

West Virginia Wildlife



Fall/Winter 2013

A Publication of the West Virginia Division of Natural Resources

New Mapping Tool on DNR Website a Boon to Outdoor Recreationists

DNR personnel, along with staff at the West Virginia GIS Technical Center, have worked diligently this year to provide outdoor recreationists with a virtual tool. Whether you hunt, trap, fish, hike, canoe or go on birdwatching outings, you'll find a new mapping tool on our website to be very helpful. The mapping tool can be found at www.wvdnr.gov under either the Hunting or Fishing headings, or by clicking on the black bear icon at the top of the home page.

While similar to the interactive trout stream map which has been on the DNR website for five years, this also includes information on warmwater fishing and hunting. You can find instructions for using the map on the landing page, choose whether you want to explore information related to hunting or fishing, and then click the appropriate box. Once on the appropriate map of West Virginia, you'll find a variety of tools at your disposal. I like the fact that you can view the maps as either topo maps or as satellite images.

On the hunting map, hunters and trappers can find the location of license agents, check stations, public shooting ranges, wildlife management areas, Class Q hunter access roads, and hiking trails throughout the state. A search option allows you to focus on a specific county, WMA or state forest.

If you want to check on fishing information while on the hunting page, a simple click reveals fishing and boating access sites, trout stocked streams, public fishing lakes, and float trips. A tool allows you to measure the length of a stream section you wish to float. As with the hunting site, an option allows you to search for a specific body of water or county.

While the tool works best with a high-speed Internet connection, those with dial-up can still access the maps, albeit at a slower pace. I welcome you to visit our website and explore your favorite haunts with this new mapping tool. After planning your adventure online, then go out and experience the best that West Virginia has to offer.


Frank Jezioro, Director



West Virginia Wildlife



Richard Bradley

Bold jumper spider

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Fall/Winter 2013

Volume 13, No. 2

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Barbara Sargent



Karen McClure



Steve Brown



Venomous MOUNTAINEERS

By Karen McClure

The brown streak down the back of these timber rattlesnakes illustrates the great variation in coloration among these snakes.

Photo by Paula Waggy

Venomous animals are often referred to as poisonous. Many scientists make a distinction that venomous describes an animal that injects a harmful substance, while poisonous refers to something that is harmful if ingested. Most dictionaries indicate the words are synonymous. In this article, venomous will reflect an injectable harmful compound.

In West Virginia, it seems like the most commonly discussed venomous animals are the timber rattlesnake, the northern copperhead, and the black widow spider. Only one cottonmouth, also known as a water moccasin, has been documented in the Mountain State. It was on a barge which had come up the Ohio River from the Mississippi River. We do host plenty of water

snakes, and although they can be pretty defensive, none are venomous. Similarly, we have plenty of harvestmen, otherwise known as daddy or granddaddy longlegs, which are nonvenomous. The urban legend goes like this: these arachnids have venom that is extremely deadly to humans, but our skin protects us from their tiny fangs. The truth is that animals don't waste their energy producing venom they can't use to subdue their prey. Harvestmen do prey on tiny insects and other small animals in addition to eating some plant material.

With those common misconceptions straightened out, let's explore the real venomous West Virginians. Many folks will be surprised to learn that venomous mammals

exist. Northern short-tailed shrews (see **Wildlife Diversity Notebook**, page 19) have many teeth that can inflict a wound and allow venomous saliva to flow into the opening. This process is used to immobilize relatively large prey, such as mice and frogs. The venom is not potent enough to be a serious threat to the health of large animals like humans.



While almost never fatal, the bite of a female black widow spider can cause serious symptoms.

Ronald F. Billings, Texas Forest Service, Bugwood.org

Reptiles can strike fear in the heart of some Mountaineers. Venomous snakes can deliver a dry bite that is venom free, saving it to kill their prey. In humans, dry bites are said to occur about 40 percent of the time. These snakes can also deliver a bite that has less venom than the maximum available. That said, you can't ask a snake what it has in mind before it bites you. In the United States, venomous snake bites result in approximately 10 fatalities a year. The reaction to the same bite is different for different people. Larger, healthier people without specific allergies stand a better chance than small folks with allergies and health problems. Both of our venomous snakes are pit vipers, meaning they have heat-sensing pits above their mouths.

The timber rattlesnake, the only rattlesnake species in West Virginia, is quite reluctant to bite humans. They swallow their prey whole and we are way too big for that. If a snake is stepped on or picked up, it might bite in self-defense. If venom is injected, exposed red blood cells are killed, and pain, swelling, breathing problems, blood coagulation and shock may follow. Skin near the bite may begin to slough off, greatly increasing the chance

of infection. It is comforting to know that very few people have ever died from a timber rattlesnake bite.

Contrary to popular belief, rattlesnakes do not grow a rattle every year. Rattlesnakes grow a new rattle with every shed, and sheds occur when the snake is well fed and healthy enough to grow. Therefore, the number of rattles is food and health dependent. Rattles can break off, so you can't even tell how many times the snake has shed by counting the rattles.

Northern copperheads are more likely to bite than timber rattlesnakes if a person just walks near the animal. Death from a copperhead bite is extremely rare, but its venom will make people quite sick. The venom from both rattlesnakes and copperheads contains a similar mix of compounds which can lead to hemorrhaging, pain, swelling, breathing problems, headache, nausea, gangrene and possibly unconsciousness. Antivenin is usually produced with horse serum. Many people are allergic to it, and all patients must be tested before it is used. Antivenin is only used if the life of the patient is truly threatened.

The copperhead, one of two venomous species of snakes in West Virginia, is a pit viper. Note the slit-like pupil and the heat-sensing pits between the eye and nostril.

Allen Bridgman, South Carolina Department of Natural Resources, Bugwood.org



Many a nonvenomous northern water snake has been killed by people thinking they were protecting themselves from copperheads. Water snakes have round pupils compared to the elliptical pupils of copperheads. Copperheads have a more triangular-shaped head. The copperhead is appropriately named, as the top of the head is an unmarked copper color. When looking at a snake in the field without binoculars, it is hard for most people to see the pupil of a snake at a safe distance. The shape of the snake is a much better indicator. In general, a fat snake describes one of our pit vipers, while skinny snakes are nonvenomous. In the heat of the moment, this easy to remember rule might serve “snakaphobes” (officially known as Ophidiophobiacs) better than color, markings or pupil shape.

Scientists think that almost half of all catfish species are mildly venomous, and the ones known as madtoms are famous for their “stings.” Glandular cells in the skin covering the spines (one in the dorsal fin and one in each pectoral fin in catfishes) hold the venom. When a person is “pricked” by one of these spines, the venom in the skin is released into the wound and inflicts pain. I’ve seen a madtom “sting” make an adult cry.



Courtesy of Ohio DNR Division of Wildlife

The stonecat belongs to a group of catfish known as a madtoms. Careful handling is advised.



