Summer is just heating up, and just like the perennials have come back into full bloom, so too has the eternal question – how hot is too hot??

In that vein, our regular authors have written a variety of articles sure to warm your heart, or ignite your brain! First up, an explainer on the NEW Maryland Native Plant Program, to help your gardening guidance stay fresh. Then, read up on the Natural Heritage Program's Prescribed Burns and learn how DNR fights fire with fire!

For those of us who would rather read about heat from the safety of the cool indoors, we dive into the relatable native animals who use estivation to beat the heat. On the opposite side of the coin are the sweat bees that use the warm weather to their advantage.

Whether you're a warm-weather wonder or awaiting the winter, remember to use sunscreen this summer and stay hydrated!

Team Habichat

Tiny Thirsty by Sharon Sexton DNR Photo Contest 2019

In This Issue:

support native plants and meet Natural Heritage Program's Restoration Ecologist Jason Harrison, the "Burn Boss!"

The NEW Maryland Native Plant Program:
Better Resourced for Growers and Gardeners

by Paula Becker, Outreach Ecologist

We all know that using native plants in our human landscapes is great for so many reasons. Native plants provide habitat for our native wildlife, birds, and pollinators. They improve water quality and soil health. They support human physical and mental health. AND they can increase the value of our homes. Getting over the initial barriers to using native plants - unfamiliarity with the plants and finding sources – can be daunting. Now, there's good news on that front!

In 2023, the Maryland Legislature passed the MD Native Plant Program Act. The goal of this program is to educate, encourage, and support Maryland homeowners and land managers in using native plants. The program is a partnership between the Maryland Departments of Natural Resources (DNR) and Agriculture (MDA), the University of Maryland Extension, and the Maryland Native Plant Society. The act addresses both supply and demand and defines what is included as a Maryland native plant.

For the purposes of this program, a native plant "occurs naturally in Maryland and the surrounding region, ecosystem, and habitat, without direct or indirect human actions, …a plant that was present before colonial settlement." The list of plants is based upon the Maryland Plant Atlas, as maintained by DNR.

On the supply side, this translates into a Commercial Maryland Native Plant list and certification program. The list is a living document, designed to assist growers, retailers, and landscapers by providing appropriate species for their customers. The current list includes over 650 straight species; anyone can nominate a species for addition to the list.

Some plants will not be included. For instance, no cultivars or hybrids of native species will be added to the list unless the straight species is no longer viable. Examples of these are the American chestnut or American elm. Since those two species are no longer able to reach maturity and fill their ecological niche due to disease impact, hybrids are considered as acceptable replacements for the list.

This commercial plant list is also used as a yardstick to certify growers and retailers. Growers can earn bronze, silver, or gold certification based on the percentage of their inventories included on the commercial native plant list. Certification earns growers access to marketing tools, the Maryland Native Plants logo, and a place on the MDA Native

Plant Growers guide. This guide as well as the Commercial Maryland Native Plant list can be found under the Maryland's Best initiative website.

marylandsbest.maryland.gov/maryland-native-plants-for-consumers/

University of Maryland Extension is leading the charge on native plant education. Their website will host expanding information for growers, home gardeners, and landscapers.

And, of course, the DNR Wild Acres page continues to offer native plant strategies for gardens of all sizes and eco-regions.

Currently, the consortium of agencies is working on regional native plant guides for each of the three ecoregions in Maryland: the coastal plain, the piedmont, and the mountains. Look for a Piedmont guide by the end of summer 2025, with the other two guides to follow. An interactive online native plant search database will be ready by the end of the year. This

handy tool will allow anyone to enter site conditions, state regions, and gardening goals (pollinators, birds, rain garden, etc.) and provide a list of plants appropriate for each particular garden. All these new resources will continue to expand and provide additional information and inspiration to gardeners around the state. Grow native!

Monarch butterfly on Goldenrod. Credit: Elena Gilroy

Mud Turtle. Credit: Charles Ruff

Bloodroot. Credit: Martha Johnston

Redbud and bumblebee. Credit: Elena Gilroy

Estivation: A Midsummer's Nap

"Ah, summer, what power you have to make us suffer and like it." ~Russell Baker

An Eastern box turtle cools off in the water, by Rebecca Bailey, 2023 DNR Photo Contest

Imagine that you are a box turtle. You slowly meander through woods and backyards, in search of water and snacks. The dappled browns and oranges on the top of your shell (your carapace) blend seamlessly with the dried leaves and speckles of unrelenting sunshine streaming through the trees, making you almost invisible to onlookers.

