WILDLINES

New Hampshire Fish and Game's quarterly newsletter of the Nongame and Endangered Wildlife Program

FALL 2023

SUMMER RAINS AND STORMS

Affect Wildlife

Rain totals this summer reached historic highs around the state, and intense storms caused substantial flooding. Floods are the most common natural disaster in New Hampshire, and the frequency of major flooding events appears to be increasing. When experts ranked natural threats in creating New Hampshire's Wildlife Action Plan, they determined that storms and flooding are the disasters that affect the greatest variety of wild animals. These impacts were evident to Nongame and Endangered Wildlife Program biologists this summer as they monitored threatened and endangered species.

Wood Turtles in Rivers and Streams

Nongame Program biologists continued tracking several adult wood turtles (species of special concern) with radio transmitters to locate their exact positions. This reptile spends most of its time in rivers and streams, often venturing onto nearby land. The habitat surrounding a river, called the floodplain, is regularly inundated during periods of heavy rainfall or snowmelt, helping to maintain a nutrient-rich environment. Floodplains are critical for slowing run-off, protecting the water quality of streams, and providing a buffer between developed areas and flood damage. These regions also support a diversity of animals and are a favorite hangout of wood turtles, which often forage and sometimes nest in these zones.

Biologists continued monitoring these reptiles during the major flooding events this year, including one area where water levels rose nearly 30 feet. "We noticed that wood turtles are good at holding their ground even when waters rise," said Nongame Program Biologist Josh Megyesy. "They stuck close to the area where they were first located, even if it meant remaining in the water for long periods of time." The turtles did float upwards as the water levels surged, but did not travel very far until the water receded back to near-normal levels.

When nesting, wood turtles make use of sand bars or exposed banks along river bends and sand and gravel deposits in floodplain areas. Nesting activity peaks in June when

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Wood turtle

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females dig holes and deposit up to a dozen eggs, covering them with soil and leaving them to develop underground. Extended periods of wet weather may negatively affect the success of egg incubation, and floods occurring from June through September have the potential to wash turtle nests away. "One benefit of flooding is that the high water resets much of the vegetation along the streams, creating microhabitats and new suitable nesting spots," said Megyesy.

Although it has been documented that major floods can wash adult turtles downstream, this tends to be more of a possibility when wood turtles are hibernating in stream banks. Floodwaters can also wash silt and debris into the stream causing turtles to possibly become entombed. The Nongame Program will continue to monitor wood turtle populations through the autumn as these reptiles make their way into winter hibernation.

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Biologists conduct a wood turtle survey to monitor populations during major flood events this year.

Northern leopard frog

Frogs, Toads, and Salamanders in Wet Habitats

Rainfall is a positive thing for amphibians because they spend part of their lives in the water and part on land. Several species, such as wood frogs and spotted salamanders, rely on vernal pools for rearing their young. These temporary ponds fill with snowmelt in the spring and typically dry out in the summer. The extensive rainfall this summer allowed water to remain in these pools later into the year, reducing stress on amphibians attempting to complete the metamorphosis from egg to larva to adult. "The extended hydro period also allowed turtles to use vernal pools longer for feeding and safe refuge," said Megyesy. "Extended rainy weather also means that amphibians can move more easily between aquatic habitats, increasing genetic diversity." Megyesy also noted that this increased movement is problematic when slow-going creatures have to venture across roads.

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Spotted salamander

Timber Rattlesnakes

Prolonged heavy rains produce wet conditions that foster the growth of moisture-loving organisms such as fungi. While colorful mushrooms add to New Hampshire's diverse landscape, other forms of fungi can be problematic. Both common and rare snakes have been observed with an infection known as snake fungal disease, which presents as sores or bumps on the animal's skin. In 2016, it was determined that the fungus *Ophidiomyces ophidiicola* was the cause of this disease, now documented in at least a dozen snake species. It can kill these reptiles and is particularly destructive to the state's small population of timber rattlesnakes (state endangered).

