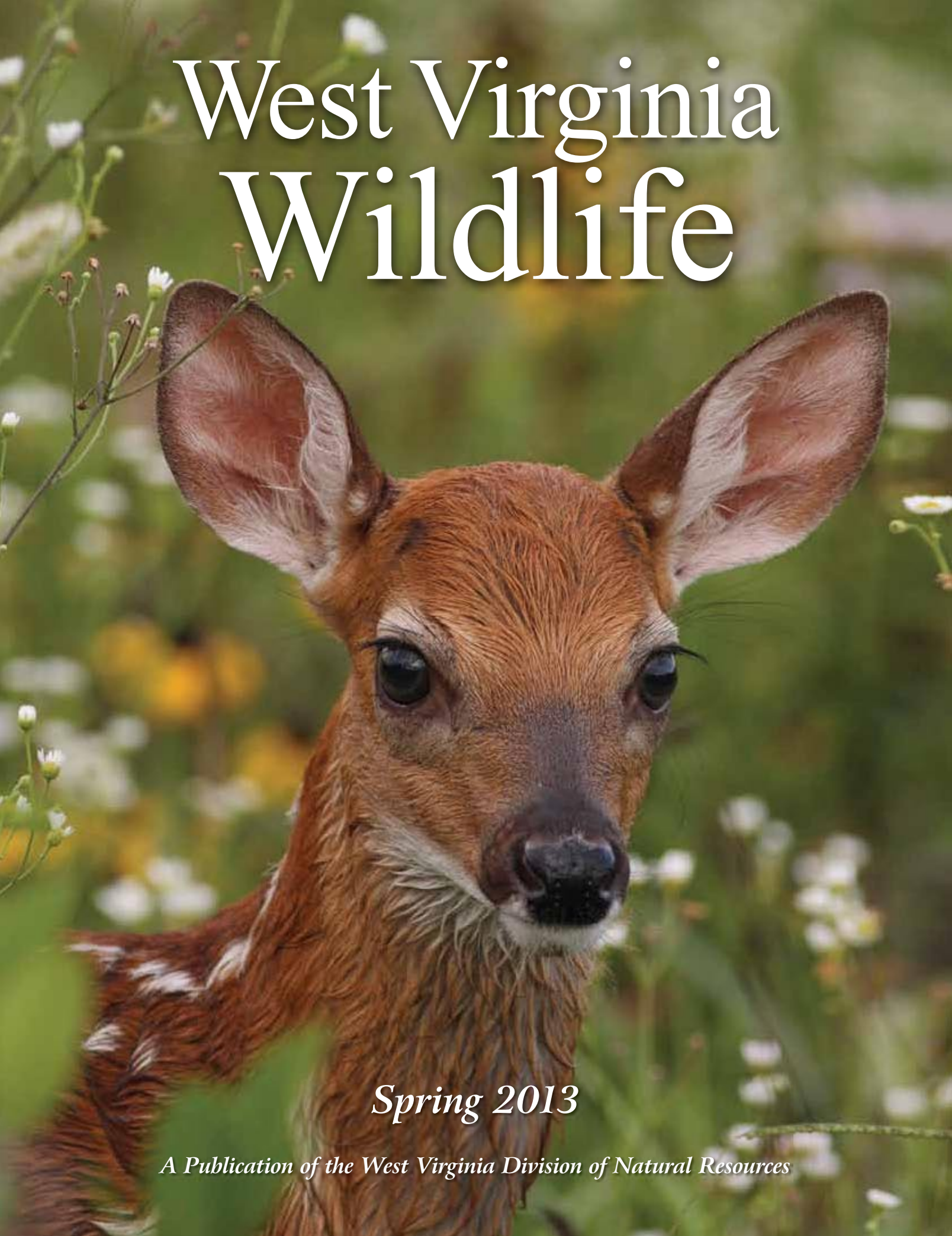
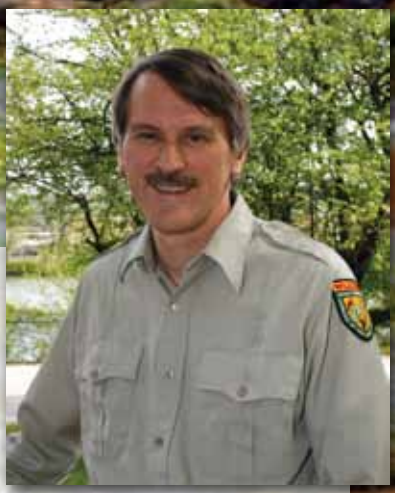


