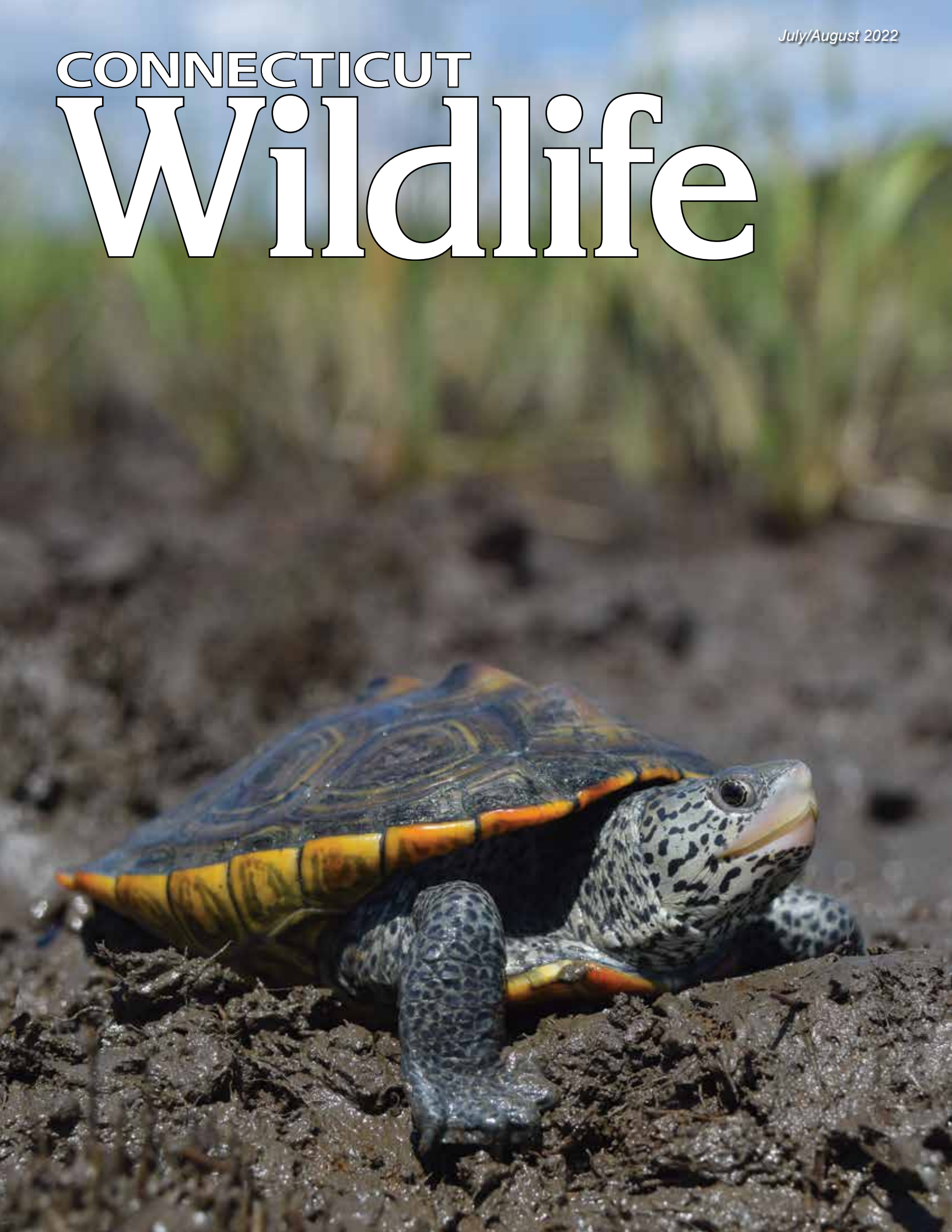
July/August 2022

CONNECTICUT Wildlife



From The Director

This issue underscores the complexity of our natural world, how much we have to learn, and the value of the time invested in learning those lessons. A great example is the American bittern. This secretive marsh bird was one of the many birds I began working with when it was first listed under Connecticut's Endangered Species Act. While we learned a lot about distribution and general habitats, the key factors surrounding when and how they use those habitats, how they interact, and how they move about the landscape remained elusive. New technology has created an opportunity to learn about these essential life history needs and hopefully guide conservation action that will help conserve this unique "star gazer". This common name refers to the habit of bitterns to freeze when threatened, with their bills pointed up to the sky making them perfectly camouflaged amongst marsh reeds and grasses.

Another mysterious gem in the natural world is the diamondback terrapin. Visitors to our coastline may have spotted the nose of a terrapin rising above the water's surface as it swims by or perhaps glimpsed an intricately patterned shell. Understanding how terrapins use the coast and how that use varies with the season is a lesson we need to learn to better protect a species that is vital to maintaining the health of eelgrass beds and our estuarine ecosystem.

One lesson we have learned that continues to serve us well is the reproductive cycle of black bears. Understanding when bears reproduce, what influences their growth, and how and when they disperse has been critical to helping us manage a growing bear population and guiding our efforts to learn how to better live with bears on the landscape.

When we think about these many lessons from the natural world, we also need to reflect on the people who took the time to observe, watch, learn, and question what was being taught. This summer the Wildlife Division lost over 180 years of collective insight, experience, and knowledge of our natural world with the retirements of Trish Cernik, Paul Fusco, Mike Gregonis, Paul Rego, Laura Rogers-Castro, and Chris Vann. Each of them helped guide the conservation and management of wildlife and, perhaps more importantly, helped all of us learn to better understand our natural world.

For that gift to all the residents of our great state and for their efforts to help ensure that these amazing places and species are here for future generations to enjoy, we simply say a heart-felt thank you. I hope we can all follow their lead and learn the lessons our natural world can teach us.

Jenny Dickson, Wildlife Division Director

Connecticut Wildlife

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CONNECTICUT Wildlife

Contents

July/August 2022

The diamondback terrapin is the only turtle in North America that spends its life in brackish water. DEEP Wildlife Division biologists are in their second year of a study that aims to learn more about the seasonal movement patterns of this turtle. To learn more about this effort, see page 4.

PHOTO BY PAUL BENJUNAS

IN THIS ISSUE

DEPARTMENTS

Cover:

A diamondback terrapin basks along the bank of a saltmarsh.
Photo by Paul Benjunas

Diamonds on the Coast
Terrapin Telemetry in a Connecticut Salt Marsh

Written by Mike Ravesi, CT DEEP Wildlife Division

Salt Marsh Ecosystem

For being the third-smallest state, Connecticut contains impressive landscape diversity. From mountains to swamplands to forests to the coast, Connecticut boasts a broad range of ecological habitats and plant and animal species that call them home. The coastal marsh ecosystem is an important component of the state's natural heritage. Coastal marshes provide for humans through recreation, aesthetics, seafood resources, and erosion prevention. Salt marshes host unique species, possess natural beauty, and provide critical ecosystem functions. They serve as nursery sites and primary habitat for many fish species, mollusks, and crustaceans. Coastal marshes also filter nutrients, buffer inland habitat from storms and flooding, are instrumental migratory bird stopover sites and feeding grounds, and are home to a spectacular array of plant and animal life that are integral components of the food chain.

