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Connecticut Wildlife

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



From the Director's Desk

Keeping Traditions Alive

In the last issue of "Connecticut Wildlife," Bill Hyatt, Chief of the Bureau of Natural Resources, artfully outlined the history of professional natural resource management in Connecticut, and inspired us to celebrate our past and set the stage for the future. My own personal reflections of the past – growing up in a household where hunting and fishing were the norm – yield an overflowing treasure chest of fond memories of trout and flounder fishing, pheasant and deer hunting, and simply bonding with family, friends, and neighbors in our great outdoors.



An early lesson for Pete from his dad Tonnes along the shores of Lake Pocotopaug circa 1963.

I cannot say for sure when I first got to join my dad and sisters on our "Opening Day" pilgrimage to our favorite spot in search of trout, but it was an annual event that I thereafter looked forward to each spring, counting the days as this special occasion drew near. In my early years, we always started by dunking worms under the old wooden bridge at Dickinson Creek near its confluence with the Salmon River. But after the crowds on the Salmon River thinned out – and we had a few good trout for the pan – we would reequip ourselves with fly rods and hike the short distance to the Salmon River Fly-fishing Only Area. One opening day, when I was rather young – and had blisters on my casting hand to show for it – I embarrassingly caught a rather gracious gentleman by the hat with one of my backcasts. He simply removed my fly, commented favorably on its undoubtedly superior trout catching abilities, smiled, and went on his way. Lesson learned!

I am confident that staff across our Inland Fisheries Division programs, like me, have had foundational life experiences outdoors that have shaped for the better who we have become as biologists. These experiences and traditions can, and should, instill a keen sense of reverence and respect for our outdoor legacy as we endeavor to conserve and properly manage our fisheries resource for current and future generations. I was fortunate in my youth to get to know a fish and wildlife professional. Officer Kirkley Dows, a State game warden (as our modern day EnCon Officers were known back then), whose patrol area included the Salmon River and other nearby waters where I spent much of my time, was a soft spoken, yet impactful ambassador for hunting and fishing in our area. I especially remember his great sense of pride – and big smile – when stocking trout in our local waters to the delight of the lucky anglers who happened to be streamside when the hatchery truck rolled up. I am grateful to now similarly see a sense of hope, anticipation, and pure joy in the faces of the numerous boys and girls and their families when they help us stock, and then fish for brook, brown, and rainbow trout each spring at various locations across our state on opening day, during Family Fishing Day, or during one of our special events.

I know that many of you reading this hold in high regard your own quality memories and stories of your own version of "Opening Day." They are precious. Cherish them, and keep your outdoor traditions alive with your family, friends, and neighbors. We owe it to future generations to pass along these traditions. We, as biologists and natural resource professionals, cannot do it alone; but with your help we can do it together.

Pete Aarrestad, DEEP Inland Fisheries Division Director

Cover:

Wildlife Enthusiast Jake Harton with a set of moose sheds found in northern Connecticut.

Photo by Paul J. Fusco

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Update on Atlantic Salmon

Article and photo by Steve Gephard, DEEP Inland Fisheries Division

Recent reports by the DEEP Inland Fisheries Division about wild Atlantic salmon spawning in the state have generated a great deal of interest and speculation about the future. Some people have suggested that we are now closer to restoring the species to the state, but that fails to acknowledge the fact that the restoration program has ended. A brief update is in order.

The first attempt to restore salmon and shad to the Connecticut River basin began in the 1860s and is described in the article on page 8 of this issue. That program ended after about 25 years due to

the failure of getting fish around dams and protecting them from nets. In 1967, another restoration program was initiated by the same parties – the four Connecticut River states (Connecticut, Massachusetts, New Hampshire, and Vermont) and the federal government. Fishways were built to enable fish to get around dams, and regulations and enforcement were put into place to limit the loss from nets.

Just like the first program, this effort also included restoring runs of American shad and later alewife, blueback herring, sea lamprey, shortnose sturgeon, and American eels – all diadromous fish species. Different techniques were employed for each species, but much of the attention was focused on the charismatic Atlantic salmon. Eggs were imported from Canada and Maine, many fish were raised in federal and state hatcheries (including DEEP's Kensington State Fish Hatchery), and millions of smolts (6-inch young salmon ready



DEEP Fisheries Technician Dave Ellis points to a nest dug into the stream bottom of the Farmington River by wild Atlantic salmon. These fish were not the first salmon to return to the river but among the first to be allowed to spawn naturally.

to migrate to sea) and tens of millions of fry (1-inch salmon that need to live in a stream before becoming smolts) were stocked into streams in all four states.

The return rates of the salmon varied greatly. In some years, hundreds of adult salmon returned to the river and in other years only dozens. Most adults were captured at fishways and taken to special facilities for spawning to keep the eggs in our possession. After 1993, the returns progressively became fewer, and not just to the Connecticut River but to most Atlantic salmon rivers on both sides of the Atlantic. The reasons for this downturn are not fully understood and still the subject of investigation by biologists from many nations. Climate change is a likely factor, and rivers at the southern extent of the species' range (like the Connecticut River) are most susceptible to warming impacts. In 2011, Tropical Storm Irene caused historic flooding in Vermont,

heavily damaging the federal salmon hatchery in Bethel, Vermont, and killing thousands of salmon. Budget cuts prevented the immediate repair of the facility. Those cuts, coupled with decreasing returns of adult salmon, prompted the U.S. Fish and Wildlife Service to withdraw from the program, a significant loss of support. New Hampshire, Massachusetts, and Vermont quit the program in 2012, leaving only Connecticut.

Connecticut DEEP is unable to maintain a true

restoration program for Atlantic salmon, but its Legacy Program seeks to maintain a hatchery-supported population in our state to preserve our cultural, historical, and ecological heritage of Atlantic salmon. This population will support education, awareness, research, recreation, and the conservation of biodiversity. Much reduced numbers of salmon fry continue to be stocked into selected habitat within the Farmington and Salmon River watersheds. Returning salmon will not be retained and bred like in the past, but will be allowed to continue upstream to spawn. That is what happened this past fall. DEEP released five salmon at the Rainbow Dam fishway and later found their "redds" (or nests) where some of them spawned. Meanwhile, the work to restore runs of migratory shad, river herring, eels, and sea lamprey continues, not only in the Connecticut River but in many streams statewide.



Follow the 150th Anniversary of the DEEP Bureau of Natural Resources at www.ct.gov/deep/NaturalResources150 and on our Facebook page at [www.Facebook.com/CTFishandWildlife](https://www.facebook.com/CTFishandWildlife). Check out our historical timeline, learn about upcoming events, and view a video that highlights the history of natural resources in Connecticut from the 1600s to present day.



Historic Fisheries in Connecticut – Atlantic Sturgeon

Written by Tom Savoy and Penny Howell, DEEP Marine Fisheries Division

The Connecticut River and Long Island Sound have a long history of providing a diversity of sea food captured through popular sport fishing and a lucrative commercial fishing industry. One of the lesser known fisheries was for Atlantic sturgeon. At one time, Atlantic sturgeon were targeted in every major East Coast river. Sturgeon flesh and caviar (eggs) were among the first American exports. The target of this fishery is now endangered coast-wide and the fishery has passed into history. However, it had a role to play in the cultural and economic development of Connecticut.

Prior to the proliferation of dams and pollution that came with industrialization, spawning runs of Atlantic sturgeon followed the more numerous springtime runs of shad, salmon, alewives, and striped bass into the Sound and Connecticut River. Mature female Atlantic sturgeon commonly ranged from 200 to 300 pounds each, and males up to 135 pounds. However, the big prize was 60 pounds of caviar produced from the eggs of an average-sized female. In 1905, a female sturgeon fetched \$70-\$80 for the processed meat and caviar, the equivalent of \$1,800-\$2,000 today! But only a few adventurous fishing families perfected the specialized tasks required to capture and market these giant and wary fish.

Specially-made, large-mesh, soft cotton, gill nets, 400 feet long and 15 to 20 feet deep, were laid out on muddy sandbars for days until they were encrusted with enough mud to sink to the bottom when set in strategic river locations. In the main stem of the Connecticut River, catching a few sturgeon in a week's worth of fishing was considered a good record using this method. In the upper river near Windsor, those "in the know" followed the fish to spawning pools and hand-hauled these large nets when they saw the fish jumping over shallow bars or riffles into the pools. More than a dozen fish per week could be captured this way over the two-month spawning season.

In a few decades, water pollution, the loss of spawning habitat, and harvest of the most productive large females took their toll. By the 1950s, few Atlantic sturgeon were returning to the Connecticut River, too few to justify the expense and difficulty in capturing and processing these fish. By the 1970s, sturgeon were so rare that it was a notable event when one was seen or captured locally. For the past few decades, sturgeon in Connect-



Bringing home the harvest of large Atlantic sturgeon in the 1940s. The Golet family of East Haddam perfected their fishing techniques over three generations.

PHOTOS COURTESY GOLET FAMILY



icut waters, mostly sub-adults three to five feet in length, proved to be just short-term migrants from other coastal states.

The DEEP Marine Fisheries Division began monitoring the local abundance of Atlantic sturgeon in the 1980s. Initial efforts were primarily to document preferred locations and relative abundance. The Division augmented its efforts by implanting acoustic tags and tracking individual fish. Recent advances allow these transmitters to last up to 10 years, greatly increasing the amount of information that can be collected on a single fish. Additionally, the movements of these fish are not only tracked by receivers placed in the Connecticut River and Long Island Sound by CT DEEP, but also coast-wide by cooperating state

and federal agencies and various universities.