WV Dept. of Commerce

Now for the truly dangerous animals – invertebrates. About 500 people die from bee stings each year in the United States, which is 50 times the rate for snakes.

It seems though that more people are afraid of spiders than bees. This could be due to the common misconception that spiders bite people voluntarily. Spiders in West Virginia eat other invertebrates. Many folks grow up learning mistakenly that small itchy spots on their skin are spider bites. This is highly unlikely. Spiders will bite defensively if sat on, stepped on, or if a person puts a foot or hand in a shoe or glove that houses a spider. We have only two species of spiders that have venom that is of any concern to humans.

The well-known black widow is most commonly found under things like rocks or logs, or in dark outbuildings. It pays to be careful when moving objects that have been on the ground. The venom of the black widow is one of the most toxic to humans. For this reason, antivenin is produced for black widow bites. This antivenin carries the same dangers of allergic reaction that the snake antivenin does, so it is used with caution. Calcium gluconate can help relieve symptoms.

Bites can cause severe abdominal pain, muscular pain, and pain in the soles of the feet. The victim’s mouth alternates between being dry and having copious saliva. The victim might sweat profusely and their eyelids may swell. Symptoms peak approximately three hours after the bite, with complete recovery



Whitney Cranshaw, Colorado State University, Bugwood.org

A millipede, (far left) which doesn't sting, has two pairs of legs per body segment. A centipede, which does sting, has one pair of legs per body segment and the legs extend more horizontally out from the body than on a millipede.

within 48 hours. Female black widows are up to ½ inch long, black, with a red hourglass on the underside of the abdomen. Adult males, which don't bite or even eat, are about one-eighth inch long with white and red marks on the side. Females can live more than three years. It is extremely rare for a human to die from a black widow bite.

The brown recluse spider, also known as the violin spider, is not native to West Virginia. This spider has a natural habitat of brushy areas, but they can be found in closets, on bookshelves, under furniture, and in dark areas of barns, outbuildings and houses. The few documented individuals in the Mountain State were found near items that were recently transported here from another state. Adult females are three-eighths inch long and males are one-quarter inch long. They are grayish brown, with no easily observed markings. Although a bite from a brown recluse may be harmless, the bite often results in black necrotic (dead) tissue, sometimes causing a crusty red wound that takes months to heal and leaves a scar.

The yellow sac spider is native to the Mountain State. These small yellow-green spiders are found all over the continental United States. Females are one-fifth to two-fifths inch long. Males are even smaller, one-fourth inch long at most. The bites of these spiders are slower to show any reaction, but can result in dead tissue that is slow to heal.

Yellow sac spiders rarely use their venom on humans.

Centipedes have a pair of claws near their heads that can inject venom. These claws are used to subdue their invertebrate prey. People usually get bitten when handling a centipede.

No records exist of someone dying from a centipede bite in the United States. Bites from certain large species in the Southwestern states can cause swelling, intense pain, fever, nausea and sometimes death of living tissue. In West Virginia, the reaction is usually similar to that of a bee sting. Centipedes can be confused with millipedes, which are nonvenomous herbivores, harmless to handle. Both animals have long, caterpillar-like bodies. Centipedes have one pair of legs per body segment, generally move faster than millipedes, often have flatter bodies, and have the claws mentioned above. Centipedes are nocturnal. Millipedes have two pairs of legs per body segment, often have rounder bodies, but are sometimes flat, and lack claws. When threatened, millipedes often roll up, and can exude hydrogen cyanide, which smells like almonds. This is released in a liquid compound that



Joseph Berger, Bugwood.org

Painful Attraction

These strange-looking moth caterpillars have hairs which can inject venom when touched. Clockwise from center: puss moth, saddleback moth, IO moth, and hag moth.



Jerry A. Payne, USDA Agricultural Research Service, Bugwood.org



Lacy L. Hyche, Auburn University, Bugwood.org



Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org



Sturgis McKeever, Georgia Southern University, Bugwood.org

will stain a handler's skin. Some millipedes can live more than seven years.

Beware of petting hairy caterpillars. Stinging caterpillars of some moths have hairs that contain venom, which can be injected when a person touches the caterpillar. The severity of the sting depends on the individual, but the puss moth caterpillar has been documented to cause pain, rash, fainting, nausea and vomiting. Other species that sting include caterpillars of the gypsy moth, hag moth, IO moth and saddleback moth. To play it safe, it is best to avoid touching any hairy caterpillar.

Hymenoptera is the scientific order that includes ants, bees, wasps, hornets and their kin. These insects usually have two pairs of wings, chewing mouthparts,

and some have tongue-like structures for drinking. Bees, ants and wasps have a narrow "waist" between their abdomen and thorax. The stinger is actually a modified ovipositor, which explains why only the females sting. An ovipositor is used by many insects to lay eggs. Some hymenopterans, including sawflies and horntails, do not sting. Most are solitary, but ants, and some bees and wasps, live in colonies, with sterile (yet stinging) female workers, and a few fertile males and females (called reproductives). Although numerous

Bumble bees (left) are big and look menacing but rarely sting. Honeybees are much smaller and are known for their nectar product.

Bumblebee by David Cappaert, Michigan State University, Bugwood.org
Honeybee by Susan Ellis, Bugwood.org



species of hymenopterans live in West Virginia, only a few are described here.

Bumblebees are stout, hairy bees marked with bold black and yellow stripes. These bees are reluctant to sting, but will defend by stinging if handled, stepped or sat on, or if their underground nest is threatened.

Honeybees are not native to North America, but were brought here from Europe to pollinate crops and provide honey. Honeybees are brown to yellow-orange with yellow bands on the abdomen, and are about ½ inch long. Since their hives are usually above ground in beekeepers' apiaries, accidental disturbance of the nest is rare.

Sometimes honeybees will swarm to create a new hive, and could nest in a hollow tree. Honeybees will defensively sting if stepped or sat on, or handled.

Bald-faced hornets, velvet ants, paper wasps and yellow jackets are all considered wasps by entomologists (scientists that study insects). Wasps sting using two lancets that are worked into the victim. After the lancets are in deep enough, the poison duct, located between the lancets, opens to release a complex blend of chemical compounds.

Bald-faced hornets are marked in black and white on all three body segments, and are approximately one-half inch long. Females build gray-brown nests that hang down from a tree branch, fence railing, porch, or similar structure. People often confuse them with paper wasp nests. Bald-faced hornet nests are often large and conspicuous, with a large hole in the bottom



Johnny N. Dell, Bugwood.org

Although the female velvet ant is wingless, the less beautiful male has wings.



David Cappaert, Michigan State University, Bugwood.org

Bald-faced hornets will vigorously defend their nests.

Joseph Berger, Bugwood.org

for a doorway. Females readily defend the nest, and can sting multiple times.

Velvet ants are actually wingless female wasps that look like large, red, velvet-covered ants, up to one inch long. They are also called cow killers in reference to the severity of their sting. Velvet ant stings are one of the most painful of North American wasp stings. A female crawls into another solitary bee's nest and kills it with a sting. She then lays her eggs on the host's eggs. The velvet ant larvae will eat the host's larvae after hatching. The males of these species have wings, which they use during courtship, taking the female for a ride. Males do not sting.