Terrapin Ecology

The northern diamondback terrapin (*Malaclemmys terrapin*) is a turtle species that inhabits the Connecticut coast. This species uses tidal estuaries and bays of Long Island Sound year-round. It is the only North American turtle whose natural history has such close ties to brackish water environments. Terrapins range from Massachusetts to the Gulf of Mexico. In Connecticut, the diamondback terrapin is listed

M. RAVESI, DEEP WILDLIFE

An adult diamondback terrapin is fitted with a radio transmitter that will allow DEEP biologists to track the turtle and ultimately learn more about the seasonal movement patterns of this state-listed species.

as a species of special concern and it is illegal to collect, harvest, or possess any terrapins.

Terrapins have large webbed feet, powerful legs, and long claws. Adult shells measure 4.5-9 inches long. Males are substantially smaller than females. These turtles are variable in color with shells ranging from light grayish to brown or black. Similarly, the skin varies from white to dark gray or black. Both shell and skin are beautifully patterned; shells often display concentric rings and skin can be punctuated by dark stripes or spots.

Terrapins feed on fish, snails, marine worms, clams, and even carrion. There is evidence that terrapins can function as important dispersers of eelgrass by ingesting and depositing seeds. Eelgrass is refuge for developing invertebrates and fish, provides food for marine and migratory bird species, can mitigate erosion by stabilizing substrate, filters carbon dioxide, and promotes nutrient cycling.

Threats to terrapins include vehicle strikes on roads, loss of habitat, and predators common around human development that prey on nests and hatchlings (e.g., raccoons, gulls). Terrapins were previously hunted for food for many years, but are now a protected species in Connecticut.

P. BENJUNAS, DEEP WILDLIFE

DEEP Wildlife Division field technician Kavi Khadar is using telemetry gear to pick up the radio signal of a nearby terrapin fitted with a transmitter. Weekly trips to this saltmarsh are required to keep tabs on the individuals being studied.

T. MAHARD, DEEP WILDLIFE

Diamondback terrapins use their strong legs and claws to dig their way into the muddy banks of the saltmarsh where they typically spend the winter. Learning more about terrapin movement will help DEEP better manage this species.

Wildlife Telemetry

Broadly speaking, telemetry is a technique commonly implemented to track movements of individual wild animals. It involves the use of a transmitter device (typically fixed to the animal), which emits a signal detected by a receiver unit (often a stationary or hand-held device). Wildlife scientists can choose from a variety of telemetry systems that differ in their functionality, arrangement, and cost.

Acoustic telemetry involves the use of underwater receivers and transmitters and is often used to monitor fish movements. For example, a small acoustic transmitter is either attached externally or implanted internally to an individual or fish. That transmitter regularly emits a sonic pulse that an underwater receiver unit, fixed at a set location, can "hear" and automatically record the approximate location of the animal. Typically, multiple acoustic receivers are installed over a broad area to optimize "listening" range capability.

GPS telemetry involves a GPS receiver unit that communicates with several satellites in orbit around Earth to obtain a location fix. In this scenario, satellites function as transmitters and the GPS device is the receiver. Location data are typically downloaded remotely or manually by recapturing the target animal and retrieving data directly from the GPS receiver unit.

Radio telemetry is a common technique for studying wildlife activity patterns. It involves the temporary attachment of a VHF (very high frequency) radio transmitter to the target animal. This transmitter emits a unique radio signal that can be detected by a person "listening" with an antenna and receiver unit within range of the transmitter. The signals appear as audible, regularly-pulsing beeps. The clearer the beep, the closer the animal is.

Regardless of telemetry technique implemented, great care is taken for each animal's safety. Peer-reviewed capture technique, transmitter size, and attachment methods are important considerations of study organism well-being. All three above mentioned telemetry techniques have been implemented by different scientists studying diamondback terrapins on the East Coast of the United States. Each method has advantages and disadvantages. The DEEP Wildlife Division opted to use radio telemetry in Connecticut because of its cost-effectiveness and fit for the project environment. The sinuous backwater creeks at the study site are not optimal for acoustic telemetry; the signals would "bounce" off the banks and lose range.

Methods

Ten terrapins were captured, weighed, measured, and outfitted with radio transmitters in 2021. Transmitters were fixed to each turtle's upper shell (carapace) using a putty safe for use on turtles. The putty is strong enough to keep the transmitter temporarily attached, but will naturally and cleanly fall off the turtle shell or can be safely removed manually. This transmitter setup does not hinder terrapin behavior. Radio transmitter signals travel more easily through air versus salt water, so each flexible antenna was oriented upwards. When swimming terrapins approach the water surface, the antenna contacts the air and emits a clearer signal.

DEEP staff and partners navigate the study site by kayak. While paddling, the receiver scans for unique radio frequencies of tagged turtles. Signal search is optimal when staff stand on shore with the antenna held high. For this project, GPS locations are primarily recorded where turtle radio signals are detected. It is rare to see tagged terrapins because they are frequently in water, so researchers approximate location based on known signal range. If a tagged turtle is observed, the precise location is recorded. Data are also collected on weather conditions and tide stage. Turtles are tracked once per week.

Goals of the Project

One goal of the project is to determine how far and where terrapins move at this site during the active season (roughly late April to November). Elsewhere, terrapins have been documented covering fairly broad activity ranges (e.g., 60-130 acres in North Carolina). This information is useful to

M. RAVESI, DEEP WILDLIFE

An adult terrapin is released back into the wild after being fitted with a radio transmitter. The transmitter is fixed to the terrapin's upper shell (carapace) with a special putty that is safe for the turtle. The transmitters are only temporarily attached and will eventually fall off cleanly.

understanding what habitat features and specific areas are important to terrapins. DEEP can better manage the species using local, on-site data. Findings from the study have real-world applications. Knowing where terrapins are found in both summer and winter, for instance, can inform DEEP reviews of proposed projects that involve marsh dredging.

Technical knowledge is another outcome of this project. For instance, tracking terrapins at different tides enables staff to quantify tidal influence on turtle behavior and detection probability. Understanding tidal effects can improve capture and monitoring efforts in Connecticut for the broader scientific community. Similarly, DEEP staff are learning how effective radio telemetry is for this species. Terrapin telemetry is relatively understudied. Our experiences attaching transmitters and detecting radio signals in an expansive saltwater environment will help other biologists more efficiently track terrapins in future projects.

M. RAVESI, DEEP WILDLIFE

Dennis Quinn of Quinn Ecological uses a caliper to measure the length of a diamondback terrapin. Dennis has years of experience studying reptiles and amphibians in Connecticut and has played an important role in assisting with this study.

Findings to Date

One year of field data has yielded interesting findings. Most observations were of radio signals rather than of turtles directly. However, turtles occasionally were seen in the grassy, unflooded portions of the marsh. Turtle activity range sizes in 2021 were between 4.3 and 18 acres. Data suggest that turtles at this site use a core portion of the estuary both in the active and winter seasons. This may be because turtles have the resources they need in a small geographic area. We observed plentiful fish, snails, clams, fiddler crabs, and other food-source invertebrates. Known nesting habitat is also present within this core area. Terrapins likely overwinter within this core zone, as a tagged individual was seen burying itself in mud in November. Known terrapin overwintering features, such as silt and muddy creek banks, are abundant at this site. Turtles were seen actively swimming in late November and into December. This project has already provided data to inform environmental reviews; the dataset will continue to grow. During winter, a combination of saline water and friction from turtles burrowing in grainy substrate can detach transmitters. It is interesting to note that several tagged turtles have been detected again in 2022. This project is expected to continue into 2023.