West Virginia Wildlife

Spring 2013

A Publication of the West Virginia Division of Natural Resources

Wild Perspective



Clean Stream Access – It Depends on You

A couple decades ago, the U.S. Department of the Interior initiated a campaign called Take Pride in America, encouraging the public to volunteer to take care of the public lands that in essence belong to all of us. At the time, Tom Blackbird, an employee of the U.S. Soil Conservation Service (now called the Natural Resources Conservation Service) who was stationed in Wheeling, West Virginia, composed a song called "Take Pride in America – Litter-ally." The song focused on the litter problem in the Mountain State, encouraging our residents to "lend a hand, pick up that can" as you roamed the beautiful hills and valleys of West Virginia. Having been to almost every other state, I can safely say that the problem is not limited to our state.

Scattered throughout the state along the numerous scenic streams and lakes are hundreds of public access sites, available for free to those interested in fishing or boating. The access sites are mainly created by the Division of Natural Resources, often in partnership with other state and local governments or federal natural resource agencies. Unfortunately, not all those who use the areas care about what they leave behind. Maybe it's because it's not their private property, or maybe that's what they do on their own property. Either way, it not only looks ugly, the litter left behind can harm wildlife species. During my career, I've tried to catch waterfowl with plastic six-pack can holders stuck around their necks or fishing line wound tightly around their legs, cutting into their skin. Broken glass may injure wildlife or humans using the sites.

It should be obvious to anyone who takes a minute to think about it, there is no way the DNR or any other agency who maintains a public access site can clean up the site every day. DNR has primary responsibility for cleaning public fishing and boating access sites, but a number of these facilities are maintained by local governments or in partnership with other organizations. Although the sites are maintained regularly, it only takes one uncaring user to trash an area. Keeping these areas clean really depends on everyone who uses the sites. The majority are anglers and boaters, but others use the areas for unintended uses such as tubing, a secret rendezvous, a picnic site, or party spot.

Please spread the word – *leave nothing but a good impression* for those who use the site after you. Thanks for your valuable help in keeping West Virginia clean.

Art Shomo

Art Shomo, *Editor*

West Virginia Wildlife

U.S. Fish and Wildlife Service/ Eric Engbretson

Largemouth bass

20

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Features

Photo by Jennifer Anderson @ USDA-NRCS PLANTS Database

Photo by Janet Clayton

Photo by WV Dept. of Commerce/Steve Shaluta

Departments

Covers

Front Cover: Fawn – *Thomas Kirkland*

Inside Front Cover: Elk Springs, Elk River – *WV Dept. of Commerce/Steve Shaluta*

Back Cover: *WV Dept. of Commerce/Steve Shaluta*

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Dave McClung

Fields of native warm-season grasses planted at McClintic WMA provide food and excellent cover for various wildlife species.

warm-season Grasses

a declining habitat in West Virginia

By Lee Haggerty

You may start by asking yourself, "What are warm-season grasses?" Well, that's simple. They are a group of bunch grasses that do their active growing during the hot summer months and become dormant during the cool seasons. This varies greatly from cool-season grasses which do their active growing during the cool seasons of spring and fall but are dormant during the summer.

Warm-season grasses (WSGs) are native to West Virginia and were once the dominant grass species in much of the region. Many factors have led to their decline. One of the major problems has been the introduction of cool-season grasses (CSGs), such as fescue and orchard grass. Other factors include adverse farming practices, suburban development, and the suppression of fires.