Telemetry data for individual fish now tell us the typical use of specific locations in the Sound, local rivers, and coastal areas farther afield. The Connecticut Long Island Sound Trawl Survey captures between one and 60 Atlantic sturgeon each year, providing more individual biological data. Directed research efforts indicate that there now may be hundreds to thousands of sturgeon in state waters at peak times. However, almost all of these fish are immature juveniles, even though they are three to five feet long, with only occasional mature adults six feet long or larger.

The picture changed in 2010 when a single six-inch yearling was captured in the Connecticut River, and in 2014 when 62 yearlings were captured in several river locations. Testing confirmed that these yearlings were genetically unique from sturgeon in all other rivers and thus were produced locally in the Connecticut River. This is the first confirmed reproduction of this species in the Connecticut River in more than 100 years. Twenty-first



R. STAMAND, DEEP MARINE FISHERIES

Yearling Atlantic sturgeon captured in a CT DEEP survey and newly confirmed as produced in the Connecticut River.

century technology, habitat restoration, and protective resource management have brought this remarkable giant back from the brink of extinction, but the very low numbers of fish demand continued care so that this population is not lost forever.

Then & Now: *Shad Fishing on the Salmon River*



CT DEEP HISTORICAL ARCHIVES



S. GEPHARD, DEEP INLAND FISHERIES DIVISION

These photos show the same view of the Salmon River in the Leesville section of East Haddam; the left photo is from the 1930s and the right photo is from present day. In the 1930s photo, the large white building is the powerhouse that sent electricity to the East Haddam swingbridge. (A fishway is now located in that spot.) The powerhouse was the first facility owned by a new company (at that time) called Connecticut Light and Power (CL&P). The small white building is the Board of Fisheries and Game's shad hatchery, and behind that is an earthen dam. It was said that the Salmon River only had a small shad run until the Board operated the hatchery to augment commercial catches in the lower river. That generated a big return to the river and it was said that sport angling for shad was invented there.

The hurricane of 1938 took out the earthen dam and hatchery. CL&P sold the property to the State for \$1 and all power generation was abandoned. The hatchery was never rebuilt and the dam remained breached until it was rebuilt in the early 1940s. The shad run petered out without the support of the hatchery.

In 1979, the Department of Environmental Protection (now known as DEEP) lowered the dam by 10 feet, demolished the foundation of the powerhouse, and built the present day fishway (which is barely visible at the right end of the dam's spillway in the photo to the right).

The Osprey Indicator

Written by Paul Fusco, DEEP Wildlife Division

Historically, Ospreys were abundant along the Connecticut coast during the nineteenth and early twentieth centuries. Over 1,000 active nests were counted between New York and Boston during a 1940s survey. This number gradually declined as shoreline development increased and large standing dead trees, used for nests, became scarce.

Dichloro-diphenyl-trichloroethane

In the 1950s and 1960s, ospreys were faced with another problem. Widespread use of the organochloride dichlorodiphenyltrichloroethane (DDT), a synthetic pesticide, resulted in ecosystem contamination. Due to bioaccumulation, those at the top of the food chain, including ospreys and other raptors, were severely impacted. Once the osprey's diet of fish became compromised, their population began to plummet. The osprey's reproductive system was affected by the contaminated fish, causing the birds to produce thin-shelled eggs which collapsed during incubation. By 1974, only nine active osprey nests could be counted along the entire Connecticut coastline.

Recovery

The banning of the use of DDT in the early 1970s was the first step to osprey population recovery. To facilitate the loss of nest trees, artificial nesting platforms were built and deployed along the Connecticut shoreline. Both of these factors led to a steady recovery of osprey populations. Osprey nesting success has been further enhanced with



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P. J. FUSCO

An osprey family uses a nesting platform along the Connecticut shoreline. The deployment of nesting platforms has been a crucial management action for the recovery of osprey populations.

the addition of predator guards to nest platforms. These metal barriers prevent raccoons from climbing into the nest and destroying the eggs and young.

Beginning in the late 1960s and continuing to this day, water quality legislation and pollution prevention actions have improved the waters of Long Island Sound. Key among the measures are the Connecticut Clean Water Program of 1967, Tidal Wetlands Act of 1969, Coastal Management Act (1980), EPA Long Island Sound Study (which began in 1985), DEP LIS Research Fund (1989), and DEP Water Quality Survey (1991). Long Island Sound waters are now better able to sustain fish which in turn has made it possible for osprey to inhabit and successfully nest along the entire Connecticut coastline.

The osprey recovery has gone so well that the birds have now expanded inland, nesting along major rivers and large lakes across the state. The recovery has been truly astounding and stands as a testimony for how the improved

management of our natural resources has made a substantial difference.

Today

Although osprey populations in Connecticut are increasing dramatically, the birds continue to face some threats. Both wintering and migrating ospreys are still exposed to pesticide contamination on wintering grounds in Latin America. Many also are killed at fish farms, with some estimates deemed to be significant. On their breeding grounds, adults are sometimes kept off their nest and prevented from attending their young due to disturbance from people getting too close and also from dogs being allowed to roam freely near nests. Carelessly discarded litter, especially monofilament fishing line and kite string, is a serious concern. Both adult and young ospreys have become entangled in fishing line and kite string in Connecticut, which often results in death.



Ospreys prefer to build their nests in the large branches of dead trees. As development and storms eliminated many of these trees, some ospreys began to build their nests on the ground.

Photo circa 1940 at Great Island in Old Lyme.



PHOTOS BY D. N. DEANE, DEEP ARCHIVE (3)

Osprey Ground Nests

Ospreys used to build ground nests on Great Island, in Old Lyme. During the 1940s, approximately 200 osprey pairs nested on and around Great Island.

Although trees were a preferred nest site, shoreline development in the early to mid-1900s caused a decline in trees available for nest sites. The habitat at Great Island afforded some protection to the ground nests as the area is separated from the mainland and ground predators, like raccoons and house cats, were limited at the time.

Today, an osprey ground nest is a rarity and seldom successful. Where trees have not been available for ospreys to use, the birds have adapted by using nesting platforms built specifically for them, as well as telephone poles, light stanchions, channel markers, and cell phone towers.

CT DEEP's Origins Linked to Early Effort to Restore Salmon

Written by Steve Gephard, DEEP Inland Fisheries Division

As our nation emerged from its Civil War in the 1860s, there were no such things as natural resource agencies at either the state or federal level. Some towns had enacted a few regulations on the taking of fish and game, but for the most part there appeared to be few restrictions on these practices and certainly no fish and game management. At the time, Connecticut was mostly agricultural with over two-thirds of the state cleared of forest. Recreational fishing was uncommon due to the lack of free time

by the citizens, fish stocks in Long Island Sound were healthy, and there were many commercial fisheries. With the Industrial Revolution in full swing, streams were



Most salmon eggs used in the restoration program came from the nation's oldest hatchery, the Craig Brook National Fish Hatchery in Maine.

PHOTO COURTESY OF THE U.S. FISH & WILDLIFE SERVICE

choked with mill dams and all manner of pollution. As the prosperity of the state grew quickly from industrialization and mill-driven manufacture of guns, paper,

William Greene, who owned the Greenville Dam, was a U.S. senator that was likely influential. When the first dam was built at Birmingham (Derby) on the Housatonic

textiles, tools, hats, and metal, fish populations declined rapidly. The last Atlantic salmon run in the state (Shetucket River) had been extinguished, but migratory runs of American shad, sturgeon, river herring, and sea lamprey still abounded below the lowermost mill dams. Although regulations dating back to colonial times prohibited the blockage of streams, there was no enforcement. The Greenville Dam, initially built in the 1840s, blocked fish runs to most of the eastern third of the state, denying food and livelihood to many.



PHOTO COURTESY - THE FORGOTTEN SALMON OF THE MERRIMACK, STOLTE, 1981

The Connecticut Fish Commission outlawed many fish weirs along the shoreline to protect returning salmon.

River, upstream residents were so incensed at the loss of the fish runs that one night they burned down the dam. It was rebuilt with posted armed guards. Fish runs were disappearing and citizens appeared powerless to do anything about it.

As educated and experienced naturalists returned from the war and assumed leadership positions in their governments and communities, a call to save or restore depleted fish populations came from the Connecticut River states: Vermont, New Hampshire, Massachusetts, and Con-

necticut. Well-known naturalists/scholars/attorneys, such as George Perkins Marsh (VT), Theodore Lyman III (MA), and Herbert Bellows (NH) began calling for the restoration of Atlantic salmon and American shad to the Connecticut River. Various resolutions and acts were passed by the States' Legislatures. In July (NH) and October (VT) of 1864, resolutions were passed calling on the four river states to "take early measures to cause fish-ways to be constructed either by requiring it to be done by the proprietors of the dams which cause such obstructions, or by the exercise of the right of eminent domain." By 1866, all four states had appointed fish commissioners, the beginnings of their Fish Commissions.

In late 1866, after the other three states had acted, Connecticut Governor Joseph Hawley authorized two state fish commissioners. One was J. Hammond Trumbull, originally from Stonington. He had graduated from Yale University; served as Secretary of State, State Librarian, and State Historian; and been elected to the National Academy of Science. The second was William H. Goodspeed, a shipbuilder and entrepreneur from East Haddam. The records are vague, but it appears that these early commissioners did not do much and commissioners from other states complained about Connecticut commissioners changing regularly. By 1871, three commissioners were appointed and served for a number of years. They were William M. Hudson, Robert G. Pike, and James A. Bill. (Interestingly, James



Early fishways on the river, like this one near Turners Falls, Massachusetts, were constructed from logs but located in a way that made it difficult for fish to find and use.

Bill is an ancestor of Fritz Gahagan, a local conservationist who worked with The Nature Conservancy to have his dam – Ed Bill Dam, which his grandfather built on the East Branch Eightmile River in Lyme – removed in 2015 to assist the restoration of migratory fish. Fritz's son Ben is a fish biologist who started his career with DEEP and now works on restoring migratory fish with the Massachusetts Division of Marine Fisheries.)