More than a decade ago, an outbreak of snake fungal disease led to a population decline of rattlesnakes during which as many as half of the population was thought to have been lost. Since then, the snakes appear to have rebounded following many years of successful reproduction. "So far this year, I've seen at least one severe case of snake fungal disease, which may have been exacerbated by the amount of precipitation, but it's still just a suspicion at this point," said Nongame Program Biologist Brendan Clifford. "Other theories include that the overcast and rainy weather may play a role in delaying the birth of new rattlesnakes, which normally happens from late August through September." The Nongame and Endangered Wildlife Program continues to monitor rattlesnakes for signs of disease, track the health of individual animals, and evaluate the population size of this endangered species.

An adult timber rattlesnake shows signs of being infected with snake fungal disease.

Piping Plovers on the Seacoast

On New Hampshire's coast, many days of rain meant one positive thing for beach-nesting piping plovers—fewer beach goers! Human disturbance has been a major obstacle for plovers (federally threatened) as they attempt to raise cotton ball–sized chicks to fledgling status. When they are left in peace, this process generally takes about 30 days.

"The most nutritious foods for the chicks, such as crustaceans and marine worms, are found at the water's edge," explained Clifford. "When the beach is empty and plovers are able to forage without disturbance at the waterline, the nutritious food allows their young to grow faster than if they are stuck eating mostly sand flies near the dunes during busy beach days."

The stormy weather didn't deter the plover families from performing their duties of feeding and watching over chicks. Although Maine reported that high tides and rainstorms washed out some neighboring piping plover nests, the New Hampshire plovers appeared to weather the storms successfully. Beach activity, rising sea levels, and increased storm frequency are predicted to be major threats to the survival of this shorebird.

Although many parts of the state have seen greater total summer rainfalls in the past, the number of consistently rainy days made this season unusual and noteworthy. Experts include this type of weather pattern as a part of climate change extremes. There are many ways that biologists and communities are looking to help species and habitats adjust to environmental disturbances, including protecting key habitats such as floodplains, raising awareness of the threats, and learning more about what vulnerable plants and animals will need to survive.

Piping plover chick

SPOTLIGHT

ON SPECIES OF GREATEST CONSERVATION NEED

APPALACHIAN TIGER BEETLE

(*Cicindela ancocisconensis*)

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Although this insect is found from Quebec to Georgia, it was first officially described from observations in New Hampshire's White Mountains. It's similar in size to other ground-dwelling tiger beetles, measuring about 1/2 inch in length with long thin antennae and lanky legs for running. As larvae, the Appalachian tiger beetles appear grub-like and live in ground burrows. Adults may be metallic blue and green, sometimes with purple undersides. They're most active on warm sunny days in spring and fall.

Habitat: In New Hampshire, the Appalachian tiger beetle has been documented in the northern part of the state along rocky rivers and streams in both cold- and warm-water environments.

Threats:

- Habitat degradation from proactive and reactive flood and erosion controls.
- Mortality from recreational river and stream users who may unintentionally trample larval burrows.
- Habitat deterioration and mortality from more frequent and intense flooding events.

Conservation Actions:

- Become familiar with New Hampshire's tiger beetles and learn to identify the Appalachian tiger beetle.
- Biologists and researchers can plan to conduct thorough surveys for this species.
- Prevent development along river edges, and tread lightly when recreating in these habitats. Protecting shoreline buffers is an excellent way to help all wildlife that rely on rivers.

Researching the WHITE MO

In early August of this year, the Mount Washington Observatory documented precipitation totals that officially made 2023 the wettest summer on record for the Northeast's highest peak. Alpine areas start at 4,900 feet in elevation and higher. From about that point to the summit of Mount Washington lies an area where trees do not grow very tall known as the alpine zone. Any animal that lives there has developed incredible adaptations in order to subsist in this harsh, high-elevation habitat. It is in the alpine zone that biologists continue to study two unique insects that survive in this cold, windy, and damp environment.