WSGs are beneficial to numerous species of birds and small mammals. Also, many reptiles and insects use WSGs during some portion of their life cycle. They provide loafing, foraging, dusting, brood rearing and escape cover from predators. These grasslands also produce an abundance of seed, insects and small rodents that are eaten by a variety of wildlife such as song birds, quail, pheasant, turkey, foxes and hawks. These habitats provide a basis to a very complex food chain.

Comparison of growth form of fescue, a cool-season grass (on left) and the warm-season switchgrass. Notice the "bunched" roots of the switchgrass which allow small mammals and birds to escape predators, such as the gray fox (top right).

Photo by Mark Shock

Don't get me wrong. Warm-season grasses do not create your typical food plot. Some people may even say they are not a food plot at all. This is somewhat true; however, it depends on what type of animal you are trying to feed. What they do provide is excellent cover which is often the missing component on most properties. Think about it. How much cover do you think an open wood lot or a field of CSGs, which has just been flattened by winter snow, provide a rabbit trying to escape a fox? You've got it – very little or none.

A big advantage warm-season grasses have over cold-season grasses is their growth form. Since they grow in clumps, space is left open on the ground between the clumps, if they are not planted too dense. This allows small mammals such as rabbits and birds, including turkey poults, the ability to be mobile in what most people would think of as a grown-up field. The main diet of a young turkey poult is insects. Poults need high levels of protein in their diets for proper growth and development. Warm-season grasslands provide this essential element needed by a young turkey. CSGs can have high numbers of insects as well, but due to restricted mobility of the poults in the thick cover, this food source may be unavailable to the young poults.

Nesting habitat can also be greatly increased by planting WSGs. Every clump has the potential to be a nest site. Birds and small mammals will use the dead leaves from the previous year's growth to construct and line their nest. Many WSGs will remain standing all winter into the next spring. This is especially important to many species of field-nesting birds that nest above the ground in these standing stems. Some of these include Henslow's sparrow, field sparrow and indigo bunting. While a sparse stand will allow better mobility, it will not provide premium nesting habitat.

Warm-season grass fields provide excellent cover for larger animals as well. Deer will readily use these fields, especially during the spring fawning season. Anyone who has mowed a tall grass field in early summer knows how much a doe loves to hide her fawn in them. Farmers are especially aware of this. A fawn can be nearly impossible to see in a field of WSGs. Their tan fur blends in perfectly with the thatch from last year's growth. A fawn's ability to hide is essential to its survival. With coyote, black bear and bobcats living in the Mountain State, a fawn has to have both good camouflage and an excellent place to hide to be able to survive.

The size of the grassland plays a role in which types of wildlife you will attract. Small grasslands less than five acres are used by deer and rabbits, whereas some species such as the bobolink and meadowlark need large grasslands of 20 acres or larger in size. More important than the actual size of the field is its proximity to other suitable habitat. You may plant a two-acre WSG field that provides quality habitat for rabbits, but if it is not in close proximity to some other early successional habitat you may not see an increase in the population. Predators are able to zero in on these small parcels of high quality habitat, and predation is likely to increase. If you are limited to the size of the WSG field you can plant, brush borders will greatly increase the quality of habitat on your property and will complement your WSG field. Brush borders provide additional cover and browse.

Many farmers who want to promote wildlife could also benefit from warm-season grasses without giving

Six commonly planted native warm-season grasses in the mid-Atlantic region are:

- little bluestem
- big bluestem *(on left)*
- switchgrass *(on right)*
- indiangrass
- sideoats grama
- eastern gamagrass

Seeds for these grasses usually can't be bought locally but can be purchased from wildlife seed supply companies.

David McClung

Warm-season grasses left standing over winter provide cover for wildlife even when weighed down by snow.

Josh Allison

up cropland or pasture. This can happen in a variety of ways. One way would be to convert part of their pasture lands over to WSGs. Many WSGs are highly palatable and highly nutritious to cattle.