Early efforts focused on the hatch and release of salmon and shad. Fish culture was a developing science at this point and Connecticut bought salmon eggs from some of the pioneers like Wilmot (Ontario) and Atkins (Maine) and incubated them in a hatch house in Poquonock (Windsor) along the Farmington River. The commissioners also hired the legendary Seth Green to incubate and hatch shad eggs, starting at the state-owned ponds (now private) on Joshua Creek in Lyme. This operation included locations in Massachusetts and eventually Poquonock and Leesville at the dam on the Salmon River. Early reports from the Fish Commission provided great detail about what was needed to restore fish – how to raise fish, which dams needed fishways, experiences in other states and nations, who were appointed as fish wardens, and which fisheries were threatening the fish restoration effort. The motivation of these reports to the General Assembly was clear: to educate elected officials and persuade them to pass laws and spend money.

An additional charge to the commis-

sion was to introduce new varieties of fish. Over a dozen species were imported from around the country and Europe. Some of these early introductions failed, like lake trout and several varieties of Pacific salmon. Many were successful, including largemouth and smallmouth bass, bluegill sunfish, brown trout, and common carp, which have become well established and are an important part of our modern day recreational fisheries.

It should be noted that the fish commissions of the Connecticut River states (and other New England states) preceded the formation of any federal fish commission by five years. In 1871, President Ulysses S. Grant appointed Spencer Baird of the Smithsonian Institute as the first federal Commissioner of Fish and Fisheries. The office would eventually evolve into the U.S. Fish & Wildlife Service and the National Marine Fisheries Service. Baird was a personal friend of Vermont Fish Commissioner George Perkins Marsh, who lobbied strongly for the creation of such a position.

Ultimately, the early effort to restore migratory fishes failed due to Connecticut's inability to restrict harvest by fishermen and Massachusetts' inability to get effective fishways built at key dams. But the seeds for modern fisheries management were planted, and carried on by the Connecticut Board of Fisheries and Game (now known as the DEEP Bureau of Natural Resources Inland Fisheries Division).

PHOTO COURTESY "THE FORGOTTEN SALMON OF THE MERRIMACK," STOLTE, 1981

Moose Hunting in the Not So Traditional Sense

Written by Andrew LaBonte, DEEP Wildlife Division, and Jake Harton, Wildlife Enthusiast

In the time period when early Native American tribes roamed North America, many were considered semi-nomadic hunters, trappers, and fisherman. Big game animals were of primary importance because they represented the greatest return on food volume and nutrition for the least amount of time spent pursuing. At that time, moose were important to the Northeast Woodland semi-nomadic Indians. In pristine moose range, where human survival was driven by the quest for food, cultural and spiritual identities of the people were linked closely to the resources they used, primarily the moose.

Native Americans considered the moose a formidable challenge, and acknowledged it as one of the most difficult animals to hunt. David Thompson, an early explorer who traveled with the Indians, stated that “the moose is of a most watchful nature, its long large, capacious ears enable it to catch and discriminate every sound, his sagacity for self preservation is almost incredible.” C. Ward stated that “when alarmed, this ponderous animal moves away with the silence of death, carefully avoiding all obstructions, and selecting the mossy-carpeted bogs and swales, through which he threads his way with a persistence that often sets at defiance all the arts and endurance of even the practiced Indian hunter.” Native Americans hunted these majestic beasts using methods, such as wooden bows and arrows, snares, waterborne pursuit with canoes, driving, enticing with calls, and stalking, pursuing, and crusting (chasing moose in deep snow).

You might ask, why are we interested in the writings of early Native American followers regarding moose? Well, in the 1600s, moose populations had declined across the Northeast due to habitat loss and unregulated hunting. In the 1930s and 1940s, the abandonment of agriculture and changes in forest practices allowed the regeneration of forest stands, providing increased habitat for moose. Moose populations have since increased across much of Northeast. However, in Connecticut moose were only occasionally reported in the early 1900s and sightings were sporadic up until the late 1990s. Since 2000, reports of credible sightings



of cows with calves by the public and hunters confirmed the establishment of a residential moose population in Connecticut. That population, based on public sightings reported to the DEEP Wildlife Division, appears to have stabilized, and is conservatively estimated at about 120 moose, with the largest concentration in northwest Connecticut. Although reports of moose sightings (56) and moose-vehicle accidents in 2015 (1) were quite low compared to the past five-year average (118 sighting reports and 3), individuals that possess skills like those of the Native Americans can still view more than their fair share of moose.

Connecticut may not have a regulated hunting season for moose, but that doesn't mean that you cannot “hunt for them.” A young man by the name of Jake Harton, who lives in Southington, has seen quite a few moose in the state. “I started looking for moose in 2013 after my photography professor in college told me about an area in Connecticut where some moose had been hanging out,” said Harton. “The first time I went there, I'll never forget seeing moose tracks in the mud and realizing just how big they really are. Finally after my third time going there, I was making my way back to my car when I suddenly caught a glimpse of a cow moose running across the dirt road at dusk and was

overwhelmed with excitement, even though it was only a brief encounter.”

Moose can be difficult animals to pursue. Although they may be the largest of Connecticut's land mammals, they have a great ability to hide and when found, they can vanish in the blink of an eye. Tracking and calling moose can be extremely challenging, especially in Connecticut where the population is extremely low.

“Later that year, I went back to the same area with a moose call, in hopes that one would respond,” continued Harton. “Sure enough, about 30 minutes of making the call, I suddenly heard what sounded like the same call in response. I stopped in my tracks and could hear something large walking in the swamp and grunting. That's when I saw him, a bull moose with his antlers just starting to grow, walking up the hill in my direction. He eventually came within feet of me until I finally took a step

back, letting him know that he was close enough. I was so nervous and shaking like crazy, realizing just how close he was and wondering what he was going to do next. He eventually turned around and began walking away slowly, an experience I'll never forget.”

Many different calls are available for “calling” moose. Native Americans used white paper birch rolled into a cone shape, not only as a calling device but also to dip in water and then pour it out, creating the sound of a moose urinating in a wetland. Oversized coffee cans with a leather tether running through the middle, mouth calls, and electronic calls may also be effective at calling moose during the breeding season.

In contrast to the Native Americans, people in Connecticut nowadays hunt these animals, not for food, but for the challenge, and not with bows and arrows, but simply with a camera. Additionally, the shed antlers of moose are a sought after treasure that requires hard work and determination in locating them. DEEP has received a report or two of such amazing findings in the past few years, and one just recently.

According to Jake Harton, he and a friend, Mike Bok, went hiking on January 13 in the northwestern part of the state after a light snowfall that night. Not even



(Left to right) Wildlife Division Deer and Moose Biologist Andrew LaBonte and wildlife enthusiasts Jake Harton and Mike Bok holding three sets of moose sheds found in northern Connecticut. Antler size can be a general indicator of a moose's age; however, range quality and genetics play more of a role in antler characteristics.

five minutes into their hike they came across some fresh moose tracks going across the ATV trail. After following the tracks for some time, they eventually came upon three female (cow) moose feeding on high branches. The two men quietly followed the movements of the moose for a period of time, but began to lose track of them and started off in the other direction. Suddenly, they spooked a group of three more moose – one they assumed was a cow and two bulls (males), one of which had a radio-collar. Upon further inspection of the photos they took, Jake realized that the moose they thought was a cow had two red holes on its head where antlers used to be!

Two days later, Jake, Mike, and Jake's cousin Ashley Kosikowski returned to the area where the six moose had been seen previously. They knew that one of the moose had recently shed its antlers, but did not know where or when. They began to backtrack the moose tracks from where they last saw them in hopes of finding an

antler. After about 15 minutes of following one set of tracks, Jake reached the top of a little hill and looked up to see a right antler sitting in the snow.

"I'll never forget the rush of excitement I felt as soon as I saw it," said Jake. "I had a feeling the other one was close, so we continued following the tracks again. About 70 yards away, I spotted his left antler sticking out from behind a rock in a frozen marsh. Both antlers still had some blood at the bases, which is a sure sign of a freshly dropped antler."

Jake had been searching for about four years for a set of moose sheds. "It has been one of my dreams to find a set in Connecticut, and it finally happened!" continued Jake. "After all the miles I put in to find these, it was so worth it!"

Jake's excitement naturally prompted him to post a photograph of his find on Facebook, where a hunter happened to see the photo and recognize the antlers. Chad St. Pierre was sitting in his tree stand while bowhunting for deer in October

2015 when a large bull moose walked under him. St. Pierre described his encounter, "What I thought was a monster buck thrashing through the laurel, turned out to be a big bull moose taking his time feeding on the tree branches, a six-hour sit that was well worth it!" St. Pierre was able to take a few photos of the moose, which turned out to be the same moose that had shed the antlers found by Jake.

Not all moose sightings may be as memorable or generate the amount of excitement as this particular one, but each and every sighting is important to the DEEP Wildlife Division's efforts to keep track of Connecticut's moose population. Anyone who observes a moose in Connecticut is encouraged to call the Division's Franklin Wildlife office at 860-418-5921 or report the sighting on to the DEEP website at www.deep-data.ct.gov/wildlife/sighting/mooserpt.htm.



Saltmarsh Mud Hen – The Clapper Rail

Article and photography by Paul Fusco, DEEP Wildlife Division

Looking out over the expansive saltmarsh, there is a sense of flatness with salt meadow grass and cordgrass gently flowing in the soft morning breeze. The grasses are only a few feet tall at most. In the distance an egret stalks slowly through the marsh, at times only its head and neck are visible as it follows a tide creek in search of an easy meal. Overhead noisy gulls give chase to a common tern that has caught a small baitfish. In this setting lives a much more secretive and hard to see inhabitant, the clapper rail.