It's been oppressively hot for weeks, and the blood in your veins feels like dried up nail polish, sticky and sluggish. Speaking of slugs, you eat one off the bottom of a leaf, but it's no use - you still feel thirsty. By midafternoon the heat is triggering an instinct you didn't know you had; you are getting very sleepy. Slowly and methodically, you dig a shallow depression under the cover of jewelweed and a tenacious blackberry bramble. You settle in against the cooling soil, close your eyes, and wait.

A Maryland summer can almost always be relied upon to bring relentless heat and humidity. For those of us who don't love the heat or who have to work in it, those days can bring to mind fantasies of escape, like wishing you could take a nap and wake up when the heat is gone! Unfortunately for humans, we are stuck in circadian rhythms and bodies that

need near-constant feeding and watering to survive even a few days. Our fragile physiology can usually maintain the constant sub-100-degree temperatures we need to thrive, but we are notoriously susceptible to damage from exposure and extreme temperatures. This forces us to flee summer heat in the shade or the air conditioning rather than lean into the swelter.

American Toad. Photo by Jordon Kron

Most of us have heard of hibernation, a prolonged period of dormancy to escape cold temperatures, but did you know there's a version of that for the heat? Fortunately, quite by design, several Maryland animals have figured out a lower-tech solution than swimming pools and forced air systems: it's called **estivation** (from *aestas*, the Latin root word for summer). Like hibernation, it's not *simply* a behavior modification like choosing to sleep. Metabolic rates actually dramatically decrease, slowing or even halting some chemical processes that consume energy. This isn't just to beat the heat for increased comfort! The decrease in metabolism can be between 70-100% of the normal rates in some animals, and it proves to be an essential survival strategy in times of food shortage and drought.

It's easy to understand how animal residents of deserts and other arid climates might need to estivate as a survival strategy. While Maryland's heat index may be less harsh, we still have a few species that utilize estivation – a tactic that may serve them very well as our global climate changes. Reptiles and amphibians are our best-known summer snoozers. Here are a few examples:

- American toad (*Anaxyrus americanus,* common): Like many toads, this one is mostly nocturnal in the hotter season. It's been shown to estivate in burrows to avoid unfavorable conditions, at times even transitioning straight to hibernation as summer temperatures cool off.
- Eastern box turtle (*Terrapene carolina,* common but populations are declining): Tthis familiar species has been well-documented as a frequent summer napper.
- Tiger salamander (*Ambystoma tigrinum,* endangered in Maryland): Young of this rare species have been shown to estivate in older studies, burying themselves under dry, sandy soils to reach a moist layer beneath until conditions improve.

Tiger Salamander. photo by Kevin Stohlgren.

That said, herps aren't the only ones with tricks up their sleeves. Invertebrates get in on the summer shut-down, with numerous species of terrestrial snail sealing up the opening of their shells and secreting mucus barriers to keep from drying up like a raisin, depressing

their metabolisms once they've secured themselves. Insects join in too, like ladybugs, some weevils, and even the hemlock wooly adelgid (*Adelges tsugae)*. This invasive species of insect, native to Japan, was first observed in the eastern United States in the 1950s. Its life cycle is complex and involves multiple generations of offspring, but in this region, it notably goes dormant as a nymph around the month of July. Research to help scientists understand the timing of this process has been essential in targeting effective treatments to save native hemlock trees from the destruction caused by this tiny insect.

Maryland Conservation Corps members inoculate trees against damage from hemlock woolly adelgids.

This summer, as you meet animal neighbors on a toasty warm day, take time to respect and admire this superpower called estivation. Even tardigrades can't take the heat like some animals who can estivate! These microscopic organisms (affectionately nicknamed "water bears") are famous for their ability to survive in the vacuum of outer space or insanely cold temperatures. Tardigrades routinely enter a "tun" state where they shrivel up in suspended animation - but even that ability doesn't function for more than a day in temperatures above 145 degrees.