These two species, which adapt through long, slow-progressing life stages, are called relics because of the isolated habitat they live in. The alpine zone was carved by glacial movement thousands of years ago, creating unique and specific conditions. The White Mountain fritillary exists only in

NONGAME SUPPORTERS

Help Pass Senate Bill 17

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Thanks to the support of the New Hampshire Legislature, the process of securing and using funds donated to the Nongame and Endangered Wildlife Program has been streamlined as of July 2023. Moving forward, any gifts, grants, or donations to the Nongame and Endangered Wildlife Program will no longer require additional state approvals to accept.

"This will further simplify the Nongame Program's procedures for receiving donations from the public and maximize the value of those donations and the timeliness of applying those monies to their intended purpose of conserving wildlife and habitats," said Nongame Program Supervisor Mike Marchand. "We owe a big thank you to the Nongame Program donors and the supporters of the bill, which now guarantees that all Nongame donations will continue to quickly be applied for their intended purposes into the future."

Fees from the sale of hunting and fishing license are not allocated to Nongame and Endangered Wildlife Program protection efforts, so the future of the program's work relies on private donations, as well as a combination of state and federal funds and Moose Plate dollars.

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OUNTAIN RELICS

New Hampshire's White Mountains, and researchers have been working to uncover the specific needs of this butterfly for several years. Led by the Nongame and Endangered Wildlife Program, the team is working to understand what controls their development time from egg and caterpillar to flying adult.

"We found that some individuals could complete their life cycle in one year, while others take two full growing seasons to become adult butterflies," said Nongame Program Biologist Heidi Holman. "We have collected and analyzed DNA samples from wild fritillaries to better understand the frequency of individuals completing their life cycle in one year versus two years. Determining if this is controlled by temperature, phenology, genetics, or some combination of these factors will help us to understand the species' ability to adapt in a changing climate."

New Hampshire's stormy weather also caused problems for biologists attempting to generate a reliable population estimate for the White Mountain Arctic butterfly, another insect that exists only in the alpine zone of New Hampshire and nowhere else on Earth. "The ability to detect butterflies is what we use to generate an estimate, and adult butterflies are very sensitive to wind and lack of sun, which were both issues on days it was not raining this summer," said Holman. "This leaves us wondering if the odd-year butterflies, those with a two-year life cycle, are as numerous as the even-year butterflies, which we estimated to be around 1,400 last year."

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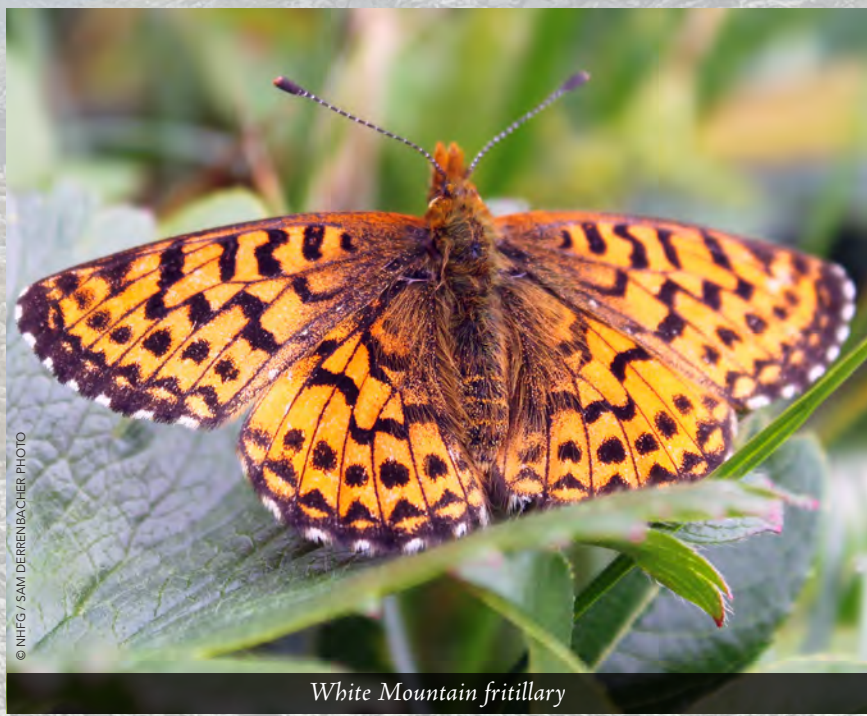
White Mountain Arctic butterfly