T. MAHARD, DEEP WILDLIFE

A diamondback terrapin spotted in November prepares for the coming winter weather by burying itself in the muddy bank of the saltmarsh.

Acknowledgements

We thank Paul Benjunas, Jeffrey Cavallaro, Eric Davison, Kavi Khadar, Tyler Mahard, Dennis Quinn, Jani Quinn, and Sandra Ruiz for their efforts on this project. All work has been conducted with CT DEEP permits and under direct supervision from CT DEEP staff.

Fishing for Participation

Article by Mike Beauchene and Andrew Bade, DEEP Fisheries Division; Photos by DEEP Fisheries Division

"**Hunting and Fishing Tops All Outdoor Sports in Connecticut**" was the headline in the May/June 1967 edition of *The Connecticut Wildlife Conservation Bulletin*. The article summarized a cross-sectional survey of 4,900 families conducted by the Connecticut Inter-Regional Planning Program. The survey was conducted to seek information on what residents do in their spare time and included a question about "families 3 favorite leisure activities". From the results, the top activity (47%) was reading, followed by watching television (37%), and then gardening (27%). Fishing and hunting came in at 15% but unbelievably, fishing and hunting were number one among traditional outdoor recreations, including swimming, baseball, boating, camping, picnicking, and skiing.

The article goes on to caution that meeting the demand for high-quality hunting and fishing opportunities in the future will not be easy for the fourth most densely populated state in the nation (500 people per square mile of land in 1967).

Participation in fishing only increased in the following decades until it peaked in the early 1990s, with just over 200,000 folks picking up the rod and reel. Since then, there has been a declining trend in Connecticut and nationally. The decline is partly due to many of the "baby boomer" generation aging out of the sport, but is also influenced by other cultural and demographic trends. To reverse this trend, a nationwide effort to Recruit, Retain, and Reactivate (R3) was initiated, building upon decades of actions to provide easy access to high-quality fishing opportunities.

R3 Increases Funding and Stewardship

Why work to increase the number of people fishing? The North American Model of Wildlife Conservation uses partici-

Fishing means many things to many people. One of the most common responses to the question "What is the most rewarding part of fishing?" is "The time spent with family and the resulting memories that last a lifetime."

pation to fuel the funding cycle that state fisheries programs, like Connecticut's, rely on. Excise taxes on fishing equipment and boat fuel are distributed by the U.S. Fish and Wildlife Service to state fish and wildlife management agencies based on the square mileage of the state's land and inland waterways, as well as the number of fishing licenses sold. The DEEP Fisheries Division also receives Connecticut General Fund contributions and 100% of the revenue from license sales to help support our Fisheries programs. The combined revenue from these sources allows the Fisheries Division to manage the state's fisheries for the betterment of our resources and the use and appreciation of Connecticut citizens.

The act of fishing and being part of the angling community can also increase feelings of responsibility to protect and maintain the resource (environmental stewardship). Anglers express their stewardship through actions including volunteering for conservation organizations, participating in community science projects, funding conservation efforts, offering political support, advocating for the environment, and self-regulating their and other anglers' fishing behavior. As such, increasing the number of anglers not only increases the amount of funding available, but also increases the number of people in our community who take an active role in the management of aquatic resources and work on their behalf. Stewardship is especially critical in times of changing environmental conditions that result in increased stress and pressure on aquatic systems.

Participation statistics clearly show that the overwhelming majority of people who fish identify as male. Since the 1930s, the State of Connecticut has been working to cut into that majority by encouraging females to "flex their fishing skill". The take home message – fishing is for all to enjoy!

Lastly, we believe that the anglers themselves receive direct benefits from fishing. Depending on your interests, fishing can offer excitement or relaxation, social connections, or quiet reflection. Connecticut's fisheries offer a local, healthy, and sustainable food source for those who choose to harvest their catch. For these reasons and many others, we should all be striving to keep our fishing traditions alive.

Connecticut's R3 Efforts

One could argue that actions to support R3 have been ongoing since the formation of the Connecticut Fish Commission (established in 1866), which was charged with restoring Connecticut's waters with a variety of fish. While the name of the agency responsible for fisheries resources has changed over the years, the efforts to broaden participation have been ongoing and continue to this day. A few examples include:

- Introduction of largemouth bass and smallmouth bass (1890s).
- Increased size of stocked trout and opened the first state run trout hatchery (1899).
- Women's only fishing area in Branford River (1933).
- Map of fishing locations and fishing regulation book published (1940).
- Children's only fishing areas established in 1947.
- Fishing curriculum promoted in schools 1950s.

- Publication of the *Connecticut Wildlife Conservation Bulletin* (beginning in 1955).
- *This is Your CT Wildlife*, a 15-minute weekly TV show on WFSB 3 at 6:15 pm (1957).
- Weekly Fishing Report (1957).
- Trophy Fish Award Program (1967).
- Quinebaug Valley Trout Hatchery begins production (1973).
- Urban Fishing Program, now named the Connecticut Aquatic Resource Education Program (1986).
- Community Fishing Waters (2007).
- Enhanced Opportunity Shoreline Fishing Location.
- CT Fish and Wildlife Facebook Page (2010).

Connecticut is fortunate to have numerous waterbodies with public access. While many of these are stocked to augment the take-home catch, there are usually some bluegill sunfish that are eager to please.

Following the participation declines of the 2000s, Connecticut doubled down on these efforts by implementing new and innovative programs like the Youth Fishing Passport, Free Fishing License Days, and focused promotion on social media. Leveraging multiple channels, such as web content and newsletters, continually improved our ability to teach budding anglers to fish. Our efforts over the five years of 2011-2015 seemed to result in a modest increase in the number of people with a fishing license by 8.9%. Nationwide, some states saw similar returns and it seemed the downward slide had slowed if not halted all together. *Connecticut's Angler R3 Plan* (2022) seeks to balance participation in fishing with responsible management of the fishery resources under our charge. As we move forward, Connecticut needs to continue balancing angler R3 with the conservation and management needs of the resources.

Connecticut's Angler R3 Plan (2022)

To distill what has been learned and organize our efforts moving forward, the Fisheries Division developed a new Angler R3 Plan. The plan consists of three different themes: Opportunities and Access, Adult-Onset Participation, and Feeding the Flame. Each theme was led by a different DEEP staff member and has goals, objectives, and details needed for implementation. The following is an executive summary of the three themes (bold text) with their goals (lettered) and objectives (roman numerals).

Opportunities and Access: There is no fishing without fish and ways to access them. Accordingly, ensuring access to high-quality fishing opportunities must be a central component of any effort to increase participation in fishing. In recent years, the Fisheries Division has increasingly focused on improving fishing opportunities in urban communities through trout stocking, Channel Catfish stocking, and special regulations. These efforts have created new, high-quality fisheries closer to home through the Community Fishing Waters Program and Enhanced Opportunity Shore Fishing Program.

a. Maintain and expand diverse, high-quality fisheries in Connecticut.
   i. Explore opportunities to expand the Community Fishing Waters (CFW) and Enhanced Opportunity Shore Fishing (EOSF) programs.
   ii. Design and implement a litter mitigation plan for CFW and EOSF sites.

b. Increase the awareness of fishing opportunities to a diverse audience.
   i. Support CT Fish and Wildlife app development.
   ii. Develop a resource map of all publicly accessible fishing access points.
   iii. Create Spanish translations of important web content.