Paper wasps are brownish-bronze with long legs, and a larger waist than many other wasps, up to 1¼ inches long. Females build a nest made from chewed wood and saliva, and hang it from a tree branch or structure such as a fence railing, gutter or porch. Paper wasps are not as defensive as bald-faced hornets, but can inflict a painful sting.

It is a rare West Virginian that has not seen a mud dauber at work. These wasps are in a group of mud



Pottery wasps make a unique little vase-like nest for their young and the young's food.

Photo by Jan Yuschack, Bugwood.org

Many people get stung by yellow jackets when they accidentally step on the opening to the bees' underground nest. These defensive wasps also get into food and sugary drink cans at picnics, particularly in the fall.

Photo by Jim Baker,
North Carolina State University,
Bugwood.org



Gary Alpert, Harvard University, Bugwood.org

wasps that includes pottery wasps, which make clay pot-like nests, and mason wasps, which build their mud nests underground. Mud wasp females sting an insect or spider and lay the egg on it, then close up the cell. The prey item provides food for the wasp larvae.

Yellow jackets are well known for multiple stings when a person steps on an underground nest. Yellow jackets are around one-half inch long, with yellow (sometimes white) and black bands on the abdomen. Unlike other wasps, the body is wider than the head. Females will sting repeatedly with little provocation. Yellow jackets are attracted to and eat both meat (or carrion) and sweets. Yellow jackets usually build softball- to basketball-sized underground nests, but they can be much larger, as large as a small car.

The best way to avoid allergic reactions from the hymenoptera is sting prevention. Do not go out of your way to attract these creatures. Flowering plants look colorful and smell wonderful in order to attract pollinators. So, dressing in flowery shirts or blouses and applying attractive scents is a good way to confuse these insects, resulting in dangerous stings. If you are allergic, your doctor can prescribe automatically injecting epinephrine devices that do not require refrigeration. These are safe and easy to use and can be reassuring and life-saving.

Desensitization to hymenoptera venom is possible and effective.

An increased awareness and appreciation of how all of our native wildlife has an important job in our habitat can make a simple walk in the yard more enjoyable. It is this complex web our fellow mountaineers weave with us that makes West Virginia one of the best places on earth to live and play outside.

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Karen McClure is a Public Information Specialist and assistant editor of West Virginia Wildlife for DNR Wildlife Resources Section stationed in South Charleston.

DIVISION OF NATURAL RESOURCES

Wildlife Resources Section

FINANCIAL REPORT

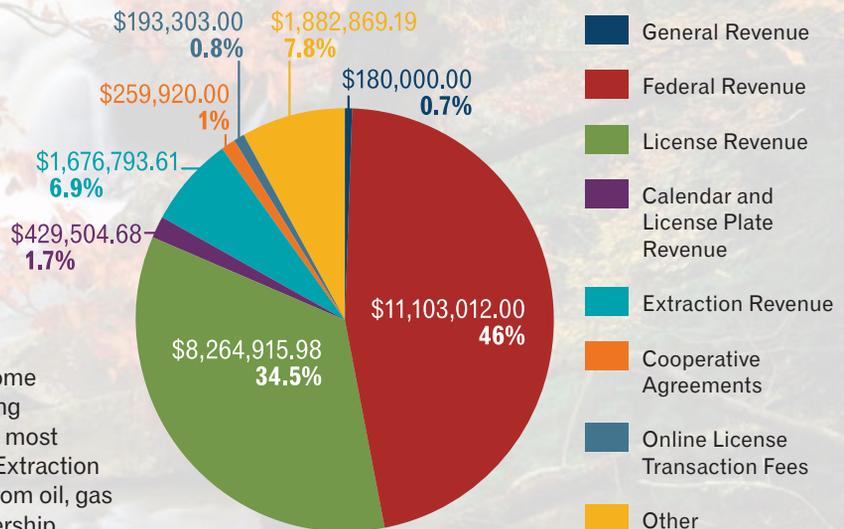
JULY 1, 2012 – JUNE 30, 2013



Revenues

Total: \$23,990,318.43

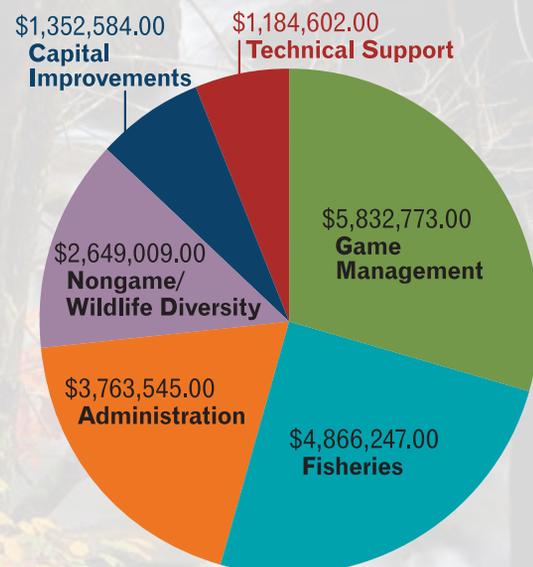
The majority of funding for the DNR Wildlife Resources Section comes from hunting, trapping and fishing license sales (34.5%) and federal funds (46%) derived from an excise tax paid by anglers, hunters and recreational shooters when they buy ammunition, firearms and fishing equipment. Federal revenue also includes state wildlife grants and endangered species grants among other sources. Revenue less than 1% of the funds come from the state's general revenues. The following chart shows a summary of the revenue for the most recent fiscal year which ended June 31, 2013. Extraction revenue refers to royalties the DNR receives from oil, gas and timber taken from areas under DNR ownership.



Expenditures

Total: \$19,648,760.00

The Wildlife Resources Section is responsible for maintaining all species of wildlife for values which may be either intrinsic or ecological or of benefit to humans. Benefits include hunting, fishing, birdwatching, and scientific and educational uses. Funds for the Wildlife Diversity programs are used to manage species for which we don't hunt, trap or fish. The Natural Heritage program manages special habitats, including the rare, threatened and endangered plants those communities support. Capital improvements pays for projects such as building fishing and boating access sites and shooting ranges as well as buying additional public wildlife management areas. Technical support includes stream restoration projects, coordination with other state and federal agencies whose projects affect wildlife (including mining and road construction), data entry and analysis for wildlife projects, and mapping projects using GIS.



A full accounting of all Division of Natural Resources revenues and expenditures can be found in the DNR Annual Report which can be found online at www.wvdnr.gov/admin/annual_report.shtm.



Scenic Morris Creek runs through the area on its way to the Elk River.