These elusive insects are a challenge to study, but continue to provide fascinating insights into the intricate world of alpine creatures.

Fish and Game biologists navigate mountainous terrain in search of White Mountain relics.



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White Mountain fritillary

UPDATES FROM OUR FIELD SEASON

Projects implemented and funded by the Nongame and Endangered Wildlife Program

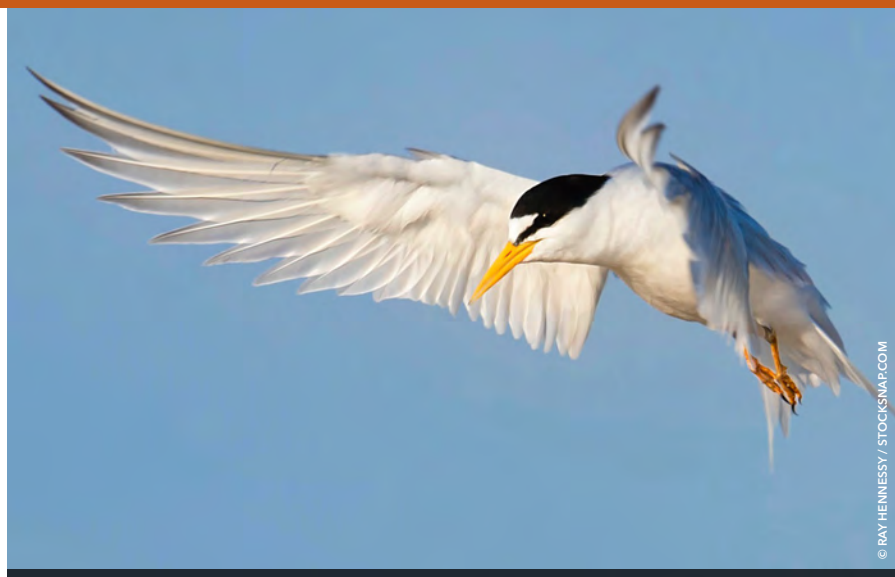
- Nine pairs of ***piping plovers*** nested on Hampton Beach, and 6 pairs nested on Seabrook Beach this summer. A combined 51 chicks hatched, and a record 38 were successfully raised to fledgling status, when they are able to fly. Although the project saw great success overall, predation of chicks, late-season crowds, and high tides still affected the federally threatened plovers this season.

- It was a highly productive year for the state-endangered ***least tern***, a species that only recently re-established a breeding colony in New Hampshire. Nongame and Endangered Wildlife Program biologists documented a record 31 pairs of least terns in Hampton this summer, surpassing last year's record of 20 pairs. Both least tern parents incubate 2–3 eggs, which are laid in a scraped-out ground nest, protecting and caring for their young until they migrate in the fall.

- Nongame and Endangered Wildlife Program biologists surveyed for state-endangered ***upland sandpipers*** at Pease Airfield, which is currently the only confirmed breeding site in the state. These sandpipers reside in grasslands and require a mix of short grasses for foraging and tall grasses for nesting. By mid-August, Nongame Program biologists had confirmed six fledged chicks, which is a lower number than in recent years. New Hampshire supports just a small portion of the New England upland sandpiper population, which typically includes about 250 nesting pairs regionwide.