That said, estivation isn't entirely magical in its protections. Organisms that use this strategy, even for very short periods of time, often wake up with issues like oxidative stress, buildup of toxins, muscle atrophy due to lack of use, and immune system deficiencies. Creating great wildlife habitat in our backyards is still the best thing we can do to support our wild comrades, and ensure the sleepiest Maryland animals recover from the hottest

part of the year. This summer, remember to provide water, lots of shade, and an array of native plants to help us all beat the heat!

Native Animal Profile: Sweat Bees

By Katy Gorsuch, Education Specialist

Green Sweat Bee by Alex Andes-Gascon, DNR Photo Contest 2019

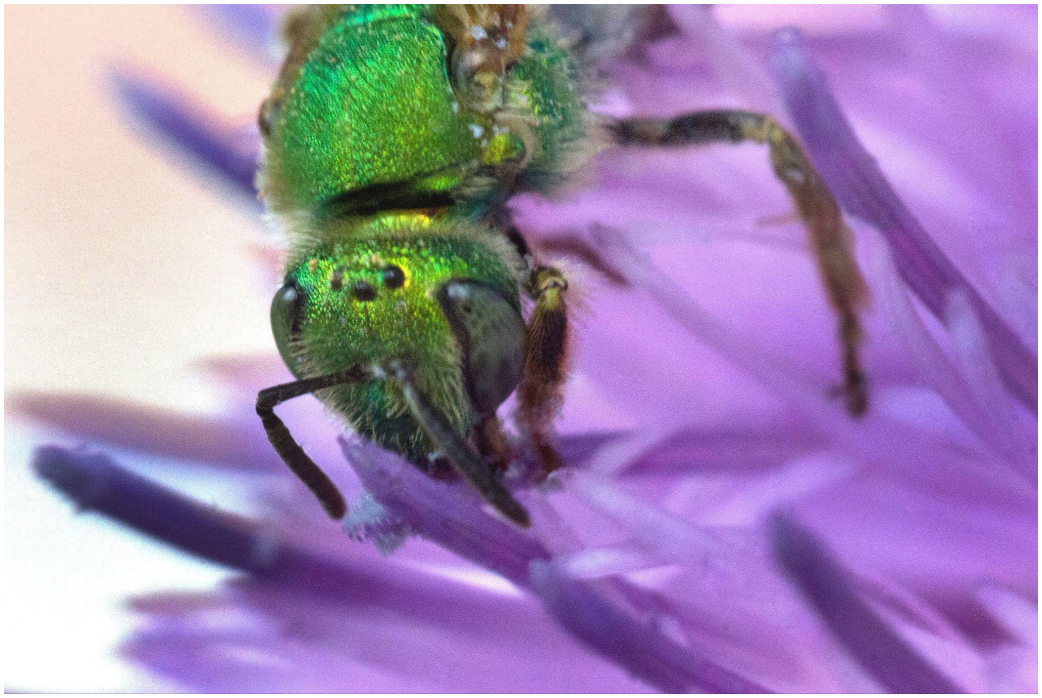
It's Sweat Bee Summer!

We've covered sweat bees bn a previous edition, but with the temperature rising, the temptation to return to our favorite iridescent insect is undeniable (don't tell the other bugs!)

As the name suggests, sweat bees are sometimes found collecting sweat from humans. The purpose of such an unusual move is to collect salts, which are often difficult to obtain in the environment. Much like a cow or deer may use a salt-lick, these bees will lap up sweat to supplement their vegetarian diet. The family of bees that are collectively known as sweat bees has some 4.5 thousand species and is called "Halictidae," giving the group the nickname "Halictid" bees. There is some controversy over the origin of the family name, which may come from the Greek *halizein* meaning "to gather" or *halēs* meaning "assembled." Let's further muddy the waters by noting that the word "halite," the mineral from which table salt is taken, comes from the Greek for *háls* for "salt," and suggesting another candidate for the origin of the name.

Halictidae is the second largest family of bees in the world, only beaten by the Apidae family, which comprises some 5700 species, including bumblebees and honeybees. Maryland is home to about 120 species of bees in the Halictidae family! Our Maryland sweat bees are classified into nine different genera, of which most belong to the *Lasioglossum* genus.