Adult Onset Participation: Fortunately, most adults are

interested in fishing even though only a minority participate. We plan to support adults who may have no previous fishing experience through education, fostering engagement with the fishing community, and connecting them with existing fishing resources. Our Adult-Onset Participation team is ahead of the game and has already started to implement multiple objectives. These items are still included to show the value of ideas generated during our planning meetings and to formalize ongoing evaluations.

a. Education – self-paced virtual instruction and in-person fishing instruction.
   i. Develop an e-learning introductory fishing course.
   ii. Deliver virtual "Learn to Fish" content through videoconferencing.
b. Community – create, connect, and coordinate community fishing groups.
   i. Develop a community page for anglers to discover and connect with fishing groups in Connecticut.

Feeding the Flame: There is more to becoming an angler than catching a fish. The first time you wet a line involves several stages, including awareness, interest, and trial (i.e., trying fishing). From there, you can decide whether to continue in fishing. This understanding is formalized in the Outdoor Recreation Adoption Model (ORAM), where people progress through a series of steps from awareness of fishing to continuing fishing without support. Generating interest in fishing and offering trial experiences are great ways to get new anglers into the pipeline, but continuing social support is needed for many to stay engaged. Accordingly, the R3 plan develops specific resources for people at different stages of the fishing journey.

a. Develop start to finish informational guides, also known as "roadmaps", of resources to get involved in fishing.
   i. Create saltwater and freshwater fishing roadmaps.
   ii. Develop species-specific roadmaps for underutilized fisheries.
b. Improve angler recognition.
   i. Electronic submission system for angler catches.
   ii. Improved user access to catch data.

We All Win

R3 programs and efforts are very diverse, from simple "come fish with us" events, to legislative efforts, to streamline fishing licenses and regulations, to improving access via purchase of lands or easements. Regardless of the specific R3 action, the common theme is to use fishing as the mechanism to connect people with the environment. We all catch the "big one" when we create, keep, or re-motivate people who self-identity as an "angler".

Not too bad for a first fish ever! Getting people "hooked" on fishing early in life by having positive fishing experiences is key for long-term participation. DEEP's Connecticut Aquatic Resource Education (CARE) Program offers a variety of fishing classes and events for all ages.

American Bittern Research

Article by Min Huang, DEEP Wildlife Division, and Sam Merker, University of Connecticut

P. J. FUSCO

The American bittern is a medium-sized and secretive migratory heron that breeds in freshwater wetlands across northern North America. In Connecticut, American bitterns are listed as endangered, and have been listed as such since the inception of the Connecticut Endangered Species Act in 1992. The American bittern winters in southern North America and Central America. Because of this bird's secretive nature, little is known about its habitat use during any period of its annual cycle. In addition, knowledge of the species' breeding biology, diet, home range, habitat requirements, mating systems, sources and rates of mortality, and juvenile dispersal patterns is extremely poor. This lack of basic information on all aspects of the bittern's life cycle, including information on migration routes, major stopover sites, and major overwintering areas, makes conservation very challenging. In order to implement meaningful and beneficial conservation actions, information is necessary!

Based on the Breeding Bird Survey, the American bittern has experienced a steep population decline over the last half century. This decline has been linked to the draining of wetlands across all but the northern edge of the American bittern's breeding range. Near the southern edge of its breeding range, total wetland habitat has decreased by approximately 53%. Although habitat destruction is a common cause of population decline for many species, little is known about how different wetland habitats are used by the American bittern. Additionally, the effects of current wetland management strategies on American bitterns are completely unknown.

Given the overall dearth of information and the American bittern's current endangered status in Connecticut, the DEEP Wildlife Division partnered with the University of Connecticut (UConn) to look at habitat use, including migratory habitat, of American bitterns. UConn researcher Sam Merker received a grant to equip five American bitterns with state-of-the-art GPS backpack radio units. These units, similar to the units Division biologists are putting on mallards and American black ducks, record a bird's location every hour, and upload that data through the cellphone network on a daily basis. Sam surveyed over 20 sites across the state that had, what was assumed, suitable bittern nesting habitat. He detected bitterns at seven different sites. Most of these sites were already documented in DEEP's Natural Diversity Data Base, but several were not.

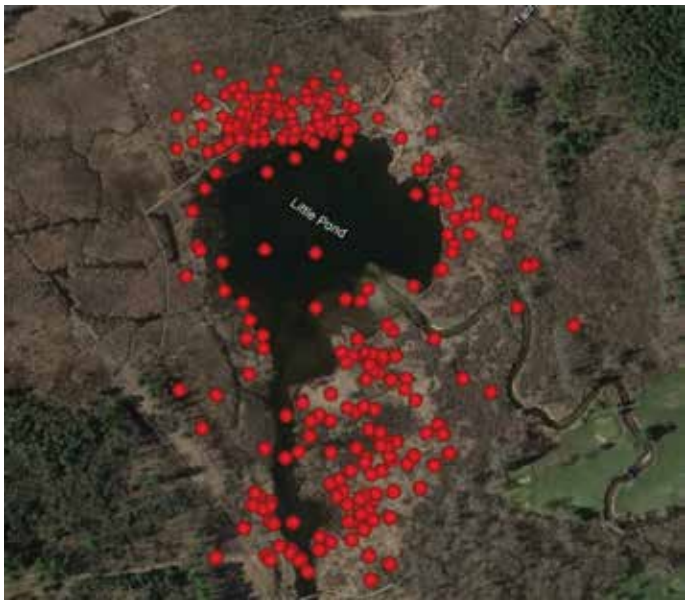
Capturing Bitterns

Capturing bitterns is quite an adventure! Similar to the Wildlife Division's work capturing clapper rails, bitterns are extremely territorial during the nesting season and biologists can use this behavior to their advantage.

Early one morning in mid-April, Sam Merker met up with James (Jamie) Fischer, Research Director at White Memo-

rial Conservation Center in Litchfield. Sam was excited and nervous because this was the day he would find out if he had started a wild goose chase, although he was not after geese. Sam and Jamie surveyed and wandered through the stunning marsh habitat at White Memorial for several hours and, even though the location appeared perfect for their target species, they heard not a peep. Despite being a bit discouraged, they decided to check a nearby marsh that had several reports of American bitterns on eBird from previous years. (eBird is a biodiversity-related science project managed by the Cornell Lab of Ornithology, with more than 100 million bird sightings contributed annually by eBirders around the world. eBird data document bird distribution, abundance, habitat use, and trends.) Upon arriving at the marsh, they agreed it appeared to be great habitat, with lots of cattails. Standing on the edge of the marsh, Jamie brought out a large speaker and set it on the ground. Not expecting much to happen, he began to broadcast the deep guttural mating call that the American bittern emits during the breeding season. The response was immediate – the booming call of a male came floating across the marsh. Shortly after, the bird launched into the air and headed at them like a low-flying cargo plane. It landed front and center and began an astounding display. No wild goose chase here – only mysterious and secretive American bitterns.

A few days after the original encounter, Sam returned to the marsh with his wife, Nicole Krauss, and a trap specifically designed to capture American bitterns. Donning hip waders, Sam hauled the trap out into the marsh and nestled it among the tall but still dead cattail stalks. Placing a speaker in the trap, Sam began to broadcast the booming call into the marsh. Just like the previous encounter, the bird called back and launched itself into the air to fly across the marsh.



An example of the movements of one of the bitterns within a marsh as documented using GPS technology.

