed me to a great variety of experiences, such as trapping alligators, studying wood ducks, surveying woodcock singing grounds, working deer check stations, and developing habitat management plans. Working with passionate, dedicated, knowledgeable, and widely experienced professors at both universities made it clear that a career in wildlife was the right path to pursue.

What year did you begin working for the Wildlife Division and what were the different positions that you held?

Before working for the Wildlife Division, I was employed by the Bureau of Land Management in Nevada for four years working as a wildlife biologist. In July 1983, I took a position as the Western District Biologist for the Connecticut Wildlife Division. Four years later, I was promoted to Wildlife Supervisor to handle responsibilities within the Eastern District. Several years later, this position was modified to serve as the statewide District/Habitat Program Supervisor, the position I held until my retirement.

Briefly describe some of your job responsibilities at the Wildlife Division.

My responsibilities varied tremendously, covering program administration, grant writing and subsequent status reports, staff supervision, technical assistance to public and private sectors, assuring our participation in regional conservation initiatives, and overseeing habitat and facility management needs of state wildlife management areas (WMAs). Tasks conducted under these responsibilities included writing federal assistance applications and performance reports; grant writing to secure additional funding opportunities; staff supervision and guidance; developing annual budgets; participating in field activities, such as grass and shrub plantings, development and maintenance of impoundments and water control structures, boundary marking, invasive plant management, woodcock surveys, and deer check stations; coordinating with the Forestry Division regarding WMA and State Forest timber management activities; developing long-

range management plans for state lands; collaborating with the U.S. Fish and Wildlife Service, Natural Resources Conservation Service, and the Wildlife Management Institute to optimize conservation efforts on a state and regional basis; and providing technical assistance to other state agencies and the private sector regarding nuisance wildlife control issues and habitat management goals and management techniques.

What were some of your major accomplishments?

To me, the goal of the District/Habitat Program was to advocate and responsibly manage DEEP lands, principally the 32,000

continued on page 18



Supervising Wildlife Biologist Paul Rothbart (right) and former Wildlife Division Director Dale May (left) participating in a workshop on constructing brush piles for wildlife.



Paul Rothbart (right) in the earlier days of his career with the Wildlife Division removing a beaver dam from an impoundment at a state wildlife management area.

Paul Rothbart

continued from page 17

acres deemed as WMAs, to enhance wildlife resources and provide mutually compatible recreational opportunities. Over the decades, ongoing conservation initiatives provided distinct opportunities to emphasize specific habitat efforts. To this end, some of my major accom-



The New England Cottontail Initiative was one of the most significant projects that Paul Rothbart was involved in during his career. (Above) Paul describes an early successional habitat project during a workshop, and (left) places a sign at a habitat site undergoing restoration. (Below) Paul gave numerous presentations to private landowners, conservation groups, and fellow professionals about the efforts to create and restore habitat for New England cottontails on both state and private land in Connecticut.



plishments were related to the following four distinct programs:

Improvement of WMAs – During the late 1980s, the only funding available was through the Federal Aid in Wildlife Restoration Program. Federal funding was used to improve parking areas, gravel access roads, and signage at WMAs and other heavily-used DEEP properties.

Inland Wetland Enhancements: The Connecticut Migratory Bird Conservation Stamp Program provides funds for maintaining and enhancing inland impoundments (approximately 90 sites). Many of the impoundments were created in the 1950s and 1960s and had not received adequate maintenance in decades. Activities conducted during my tenure included installation of new water control structures, re-contouring dikes and spillways, controlling woody plants destabilizing dikes and invasive phragmites, installation of wood duck boxes, and signage. Sites ranged in size from three to 180 acres and now provide valuable habitat for wood

ducks, black ducks, herons, kingfishers, and many other wetland-dependent species. These efforts continue and, to date, over 3,100 acres of wetlands have been enhanced through this program.