Individual species can be difficult to differentiate, and many of Maryland's sweat bees have no common names (only scientific ones) so we'll be discussing sweat bees more generally.

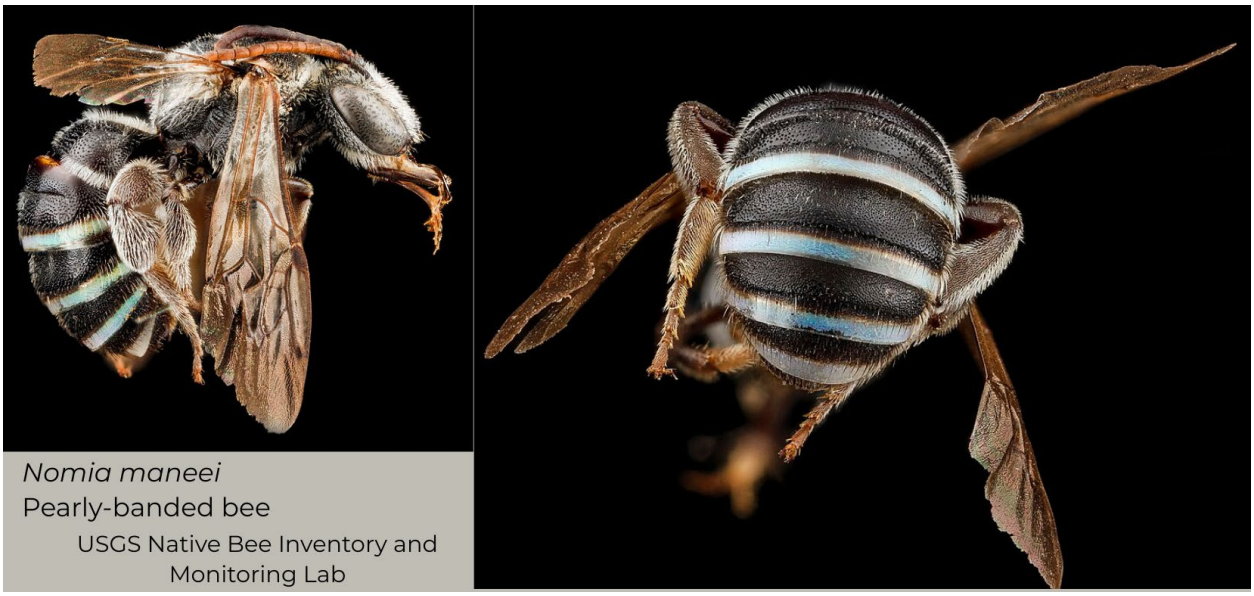


Metallic Green Bee on Thistle Flower by Amy Morrison, DNR Photo Contest 2015

A Shining Example

One of the most visible characteristics of many sweat bees is their vibrant green or blue metallic appearance. The genuses *Augochloroposis, Augochlorella,* and *Augochlora* all take their names from the Greek words for "to shine" and "green." Along with *Agapostemon,* these genera consist only of metallic species in Maryland.

Not all sweat bees are metallic green and blue, although these are certainly noticeable. Maryland species of *Sphecodes* are red and black, giving rise to their nickname "blood bees," although intensive interrogation of our state entomologist has led to the reluctant conclusion that none of them are vampires. *Dieunomia* has no metallic species in Maryland, and while *Nomia maneei* (the pearly-banded bee) wouldn't be called metallic, it does possess a rare and beautiful coloration. Not many bees can pull off opalescent banding, but this bee does it with panache!



Nomia maneei
Pearly-banded bee
USGS Native Bee Inventory and Monitoring Lab

The *Lasioglossum* genus is widely varied -- some members look more like what we may consider “normal” for a bee, while others do display the green or blue colors we associate with sweat bees. In between are a chorus of variable blacks, deep blues, and even reds that are difficult to appreciate without the help of a microscope!

Don’t Sweat the Small Stuff

Many sweat bees are much smaller than their more well-known cousins -- the Gotham bee (*Lasioglossum gotham*) is about the size of a grain of rice, with the males being even smaller! Being tiny has the advantage of being less noticeable to predators, but means that such tiny bees may easily be overlooked by humans as well: the Gotham bee was only discovered in 2010, despite being common in New York City! The bee, along with ten other sweat bee species, were discovered as part of a survey of the city’s bee populations for the American Museum of Natural History.