Description: Morris Creek Wildlife Management Area lies south of the Elk River, just east of Clendenin in Kanawha County. A small portion of the 9,900 acre area is in Clay County. The parcel features nearly three miles of river frontage. Morris Creek almost bisects the property, and runs into the Elk River about halfway down the river frontage. County Route 67 runs along Morris Creek, and three smaller roads provide access. All roads in Morris Creek WMA are unpaved.

The area's steep hills are covered in forest, with a few open areas, including two gas pipelines. Public stream access sites are available near each end of the area's river border, allowing great paddling and float trip opportunities.

Viewing information: White-tailed deer, turkeys, mourning doves, and squirrels are present year 'round. Virginia opossums, big brown bats, Eastern chipmunks, groundhogs (woodchucks), Southern flying

Watchful evening guests might hear or see a screech owl. A common call of these small nocturnal predators is a descending trill. Screech owls come in two color phases; a red phase (shown here) and a gray phase.



Karen McClure
© Steve Byland

squirrels, Eastern cottontails, foxes, coyotes, raccoons, striped skunks, and bobcats can be seen with some luck and perseverance.

River birds include Canada geese, mallards, great blue herons, green herons, killdeer and belted kingfishers. Turkey vultures and red-tailed hawks might be observed soaring overhead. Visitors might hear barred owls, screech owls and whippoorwills. Birds of field and forest include: ruby-throated hummingbirds, downy and hairy woodpeckers, pileated woodpeckers, Eastern wood peewees, Eastern kingbirds, tree and barn swallows, common ravens, eastern bluebirds, wood thrushes, cedar waxwings, red-eyed vireos, yellow warblers, prairie warblers, black-and-white warblers, ovenbirds, common yellowthroats, scarlet tanagers and indigo buntings.

Visitors seeking amphibians might find red-spotted newts, spotted salamanders, slimy salamanders, Northern dusky salamanders, Appalachian seal salamanders, spring salamanders, Northern red salamanders, longtail salamanders, Eastern American toads, gray treefrogs, American bullfrogs, Northern green frogs, wood frogs and pickerel frogs.

Looking for reptiles? You might find Eastern snapping turtles, Eastern box turtles, Eastern fence lizards, common five-lined skinks, Northern water snakes, Eastern garter snakes, Northern ring-necked snakes, Eastern worm snakes, black rat snakes, or Northern copperheads.

Directions:

From I-79, take exit 19 and drive two miles south on U.S. Route 119 to Clendenin, then continue east on route 4/1. The area can be accessed from the river by putting in a boat at Queen Shoals, and paddling downriver. county Route 67 provides access through the middle of the area.

Hunting Prospects:

Hunters can harvest bear, deer, squirrels, and turkeys.

Fishing:

In the Elk River, smallmouth bass are the choice species for anglers, but folks catch other warm water species including: catfish, muskellunge, and walleye. A boat slide is located at Queen Shoals and a carry-down boat ramp is located at the site of the old (demolished) Clendenin Water Plant.

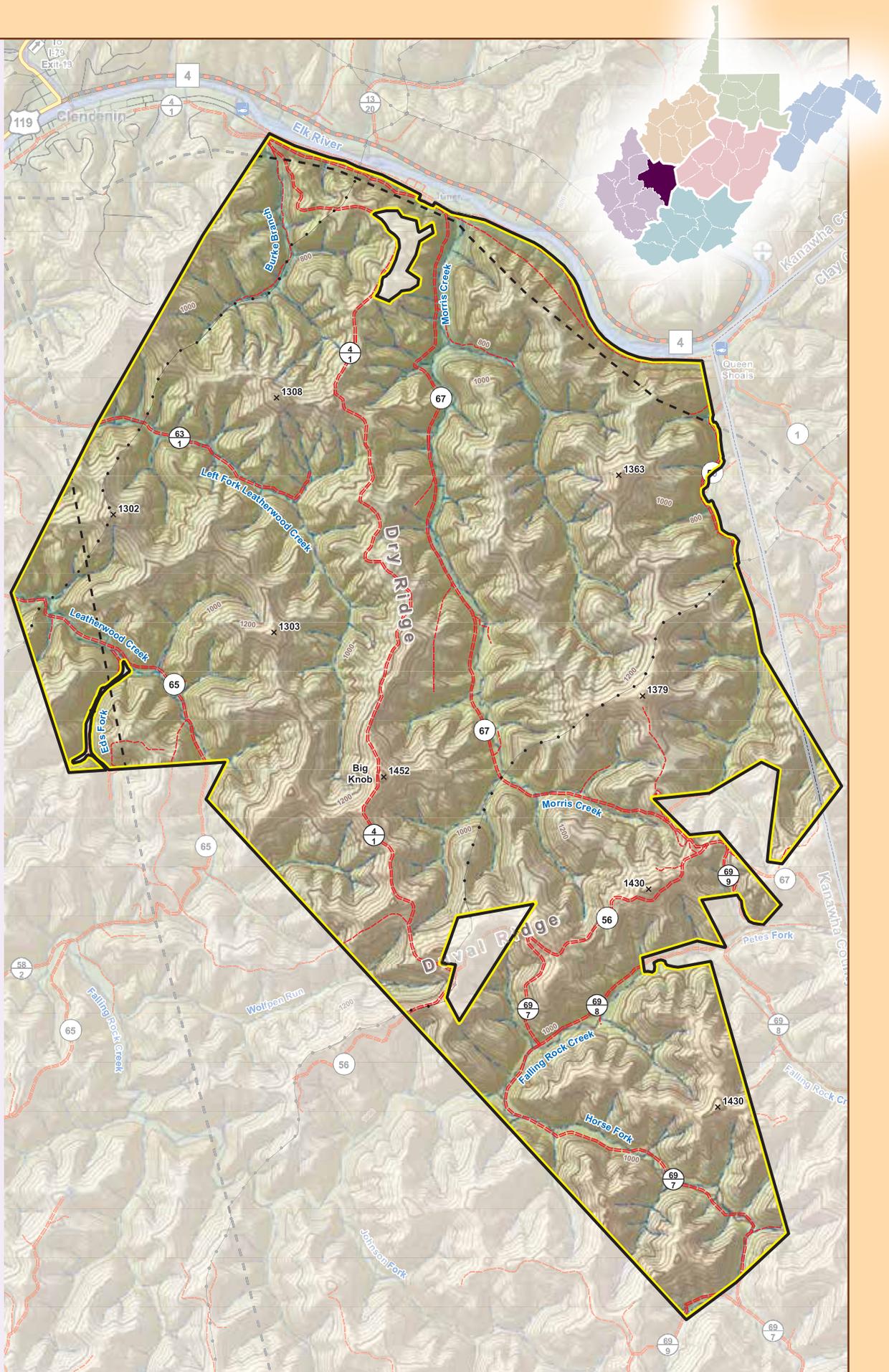
Camping:

Camping is not permitted on the WMA.

Note: Morris Creek WMA is a public hunting area. Please check the current West Virginia Hunting and Trapping regulations, available online at: www.wvdnr.gov/wf or call the DNR office listed below for hunting season dates.