Wildlife Habitat Incentives Program (WHIP):

In 1998, WHIP was established by the USDA's Natural Resources Conservation Service. This was the first conservation program developed under the wide-ranging "Farm Bill" that was truly dedicated to the wildlife resource. Wildlife biologists, including myself, serving on the 13 state Northeast Regional Habitat Committee and working with the Wildlife Management Institute were able to develop the program to best enhance wildlife resources on private and public lands throughout the region. Over the course of the next 10 years, WHIP provided the bulk of funding to conduct habitat management projects on DEEP wildlife areas. Projects included warm and cool season grass plantings, water control structure replacements, invasive plant control, and bat hibernacula protection. A total of 88 contracts were developed, providing \$1.8 million to manage 1,800 acres of wildlife habitat.

New England Cottontail: Once abundant throughout most of New England and eastern New York, the New England cottontail population had declined to the point where in 2006 it became a candidate for listing under the federal Endangered Species Act. To keep the New England cottontail from becoming a federally listed species, a regional initiative began in 2009 with state, federal, and non-governmental organizations collaborating on habitat projects, species and habitat monitoring and assessment, targeted landowner outreach, and captive breeding programs.

In September 2015, the Secretary of the Interior announced that due to these extraordinary on-the-ground efforts and unprecedented collaboration, the need for listing had been precluded. These efforts have resulted in hundreds of acres of young forest being created on state and private lands in key locations throughout Connecticut.

What was your favorite project?

Given the opportunity to impact a variety of habitats over the years, I really cannot say that one, be it grasslands, shrublands, wetlands, or forests, is my favorite. Because habitat is limited and becoming more scarce every day, I felt rewarded whenever I had a positive impact on any valuable wildlife site. A major component of seeing these projects through and one that I have always enjoyed and felt most rewarded by is the working relationships I established and maintained to be successful in accomplishing these activities. Other staff or agencies must bring expertise, and many times funding, to the table when carrying out habitat management projects, which can be expensive and influence a wide array of species. Habitat management is especially rewarding because you can see results in a relatively short timespan.

What part of your job will you miss?

The Wildlife Division and the Connecticut conservation community are truly a family. Division staff members have a commitment and passion for their jobs. After spending over 33 years at the Division, it is the people I have worked with and others in the conservation community that will be dearly missed.

What part will you not miss?

Being a supervisor can be a stressful and thankless position. Much time is spent worrying about timesheets, conducting appraisals, pointing out both good and bad performances, and assuring staff compliance with safety training. Although these activities are necessary, I often wished that my time could be spent more directly on wildlife issues.

What are the three major issues currently facing the Wildlife Division?

Reduced Staff: Responsibilities continue to increase while staff is diminishing at an unprecedented rate – the Division has truly reached a breaking point. Position vacancies need to be filled.

Land Access: Open lands continue to disappear. The downturn in the economy has kept this loss in check to some degree, but this appears to be changing as another burst in development is on the horizon. It is critical that land acquisition and lease efforts are maximized strategically. This will assure habitat for wildlife and also maintain areas for hunter access.

Education and Outreach: The Division must continue to provide education about the need for wildlife and habitat management, whether it is through forest harvests, controlling invasive plants with herbicides, opening areas to hunting, or regulating new types of hunting. There needs to be an understanding that many natural factors have been disrupted and species have reached levels of such dramatic concern that management actions are required.

What is the most memorable event that happened during your time with the Wildlife Division?

The most significant conservation program that I was involved with was the New England Cottontail Initiative. I served as the State's Technical Committee representative and was involved with much of the grant applications, conservation planning, outreach, and habitat implementation. It was extremely rewarding to be part



Always the ultimate professional and a wealth of knowledge, Paul Rothbart still took some time out to show, not only his dedication to wildlife and habitat, but also a sense of humor.

of the event held in September 2015 when the Secretary of the Interior announced that due to these extraordinary on-the-ground efforts and unprecedented collaboration, the need for listing had been precluded.

What major changes have you seen since you first joined the Division?

The major change is the dependence on computers and the internet. A large component of our communications, database management, and outreach is certainly provided via the web. I also observed the District Program expand from one of essentially maintaining WMAs to a more comprehensive group involved with all aspects of habitat management.

Has anything remained the same?

The dedication and passion of the staff has always been unquestionable. Although there are many obstacles within any large organization and occasionally faces change, staff always is willing to go above and beyond to see programs succeed.