Covering the bittern's head and eyes calms the bird, creating a safer and less stressful experience. In addition, it reduces the number of bill strikes towards the handler's eyes and face. Bitterns are well known for their downward facing eyes. Here, the head covering slipped back allowing a glimpse of how dramatic this adaptation is, which allows the bird to look down into the water without moving its head.
PHOTO BY LAURIE DOSS

The observed behavior was incredible. The bird flew back and forth over the trap, until it finally decided to investigate further. The bittern began to march back and forth, sneaking through the marsh with both stealth and speed. It found the speaker and then, because of the mirror placed at the back of the trap, the bird found the "intruder" and went in to chase it away.

Catching a bird is one thing, getting it out of a trap can be an entirely different matter. Sam rushed into the marsh and came face to face with one of the most incredible looking birds he had ever seen. Generally thought of as being "brown", American bitterns have remarkable coloration with perhaps a dozen shades of brown, orange, tan, white, black, and an overall greenish wash, making them incredibly camouflaged and notoriously difficult to see. In addition to their beauty, bitterns are formidable predators, and their sharp pointed bills mean the birds should be handled

continued on page 23

Reproductive Cycle of Black Bears

A female's two-year cycle revolves around changing physiology

Article by Kyle Testerman, Wildlife Management Institute

Black bears are generally solitary, choosing to avoid close encounters with other bears and maintain their own home ranges. However, there are periods when multiple bears may spend time together – during the mating season and while a female rears offspring.

The mating season is just one of the events that make up the broader reproductive cycle of adult female black bears. This cycle takes roughly two years and repeats for most of the female's life. During this cycle, females undergo fascinating and unique physiological changes, beginning with reaching sexual maturity and experiencing their first period of estrous. Female bears in our area may reach sexual maturity as early as 2.5 years of age, although this can be delayed a year or two depending on biological and environmental factors. In other regions of black bear range, females can take upwards of 5.5 years to experience estrous for the first time.

Female black bears may reach sexual maturity as early as two and a half years of age. Younger sows, like the one pictured here, are still able to raise cubs successfully, despite not yet reaching their maximum size. Younger sows tend to weigh less than older sows, which can weight upwards of 350 pounds. PHOTO BY KYLE TESTERMAN

This period of fertility kicks off in late-spring and can last through July. It may also involve multiple periods of estrous (polyestrous), where a female may ovulate more than once during the season and is receptive to copulation more than one time. During the breeding season, females may be pursued by multiple males; however, they are unlikely to be receptive towards a male's attempts to copulate until she is at her most fertile point. Until then, a male may follow her closely for several days. He will frequently examine her day beds, or resting areas, to smell when she might be ready to mate. As it gets closer to her peak time of fertility, a male often follows directly behind a female to keep rival males away. When the time comes, the female will allow the male to make physical contact. The two may nuzzle, gently bite or gnaw on each other, but once the act is complete, they will separate. There are no further responsibilities for the male after copulation.

During the two months of the mating season, females may have a second estrous period. This second estrous may occur if fertilization failed to occur previously, but there is some evidence that she may have a second estrous even if fertilization has occurred. Much is still unknown about this aspect, though some researchers think it is physiologically possible for females to get pregnant from both cycles, resulting in superfetation.

If an egg is fertilized, the developing embryo begins to divide and grow into a tiny ball of cells, called a blastocyst. Each blastocyst enters a period of embryonic diapause, where it stops growing and dividing and does not implant into the female's uterine wall. This active pregnancy is put on hold until the beginning of winter and requires unique physiological changes for the mother. This process is seen in nearly 100 other species of mammals, including bats and mustelids. While this evolutionary strategy is generally

Despite being solitary most of their lives, adult male bears often follow a sow who is in estrus, waiting for opportunities when she is receptive to copulation. Seeing a pair of adult bears together like this in early summer is not unusual. PHOTO BY GINNY APPLE

used by species to avoid giving birth in the middle of winter, bears are doing the opposite. By delaying active pregnancy, bears can ensure they have gained sufficient weight and fat reserves before winter. If food is scarce or the female is sick, she may not be healthy enough to resume gestation.

In other parts of black bear range, like the arctic or desert regions, it may be more challenging to gain enough weight prior to denning and females may be more likely to not resume active pregnancy. Litter sizes also tend to be smaller in these regions.

Connecticut has an abundance of suitable bear habitat from border to border. Good habitat means that, for the most part, females have no problem gaining enough weight throughout summer and particularly fall during a period known as "hyperphagia", or excessive eating. Both sexes and all ages of bears kick their eating habits into high gear during hyperphagia and can consume over 20,000 calories a day for several weeks. When seasonal food resources naturally diminish with the onset of winter, bears head to winter dens.

Around this time, the blastocyst(s) will implant and a relatively short period of development begins. Cubs are born in the female's den after about two months of active development and are only the size of a soda can. The female cleans the cubs and helps them nurse, but remains in a lower metabolic state. On average, she will produce two to three cubs, but may have as many as four or five in a litter. The physiological demands of enduring weeks without food and water while undergoing pregnancy, parturition, and nursing is remarkable. For the remainder of winter, the female will sleep and rest in the den while her rapidly growing cubs sleep and feed on her rich milk. The new family will emerge mid-spring, usually later than males, sub-adults, and females with yearlings. The female's energy and milk production demands will significantly increase once the group starts traveling, so they remain in the den until the cubs are larger and more spring foods are available for her.

The cubs' first spring marks the halfway point in the female's cycle. This year, she will not be going into estrous; her focus will be on protecting and nursing her cubs. Weaning occurs within a couple months of den emergence, as more natural foods come into season. In Connecticut, cubs can grow quite fast, some reaching 100 pounds before their first birthday. The group spends the spring and summer moving around the female's home range, growing and learning about what foods to eat and where to find them. In most parts of Connecticut, this is when young bears start to learn about all the human-associated foods around them, such as food waste, as well as wild and domestic bird feed. Unfortunately, human-habituation and food-conditioning start at a young age when bears have easy access to our unsecured foods.

The second autumn of the female's cycle differs from the previous year. Her energy demands will be lower now that she is not nursing or pregnant. The weight she gains during hyperphagia this year will exclusively be used to sustain herself through winter. She may put less effort into finding a sheltered den site this winter because there will not be newborn cubs to protect from harsh weather. Her yearlings may share a space with her or find something suitable nearby. In times of mild winter weather, they may become active and leave their dens, as do other males and sub-adults. When spring arrives and the group emerges from their second winter together, big changes

Adult male bears, called boars, can weigh over 500 pounds. Even with this impressive size, they can still move fast and even climb trees, if necessary. Their size and strength help boars compete with rivals for mating opportunities. PHOTO BY KYLE TESTERMAN

are on the horizon.

The female's reproductive cycle is nearly complete, and she will soon begin another. Before she can breed again, she will need to push her yearlings to disperse on their own. Some yearlings will get the picture quickly and may have been independent for some time already, others may need to be aggressively driven away. They may stay local, but remaining by the female's side could be dangerous for young males during mating season. Most dispersing males wander long distances while they seek out their own home range. Female yearlings are less likely to disperse long distances, and may eventually settle in an area that overlaps some of her mother's home range.

With the offspring from the past cycle dispersing, the reproductive cycle is starting over as the female's body readies itself for mating once more.

Emerging from the den in late winter, this yearling bear will soon be pushed away by its mother and seek out a territory of its own. PHOTO BY GINNY APPLE

What About the Males?