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The Ups
& Downs,
Hows &
Whys of

WILDLIFE Populations

By Colin Carpenter

You feel good as you load the fat four-point buck into the bed of your pickup. It's the Monday before Thanksgiving and you were only in the woods for two hours when the unsuspecting buck walked into your cross hairs. You're thinking about the work that lies ahead in processing the buck for the freezer as you pull into the game checking station. Several West Virginia DNR wildlife biologists are set up in the parking lot, taking measurements from a buck brought to the check station by a hunter ahead of you. As you pull up beside the other hunter, one of the biologists tells you that they'll check the deer for you and that they would like to take some measurements from your deer.

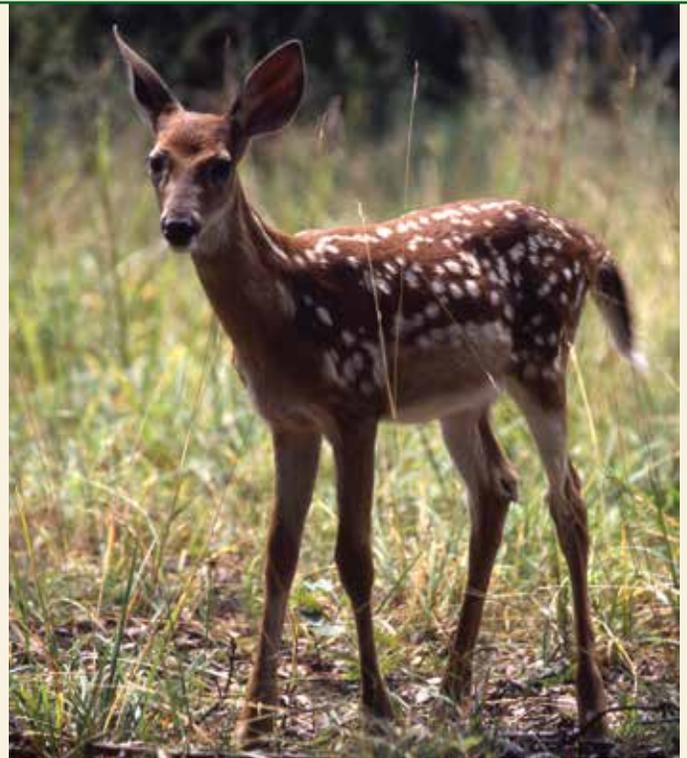
As you watch, the biologists weigh and age the deer and take a number of antler measurements. They explain that the data from the buck you've killed will be used to wisely manage West Virginia's white-tailed deer population. Scenes like this happen every fall throughout West Virginia and the entire range of the white-tailed deer. Wildlife biologists use these data to monitor the population dynamics of the species.

Many hunters who have harvested game in West Virginia have contributed to the management of the



species they hunt, whether it's deer, bear, turkey, grouse or migratory birds. Wildlife biologists collect data from harvested animals and from animals studied in research projects to determine birth rates and the impacts of hunting and natural mortality factors on the populations of different species. Simply put, population dynamics refers to all the changes in the number, sex and age that take place in a population during a given time period.

A myriad of factors influence the populations of a given species. Entire college courses are dedicated to the study of population dynamics, and many wildlife professionals devote their careers to this one topic. What follows is a crash course in the basics of population dynamics. Don't worry, there won't be a test at the end!



Mark Shrock

The number of fawns born per doe is an important statistic in managing deer populations.

The Four Main Factors that Control Populations

1. Natality

One of the first principles involved in determining the population dynamics of any species is estimating the number of animals born each year. The number of young born in a given unit of time is referred to as the birth rate or natality. Most big game species reproduce once a year, so biologists are interested in finding out how many young are born to each female on a yearly basis. The average number of young produced each year is often used to compare birth rates between populations of the same species. Birth rates can be difficult to measure because they are influenced on a yearly basis by factors such as number of females of breeding age in the population, natural food conditions during the previous year, mating habits of the species, and population density.

Wildlife biologists collect data about birth rates from both harvested animals and animals wearing radio transmitters during research projects. It is possible to determine the number of young that deer and bears would have produced by examining ovaries

from harvested animals and looking at developing embryos or placental scars. This technique has been used in the past for deer in West Virginia, but is not currently used because the vast majority of deer that biologists handle at check stations have been field dressed and had all of their organs removed.

Wildlife biologists do examine the reproductive tracts of harvested black bears to count either embryos or placental scars. If embryos are present in the reproductive tract, the bear was bred in the year of harvest and would have given birth in January or February of the next year. If placental scars are present in the reproductive tract, it means that the bear gave birth in the year of harvest. Female bears have cubs every other year. Although it is illegal to harvest a female black bear accompanied by cubs, females sometimes don't carry litters of cubs to term. If the female lost her litter after the breeding season, she would not be pregnant but placental scars would be visible.

2. Mortality

The next major factor that influences population dynamics is mortality, or the number of animals that die during a given period of time (deaths per year). People often ask wildlife biologists how long a certain species lives. The main problem with using published estimates of longevity is that the ages often come from animals in captivity that live much longer than animals in natural environments. Wildlife biologists are more interested in what causes death and the rates at which these mortality events occur.

Some of the most valuable data concerning mortality can be collected by determining the age at death for animals killed by hunters. Age at death information from hunter-harvested animals is widely used because large amounts of data can be collected cheaply during a short period of time. These data can then be inserted into what is called a life table (more accurately a death table) to “back-calculate” population size in previous years. As a population ages, there are fewer and fewer individuals in the oldest age classes due to death. Life tables also allow biologists to calculate survival rates of populations and study the interaction of the birth and death rate. Actuaries use human life tables to help calculate your life insurance premiums!

Wildlife biologists often use birth rate and mortality data collected during research projects using animals wearing radio transmitters to verify or add to the data generated by life tables. Animals wearing radio transmitters allow researchers to determine the actual number of young born, which can differ from the number of young determined by examining ovaries. In addition, animals wearing radio transmitters allow biologists to estimate natural mortality, which cannot be calculated with a life table.

3. and 4. Emigration and Immigration

Emigration and immigration are usually discussed together. Animals that leave a population and do not return are emigrants. Immigration is one-way movement into a new area or population. Wildlife biologists often assume that the effects of emigration and immigration cancel each other out, but this is not always the case.

The concept of dispersal is tied to both emigration and immigration. Dispersal is defined as the movement of an animal away from the area where it was born into a new area. Dispersal is a regular occurrence in wildlife populations and often occurs more frequently when population densities are high. In many wildlife species, males disperse farther than females. Increased dispersal distance often leads to higher mortality rates for males. Researchers speculate that males disperse farther than females as an adaptation that prevents inbreeding.



David Welman

WVDNR and the Virginia Department of Game and Inland Fisheries completed a gobbler survival study in which biologists trapped and equipped birds with radio transmitters to determine harvest rates and other mortality factors.

Legally harvested bears, such as this one taken by the author, are considered as additive mortality and are factored into bear management decisions.