What advice do you have for your colleagues at the Wildlife Division?

Work hard and enjoy every moment. We have all been lucky enough to find employment and be able to influence resources that we hold dear.

What are your plans after retirement?

Immediate plans are to do some long neglected house remodeling, work on improving my personal health routine, and enjoy some fishing and kayaking. Eventually I hope to stay involved with wildlife issues, particularly New England cottontail efforts.

Any other thoughts you'd like to include?

Just a reiteration of how fortunate I feel to have had a career in the wildlife field. It exceeded my wildest expectations regarding places I have seen, projects I have been involved with, people that I have collaborated with, and habitat management results that I hope will result in long-term benefits.



Fall 2016 Junior Hunter Training Days

Certain days are set each year for licensed junior hunters (12 to 15 years of age) to hunt deer, turkeys, pheasants, and waterfowl when accompanied by a licensed adult hunter 18 years of age or older. The adult mentor may not carry a firearm and at all times must remain within physical contact in a position to provide direct supervision and instruction. These training days provide junior hunters with an opportunity to learn safe and effective hunting practices from experienced hunters. DEEP's Conservation Education/Firearms Safety Program also sponsors special youth pheasant hunts in cooperation with local sportsmen's clubs and organizations. Information about these events can be found at www.ct.gov/deep/juniorhunter or www.Facebook.com/CTFishandWildlife.

Waterfowl – Saturday, October 1 and Saturday, November 5: Participants must possess a valid small game junior hunting license and a 2016 Connecticut Migratory Bird Conservation Stamp (**new this year**). Previously, junior hunters were required to purchase the HIP permit, but not a Connecticut Migratory Bird Conservation Stamp. Both of those items have been combined as of July 1, 2016, into a single product. Therefore, junior hunters must now purchase the stamp, but can do so at half the regular price. The new, combined stamp regularly costs \$17.00; junior hunters will pay \$9.00. Adult mentors must possess a valid hunting license; however, they are not allowed to carry a firearm. Ducks, geese, mergansers and coots may be hunted.

Bag limits and shooting hours are the same as for the regular duck and goose hunting seasons.

Pheasant – Saturday, October 8: Youth participants must possess a current junior hunting license and a Resident Game Bird Stamp (new this year – details are still being finalized. Please monitor the DEEP website for more details: www.ct.gov/deep/hunting). There may be exceptions if hunting on a private shooting preserve or a hunting club property with a Resident Game Bird Stamp exemption. Adult mentors must possess a valid hunting license; however, they are not allowed to carry a firearm.

Deer – Saturday, November 5 through Saturday, November 12 (excluding Sunday): Private Land – Licensed junior hunters must have a valid private land shotgun/rifle deer permit and written consent from landowner. Adult mentors must have a valid private land deer permit and written consent from the landowner. Harvested deer must be tagged and reported. State Land – Licensed junior hunters must have a state land shotgun deer permit (Lottery or No-Lottery). Adult

mentors must have a valid deer permit of any type. Deer hunting on Junior Hunter Training Days is permitted on any Lottery or No-Lottery Deer area, regardless of area designated on the permit, with the following exceptions: 1) Yale Forest, MDC Barkhamsted Reservoir-Barkhamsted East Block, MDC Barkhamsted Reservoir-Hartland East Block, MDC Nepaug Reservoir-Valentine Block, and MDC Nepaug Reservoir-Pine Hill Block are not open during Junior Hunter Training Days; and 2) Centennial Watershed State Forest and Bristol Water Company are only open to junior hunters and mentors who have both been awarded a permit for these areas.