More often heard than seen, the clap-

per rail is a chicken-sized bird that slinks through the thick marsh on powerful legs and feet. Its call is loud and resonating. Clapper rails move through the grasses with such ease that blades of grass are barely disturbed. The only telltale sign of a rail's whereabouts is its call. Starting off slowly, then rapidly increasing, *Kek, kek, kek kek, kek*, the clapper rail boldly announces its presence. The bird also makes a loud growling type of call, *k-k-kerrrrr*.

These distinctive calls can be heard over long distances, making it a good way for wildlife biologists and bird surveyors to determine the clapper's presence in a marsh despite the difficulty of observation. On occasion, a clapper rail may be seen in the open as it comes out from the dense cover to bathe or feed along receding tidal channels.

Connecticut is home to four species of regularly occurring rails, including king, sora, and Virginia, along with the clapper. As with all rails, the clapper's legs and feet are strong and well-adapted for life on the ground. Their toes are long and tails are short. A laterally compressed body enables them to run through thick vegetation with ease. Clapper rails have a long, slightly decurved bill, which they use to surface glean or shallow probe the mud for fiddler

crabs. Along with small crabs, the diet also consists of crustaceans, mollusks, insects, worms, bird eggs, and small fish. The birds also consume lesser amounts of seeds from marsh grasses.

The drab olive and brown plumage of a clapper rail is cryptic, blending perfectly into the soft browns and greens of the saltmarsh. The flanks have dull barring and the cheeks are gray. Clapper rails usually hold their tail cocked, making a white undertail patch visible.

The flight of the clapper rail is weak. The bird's short rounded wings are not adapted to long distance flying. Clapper rails from the northeast will move farther south for the winter so clappers are considered short-distance migrants. Migration takes place primarily at night and low altitudes. The range of the clapper rail includes the entire Atlantic coastline from New England to South America, wherever there is saltmarsh and mangrove habitat. On rare occasions, they may use brackish marsh habitat, and in the south, they will sometimes use shallow mangrove swamps. But along the Atlantic seaboard, clapper rails are primarily found in saltmarsh habitat.

Nesting and Young

Nests are normally built on higher and drier portions of the marsh that have dense cover and offer some protection from flooding tides. Flooding is a major cause of nest failure. In our area, nests are usually placed within dense stems of saltmarsh cordgrass at or close to the ground. Vegetation is often woven into a dome to help conceal nests.

The typical clutch size is nine to 12 creamy white or pinkish buff-colored eggs with irregularly splotched darker markings. Both parents incubate the eggs. Young hatch after about three weeks and are able to leave the nest after one day. Chicks con-



Clapper rails are sometimes seen as they step into the open to feed or bathe.



Young clapper rail chicks have downy, jet black plumage.



Saltmarsh habitat is the domain of the clapper rail.

tinue to be brooded and fed by adults until they become independent after six weeks. They are able to fly after nine to 10 weeks. Newly-hatched downy young are jet black.

Conservation

As with many species of wildlife in Connecticut and elsewhere, the major conservation challenge is loss of habitat. This also includes the loss of quality habitat due to impacts such as degradation and encroachment.

DEEP estimates that Connecticut has lost between 33 percent and 50 percent of its original wetlands. Urban and coastal areas have been hit the hardest. For instance, the estimated loss of tidal wetlands in Fairfield County stands at 61 percent. Connecticut's loss of coastal wetlands has slowed dramatically since the passage of the Tidal Wetlands Act in 1969. This act regulates the draining, filling, and excavation of tidal wetlands through a permit process.

While it may be too late to reclaim some lost habitat, the DEEP Wildlife Division, along with cooperating partners, is using resources through the agency's Wetland Restoration Program to restore and

reinvigorate degraded coastal wetlands. These projects benefit a wide variety of fish and wildlife species. Since the mid-1990s, over 4,600 acres of tidal marsh have been restored by the Wetland Restoration Program. The funding to complete these projects has come from a number of conservation grants and partnership donations, including the Connecticut Duck Stamp Program.

Rising Sea Levels

Wildlife conservationists face a difficult challenge as sea-level rise associated with climate change is expected to have major impacts to the Northeast's tidal marshes. Any birds that nest on or close to the ground within the saltmarsh are subject to the extreme tidal flooding that is already happening due to climate change and rising sea levels. Many of these marshes are already heavily degraded from past ditching, filling, associated coastal development, and continuing encroachment. With sea levels rising as expected, there will be many uncertainties. But, the fact remains that there is little room for marsh systems to migrate inland, especially in Connecticut. Marsh ecosystems that are continually flooded by

higher and higher tides will likely become more fragmented and gradually erode to low marsh and then to mudflat, eventually being lost to open water. Marshes will be squeezed between the rising sea and existing coastal development and upland. Extensive areas of saltmarsh grasses may be greatly reduced in size or eliminated altogether. This would severely impact the nesting habitat required by clapper rails. Thus, clapper rails are extremely vulnerable to the effects of climate change and sea-level rise.

The clapper rail is not the only species at risk. Other saltmarsh-dependent wildlife will likely be threatened by sea-level rise, including waterfowl, shorebirds, terns, sparrows, shellfish, crabs, and the state-endangered least shrew. Fish populations are also at risk because healthy marshes serve as important spawning nurseries. Many species of migratory birds depend on salt marshes as stopover habitats to refuel and rest during their journeys.

Do a favor for Connecticut's saltmarshes and the wildlife that depends on them – Buy a Connecticut Duck Stamp!

EnCon K-9s Are a Valuable Contribution to Law Enforcement

Written by Colonel Kyle Overturf, Connecticut Environmental Conservation Police Division

In 2010, the Division of State Environmental Conservation (EnCon) Police proposed establishing a K-9 unit. Officer Erin Flockhart was the lead in developing a proposal that would use Labrador retrievers for search and rescue operations and evidence recovery. Her proposal showed the value a K-9 unit would bring to the Division and DEEP. Deputy Commissioner Susan Whalen supported and approved the proposal, and by spring 2011, four officers were selected for the unit. Labrador retrievers were obtained at no cost to the state and soon Officers Holly Bernier, Erin Flockhart, William Logiodice, and Karen Reilly were teamed up with their K-9 partners. In spring 2012, the teams went through three weeks of vigorous training by the State Police K-9 unit and were certified in search and rescue tracking and evidence recovery.

For three years, the K-9 unit's skills and abilities were called upon numer-

ous times to assist in the search for lost and missing persons and the location of evidence. They were also favorites at many public outreach events, such as the Goshen Fair, Great Park Pursuit events, and New Britain Rock Cats baseball games.

During this time, Officer Flockhart and her partner Ellie Mae became certified with and incorporated into the State Police Search and Rescue team. They are trained in live find area search and human remains (cadaver) detection. Ellie Mae and Officer Flockhart then went through an advanced water search class for human remains detection. The odors put off by a decomposing body do float and can be picked up by a dog on the water. This search is used primarily for drowning victims, victims involved in boating accidents, or missing persons in the water. Ellie Mae and Officer Flockhart also attended training on "Disaster Recovery SAR," which involves work on rubble piles and disaster scenes. This training simulates 9-11 or hurricane Katrina type scenarios where people, living and dead, are unaccounted for in dangerous and unsettled terrain.

Recognizing the need and ability of the K-9s to detect illegally taken wildlife, the Division looked into training some of the Labra-

dors in fish and game detection. Working with the Connecticut State Police K-9 unit, a training program was developed and initiated in spring 2015. The EnCon K-9 Unit Fish and Game Program was the first of its kind in the New England State Police Administrators Council (NESPAC). Connecticut State Police K-9 Trainer Kevin Eklund worked with EnCon Officers Reilly, Bernier, and Logiodice, as well as a New Hampshire Fish and Game K-9 trainer, to create a training syllabus that included practical scenarios for detection of hidden fish and downed/hidden game. During the two-part training, these officers and their K-9 partners, Hunter, Saydee, and Ruger, used freshly caught fish, as well as frozen samples, to teach the K-9s to identify the odor of three key species of fish and three major game species that Connecticut sportsmen are most often out to harvest.

Initial training focused on fish, primarily tautog, striped bass, and trout (brook, brown, and rainbow). Once the K-9s recognized the odor of these fish, their skills were pushed to practice finding them hidden in rocks, cars, buildings, boats, and even buried in the sand. After certification was completed, the handlers began adding other fish species, such as herring, scup, and summer flounder, into training to expand the dogs' abilities and provide more assistance to fellow officers.



EnCon Officer Karen Reilly and Officer William Logiodice pose with their puppies (and future K-9 partners) Hunter (left) and Ruger.



DEEP Environmental Conservation Police Officer Erin Flockhart and K-9 partner Ellie Mae.

The second part of this training occurred in September 2015 and introduced the odors of game species. White-tailed deer, wild turkey, and several species of waterfowl were used to teach the K-9s to search for and alert their handlers to hidden game. The training involved hiding whole samples, as well as cut-up parts, of the different species in the field, as well as in coolers and vehicles. In fall 2015, the K-9 unit trained with the Division's Hunting Related Shooting Incident investigative unit and proved that they could play an instrumental role in finding evidence in these investigations.

Over the last three-and-a-half years, EnCon's K-9 unit has successfully found lost hikers and missing and endangered children, and located victims from boating accidents. The K-9s and their handlers have discovered illegally-taken fish hidden under rocks and inside vessels; tracked a hunter from an illegal deer kill site back to his residence; and found firearms hidden by felons that were illegally hunting. Due to the dedication and hard work of the Officers and their K-9 partners, this unit has proven that they play an important role in supporting the Division's mission of providing natural resource protection and public safety to the citizens of Connecticut.