Additional Concerns for Hunted Populations

Compensatory Mortality

Population dynamics are difficult to study in populations that are not hunted. Adding hunting to the equation makes studying population dynamics even more challenging. One of the questions that wildlife biologists have asked themselves about hunted species since the beginning of the wildlife management profession is, “Is hunting mortality compensatory or additive?”

The concept of compensatory mortality assumes that one kind of mortality replaces another kind of mortality in a population. An animal dying from one cause, such as disease or predation, cannot die from another cause such as hunting or starvation. In a population where compensatory mortality is present, the total mortality rate will not be greatly influenced by changes in any one single cause of death. If death due to predation in one year is 10 percent and death due to disease is 25 percent, the total mortality is 35 percent. If in the next year, death due to predation is 25 percent and death due to disease is 10 percent, the effect of predation is compensatory. It’s important for wildlife biologists to know whether hunting mortality is

compensatory because the total annual mortality rate may remain unchanged with or without legal hunting.

In general, wildlife populations that produce multiple litters of multiple young each year such as rabbits and squirrels display compensatory mortality, so mortality due to hunting just removes individuals that would have died from other causes. In some wildlife populations, however, hunting mortality is considered compensatory only up to a certain level. Biologists have determined that rates of hunting mortality for female wild turkeys in some populations can reach 10 percent and still be considered compensatory. In addition, biologists studying ruffed grouse in West Virginia and Virginia found that the rates of hunting mortality observed in their study were compensatory.

Additive Mortality

The concept of additive mortality assumes that the effect of one kind of mortality is added to other sources of mortality. If predation takes 25 percent of a population in one year and disease takes 15 percent, the total mortality for the year is 40 percent. If in the next year, predation takes 25 percent of a population and disease takes 20 percent, the total mortality for the year is 45 percent. In this case, the two death causes are additive. In populations where additive mortality is present, hunting can be viewed as an additional source of mortality that will increase total annual mortality.

In most populations, black bears suffer very low rates of natural mortality (less than 10 percent total mortality). The vast majority of black bear deaths in a given year can be attributed to humans through legal hunting mortality, vehicle collisions, and killing of bears for nuisance behavior. Therefore, these human-caused



Steve Wilson

If deer populations are not managed at levels suitable for the habitat, density dependent factors may affect the population.

deaths are considered additive to total mortality. However, a conservative hunting season structure designed to protect adult females has allowed black bear populations to grow.

Density Dependence

Many wildlife populations are influenced by density-dependent factors. A density-dependent factor acts in proportion to the number of animals per acre or square mile within a population. Natality and mortality often fluctuate with changes in density. Some diseases are density-dependent, meaning a higher percentage of the population becomes infected as density increases. White-tailed deer populations often exhibit density-dependent reproduction. As white-tailed deer populations grow, less food is available to feed all animals in the population. A reduction in food leads to delayed sexual maturity for females, decreased reproductive rates, and a lower rate of fawn survival. This is why wildlife biologists encourage the harvesting of antlerless deer. Deer populations that are in balance with the amount of natural food that the habitat can support will consist of healthier animals.

A density-independent factor is a factor that operates independently of population density. Wildlife biologists usually have no control over density-independent factors. Droughts, hurricanes, floods and severe winter storms are examples of density-independent factors. Although wildlife biologists cannot control Mother Nature, they can help to lessen the impacts of density-independent factors by keeping wildlife populations in balance with the habitat.



Photo by Mark Shock

Carrying Capacity

Two kinds of carrying capacity interest wildlife biologists. The first is called biological carrying capacity. Biological carrying capacity is the maximum number of animals that a particular habitat can support over a sustained period without causing damage to the habitat. Biological carrying capacity can change on a yearly basis due to weather and food conditions. Wildlife populations in West Virginia greatly depend on hard and soft mast crops on a yearly basis for survival and reproduction. In most cases, reproductive output and survival of young are negatively impacted following a mast failure. The opposite is true following a good mast year.

The second type of carrying capacity that is important to wildlife biologists is sociological carrying capacity. Sociological carrying capacity refers to the maximum number of animals that the human population living in a given area will tolerate. In most cases, biological carrying capacity is higher than sociological carrying capacity. The disparity between the two types of carrying capacity is increased as suburban



Kim Shomo

Biologists must consider sociological carrying capacity when managing deer populations in West Virginia, particularly near urban areas.

The Importance of Long-Term Data Collection

Wildlife populations are constantly changing in response to both environmental factors and social factors within the population. The fact that these populations are dynamic makes it difficult for wildlife biologists to say anything with certainty about how these populations fluctuate. In most cases, wildlife biologists do not have techniques to determine the exact number of animals in a population. Therefore, wildlife biologists study trends in data. They need to know whether the population is stable, increasing or decreasing. Wildlife biologists collect data on wildlife populations, the hunters that pursue the populations, and natural food conditions to analyze the impacts of these factors on one another. The complexity of biological systems requires the collection of data on a continuing basis. As data sets become larger, trends within the data become easier to detect.

An example of the importance of long-term data collection can be illustrated with the recently-completed study of black bear population ecology in West Virginia. Information concerning black bear survival, reproduction and home ranges had been collected in the eastern mountain counties in West Virginia since the early 1970s using radio-collared bears. In response to a perceived increase in the black bear population in the southern coalfields, Wildlife Resources Section personnel placed radio collars on additional black bears beginning in 1999. The southern study was originally planned to run five years, but was extended for another five years to collect additional data.

sprawl puts humans into direct contact with wildlife. In many cases, the introduction of human development into forested habitat increases biological carrying capacity. In the case of deer, it increases the variety of food by creating more diverse vegetative communities. For another example, suburban sprawl means bears have easier access to food because people either feed the bears on purpose (a bad idea!) or unintentionally feed them by leaving dog food, trash or other edibles unsecured.

Sociological carrying capacity is very important for wildlife biologists to monitor. In order to maintain support for wildlife management programs, citizens must be assured of reasonable protection from property damage or bodily harm caused by wildlife. Negative attitudes about wildlife caused by overpopulation contribute to society devaluing the wild animals that we strive to manage.



DNR photo

Wildlife Resources Section personnel collect data from a hunter-harvested deer at a game check station.

Reproductive rates for adult female black bears on the southern study area were three cubs per female during the first five years of the study, significantly higher than for bears in the northern study area. However, after analyzing 10 years of reproductive data, reproductive rates on the southern study area for adult females were 2.85 cubs per female which was not significantly different than those in the northern study area (2.71 cubs per adult female). If wildlife biologists had only collected five years of data, conclusions regarding population growth potential may have been overestimated.

The Costs of Data Collection

Wildlife Resources Section personnel spend a considerable amount of time and money collecting biological data to manage wildlife populations on a yearly basis. A major goal of both wildlife biologists and wildlife administrators is to identify the most cost-effective methods of monitoring wildlife populations. Therefore, wildlife biologists regularly evaluate their data collection needs and the costs associated with collecting the data.