- A team of biologists conducted surveys in Concord this summer of the state's official butterfly, the ***Karner blue***. This federally endangered insect lives within sandy, shrubby habitat dominated by pitch pine and scrub oak known as pine barrens. Biologists surveying for the year's first generation of Karners observed many more flying adult butterflies in May and June than in recent years. This suggests that more of the insects successfully overwintered as eggs and that a larger population would then lay the eggs that would become the second generation of the season. Biologists also conducted lupine surveys, a critical habitat component for the Karner blue caterpillar, which feeds solely on wild lupine leaves.

- Nongame Program biologists searched for the ***Edward's Hairstreak***, a tiny brown-to-gray butterfly that lives within dry oak and pitch pine shrubby forests. The team strategically searched within the pine barrens for flying adults, collecting data that will be used to generate a population estimate for this species of conservation concern. The Nongame Program's butterfly research laboratory will be overwintering eggs that were collected for captive rearing by the team in early August.



Least tern

Upland sandpiper

Edward's hairstreak

VOLUNTEERS ACCOMPLISH IMPORTANT WORK

The Nongame and Endangered Wildlife Program is grateful to all of the dedicated volunteers who continue to be advocates for piping plovers on New Hampshire's beaches. While engaging with beachgoers to educate them about plovers and reminding others to respect the roped-off areas used to protect the plovers' nursery, volunteers also get to know individual plover families, helping to track their growth and successes throughout the season until they are ready to migrate. The people who donate their time and resources are critical to the success of the Plover Protection Program.

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Volunteer effort is also critical to the variety of programs that rely on reporting from the public. This includes the Wildlife Sightings platform (***nhwildlifesightings.unh.edu***) and the Butterfly Monitoring Network (which gathers reports through ***iNaturalist.org***). If you have submitted observations through either outlet this year, you are part of an extremely valuable network providing data directly to biologists and researchers who create and maintain conservation plans for vulnerable wildlife. *Thank you!*

RAARP

Reptile and Amphibian Reporting Program

REPORT YOUR SIGHTINGS!

Help us survey the amphibians and reptiles of New Hampshire

wildlife.nh.gov/wildlife-and-habitat/nongame-and-endangered-species

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FALL Wildlife Almanac

OCTOBER

• The porcupine's mating season begins this month; females give birth to one porcupette in the spring. In the coming months they will primarily subsist on the buds and needles of white pine and hemlock and the bark of sugar maple and birch.

NOVEMBER

• Meadow voles remain active day and night, eating grasses, bulbs, seeds, and grains. They will begin to retract their home range over the winter months, utilizing the extensive tunnels and runway systems already built by them or other species such as moles and woodland voles.

DECEMBER

• Eastern screech owls may cache food in tree cavities this month, using these natural spaces like feeding stations. These opportunistic predators will eat rodents, insects, other birds, and aquatic animals such as crayfish and amphibians.

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There are many wild animals not mentioned here that either thrived or struggled in this summer's persistently rainy weather. Rushing waters and flooding are two of the greatest threats to New Hampshire's ten types of freshwater mussels, for example. Although there are 169 wild animals identified as species of conservation concern in New Hampshire's Wildlife Action Plan, the Nongame and Endangered Wildlife Program is responsible for *all* species not hunted or fished, both common and rare, ranging from spiders and slugs to chickadees and dragonflies. This huge responsibility is why the Nongame Program collaborates with so many groups and volunteers, looking at entire ecosystems to protect wildlife into the future. Resources for conservation commissions and individuals interested in helping conserve wildlife can be found by visiting ***TakingActionForWildlife.org***.

COVER BANNER PHOTOS: *TIMBER RATTLESNAKE* - © NHFG/BRENDAN CLIFFORD PHOTO • *LEAST TERN* © ANDY MORFFEW • *WHITE MOUNTAIN FRITILLARY* - © NHFG/SAM DERRENBACHER PHOTO