COURTESY, CONSERVATION OFFICER P. BEGLEY, DEEP ENCON POLICE DIVISION

First K-9 Patrol Dog School Graduation

The first two certified patrol dog teams in the history of Connecticut DEP's Fish and Game Law Enforcement Division (now known as DEEP Environmental Conservation Police Division) graduated on January 7, 1983, from a 14-week State Police patrol dog training class. The K-9s, both German shepherds, were trained and certified in handler protection, tracking, evidence recovery, and building searches. Both K-9s were later trained and certified in "venison detection." Pictured on the front steps of the Connecticut Police Academy in Meriden are (left to right) Assistant Chief of Law Enforcement Robert Buyak, Conservation Officer Peter Begley and K-9 Volk, Conservation Officer Joseph Balint and K-9 Thunder, and Chief of Law Enforcement Frederick J. Pogmore.

COURTESY, B. MYERS COLLECTION DEEP ENCON POLICE DIVISION (2)



Conservation Officer William Myers and K-9 Sach graduated from K-9 training in May 1984. They are checking a field at Bridgeport Hydraulic in Easton in October 1985. The patrol car is a 1984 Chevrolet Impala.



T. DELGADO, DEEP ENCON POLICE DIVISION

Current Connecticut EnCon Police Officers and their K-9 partners at a graduation ceremony after completing an initial three-week training period: (l to r) Officer William Logiodice with Ruger, Officer Holly Bernier with Sadie, Officer Karen Reilly with Hunter, and Officer Erin Flockhart with Ellie Mae.

Look Beyond the Trees

It is easy to take Connecticut's forests for granted. After all, almost 60 percent of the state is covered by trees. And yet, the stone walls that criss-cross the landscape quietly tell us that, over the centuries, there have been many changes in our woods. The primeval forest in Connecticut was mostly oak and chestnut, along with hemlock, white pine, maple, birch, beech, and many other hardwoods. Although often thought of as a vast unbroken forest, there were actually many openings created by hurricanes and other windstorms, insect and disease infestations, and beaver activity. Native Americans also felled trees for fuel for cooking and warmth, and for shelter, tools, weapons, and canoes. They also cleared some areas to grow crops, and did some burning to improve hunting.

After the Europeans arrived, forests were extensively cleared to create farmland. Wood was needed for fuel and lumber for houses, barns, fences, furniture, boxes, tools, and ships. Also, a lot of wood was cut down and shipped back to Europe because the European forests had become depleted by centuries of overcutting.

By 1810, most of Connecticut's original woodlands had been cut down, and the wildlife it supported disappeared, such as wild turkeys, wolves, and bears. On the other hand, animals that required fields and brushy young forests for habitat thrived, such as rabbits, foxes, ruffed grouse, and yellow-breasted chat.

As the 1800s progressed, much of Connecticut's farmland was abandoned as farmers moved to the better soils of the Midwest, and second growth forests grew back.

There was still a tremendous need for wood. Cordwood was used for heating and cooking in every home. A typical household burned 25 cords each year, or roughly an acre's worth of trees. Entire hillsides were clearcut to satisfy the demand.

The Industrial Revolution created an enormous demand for charcoal for fuel to make iron, brass, bricks, and glass. Charcoal was made by covering a big pile of logs (about 30 cords) with dirt, and then burning the wood slowly. Thousands of old charcoal mounds are still evident in our forests. Covered with decades of leaf litter, these mounds are usually about one to two feet high and about 20 feet in diameter. They can still be found, and small bits of charcoal can be discovered if you dig into them.

The invention of the portable sawmill allowed the logging of forests that were previously too far away from the traditional water-powered mills. Forests that had been considered inaccessible could then be cut.

Extensive forest fires were common, often caused by sparks thrown from trains and fueled by the considerable amount of brush in logged areas. Generally,

fires were allowed to burn unless they threatened a building. Thousands of acres burned each year. By the late 1800s, Connecticut's forests were in terrible shape. They covered only about one-third of the landscape, and they were often burned and cut without any regard for the future.

In 1895, a concerned group of citizens organized the Connecticut Forestry Association (which later became the Connecticut Forest and Park Association). Its purpose was to develop public appreciation of the value of forests, establish state forests, and introduce forest management on these lands. In 1901, the state legislature created the position of State Forester, in large part because of the efforts of the Connecticut Forestry Association. The State Forester was allocated \$2,000 to buy land for state forests (not to exceed \$4 per acre), with the intent to reforest them by planting trees. The state forests were to serve as demonstration areas to educate landowners in forestry and encourage them to practice it on their own lands. At that time, planting trees and protecting them from forest fires were considered the most important forestry practices.

Meshomasic State Forest in Portland



A Forest Fire Law, passed in 1905, provided for statewide training of town fire wardens and penalties for violations of burning regulations. This undated photo shows a fire wagon used by the town of Winchester to fight forest fires.

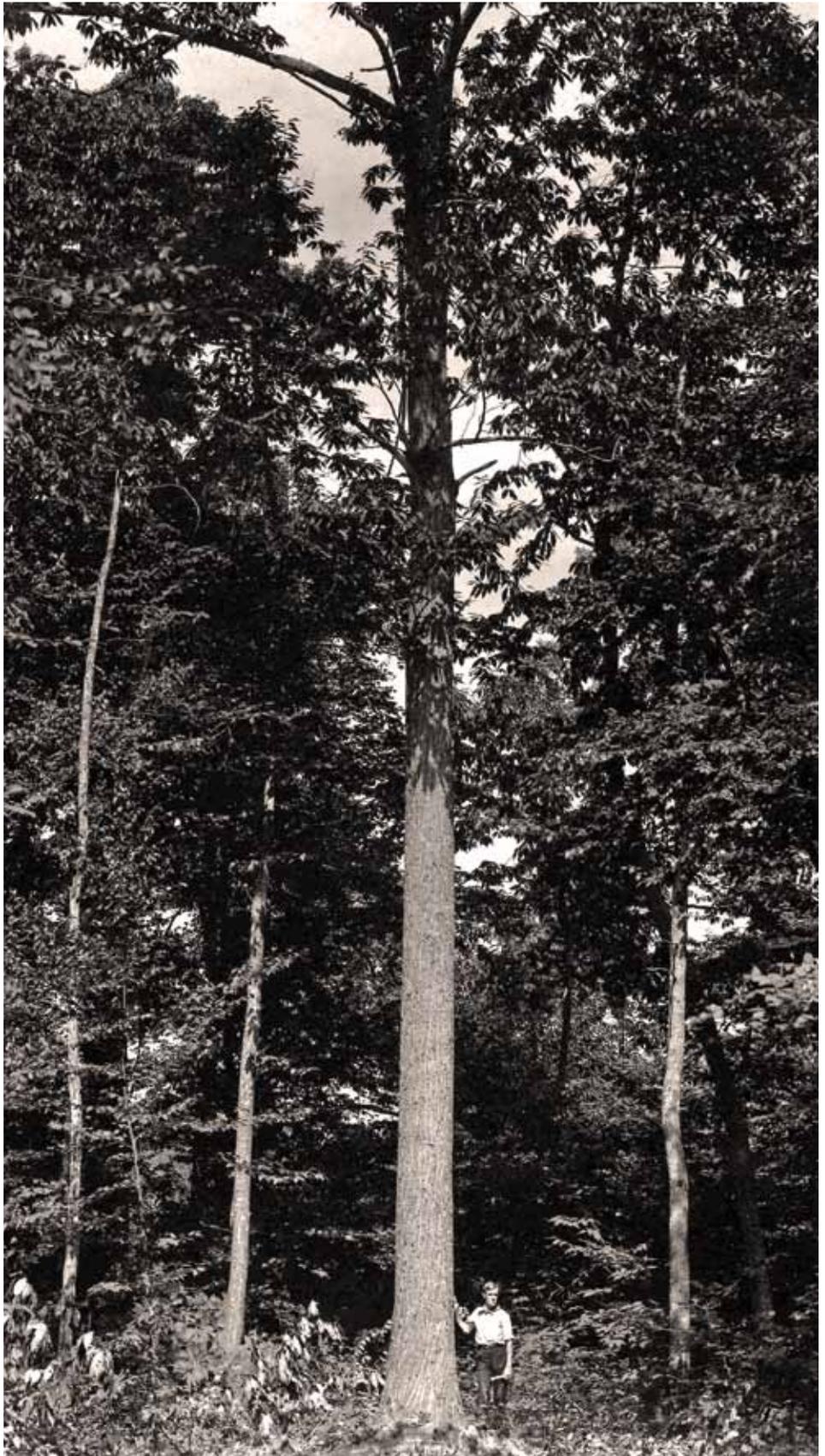
became the first state forest in Connecticut and New England in 1903. The first parcels were acquired at a cost of \$1.75 per acre. The site was chosen in part because of its excellent stands of American chestnut. The people involved in the early state forest movement had a tremendous amount of vision. The lands that were acquired were typical of Connecticut, in that they were mostly scrubby, burned, and cut over. It must have been difficult to convince the public and the Legislature to approve funding. Austin Hawes became State Forester in 1904, eventually serving for 27 years. Under his leadership, the state forest system expanded greatly.

Nipmuck State Forest in Union became the second state forest when 300 acres were acquired in 1905 at \$3.75 per acre. That same year, the first state nursery was built in Windsor to grow evergreen seedlings to sell to the public at cost for reforestation.

With the technology available at the time, fighting forest fires was a slow process at best, and the widespread fires at that time discouraged landowners from planting trees and investing in long-term forestry practices, such as thinning and pruning. Why bother if the trees are going to burn anyway? A Forest Fire Law, passed in 1905, provided for statewide training of town fire wardens and penalties for violations of burning regulations.