A recent example illustrating an analysis of the costs associated with data collection comes from the Black Bear Research Project. Wildlife biologists have

collected data concerning black bear reproductive rates and survival rates using radio-collared animals in addition to teeth and reproductive tracts collected from bears killed by hunters. Analysis of long-term data sets collected by both methods indicated that the number of cubs produced per female and survival rates did not differ between the two methods of data collection. The estimated yearly cost of collecting data from radio-collared animals was \$216,918, while the estimated yearly cost of collecting and processing bear teeth and reproductive tracts was \$33,271. Wildlife biologists can collect the same data from hunter-harvested animals as they do from radio-collared animals at a much reduced cost. This illustrates the importance of teeth and reproductive tracts submitted by successful hunters in managing West Virginia's black bear population. However, radio telemetry studies yield a greater variety of statistical information which biologists can use to manage the bear populations wisely.

The Take Home Message

The DNR Wildlife Resources Section devotes a great deal of time and money each year to collect biological and sociological data used to manage wildlife populations. In many cases, data supplied by successful hunters is critical in detecting trends in wildlife populations and in setting future seasons and bag limits. Hunters are and will continue to be an integral part of wildlife conservation efforts.

Each fall as hunters take to the field, wildlife biologists will be ready to collect data from the animals that are harvested. Hunters can be assured that the data they supply will be used to wisely manage wildlife populations and to continue providing the recreational opportunities they enjoy.

Colin Carpenter is the the DNR Wildlife Resources Section bear biologist stationed in Beckley.

Wildlife Diversity Notebook: Northern Short-tailed Shrew

By Karen McClure

Common Name:
Northern Short-tailed Shrew

Scientific Name: *Blarina brevicauda*

West Virginia Status:
Common statewide

Description: The Northern short-tailed shrew is the largest shrew on our continent. Adults are 3 $\frac{3}{4}$ to 5 inches long, plus they have a short tail up to one-inch long; hence the scientific name: *brevi* comes from a Latin word meaning short, and *cauda* is Latin for tail. Northern short-tailed shrews are gray all over, and weigh one-half to one ounce. That's about the same weight as four quarters.

Habitat: These shrews live in a variety of habitats, but are most common in woods and wetlands.

Diet: Northern short-tailed shrews eat mostly invertebrates such as snails, earthworms, centipedes and insects. Sometimes, they leave middens of snail shells under logs. On rare occasions, they eat smaller shrews, and have been known to eat mice when mice are abundant. These mammals also consume quite a bit of underground fungi.

Range: These shrews are native to southeastern Canada, the northeastern United States, and south through the Appalachians to the mountains of Alabama. Isolated populations exist in North Carolina and Florida. They are native to West Virginia.



Steve and Dave Maslowski

Life History: Northern short-tailed shrews have several claims to fame. They are our largest shrew, they are venomous (see *Venomous Mountaineers* in this issue for more details), and they eat from 50 to more than 100 percent of their weight in food each day. Some prey is paralyzed with venom and then stored for later.

This shrew is one of the most common mammals in North America. These tiny predators have burrows with oval openings that are less than an inch across, and even smaller in height. They dig burrows with their snout and forelegs, and they run the subterranean tunnels in the morning and evening searching for prey.

Males mark their burrow openings with liquids from their hips and belly. These territorial markings keep other males out. If two males do meet, a fight might ensue. One shrew usually rolls over like a dog, and the other male usually runs away. Females and males don't fight with each other, but form permanent bonds.

Northern short-tailed shrews shred leaves and grass to build a nest, 6 to 8 inches across, placing it under a log or stump. The female then gives birth to four to eight young. Northern short-tailed shrew litters occur mostly in spring and summer, but the female can give birth year-round.



Steve and Dave Maslowski

Northern short-tailed shrew inside a hollow log.

Spider Season

Background

More than 35,000 species of spiders are known to humans, with more than 3,500 in North America. Fall is a great time to explore spiders, since most of them are at their largest and showiest at this time of year. Spiders live in many different habitats, eating insects and other small animals. If we had no spiders, there would be so many insects in West Virginia that life would be quite different, since our food and overall quality of life would be affected.

Spiders are not insects, but arachnids, having two body segments, eight legs, and no antennae. Insects have three body segments, six legs and antennae. Female spiders of a species are usually much larger than males. Many different species of spiders live in West Virginia. Some build webs; others do not. Here we will look at six of the most common and noticeable spiders that live statewide. Many other common spiders are so tiny, they are hard to find and identify.

Objectives

Hike and enjoy looking for spiders in the yard or a local natural area. Learn to identify spiders and their habitat, and to estimate the size of spiders.

Method

Cut out and use the Spider Cards to find and identify common noticeable species. Make observations in a journal.

Materials

Spider Cards, ruler, pencil, journal (optional).

What to do

1. Cut out and read the Spider Cards. Find objects that are about the same length of each species. Note on each card (or in your journal) the object you found that matches the spider in length.
2. Go out in the yard, field, forest, or garage and look for spiders. Note where each spider species was found on the cards or in your journal. Note other interesting things you found while looking.
3. Go on a hike nearby (a walk if you live in the city) and look for more species. Note the ones that you find in your journal. Note the other things you notice while looking: temperature, weather, sounds, smells and sights.
4. For more spider fun, check out these publications:

Spiders and their Kin by Herbert W. Levi and Lorna R. Levi

The Audubon Society Field Guide to North American Insects and Spiders by Lorus and Margery Milne

About Arachnids: A Guide for Children by Cathryn Sill

Are You a Spider? by Judy Allen and Tudor Humphries

Do all Spiders Spin Webs? by Melvin and Gilda Berger

Spiders by Gail Gibbson

Spider's Lunch by Joanna Cole

Spiders Spin Webs by Yvonne Winer

Web Weavers and Other Spiders by Bobbie Kalman

www.wvagriculture.org/images/Literature/Spiders.pdf

References

Spiders and their Kin by Herbert W. Levi and Lorna R. Levi

The Audubon Society Field Guide to North American Insects and Spiders by Lorus and Margery Milne

Terry Carrington, Agricultural Survey Entomologist, WV Department of Agriculture

Wolf spiders, which stalk their prey, are often seen on the ground, instead of on webs.

Photo by Art Shomo

Arrow-shaped Microthena

Microthena sagittata



Richard Bradley

Bold Jumper

Phidippus audax



Richard Bradley

Banded Sac Spider

Castianeira longipalpa



Richard Bradley

Grass Spider

Agelenopsi pennsylvanica



Richard Bradley

Black-and-Yellow Garden Spider

Argiope aurantia



Richard Bradley

Spitting Spider

Scytodes thoracica



Richard Bradley

Bold Jumper

Scientific Name: *Phidippus audax*

Size: Female – 1/2" Male – 1/4"

Habitat: Woods

Web Type: Bungee and retreat

Notes: This spider is thought to be bold because it turns to face anything that moves. The top of the abdomen is marked with three spots of white or orange. The bold jumper drags a thread of silk wherever it goes, using it to climb back to the launch pad if it misses the target on a jump. The female stays in a retreat to lay her egg sac and care for her young until they disperse. Boldness should not be confused with aggression. This spider only bites when handled roughly.