P. J. FUSCO

Urban Bird Treaty Cities: Hartford and New Haven

The Urban Bird Treaty program helps municipal governments conserve birds that migrate through or live, nest, or overwinter in their cities. Launched in 1999, the program is a unique, collaborative effort between the U.S. Fish and Wildlife Service (USFWS) and participating U.S. cities bringing together private citizens, federal, state, and municipal agencies, and non-governmental organizations. Cities can become effective sanctuaries for birds and other wildlife, with an environmentally aware citizenry dedicated to conserving and enhancing natural resources. Hartford was designated an Urban Bird Treaty City in 2012 and received a grant from the USFWS to improve migratory bird habitat within Hartford Parks, and to develop educational guidelines that describe bird habitat characteristics in detail, so that city staff, area non-profits, and citizens can participate in enhancing bird habitat throughout the city. New Haven was designated an Urban Bird Treaty City in May 2016 due to its Urban Oases Initiative,

which works with local communities and neighborhoods to make a difference for the environment and foster natural resource stewardship. Audubon Connecticut was awarded a grant from the National Fish and Wildlife Foundation and USFWS to support the Urban Oases efforts carried out in partnership with Common Ground High School, Urban Farm and Environmental Center, Yale Urban Resources Initiative, the City of New Haven Department of Parks, Recreation and Trees, Stewart B. McKinney National Wildlife Refuge, USFWS New England Coastal Program, Yale Peabody



American robin
PHOTO: PAUL J. FUSCO

Museum, Menunkatuck Audubon Society, Southern Connecticut State University, New Haven Land Trust, New Haven Public Schools, and local neighborhood groups.

Highly Successful Hamden Eagles Fledge Triplets

The bald eagle pair nesting on State Street in Hamden fledged three young this year, two females and one male. The typical clutch size for eagles in Connecticut is one or two, so successfully raising three chicks is no easy feat. It is testimony to the bounty of food available in the area. The nearby Quinnipiac River tidal marsh has been their main hunting territory.

The Hamden nest was built in 2012, and the pair laid its first eggs in 2013. The very large stick nest was built in a crotch of a sturdy cottonwood tree. Including the three chicks from this year, the eagle pair has fledged a total of seven young eagles from this nest. It is remarkable that they have had this much success in such a highly urbanized location.

Eagle watchers can get a fairly good look at the nest through the leaves and branches from an observation area on the west side of State Street. The nest site offers the eagles a commanding view of the marsh and surrounding habitat.

Many thanks to eagle volunteer, Mike Horn, who has been monitoring the nest and providing information to interested eagle viewers.

Paul Fusco, DEEP Wildlife Division



Bald eagle
PHOTO: PAUL J. FUSCO

Bald Eagle Nest Results, 2016

	2016	2011-2015 Five Year Avg.	2006-2010 Five Year Avg.	2001-2005 Five Year Avg.	1992-2000 Average
Total Nesting Territories	51	33.6	16.8	7.8	1.6
Successful Nests	34	24.8	11.6	4.8	1.0
Unsuccessful Nests	10	3.6	2.8	2.2	0.2
Territorial	4	4.4	2.4	0.8	0.3
Unknown	3	0.8	0.0	0.0	0.0
Chicks Produced	58	42.2	20.4	8.2	1.7

Bald Eagle Nest Happenings

Moving into a busy neighborhood:

Sometimes we are surprised by the locations that bald eagles choose for their nests. In January 2016, a pair of eagles began building a nest on top of a monk parakeet nest along one of the busiest streets in New Haven. The pair, an unbanded female and a banded male that hatched on the Connecticut River in 2011, did not lay eggs but continued to copulate, defend the territory, and construct the nest throughout spring and summer. This behavior is colloquially known as “housekeeping” and appears in the chart above as “territorial.” While there were no young this year, we are preparing for the eagles to return and hopefully lay eggs in 2017.

Thwarted by a winter storm:

Natural forces can be dangerous to eagle nests. Because the nesting season begins in February and extends into July, eagles can be exposed to cold, deep snow, gale-force winds, soaking rain, stifling humidity, and extreme heat. Lightning strikes can even be a threat to

their tall nesting trees. On February 24, 2016, a strong wind storm swept through the state with gusts up to 75 mph. A pair of bald eagles in Milford lost their nest and egg when the supporting limb snapped in the storm. Over the next few months, the eagles built a new nest nearby but did not lay any more eggs in 2016. This nest was counted as a “failed,” but we have good reason to expect a better outcome next year.