The early 1900s also saw the rise of exotic insects and diseases that devastated Connecticut's forests: the gypsy moth was documented in Stonington in 1905; chestnut blight was discovered in Fairfield County; and white pine blister rust was brought in on white pine seedlings imported from Germany in 1909. The demise of the American chestnut because of chestnut blight, a disease imported from Asia, is one of the most tragic events to ever happen to our forests. Chestnut comprised about 25% of the forest, and not only was it highly valued for its timber, which was decay resistant and used extensively for railroad ties and telegraph poles, but also for its nuts that were consumed by people and wildlife. And yet, by 1911, only six years after the blight was first discovered in Connecticut, virtually all the chestnuts in Fairfield County were dead. By 1915, American chestnut was declared "doomed" throughout the state. By 1921, chestnut trees had essentially disappeared throughout the state.

Connecticut's third state forest, Massacoe State Forest in Simsbury, was



This 83-foot tall, 103-year-old American chestnut tree was photographed in Scotland, CT, in 1905. Around that same time, the chestnut blight fungus was discovered in New York City. By 1921, chestnut trees had disappeared from Connecticut. Many wildlife species, from deer to bears, had to readjust their diets as the nuts had been an important food source.

acquired in 1908 because it bordered railroad tracks and could serve as a demonstration site for how to prevent fires caused by trains – the number one cause of forest fires at the time. 1915 was a record year for forest fires in Connecticut when there were 1,443 fires on 103,000 acres, fueled in part by all of the dead chestnut trees in our forests.

By the 1920s, state forest acreage had increased to 44,830 acres and a total of 15 state forests through purchases and donations.

In the 1930s, during the Great Depression, the Civilian Conservation Corps (CCC) was established. The CCC worked on a variety of projects, such as building roads and bridges, planting trees, creating hiking trails, and controlling gypsy moths and white pine blister rust. Most of our current state forest roads, trails, and recreational buildings were built by the CCC. For example, the Stone Museum at People's State Forest in Barkhamsted was built by the CCC of native stone and chestnut wood. The building is still in use as a nature museum during the summer.

Connecticut's forests were severely impacted by the massive and historic hurricane of 1938. It was estimated that one-fifth of the state's timber was destroyed in the storm. The CCC helped salvage the timber on state forests.

By the 1940s, there were 24 state forests encompassing up to 102,000 acres. Fast forward to 1994, when the number of state forests increased to 30, covering 143,000 acres. Today, the number stands at 32 state forests, totaling about 170,000 acres. These lands are owned by the State of Connecticut and managed by the DEEP Division of Forestry. In managing these lands, the Division of Forestry seeks to develop a vigorous, resilient, forest environment capable of sustaining the wide range of demands that the public places on these lands. These demands include a variety of recreational experiences, natural diversity (including threatened and endangered species), preservation of unique sites (both geologic and archeological), provision of raw materials as forest products, and maintenance of wildlife and fisheries habitats. The Division's

professional foresters work to ensure that these forests remain healthy and vigorous while serving the needs of the citizens of Connecticut.

State forests provide many benefits: wildlife habitat, sawtimber and cordwood production, recreation, watershed protection, research, education, protection of unique natural areas, and beauty. Foresters take hundreds of inventory plots to assess the health and condition of the forest, and then consult with wildlife and fisheries biologists to write management plans for each forest. Connecticut's state forests are an important resource that were created by farsighted individuals more than 100 years ago. It is easy to take the forests for granted. But, they must be properly cared for to benefit future generations.

This article was adapted from a 100th anniversary slide show written by Don Smith, Retired DEEP State Forester and Director of the Division of Forestry.

All photos are from the CT DEEP Historical Archives.



Mohawk S.F., 1924



Shenipsit S.F., 1937



Turkey Hill S.F., 1938



Sessions Woods WMA (formerly Goodwin S.F. Tower)

Forest Fire Wardens and Lookout Towers

In 1905, the Connecticut Forest Fire Law was established and the first fire wardens were appointed. State Forester Austin F. Hawes became the first State Forest Fire Warden on July 1, 1905. Prior to this time, there was little effort to stop forest fires unless they threatened valuable timber or buildings. A large number of forest fires at the time were attributed to railroad trains (about 30%), but the cause of at least half of the fires was unknown. The first fire tower built on state forest land was the Mohawk State Forest tower in 1924. Others were built later and the system of triangulation to pinpoint the location of fires was introduced.

Today, forest fire towers are no longer used to detect and locate forest and brush fires, and most towers no longer exist. One of the original fire towers, formerly located at Goodwin State Forest in Hampton, now sits on a high point at the DEEP Wildlife Division's Sessions Woods Wildlife Management Area (WMA) in Burlington. Visitors to Sessions Woods can climb to the top of the tower to view the surrounding landscape as far as the trap rock ridges in Meriden and Southington. The tower was moved to Sessions Woods in fall 1988. The 30-foot tower, which had been partially disassembled, was trucked across the state to Sessions Woods, where it was reassembled and moved to its final destination on the WMA with the help of a Connecticut National Guard Sikorsky Sky Crane.

Wild Turkey Brood Surveys Provide Insight

Written by Michael Gregonis, DEEP Wildlife Division

Wild turkey brood surveys provide insight into annual productivity of the state's wild turkey population. These surveys are conducted during June, July, and August by DEEP staff and volunteers. All cooperators are requested to collect and report hen and pout wild turkey sightings, and these sightings are categorized by total hens, total poults, and total number of hens with poults. Observations are analyzed to obtain an annual productivity index and also evaluate recruitment into the fall population. By evaluating recruitment over time, biologists can quantify change and trends in Connecticut's statewide wild turkey population.

Research indicates that the brood survey results require an approximate average of three poults per hen to maintain a stable wild turkey population. Since the initiation of the brood survey in 2007, the average ratio has been 2.6 poults per hen. This index indicates that the population trend is declining. Since the survey began, the annual index of the three poults per hen minimum for population stability was exceeded in only one year. The statewide spring wild turkey harvest also indicates that Connecticut's turkey population has declined since the mid-2000s. The highest spring wild turkey harvest occurred in 2003 when hunters harvested 2,367 birds.

Connecticut's wild turkey population decline is likely attributed to spring weather. During the nesting (May) and brooding (June) periods, rain events can have a major impact on annual turkey productivity. When a hen is sitting on the nest during an extended rain event, she does not have the ability to dry her feathers. This creates more scent, enhancing the chance a predator locates and preys on her and/or destroys the nest. In addition, when poults first hatch, they only have downy feathers, which do not provide

adequate protection during inclement weather. Therefore, extended rain events can drench the downy feathering and eliminate its insulating ability, which may cause young turkeys to die from exposure to the cold.

To evaluate the relationship between spring rainfall and annual wild turkey productivity, the productivity index was compared to the average spring rainfall (May and June) from 2007 to 2015. The productivity index was derived from the brood survey (poults/hen). Spring rainfall information was obtained from five weather stations distributed across Connecticut (Norfolk, Bridgeport, Hamden,

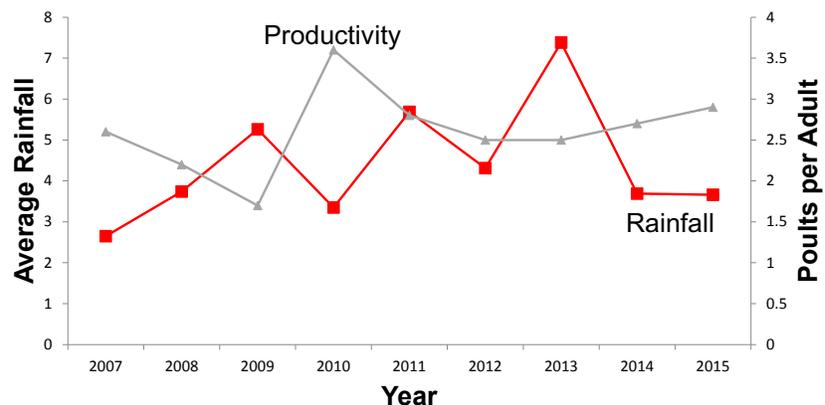
Windsor Locks, and Groton). The May and June total inches of rainfall were averaged by year for all weather stations, providing a rainfall index. Analysis found that there was an inverse relationship between rainfall and turkey productivity. That is, in years with abundant rainfall, annual turkey productivity declined and during years with limited rainfall, turkey productivity increased.

Although there are many pieces to the wild turkey management puzzle, the annual brood survey provides important insight into the population dynamics of Connecticut's largest game bird.

Wild turkey brood survey data for Connecticut, 2007-2015.

Year	Total Adults	Total Young	Total Adults & Young	Adults w/out Young	Young per Adult	Young per Adult w/Young	Number of Reports
2007	731	1,900	2,631	270	2.6	4.1	405
2008	448	988	1,436	330	2.2	4.3	224
2009	611	1,049	1,660	177	1.7	2.4	323
2010	472	1,686	2,158	105	3.6	4.6	278
2011	685	1,919	2,604	118	2.8	3.4	375
2012	435	1,089	1,524	293	2.5	3.7	244
2013	337	843	1,180	115	2.5	3.7	200
2014	579	1,561	2,140	194	2.7	4.1	313
2015	530	1,560	2,091	152	2.9	4.1	266
Tot./Avg.	4,828	12,595	17,424	1,754	2.6 (avg.)	3.8 (avg.)	2,628

Weather vs. Pout Production, 2007-2015.



Results from wild turkey brood surveys and the spring turkey harvest indicate that Connecticut's turkey population is declining. This decline is likely attributed to spring weather conditions.