Arrow-shaped Microthema

Scientific Name: *Micrathena sagittata*

Size: Female – 3/8" Male – 1/8"

Habitat: Woods

Web Type: Orb

Notes: This cool-looking, colorful spider often builds its web between two trees or across trails. The tiny male does not have the spines seen on the female. Look for him hanging out at the edge of the web. The female pipe organ mud dauber often kills these spiders to provide food for its young

Grass Spider

Scientific Name: *Agelenopsi pennsylvanica*

Size: Female – 3/4" Male – 3/4"

Habitat: Grasses and shrubs

Web Type: Funnel

Notes: Look for dew on the flat webs in the morning. The spider hides at the narrow end of a silk funnel attached to the web. When something lands in the web, the spider runs out to the prey, bites it, and carries it back to the hideout. The web gets larger as the spider grows. Grass spiders don't see well. In fall, the female hides a disc-shaped egg sac in a crevice.

Banded Sac Spider

Scientific Name: *Castianeira longipalpa*

Size: Female – 1/4" Male – 1/4"

Habitat: Many

Web Type: Retreat

Notes: These spiders mimic ants. They can be found running out in the open like an ant. Often they move their front legs around in the air to mimic ant antennae. The banded sac spider even hangs out with carpenter ants sometimes. This behavior is thought to protect them from some predators, since ants are low in nutrients, and some ants sting.

Spitting Spider

Scientific Name: *Scytodes thoracica*

Size: Female – 1/4" Male – 1/8"

Habitat: Under leaves, stones, logs

Web Type: None

Notes: These spiders spit sticky stuff out to trap their prey. The female carries her egg sac around in her jaws. The young stay together, cared for by their mother until they disperse.

Black-and-Yellow Garden Spider

Scientific Name: *Argiope aurantia*

Size: Female – 1" Male – 1/4"

Habitat: Yards, fields, and gardens

Web Type: Orb

Notes: Old-timers called these spiders "writing spiders," and some claimed to tell the future by reading what the spiders wrote. The "writing" is called a stabilimentum by scientists. The female hangs upside-down in her web, and some tiny males might be found off to the side in their own tiny webs. The tan egg case is grape-sized, often hanging from a bush.

DNR Natural Resources Police Officers Uncover Extensive Deer Poaching Operation.

A three-month investigation by the West Virginia Division of Natural Resources and the Virginia Department of Game and Inland Fisheries resulted in the arrest of six West Virginia residents in an extensive deer poaching ring.

DNR Natural Resources Police officers executed a search warrant at two homes in Hedgesville, West Virginia and uncovered an extensive deer processing operation. The investigation revealed the group was routinely killing deer in West Virginia, processing the meat, and shipping it across state lines to be sold.

“Early into this investigation it became apparent that this was a large scale operation which was in fact illegally killing wildlife, processing and selling it, and potentially transporting it out of West Virginia,” said Captain T.R. Stuckey of the DNR Law Enforcement Section. “Once these facts were established by numerous undercover buys of wildlife and wildlife parts in West Virginia by our undercover officers, a joint investigation was launched in conjunction with the

Virginia Department of Game and Inland Fisheries.”

Officers started the probe in September after getting information the group may have been illegally killing deer. They were also getting large numbers of crop damage permits from various farmers and other individuals in the Eastern Panhandle.

Virginia Conservation Police officers working undercover made numerous buys of butchered deer from the eastern panhandle operation. Undercover officers from both states were also able to buy illegal drugs in both states from the same suspects.

The search warrant which yielded the illegal deer processing operation also yielded 341 marijuana plants at the home of two brothers from Hedgesville. The brothers, along with the wife of one of the brothers, are charged with multiple game and drug law violations in West Virginia. They face a range of charges in Virginia as



DNR photo

Evidence seized by West Virginia DNR Natural Resources Police officers.

well. Three other men were arrested for their involvement in the ring.

Charges for the ring leaders included spotlighting, killing deer during closed season, taking deer with an illegal weapon, illegal sale and transport of wildlife out of state, and a felon in possession of a firearm, among other drug-related charges. Others involved with the illegal operation were charged with fewer charges.



DNR photo

WRS Employee Receives Award from Wings Across the Americas

Kieran O'Malley, wildlife diversity biologist working from the DNR Romney office, was recognized at the 78th North American Wildlife and Natural Resource Conference by the “Wings Across the Americas” program for his contributions to and coordination of DNR participation in the Eastern Golden Eagle Working Group. This group was the first winner in the Research Partnership Award category.

“Over several years, Kieran has led our work to establish baiting sites to trap and tag golden eagles, and most recently, has been heavily involved in the use of trail cameras to photograph them for a population dynamics study,” said DNR Wildlife Resources Section Chief Curtis Taylor.

Golden eagles breed in eastern Canada but recent research by the Working Group has identified the tremendous importance of West Virginia as wintering habitat.

Explore West Virginia's Free Wildlife Epub Page

Wildlife Resources has an Epubs (electronic publications) page that is now available online. Go there and read a book, print a map or poster, check the hunting and fishing regulations, and interact with the new mapping tool. This page offers something for everyone. There are snake field guides, wildlife magazines, and coyote quiz books to learn about wildlife in West Virginia, first deer and first fish certificates to print, wild game recipes, butterfly gardening how-tos, and wildflower ID charts. "Outdoor enthusiasts have been asking for these for a while, and we are really excited to offer these now," said Frank Jezioro.

Nature techies can go to the DNR website and try it all out today. To access the page, go to: www.wvdnr.gov/wf.



www.wvdnr.gov/wf



New Dents Run Shooting Range Open

The newest West Virginia Division of Natural Resources public shooting range opened to hunters this fall. The Dents Run Shooting Range is located on the Dents Run Wildlife Management Area one mile west of Mannington in western Marion County. It was built entirely by DNR employees to help control costs, according to Frank Jezioro, DNR Director.

The range features four standard benches and one bench for persons with disabilities. The benches are made of concrete and are covered with a shelter, so it is hoped they will stand up to prolonged use. Target frames and backstops are located at 25, 50 and 100 yards.

"The construction of this new facility was made possible through the cooperation of the DNR, CONSOL Energy and the National Rifle Association, and with the support of our state and federal leaders," Jezioro said. "We expect that this new facility will receive a lot of use."

Hunters and recreational shooters are urged to follow the rules of the range which will be posted and enforced.

The shooting range can be reached by taking county Route 1 (Buffalo Creek Road) from Mannington and then turning right onto Dents Run Road (CR 5). The entrance to shooting range is approximately 1 mile on the right.

For additional information pertaining to Dents Run Wildlife Management Area and the shooting range, please contact the Farmington District 1 DNR Office at 304-825-6787.

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