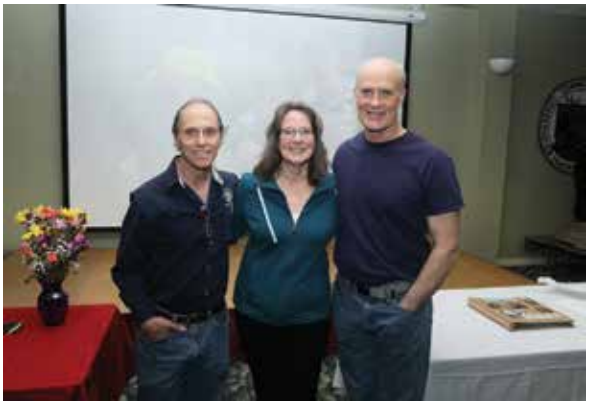
- Male bears reach sexual maturity around the same time as females, though most of the mating opportunities are won by older and more dominant males.
- Males will look to mate every year because some females are ready to breed while others are rearing cubs.
- Males seek out opportunities from more than one female.
- While males are in pursuit of females in estrous, they may seem to be acting strange to the casual observer – not noticing people around them, marking with urine, and having an exaggerated cowboy-like walk.

Why Do Black Bear Cubs Mature So Fast?

The health of the mother and quality of habitat can have a big impact on how fast cubs grow and become independent. In other species of bears in North America, such as polar bears and inland brown bear populations, offspring can remain with the female for three to five years. This longer period of raising offspring also extends the length of the female's reproductive cycle, which can limit the population's potential for growth. Black bears in Connecticut have a high potential for fast population growth because bears thrive in areas of good quality habitat, which is abundant in the state. Females also have larger litters and higher cub survival on average than many other parts of the species' range, in part due to access to abundant natural and non-natural foods.

Six Long-time Staff Members Retired from the Wildlife Division

2022 has been a big year for retirements at DEEP, especially at the Wildlife Division where we lost six long-time staff members, taking with them decades of experience and knowledge. As much as we wish them well in the retirements, their absence is felt and they are missed. We would like to highlight each of these employees and their contributions to the Wildlife Division's efforts.



P. FUSCO

(From left to right): Long-time DEEP Wildlife Division employees Chris Vann, Trish Cernik, and Paul Rego recently retired in March 2022.

Paul Rego

When Paul Rego began his career as a Wildlife Biologist with the DEEP Wildlife Division's Furbearer Program back in 1986, the agency was then known as the Department of Environmental Protection Wildlife Bureau; the fisher was listed as a Connecticut species of special concern; coyotes were relatively new residents of the state after appearing in the 1960s; the bobcat population was low; and bears were non-existent after being extirpated from the state in the mid-1800s. So much changed over Paul's 36-year career with DEEP, providing him the opportunity to be at the forefront of landmark research and management efforts regarding furbearers and black bears.

Paul came to Connecticut after receiving his bachelor's degree from the University of Wisconsin and a master's degree from the University of Maine. He hit the ground running as his first major project was to reintroduce fishers live-trapped from New Hampshire and Vermont into northwestern Connecticut. In what is termed a "soft release," fishers were penned and fed at the release site for a couple of weeks prior to being released in the late 1980s. Through radio and snow tracking, it was documented that the fishers released in northwestern Connecticut had high survival rates and successfully reproduced. As a result of this project under Paul's leadership, a viable, self-sustaining population of this native mammal is now established in western Connecticut. Fishers found throughout eastern Connecticut are a result of natural range expansion.

P. FUSCO

Retired Wildlife Division biologist Paul Rego weighs a bear cub as part of a long-term research project focused on Connecticut's black bear population. During his time with the Division, Paul contributed to bear research and management efforts in Connecticut and throughout the Northeast.

Around the same time Paul was involved with the fisher project, black bears started their return to Connecticut after being absent from the state since the mid-1800s. Beginning in the 1980s, the DEEP Wildlife Division had evidence of a resident black bear population. The return of bears prompted the start of a long-term research project into the productivity and distribution of Connecticut's bear population, led by Paul. With close to 30 years of data as a result of this project, Paul and his staff have contributed to bear research and management efforts not only in Connecticut, but throughout the Northeast through Paul's involvement with the Black Bear Technical Committee, which is part of the Northeast Association of Fish and Wildlife Agencies (NEAFWA).

Throughout his tenure, Paul was also Connecticut's representative on the Northeast Furbearer Resources Technical Committee (NEFRTC), whose primary mission and objectives include preserving and sustaining furbearer populations for their biological, eco-

As the Technical Assistance Wildlife Biologist, Chris Vann provided wildlife damage control assistance to the public. He assisted thousands of callers for over 30 years, providing natural history and damage control information to effectively resolve wildlife conflicts.

logical, economic, aesthetic and subsistence values, as well as for recreational, scientific and educational purposes for present and future generations. Paul was involved with the NEFRTC's efforts in producing outreach and education materials about furbearer management and trapping in the Northeast. He was also active with the New England Chapter and Northeast Section of The Wildlife Society throughout his career. The Wildlife Society is an international network of over 11,000 leaders in wildlife science, management and conservation who are dedicated to excellence in wildlife stewardship.

Paul was well-known in the local media as he appeared in numerous interviews for local news stations and print media, covering topics ranging from bears, coyotes, beavers, bobcats, and even the non-existent mountain lion population in Connecticut. Paul did have to deal with a mountain lion when one was killed by a car on the Merritt Parkway in 2011 and its origins were traced back to South Dakota before it made its way into our state. Besides interacting with the news media, Paul could be counted on to provide the public with information and identification of wildlife through emails and phone calls.

Paul spent his career working with wildlife like beavers, coyotes, bears, and bobcats that are high-profile, often controversial, and sometimes cause frustration, anger, and emotional reactions from Connecticut residents. Despite, the challenges posed with furbearer research and management, Paul remained calm and professional throughout his career and always based decisions on science and data.

Chris Vann

Chris Vann graduated from the University of Connecticut with a Bachelor of Science degree in Renewable Natural Resources. Shortly after graduating, Chris started as a Seasonal Resource Assistant with the DEEP Wildlife Division and worked with a variety of programs and staff. He assisted visitors at the Shepaug Bald Eagle Observation Area in Southbury during the winter viewing season (back when the Wildlife Division ran the observation area), and then monitored nesting piping plovers over the summers. He also worked with the habitat management program, conducting habitat improvement work at state wildlife management areas on the western side of the state. Chris was hired as a Wildlife Technician in 1990 to work on the Division's Technical Assistance Program and was eventually promoted to Wildlife Biologist.

Chris' primary responsibility as the Technical Assistance Wildlife Biologist was to provide wildlife damage control assistance to the public. He assisted thousands of callers for over 30 years, providing natural history and damage control information to effectively resolve wildlife conflicts. One of the most notable times during his career was the difficult days of fielding phone call after phone call during the raccoon rabies epizootic that hit Connecticut in fall 1991.

One of Chris' major responsibilities was the administration and coordination of the Connecticut Nuisance Wildlife Control Operator (NWCO) Program. Following changes in the licensing law for NWCOs in 1987, Chris assisted in the design and implementation of a comprehensive Nuisance Wildlife Training class and exam, as well as representing the DEEP while instructing NWCO applicants of important nuisance wildlife laws, policies, and regulations at dozens of training classes over the years.