Importance of Acorn Surveys

Written by Michael Gregonis and Andy Labonte, DEEP Wildlife Division

According to Mark Ashton (Professor of Silviculture and Forest Ecology, Yale School of Forestry & Environmental Studies), a mature oak tree will produce about 250 pounds of acorns in a typical fall. This is a tremendous and important food resource for a variety of wildlife species because acorns are a highly nutri-

will reduce competition and increase light availability, thus increasing the likelihood of it maturing into a mighty oak.

Acorns also impact productivity and fall movements of wild turkeys and large mammals, such as white-tailed deer and black bears. When acorns are abundant, these species will concentrate feeding

most survey was initiated in 2007 to assess annual acorn productivity. This involved permanently marking 25 red oak (e.g. red, black, pin, scarlet) and 25 white oak (e.g. white, chestnut, swamp) trees in 11 of Connecticut's 12 deer and turkey management zones; only 25 red oak trees were marked in one zone due to the lack of available white oak trees.

This annual survey, which is conducted in late summer, involves scanning the crown of each marked oak tree with binoculars to detect the presence or absence of acorns. Based on the percentage of oak trees with acorns, a numeric index is developed consistent with the deer hunter survey mast index. Although the mast survey index was not exactly the same for each survey, both indicated the same trends in acorn abundance (see graph on page 21).

Mast survey indices help biologists predict deer hunter success, abundance of certain game species, and specific habitat types where game animals may be concentrated. Since 2007, the Wildlife Division's Deer Program has reviewed the relationship between acorn abundance and deer hunter success during annual deer seasons. It was found that there is an inverse relationship between these factors. In other words, in years with abundant acorns, the hunter success rate declines. The reason for this phenomenon is that

deer movements are reduced because of the abundance of food, reducing the probability of encounter by a hunter. In years when acorns are scarce, deer move more and tend to feed in crop fields, increasing their vulnerability to harvest.

Research also indicates that certain wildlife populations respond positively to acorn abundance. For example, gray squirrel populations have been shown to increase following a year of abundant acorn production. Literature also suggests that bumper acorn crops enhance black bear productivity and cub survival. Acorns are such a valuable and desirable resource that in years when they are abundant, hunters pursuing gray squirrels, white-tailed deer, and wild turkeys should concentrate hunting efforts in oak stands to enhance their chances of success.



R. WOLFE, DEEP/WILDLIFE



Wildlife Division biologist Michael Gregonis scans a marked oak tree to detect the presence/absence of acorns as part of an annual acorn survey conducted throughout Connecticut.

tious food that can enhance overwinter survival and reproductive output. Biologists use acorn surveys to predict wildlife population increases and decreases, and hunter success rates. Survey results also provide insight on where the best hunting opportunities may exist for a variety of species.

Acorn Consumers

A wide range of forest dwellers are acorn consumers. For example, insects typically destroy about 50 percent of annual acorn production. Acorn weevils and acorn moths are among the most notorious acorn destroyers. Rodents are a major acorn consumer, but also beneficial dispersers of the seeds. Research indicates that gray squirrels will carry acorns up to about 650 feet away from the parent tree. If the acorn survives in a remote location away from the parent tree, this dispersal

activity in oak stands to increase fat reserves, which enhances survival and productivity.

Acorn Surveys

To explore annual acorn productivity, the Wildlife Division developed and initiated two types of acorn/mast surveys. The first mast survey began in 1993 as a question on the annual deer hunter survey. Hunters were asked to report their perception of acorn abundance by responding to the following question: "In the zone you do the majority of your deer hunting, how would you rank the fall acorn crop? (Circle one – Scarce, Moderate, Abundant, No Opinion/No Oak Trees)" From this information, a numeric index was developed with 0 representing an absence of acorns, 3 representing moderate abundance, and 6 representing high abundance. The second

2015 Deer Season a Tough One for Many

Written by Bill Embacher, DEEP Wildlife Division

The 2015 deer hunting season left many Connecticut hunters scratching their heads. During the season, hunters were calling the Wildlife Division daily to discuss their concerns about the lack of observed deer activity and deer harvested during the season. All seasons combined, the total 2015 harvest was 9,113, 20% lower than 2014 (11,134). So what caused this past season to be more challenging than previous years?

Weather Reduced Movements

Warm weather this past fall and winter was the first potential factor. According to NOAA, December 2015 was the warmest on record for the continental United States, with Connecticut being no exception. The average high temperatures in November and December 2015 were 7.4 and 10.8 degrees (F) higher than in November and December 2014, as recorded at Brainard Air Field in Hartford.

The unusually warm temperatures kept deer movement minimal during daylight hours. People who used trail cameras throughout the season reported most activity at night, when temperatures were cooler. Deer transition from summer to winter pelage by October. Winter pelage is composed of long guard hairs and a short underfur, which provide excellent insulation from the cold and snow. However, this winter coat insulates deer too well in warm temperatures. White-tailed



B. EMBACHER, DEEP WILDLIFE

Despite the difficult conditions deer hunters faced in 2015, those who stuck with the basics of keeping still and recognizing the effect of the wind were often rewarded.

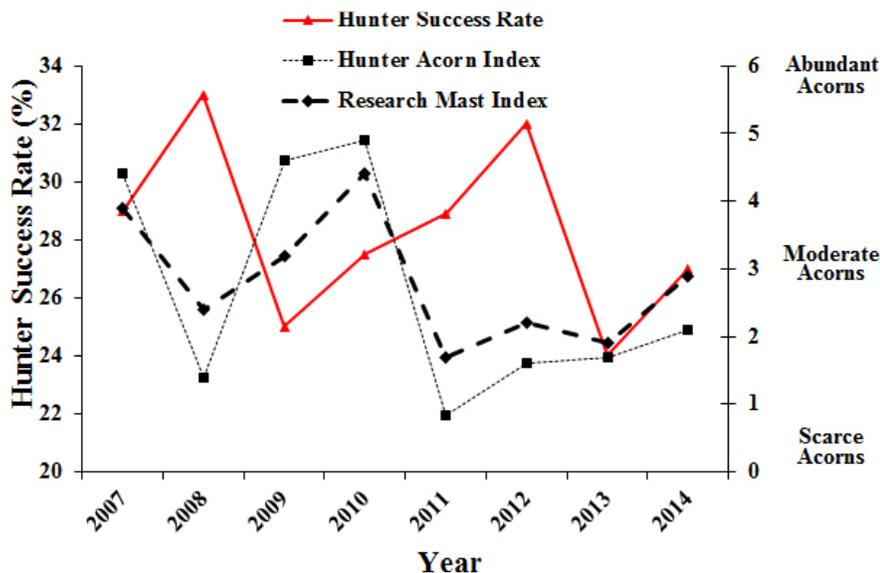
deer living in southern climates avoid this by not growing the underfur, even though they still have the ability to do so. Consider the situation when you wear a warm winter coat on a warm fall day. When you are not moving, this may be bearable. However, with any physical activity you quickly become uncomfortable. Deer

do not have the option of removing the coat immediately. So, instead, they keep movements to a minimum, making them less susceptible to hunters.

Plenty of Acorns

A second contributing factor to the low harvest in 2015 may be attributed to the large amount of available deer foods. Oak (especially in the form of white oak acorns, a favorite food of deer) and apple trees (*Malus spp.*) produced an abundance of food in 2015. Since 2007, the Wildlife Division has conducted an annual survey to assess the abundance of the acorn mast crop in Connecticut's deer management zones (see article on page 20). In 2015, the statewide index was 4.4 on a scale of 0 to 6, 0 being no acorns and 6 being most abundant. Acorns in three of the deer management zones had an index above 5.0, while the index was 4.1 or higher in six zones. All 12 zones were above the nine-year average. When correlated to deer hunter success (total deer harvest divided by the number of hunters in a given area), hunter success drops in years with a high acorn abundance, while hunter success is high in years when acorns are sparse.

Correlation between deer hunter success and acorn surveys.



continued on page 22

2015 Deer Season

continued from page 21

Hunter Movements Disturb Deer

A third contributing factor may be that hunters who were not seeing deer decided to move around to look for better hunting areas rather than sit still and wait for the deer to come to them. These movements may have unknowingly alerted deer to their presence, leaving the deer reluctant to return. Even a cau-

tious hunter will leave some scent in the woods, and a successful hunt may be a function of wind direction. High acorn abundance meant that deer had many options on where to feed, so if human disturbance or scent were factors, deer did not have to travel far to find an alternate food source and had no reason to return to the area from which they were disturbed or encountered human scent. In years when food resources are limited, deer may be willing to take greater risks

to access a food source, again making them more visible and susceptible to being harvested.

There could be a bright side to this dismal hunting season. With low harvest, high food availability, and a mild winter, recruitment of fawns into next year's herd should be high, providing hunters with ample opportunity to harvest deer during the 2016 hunting season.



New Species of “Rock Snot” Discovered

Article and photo by Mike Beauchene, DEEP Inland Fisheries Division

New species of microscopic algae were discovered in Connecticut by Diba Khan-Bureau, Ph.D., Professor at Three Rivers Community College (Norwich) and Mike Beauchene, Supervising Fisheries Biologist with the DEEP Inland Fisheries Division. In their recently published article in the European *Journal of Phycology* (the study of algae), Khan-Bureau and Beauchene reveal a new species to the world, *Didymosphenia hullii*, and a new species to Connecticut, *Cymbella janischii*. Both belong to a notorious group of microscopic algae collectively termed “rock snot.”

“Rock snot” first made headlines when pristine New Zealand trout streams became overrun with thick, sticky mats of a diatom, *Didymosphenia geminata* (known as didymo). These mats are comprised of multiple individual stalks, each supporting one or more coke bottle shaped cells. Didymo is not native to New Zealand, and it was hypothesized that it was transported inadvertently by an angler’s boots or fishing equipment.