One recent study into the species *Halictus ligatus* found that their size varied significantly across different environments in three different cities: Chicago, St. Louis, and Detroit. Temperature seemed to play a significant role in their sizes, although it was not the only factor. The findings carry weight for the future of native bees in North America and how they may adapt to the rising temperatures caused by climate change.

Sweat Bees of Maryland - Halictidae			
Genus	Species in MD	Some Notable Characteristics	Notable Members in Maryland * most common, based on number of identifications ❖ rare ⚑ non-native

Lasioglossum	85	Name: “hairy tongue” Highly variable appearances	*Lasioglossum fuscipenne** *L. coeruleum* *L. semicaeruleum* *L. zephyrus*
Sphecodes	17	Name: “Like a wasp” aka blood bees	Sphecodes coronus S. fattigi S. heraclei: Cyclops Blood Bee S. antennariae
Halictus	5	Furrow bees	*Halictus confusus** *H. tectus*
Agapostemon	4	Name: “Stamen loving” Metallic	*Agapostemon sericeus* *A. virescens**
Augochloropsis	2	Name: “Augo” - to shine “Chloros” - green Metallic	*Augochloropsis metallica* *A. sumptuosa*
Augochlorella	2	Name: “Augo” - to shine “Chloros” - green Metallic	*Augochlorella aurata* *A. persimilis*
Dieunomia	2		*Dieunomia heteropoda* *D. nevadensis*
Nomia	1	Pearly-banded bee Highly state rare	*Nomia maneei*
Augochlora	1	Name: “Augo” - to shine “Chloros” - green Metallic	*Augochlora pura*

Bee-havior

When we think of bees, images of hives and queens immediately come to mind. However, the vast majority of native bees are actually solitary. Sweat bees exist in a kind of in-between space; some members are solitary, while others are what is known as “primitively eusocial.” Eusociality is animal social behavior in which a group of adults lives together, cooperatively caring for their young. Additionally, eusocial groups display overlapping generations, and within the group there is a division of labor based on reproduction (think of the queen and workers in a typical honey bee hive). “Primitive” eusociality means that there is not much difference physically between those that reproduce and those who do not, and that the colonies tend to be small and brief, unlike more established eusocial species who may maintain an ongoing colony

in the thousands for decades (one hive in Scotland may have been occupied for hundreds of years). For comparison, an *L. zephryus* nest typically has less than 20 bees living in it.

Besides the sweat bees that are primitively eusocial, others are communal, solitary, and still others are parasitic. The fact that so much diversity exists within the sweat bee family has led experts to look intensely at the group as a model to understand the evolution of social behavior in bees as a whole!

Blood bees (*Sphecodes*) are known to participate in kleptoparasitism, or food stealing. This is a common tactic across the animal kingdom, and many animals will steal food from others as the opportunity arises. Blood bees have acquired the additional nickname of “cuckoo bees” due to their specific tactic; they will find already laid bee nests and lay their own eggs inside, just like cuckoo birds do with other bird species. Blood bees are not the only cuckoo bees, and this tactic extends to some species of wasp, butterflies, and fish as well as other birds. Blood bees are most likely to seek other sweat bees as the host for their eggs.

Despite all this, adult sweat bees have a varied diet of many native flowers regardless of their social adaptations. Due to being generalists, they visit multiple types of flowers to gather nectar and pollen, acting as diverse and wide-ranging pollinators as a result. When they land to collect salt from humans or other sweaty animals, they do not bite or sting in order to get the minerals they’re seeking, but gently lap it up. Sweat bees are unlikely to sting, and no more dangerous than any other bee to those of us without a bee sting allergy. This summer, if a sweat bee graces you with their presence, take an opportunity to observe this unusual and fascinating bee family up close. To further support them, plant native wildflowers in pots, or in the ground, on your porch or in your yard, and avoid pesticides that often poison species other than the ones they intend to target. No matter your space, small or large, your help makes a difference in the lives of our small buzzing buddies!