The increasing appearance of eastern coyotes into populated communities and the associated threats and damages caused by coyotes, primarily to small pets, have been a continuing challenge over the past several decades. An important focus of Chris' work was on documenting damages, speaking at forums and to the media, holding workshops, and advising residents and town officials on comprehensive coyote control. In addition to high-profile coyote conflicts, Chris also assisted numerous residential landowners, businesses, town public

DEEP WILDLIFE DIVISION FILE PHOTO

Wildlife Division Biologist Mike Gregonis worked on a variety of research activities during his 30-year career with DEEP, including survival of rehabilitated fawns, assessing annual acorn mast abundance, evaluating "nuisance turkey" issues throughout the U.S. and Canada, and investigating turkey crop damage complaints in vineyards.

works, the CT Department of Transportation, railroads, and many state forests and parks with managing problems caused by beavers. He provided information on how to prevent beaver problems, as well as recommending targeted beaver removal through services offered by the invaluable group known as the Connecticut Volunteer Beaver Trappers.

Chris is looking forward to being able to spend more time enjoying his hobbies of hunting, fishing, birding, and cycling during his retirement.

Michael Gregonis

If you want to learn about the accomplishments and contributions to wildlife management and conservation in Connecticut by Michael (Mike) Gregonis, you only need to read some recent articles in *Connecticut Wildlife* magazine – *Connecticut's Deer Program* in the January/February 2022 issue and *CT's New Inductees into the New England Turkey Hunting Hall of Fame* in the March/April 2022 issue. Mike recently retired after 30 years with the Wildlife Division where he shared his time between the Deer, Wild Turkey, and Small Game Programs.

After receiving a Master's degree from Yale School of Forestry and Environmental Studies, Mike joined the Division as a seasonal resource assistant for the wild turkey and waterfowl programs before taking a job as a biologist with the Illinois Department of Natural Resources. He returned to his home state of Connecticut in 1995 when he was hired as a biologist for the Wildlife Division's Deer and Turkey Program. He administered the Deer Program until 2007 where he collected harvest data, assisted with a variety of research projects, modernized the deer lottery program, coordinated vendor deer check stations, conducted aerial deer surveys from a helicopter, administered controlled deer hunts, and more. He stayed involved with the Deer Program for most of his career, but his main focus was on the management of Connecticut's wild turkey population where he collected annual harvest data on Connecticut's three turkey hunting seasons and conducted statewide brood surveys to assess annual productivity, as well as annual surveys to evaluate hunter opinions. Mike's research activities included assessing annual acorn mast abundance, survival of rehabilitated fawns, evaluating "nuisance turkey" issues throughout the United States and Canada, and investigating turkey crop damage complaints in vineyards. His body of work with the Wildlife Division culminated in numerous popular articles and several professional publications. Just before retiring, Mike developed a working group of foresters and biologists from Connecticut, Massachusetts, and the Metropolitan District Commission to design and execute timber harvests to create critical young forest habitat.

As a seasoned wild turkey hunter, Mike presented numerous turkey hunting seminars and often mentored novice hunters. Just before retiring, Mike was inducted into the New England Turkey Hunting Hall of Fame (NETHHF). The New England Chapters of The National Wild Turkey Federation are stewards of the NETHHF. Mike is also a Certified Wildlife Biologist through The Wildlife Society. He plans to spend his retirement hunting, fishing, enjoying the outdoors, traveling, and remaining involved in wildlife conservation and hunter safety efforts.

Trish Cernik

Trish Cernik was instrumental and invaluable as the Secretary at the Wildlife Division's field office at the Sessions Woods Wildlife Management Area in Burlington for more than 23 years. Trish was the one who held everything and everyone together and she is sorely missed! Trish's job duties were many! She fielded the numerous telephone calls the Wildlife Division receives on a daily basis, and was always friendly and helpful. She also managed the subscription orders and mailing list for *Connecticut Wildlife* magazine. Most importantly, Trish ordered, received, and distributed supplies for the office, handled staff needs, and managed Division projects. In addition, she sold

hunting and fishing licenses to the public, assisted with the administrative needs of the Hunter Safety Program, and involved herself in the hiring process of "seasonal office assistants". She took these "seasonals" under her wing, often becoming involved in helping them advance their personal goals and careers in natural resources. Many of Trish's past seasonals consider her like family and continue to seek her guidance and friendship.

Trish was the one who reached beyond the Wildlife Division and Bureau of Natural Resources to work closely with staff from other divisions and bureaus within DEEP and other agencies. Because Trish's work was so critical, she was back in the office at the Wildlife Division's Sessions Wildlife Management Area during the COVID pandemic while most staff were still teleworking from home.

Trish had to know everything about everything – she was the one person we all went to with questions. Years of knowledge, devotion, and practical experience went with Trish when she retired. However, given her devotion and loyalty to the programs she was involved in, she still offers assistance whenever needed. We miss her greatly and know she is enjoying retirement and traveling the world, and will return to see us often because she misses us, too.

DEEP WILDLIFE DIVISION FILE PHOTO

L. ROGERS-CASTRO

(Top) As the Secretary at the Wildlife Division's Sessions Woods office for more than 20 years, Trish Cernik used her administrative and people skills to hold everyone and everything together. She enjoyed the opportunities to help biologists in the field, including bear den visits to collect data on Connecticut's bear population. (Bottom) Paul Fusco's skills as a wildlife photographer and artist, and a graphic designer were instrumental in transforming *Connecticut Wildlife* magazine into what it is today.

Paul Fusco

Paul Fusco joined the DEEP Wildlife Division in 1989 as part of the fairly new Public Awareness (now Outreach) Program. His skills as a wildlife photographer and artist, and a graphic designer were instrumental in transforming *Connecticut Wildlife* magazine into what it is today. When he first started working at the Division, the Outreach Program was producing a newsletter called SCOPE that had short articles and black-and-white photographs and illustrations, and it was sent to a small mailing list that included libraries, conservation and inland wetland commissions, and Wildlife Division volunteers. Over the years, with the help of Paul's expertise and creativity, SCOPE became *Connecticut Wildlife* and was eventually published as a full-color magazine. It became available by subscription and the mailing list grew. Paul also contributed a wealth of

articles to *Connecticut Wildlife* on a variety of bird, conservation, and watchable wildlife topics.

Paul's contributions did not end there. He designed interpretive signs that have been installed throughout the entire state at wildlife management areas, state parks, and state forests; documented the work of Wildlife Division biologists and amassed a photo library of our state's wildlife and habitats; created the artwork for wildlife license plates; designed and provided photographs for a variety of brochures, fact sheets, reports, and other publications; created exhibits for the Sessions Woods Conservation Education Center, as well as for use at fairs, festivals, and other outreach events; participated in a variety of outreach and Wildlife Division projects; and so much more. Paul also received requests from the news media and partner fish and wildlife agencies and conservation organizations for his amazing photographs.

Beyond his artistic skills, Paul also participated annually in bird surveys, such as the Wildlife Division's Breeding Waterfowl Survey and Audubon's Christmas Bird Count. He was often a go-to person for bird identification requests and natural history information. He has an affinity for shorebirds and has spent countless hours taking photographs along the Connecticut coastline while also keeping an eye out for sensitive bird species like the piping plover and least tern. We are sure that Paul is continuing his love of photographing the wildlife and nature of Connecticut and other places during his retirement.