The first report of didymo in Connecticut came in March 2011 in the West Branch of the Farmington River in Barkhamsted. Concern about what would happen to Connecticut’s trout streams radiated throughout the angling community. Khan-Bureau began to monitor the situation closely. She observed the prolific growth, and collected water chemistry and mucilaginous tufts of didymo from various locations within the river. It was apparent from the beginning that the diatom she was observing was different from traditional descriptions of *D. geminata*. Khan-Bureau sent the photos to leading diatom experts worldwide. Their consensus was this was a new species of didymo, previously not known to science. Following protocols and documentation, she named the new species *Didymosphenia hullii* (Khan-Bureau sp. nov.) in honor of the late David Hull M.D., Director of Transplant Surgery at Hartford Hospital.

In an interesting coincidence, while building the knowledge base around didymo, Beauchene and Khan-Bureau found what appeared to be an area covered with it. It was not, however, in the usual location, nor was it during the typical time of year. Upon review in the lab, this “look alike” was determined to be *Cymbella janischii*, a species lumped into the “rock snot” group but one whose cells look nothing like didymo. *C. janischii* is endemic to the Pacific Northwest and had not been found on the eastern seaboard except in New York. While didymo has not manifested itself into the massive mats first documented in New Zealand, many anglers reported thick clumps of “rock snot” throughout the West



Rock snot (*Didymosphenia hullii*) is currently “blooming,” meaning growing rapidly, in the West Branch of the Farmington River, Barkhamsted.

Branch Farmington River in July, about 1.5 miles up and downstream of the “Church Pool.”

DEEP reminds everyone about the potential impacts of the inadvertent transport of species from one water body to another. Once introduced, these organisms are often difficult, if not impossible, to eradicate. Everyone can take simple steps to minimize transport and introduction of invasive species. Before leaving a water body, practice the “Clean, Drain, Dry” technique on anything that had contact with the water or river bottom, including boats and fishing gear (waders). Anglers who frequent the West Branch Farmington River, especially through the towns of Hartland to Canton, should be extra vigilant. Didymo is currently “blooming,” creating thick mats, especially in Riverton. This algae can be easily spread from water to water as it can remain alive for long periods of time, even when slightly moist. Cleaning equipment is critically important if you plan to move to additional waters within a few hours or the same day after being in the West Branch Farmington River.

Information on nuisance aquatic organisms can be found at www.ct.gov/deep/invasivespecies (select “aquatic invasive species”).

Conservation Calendar

- Mid-April-August..... Respect fenced and posted shorebird and waterbird nesting areas when visiting the Connecticut coastline. Also, keep dogs and cats off of shoreline beaches to avoid disturbing nesting birds.
- May 14..... **International Migratory Bird Day** – Celebrate this special day that highlights “Spread Your Wings for Bird Conservation.” Learn more at www.birdday.org.
- May 20..... Endangered Species Day, which was initiated by Congress in 2006, is an opportunity for people of all ages to learn about the importance of protecting endangered species and the everyday actions they can take to protect our nation’s disappearing wildlife and last remaining open spaces. Learn more about Endangered Species Day at www.endangeredspecies.org. Learn about endangered species in Connecticut at www.ct.gov/deep/endangeredspecies.

Programs at the Sessions Woods Conservation Education Center

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

- May 7..... **Children’s Program: Wildlife in Spring**, 1:30 PM. Children and their caregivers are welcome to join Wildlife Division Natural Resource Educator Laura Rogers-Castro on a two-mile roundtrip hike at Sessions Woods. Participants will identify signs of spring; learn why birds migrate; visit a vernal pool; and discover fun facts about the Sessions Woods Wildlife Management Area. All children must be accompanied by an adult during the program.
- June 4..... **Trails Day Hike**, 9:00 AM-12:00 PM. Join Friends of Sessions Woods member Jan Gatzuras and CT Forest and Park Association Trail Manager and Board Member Jeff O’Donnell for a five-mile hike over varied terrain on the Blue-blazed Tunxis Trail. This pretty woodland loop includes the Great Wall, a steep rock escarpment nearly 70 feet high. Bring water and a snack and meet in front of the Sessions Woods Conservation Education Center.
- June 4..... **Wildlife Activity Day**, 10:00 AM-3:00 PM. Visit Sessions Woods during “Wildlife Day” for some outdoor fun! Learn survival skills all day, such as how to make a shelter and start a fire. Go on an insect hunt or habitat walk at 10:30 AM. Try an archery activity from 11:00 AM to 1:00 PM. Take a hike in honor of National Trails Day. Learn about wildlife, animal tracks, and more!

Hunting and Fishing Season Dates

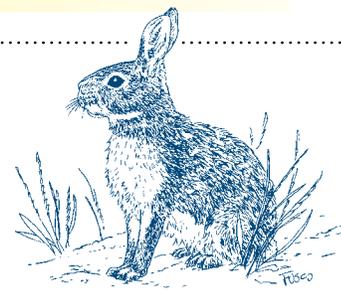
- April 9..... Opening day of trout season
- April 27-May 28..... Spring Turkey Hunting Season
- May 7..... Free Fishing Day, No Child Left Inside: Great Park Pursuit and CARE Family Fishing Day at Stratton Brook State Park in Simsbury. More details are at www.NoChildLeftInside.org.
- June 19..... Free Fishing License Day #1. Statewide free fishing licenses for this special day are available starting May 29 at www.ct.gov/deep/sportsmenlicensing.
- August 13..... Free Fishing License Day #2 and CARE Saltwater Fishing Event at Fort Trumbull State Park in New London. Statewide free fishing licenses for this special day are available starting July 23 at www.ct.gov/deep/sportsmenlicensing.

Consult the 2016 Connecticut Hunting & Trapping 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.



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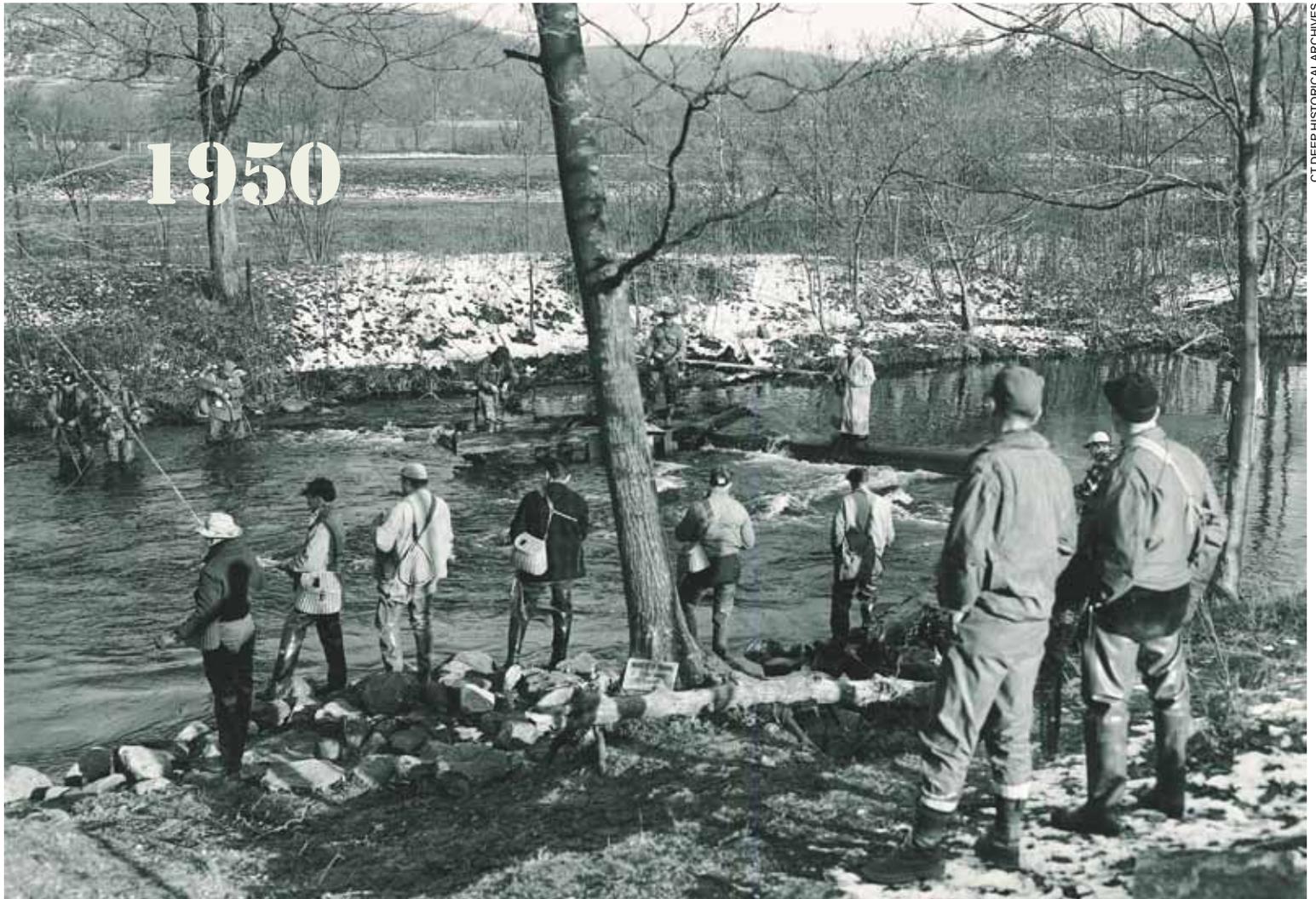
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CTDEEP HISTORICAL ARCHIVES

Above is a scene along the Natchaug River in Ashford during Opening Day of trout season in 1950. Opening Day of trout season is a long tradition in Connecticut. In 2016 (as in years past), anglers will line the banks of rivers, streams, lakes, and ponds to cast promptly at 6:00 AM.