Success (with a little help):

When an adult eagle is flushed from the nest, it uses valuable energy and leaves the eggs or young exposed to the elements. Repeated disturbance can cause nest abandonment. Limiting human disturbance to nesting eagles helps minimize this threat. So, when necessary, sensitive areas are closed to public access. Such protection for the eagles nesting along the Windsor Locks Canal Trail has resulted in another successful year. The birds fledged one chick from their nest on June 24, 2016, and the south end of the trail reopened later that day. The pair has been

nesting along the trail since 2011, producing a total of five chicks from four successful years (2011, 2014, 2015, and 2016).

Returning to a historic spot:

After the agricultural use of the organochlorine pesticide DDT was banned nationwide in 1972, bald eagle populations began to recover. A breeding pair of eagles returned to Connecticut in 1992, building their first nest in Barkhamsted. Since then, that first nesting territory had been continuously occupied until 2015, when eagles did not return and the territory was unused. While it is normal for eagle territories to move, appear, and disappear over time, we were sad to see this special spot vacant in 2015. That sadness was short-lived because in 2016, a pair of adults returned to this original nest and successfully raised two chicks. Over the past 24 years, this historic nest site has produced nearly seven percent of all eagle chicks in the state (28 chicks / 427 total).

Brian Hess, DEEP Wildlife Division

Be a Good Witness – Report Illegal Activity on DEEP Lands

Article and photographs by Jerry Milne, DEEP Division of Forestry

Readers of this magazine value DEEP lands because they like to hunt, fish, observe wildlife, cut firewood, hike, mountain bike, kayak, or appreciate the outdoors for any number of reasons. Those of us who work for the DEEP Bureau of Natural Resources share those same passions. It is not just a job to us, it is a way of life!

Unfortunately, judging from the many emails, phone calls, and even Facebook messages the Bureau receives from concerned people about damage to DEEP property, it appears that not everyone who lives in our state has a strong conservation ethic. The list of damage is endless: gates ripped out of the ground, signs shot up, picnic tables burned, roads torn up by four-wheel drive vehicles, dumped garbage, illegal trails, brush fires, and more. It costs DEEP thousands of dollars to repair damage caused by vandals each year – and the situation is getting worse.

How can you keep our DEEP lands from being ruined? Be a good witness! If you see any illegal activity on DEEP land, call DEEP's 24-hour radio dispatch for EnCon Police immediately – 860-424-3333. Get a good description of the individual(s). Do not confront them, but remember what they look like and what they are wearing. Maybe you see a vehicle with a trailer unloading dirt bikes or ATVs to ride in a state forest – call with a description, including make, model, license plate, and color of the vehicles. Maybe you pass a truck filled with construction debris parked at a trailhead on a quiet state forest road. Write down the make, model, and color of the vehicle. Take a picture if you can do so safely. On the way back, if the truck is gone but there is a pile of roofing shingles, call and provide the dispatcher with the information.

Some people are afraid to report a violation because they do not want to give out their name. When you report illegal activity to DEEP Dispatch, you can remain anonymous. However, if you do not mind leaving your contact information, it might be helpful for EnCon Police to follow up.

Help DEEP keep our lands beautiful for generations to come by being a good witness! Thank you to the many residents who have contacted us and provided important information about violations.



Conservation Calendar

Connecticut Hunting & Fishing Days (two events this year!)

- Sept. 10 **CT Hunting & Fishing Day at Franklin Wildlife Management Area**, in North Franklin (391 Route 32), from 10:00 AM - 4:00 PM. DEEP will be hosting its first Connecticut Hunting & Fishing Day at Franklin WMA. A featured activity is a live birds of prey program by A Place Called Hope, from Killingworth. The day features additional activities for all ages, including target shooting; hunting dog and water retriever demonstrations; archery; kid's crafts and activities; hunting and trapping tips; fishing demonstrations; and more! Equipment vendors, sporting clubs, fish and wildlife exhibits, and conservation organizations will also be present. And, it's all FREE! Visit www.ct.gov/deep/HuntFishDay for more details and information about free parking and shuttle buses.
- Sept. 24 **CT Hunting & Fishing Day at Sessions Woods Wildlife Management Area**, in Burlington (341 Milford Street), from 10:00 AM - 4:00 PM. DEEP will be hosting the 6th Connecticut Hunting & Fishing Day at Sessions Woods. A featured activity is a live birds of prey program and a raptor meet-and-greet by Master Class Falconer Lorrie Schumacher from Talons. The day features additional activities for all ages, including target shooting; hunting dog demonstrations; archery; kid's crafts and activities; hunting and trapping tips; fishing demonstrations; and more! Equipment vendors, sporting clubs, fish and wildlife exhibits, and conservation organizations will also be present. And, it's all FREE! Visit www.ct.gov/deep/HuntFishDay for more details. Free parking and shuttle bus service will be available in Bristol at Depot Square across from Bristol City Hall (111 N. Main Street) and in Burlington at Lewis Mills High School.