P. FUSCO

Wildlife Educator Laura Rogers-Castro was involved with many aspects of the Wildlife Division's outreach and education efforts, but her legacy is developing and running the Master Wildlife Conservationist (MWC) Program to train volunteers to assist with Wildlife Division projects. Here Laura and long-time MWC Dave Zabel show off a cake to celebrate the completion of one of the MWC training sessions.

Laura Rogers-Castro

Wildlife Educator Laura Rogers-Castro started working for the Wildlife Division's Outreach Program in 1996 after spending several years with the State Parks Division at the Kellogg Environmental Education Center in Derby. She hit the ground running, holding educational programs at the Division's Sessions Woods Conservation Education Center and participating in the development of exhibits and displays for the Sessions exhibit room as well as for fairs, festivals, and other outreach events. Laura played an integral role in supporting the establishment of the Friends of Sessions Woods (FOSW). As an ex officio member of the board, Laura attended monthly FOSW meetings and worked closely with the group to facilitate projects and programs that were designed to enhance the value of Sessions Woods as a resource for education, research, and the enjoyment of nature. Laura's role as an educator provided her with the opportunity to work closely with local nature centers and schools to present and create educational programs about wildlife and habitat in Connecticut.

In 2002, Laura was tasked with developing and running the Master Wildlife Conservationist Program (MWCP), which is an adult education program that trains participants in the fields of wildlife management, natural history, and interpretation. The purpose of the program is to develop a volunteer corps capable of providing education, outreach, and service for state agencies, environmental organizations, libraries, schools, and the general public. Participants receive 40 hours of intensive classroom and field training and have one year, following completion of the training, to provide 40 hours of volunteer service. To maintain certification in the program, a minimum of eight hours of advanced training and 20 hours of volunteer service each year must be completed. Laura spent countless hours teaching and coordinating lessons and special training for Master Wildlife Conservationists (MWCs); coordinating volunteer activities and recording volunteer hours; developing educational kits and programs for use by the MWCs; producing a monthly newsletter for volunteers; and corresponding with volunteers and those who requested their service. Twenty years later, the MWCP is still going strong with about 120 active volunteers who continue to assist the Wildlife Division and other organizations. The MWCP is a legacy of Laura's that will continue into the future despite her retirement.

Successful Bat Appreciation Day 2022

The DEEP Wildlife Division and CT Department of Economic and Community Development (DECD) held the sixth annual celebration of bat conservation at the Old New-Gate Prison and Copper Mine in East Granby on Saturday, September 10, 2022. Bat Appreciation Day helped raise awareness about the story of one of Connecticut's most intriguing historical sites and its importance to the conservation of endangered bats.

The event was well attended by families, individuals, and Girl Scout Troops, including Girl Scout CEO Diana Mahoney, who viewed educational displays and participated in bat activities, such as bat story time, historical tales, a "five senses hike", a unique opportunity to sneak a peek at the "bat cave", bat crafts, and a chance to see a live bat up close.

If you didn't have a chance to attend Bat Appreciation Day this year, make sure to attend the seventh annual event in 2023. Stay tuned to the DEEP website as next September approaches (*https://portal.ct.gov/DEEP/Wildlife/Wild-Activities/Bat-Appreciation-Day-at-Old-New-Gate-Prison-and-Copper-Mine*).

Old New-Gate Prison and Copper Mine is our nation's oldest state prison. It was also the first operating copper mine in the North American colonies. Today, it is not just an amazing cultural resource – its underground tunnels are the winter home of several state endangered bat species.

The bats of Old New-Gate Prison are considered "cave bats" because they spend the winter underground. Cave bats are affected by the disease known as white-nose syndrome (WNS). WNS has killed millions of bats throughout the Northeast and has spread to at least 38 states and eight Canadian provinces, and is suspected in an additional five U.S. states.

Bat Day attendees learned about the remarkable history of Old New-Gate Prison and viewed it through the lens of the state-endangered bats that depend on it as their winter home. Little brown, tri-colored, and northern long-eared bats have all used this site to hibernate during the winter months. DECD and DEEP have worked closely together to protect this unique site.

Top photo: During Bat Appreciation Day, Wildlife Division Seasonal Resource Assistant Caleb Estelle explains how Division staff and volunteers conduct summer acoustical surveys for bats to help monitor Connecticut's bat populations.

Middle photo: Wildlife Division biologist Devaughn Fraser explains a display about the bats at Old New-Gate Prison and Copper Mine to some of the Girl Scouts who attended Bat Appreciation Day.

Bottom photo: Wildlife Division Director Jenny Dickson reads a book about bats during storytime at the 2022 Bat Appreciation Day.

PHOTOS BY PAUL BENJUNAS/CT DEEP WILDLIFE DIVISION

Conservation Calendar

2022 Hunting and Fishing Season Dates

Sept. 15 ..... Opening day of the Fall Archery Deer and Turkey Season.

Oct. 1 ..... Junior Waterfowl Hunter Training Day (the second date is November 5).

Oct. 8 ..... Junior Pheasant Hunter Training Day (more details about events for Junior Pheasant Hunters is at *https://portal.ct.gov/DEEP/Hunting/Junior-Hunter-Training-Days*).

Oct. 15 ..... Opening day of the pheasant and some small game seasons.

Nov. 5-12 ..... Junior Deer Hunter Training week

Consult the 2022 Connecticut Hunting and Trapping Guide, 2022-2023 Migratory Bird Hunting Guide, and Connecticut Fishing Guide for specific season dates and details. Hunting guides are available at town halls and outdoor equipment stores (Fishing Guides were not printed this year). All guides can be found on the DEEP website at **https://portal.ct.gov/DEEP-CT-Outdoor-Guides**. *Go to* **https://portal.ct.gov/CTOutdoorLicenses** *to purchase Connecticut hunting, trapping, and fishing licenses, as well as required permits and stamps. The system accepts payment by VISA or MasterCard.*

Bittern

continued from page 13

carefully. Sam and Nicole donned safety goggles and went about banding and measuring the male bittern. Finally, they attached a solar-powered tag that tracks the bird throughout the rest of its annual cycle and ideally the rest of its life.

Collecting Data

The movement data uploaded by the solar-powered GPS tags are incredible. Because the data are collected daily and uploaded whenever the unit is within cell phone service range, both fine scale movements and larger, regional and continental movements can be documented. This information is critical to protecting this species and ensuring that American bitterns continue to exist and breed in Connecticut and across their breeding range.

From this study, biologists have already learned a great deal about the American bittern, and there have been some surprising findings, including the occasional use of what appear to be small, forested streams. The next time you are out for a hike in the forest, do not be surprised if you find a bittern fishing the shade of the forest. Additionally, some data indicate that male American bitterns may establish territories in one location (Connecticut) early in the breeding season and then move to establish a second territory further north in locations like Massachusetts and New Hampshire.

This study represents a first small step towards conservation of secretive marsh birds like American bitterns and biologists hope to continue studying this beautiful and elusive species. Despite being a relatively small state, Connecticut has a large amount of possible bittern habitat, much of which is difficult to access. It is suspected that there are more bitterns in Connecticut than originally estimated, which is, in the end, encouraging. If you know, or suspect you know where there are American bitterns in Connecticut, let the Wildlife Division know by sending an email to *min.huang@ct.gov*.

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

P. J. FUSCO

Salt marsh restoration projects along the Connecticut coast have benefitted many types of wildlife that depend on quality habitat in order to find food and solace.