Read more about Maryland’s native bees here:
Common Maryland Bees
Sweat Bees - Chesapeake Bay Program
Gardening for Native Bees
Wild Acres
Wildflower Meadows

Bringing Fire Back to the Landscape: Restoring Habitat Through Prescribed Burns

By Edwin Guevara, Natural Heritage Program

A burn crew listens to a safety briefing and goes over the prescribed burn plan at the staging area.

Imagine this: You're on a scenic woodland hike in Maryland. Birds are chirping, squirrels are scurrying — and suddenly, you spot smoke rising from the forest. Your first instinct? Panic. Your second instinct? Call Smokey Bear. But wait — what if we told you that fire was... *helping*? Welcome to the world of prescribed fire, where the Maryland Department of Natural Resources literally fights fire with fire for a good cause!

"The Burn Boss" in this case is not the name of a metal band -- it's the real title of the person who is responsible for ensuring all aspects of the fire operation, from planning to execution, adhere to the prescribed fire plan and safety protocols. Essentially, they are the leader and coordinator of the burn crew, overseeing the ignition, containment, and post-burn activities; they

call the shots during a prescribed burn. Before lighting a single match, they study everything from fuel types (dead leaves, dry grass — forest's version of kindling) to weather conditions, down to the breeze's mood that day. One wrong gust, and it's a no-go. Mother Nature gets final say!

Dressed in Nomex flame-resistant fashion gear, the ignition team helps start the blaze. The look includes rugged leather boots, gloves, banana yellow shirt, green pants, hard hat, and a drip torch (yes, that's a thing). This individual is basically the firefighter's cousin who likes planning ahead.

Maryland DNR's Wildlife and Heritage Service has many employees trained and certified as wildland firefighters. This is a useful skillset to have for two main reasons; fighting wildfires and

conducting prescribed burns. In annual prescribed burns, we use fire to restore our natural areas by returning this natural process that has been removed for the past century or so through fire suppression. Fire serves many purposes, like burning off accumulated thatch and debris, which exposes soil and makes it easier for seeds to find suitable places to germinate. It also releases nitrogen into the soil, which stimulates plant growth and encourages roots to grow deeper, making plants more drought resistant. Burning also gives fire-adapted plants an advantage, as these plants are better able to utilize the increased light and resources created by the disturbance fire creates. Many of these fire-adapted plants are at a disadvantage when fire is suppressed from a natural area, so the goal is that re-introducing fire will help these Maryland native plants thrive.

In Maryland's fire-adapted ecosystems, prescribed burning has become a vital tool for restoring and maintaining rare species habitat. Natural Heritage Program's Restoration Ecologist Jason Harrison has been involved with prescribed fire for over two decades, and his work highlights the delicate balance between ecology, timing, and community outreach.

"Not every site has the same prescription," Harrison explains. "We assess each area's needs—whether it's in a restoration phase or a maintenance phase—and develop fire plans accordingly." At a site in the Eastern Shore, burns have been applied for over ten years, keeping the area in an open oak woodland state supporting a lush herbaceous layer of native plants. In contrast, locations that haven't had a prescribed burn since 2016 were burned this past spring to reset succession, reducing fuel loads and fire intolerant species.

Prescribed fire does more than manage vegetation. It benefits a wide range of rare species that thrive in open, sunny habitats—conditions fire helps create and maintain. A notable example comes from Furnace Town Dunes, where DNR is managing the sundial lupine (*Lupinus perennis*) and yellow wild indigo (*Baptisia tinctoria*) populations to support the frosted elfin

butterfly (*Callophrys irus*), a state-endangered species. “The lupine and indigo respond particularly well to fire, often producing more robust flowering plants and higher stem densities, which helps the butterflies,” says Harrison.

Prescribed burns also offer hidden benefits, such as reducing tick populations and lowering the risk of dangerous wildfires. A past wildfire at Soldiers Delight underscored the importance of proactive burning. “That fire did more ecologically than we could have accomplished in years of prescribed burns,” says Harrison. “But it also showed the risks of unmanaged fuel accumulation.”

As DNR expands its capacity to conduct burns and educates the public about their necessity, the hope is to restore balance to fire-starved landscapes—ensuring that Maryland’s rarest species and habitats not only survive but thrive.

A crew uses flappers and water to maintain a boundary during a burn.

Sundial lupine Photo: Jason Harrison

Frosted elfin butterfly (*Callophrys irus*)