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.

- Sept. 10 **Trail Hike**, 1:30 PM. Come to Sessions Woods for a guided trail hike led by Wildlife Division Outreach Program Assistant Kelly Cannon. This trek includes educational mini-lessons on different aspects of Connecticut's forests, research studies, management practices, ecology, as well as a children's scavenger hunt! The hike to the beaver marsh and back will be approximately two miles roundtrip.

Hunting Season Dates

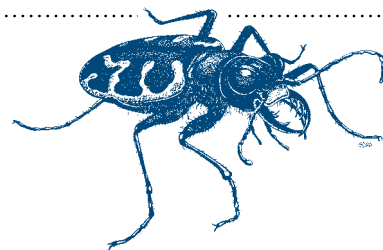
- Sept. 1-30 Early September goose hunting season in the North Zone.
Sept. 13-30 Early September goose hunting season in the South Zone.
Sept. 15 Opening day of the archery deer and turkey hunting seasons.
Oct. 1 AND Nov. 5... Junior Waterfowl Hunter Training Days (see page 20 for more information on Junior Hunter Training Days).
Oct. 8 Junior Pheasant Hunter Training Day.
Nov. 5-12..... Junior Deer Hunter Training Days (except Sunday, Nov. 6).

Consult the 2016 Connecticut Hunting & Trapping Guide, 2016-2017 Connecticut Migratory Bird Hunting Guide, and the 2016 Connecticut Angler's Guide for specific season dates and details. Printed guides can be found at DEEP facilities, town halls, bait and tackle shops, and outdoor equipment stores. Guides also are available on the DEEP website (www.ct.gov/deep/hunting or www.ct.gov/deep/fishing). Go to www.ct.gov/deep/sportsmenlicensing to purchase Connecticut hunting, trapping, and fishing licenses, as well as required deer, turkey, and migratory bird permits and stamps. The system accepts payment by VISA or MasterCard.

Attention Deer Hunters: Look for the 2015 Connecticut Deer Program Summary on the DEEP website before the archery deer and turkey seasons open on September 15: www.ct.gov/deep/hunting.



Connecticut Wildlife



Subscription Order

Please make checks payable to:
Connecticut Wildlife, P.O. Box 1550, Burlington, CT 06013

Check one:
 1 Year (\$8.00) 2 Years (\$15.00) 3 Years (\$20.00)

Name: _____

Address: _____

City: _____ State: _____

Zip: _____ Tel.: _____

Email: _____

Will only be used for subscription purposes

Check one:

- Renewal
 New Subscription
 Gift Subscription

Gift card to read: _____

Donation to the Wildlife Fund:

\$ _____

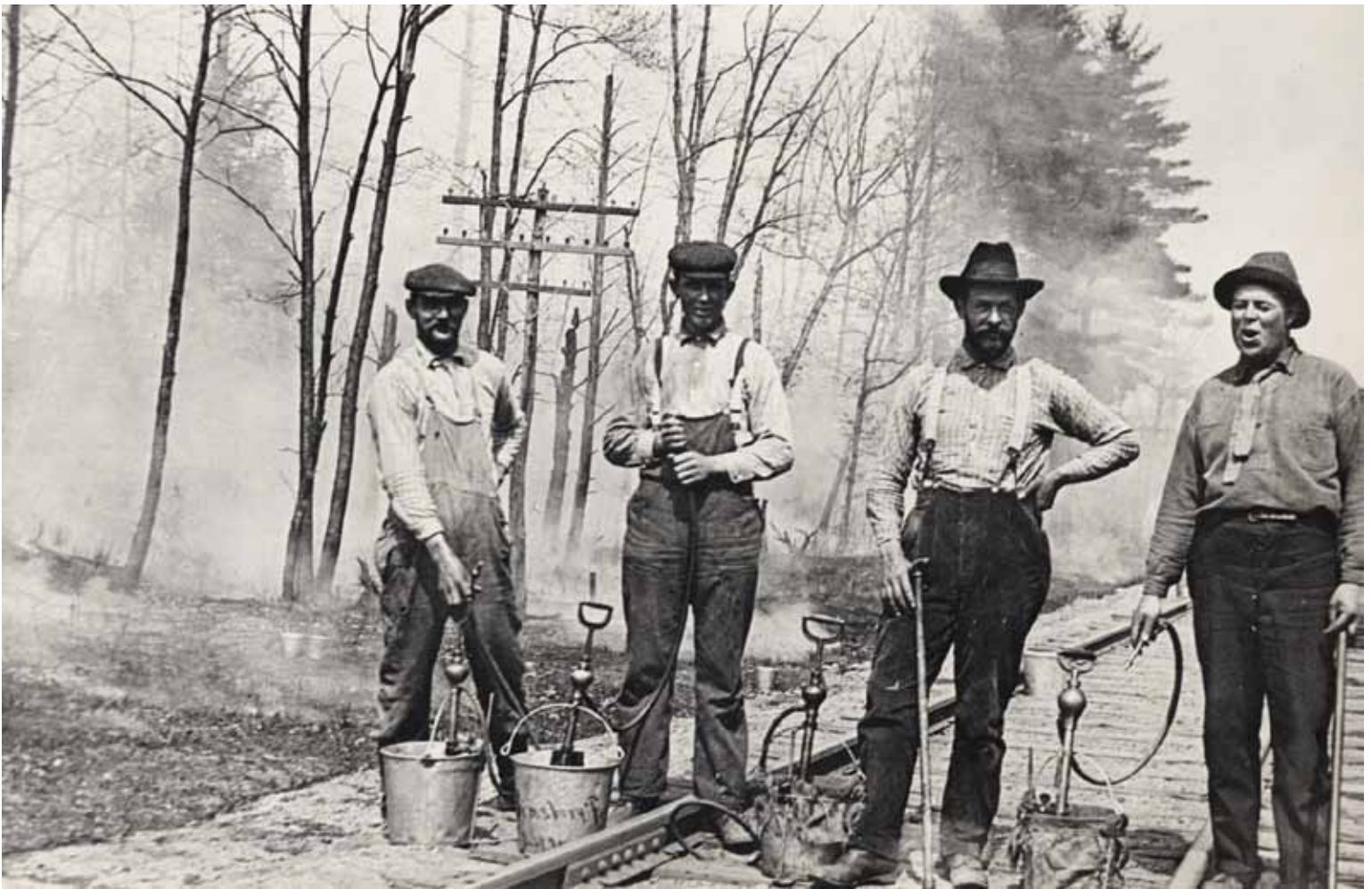
Help fund projects that benefit songbirds, threatened and endangered species, reptiles, amphibians, bats, and other wildlife species.

Order on-line with a credit card through the DEEP Store at: www.ct.gov/deep/WildlifeMagazine

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



Connecticut's first forest fire law, which was established in 1905, made the State Forester the ex officio forest fire warden without additional salary. Upon his request, and with his approval, town selectmen appointed fire wardens. The work of these fire wardens was "to prevent and extinguish forest fires" in their respective towns. Wardens were paid 25 cents an hour while employed; and assistants at a price fixed by the towns, but not over 20 cents an hour. These Simsbury fire wardens battled a forest fire that was ignited by sparks from a train. (Information from *History of Forestry in Connecticut*, by former State Forester Austin Hawes written in 1952-1957).

Photo courtesy of the Connecticut Agricultural Experiment Station.