As we already know, WSGs grow in the hot summer months when CSGs are dormant. By doing this, CSG fields can be pastured in the spring. Then when it gets hot and cool-season grasses stop growing, cattle could be moved to WSG fields, and then rotated back to CSG pastures in the fall. This will increase pasture yields and allow farmers to pasture their cattle longer into the fall/winter without supplemental feeding. This will lower feed costs and operating costs. Another way for farmers to promote wildlife without sacrificing cropland would be to plant waterways, hillsides and less productive areas in WSGs. WSGs are adapted to grow on less productive soils and often do very well in areas where row crops are unable to grow.

Early successional habitats have been declining for years, especially warm-season grass fields. As a result, animals that benefit from these habitats have been on the decline. So often you hear people wanting to blame the disappearance of small game on predators, but predators have always been here. It's not hard to see what is missing when you go out on almost any farm or country side in West Virginia. We do not have the early successional habitats that we once had. Small farms littered the Mountain State in the early 1900s. But these farms were not managed like the farms of today. Farms were not intensively managed to use every inch of the land for crop or pasture production and most farmers planted some type of small grain. Farm equipment either was not available or what was available was not as efficient as the equipment today. Consequently, more grain was left for wildlife.

Timbering practices have also changed. In the early 1900s nearly all of West Virginia was clear cut. This had many negative effects on the environment, but one thing it did do was provide an abundance of early successional timber habitat for years to come. The term "clear cut" to most people today is a bad word and they don't want any part of it. But with research and advancements in technology, clear cuts have proven to be environmentally friendly and can benefit many species of wildlife.

If we want to promote small game, maybe we should look to the past and ask ourselves, "What is different today as opposed to 75 years ago when small game flourished?" One prime part of the solution is for private landowners and public land managers to plant more fields of warm-season grasses.

Lee Haggerty is a former wildlife manager with the DNR Wildlife Resources Section.

Field Trip

Stonewall Jackson Lake Wildlife Management Area

Description: Stonewall Jackson Lake Wildlife Management Area, located just off I-79 in Lewis County, consists of an impressive 18,289 acres, including the 2,650-acre Stonewall Jackson Lake. The upland habitats consist of mixed hardwoods with brushy edges and several hundred acres of maintained clearings on rolling hills. This terrain attracts white-tailed deer, wild turkeys, rabbits and squirrels. Class Q hunting access is provided. Stonewall Jackson Lake provides habitat for some waterfowl, including Canada geese, wood ducks and mallards. Careful observers might also see river otters, muskrat, beavers and mink in and around the lake.

Largemouth bass, bluegill, carp, channel catfish, crappie, muskellunge, and walleye live in the lake, the second largest in West Virginia. The lake is noted for its outstanding black bass fishery, which is currently under a catch-and-release regulation, and its musky fishery. DNR personnel stock the tail waters with trout once in February, and every two weeks from March through May. The lake has four boat ramps and one carry-down access. Physically challenged anglers who wish to fish in the tailwaters can use a pier maintained by the U.S. Army Corps of Engineers, while those who want to fish in the lake can use a pier at the marina in the state park.

Viewing information: Visitors to Stonewall Jackson Lake WMA can observe numerous species of birds year-round. Among them are: great blue heron; downy, hairy and pileated woodpeckers; Eastern bluebird; common raven; cedar waxwing; Carolina chickadee; red-winged blackbird; Eastern meadowlark; and American goldfinch. Birds of prey seen on the area include the osprey, red-shouldered hawk and bald eagle. Summer residents and fall and spring migrants include the yellow-billed cuckoo, Eastern wood-pewee,

WV Dept. of Commerce/Steve Shaluta

The expansive lake is a popular destination for anglers.

Eastern kingbird, white-eyed and red-eyed vireo, tree swallow, cliff swallow, barn swallow, blue-gray gnatcatcher, wood thrush, common yellowthroat, ovenbird, Louisiana waterthrush, cerulean warbler, blue-winged warbler, Kentucky warbler, hooded warbler, American redstart, prairie warbler, field sparrow, scarlet tanager and indigo bunting.

The fields provide habitat for a variety of butterflies including the monarch, pearl crescent, meadow fritillary, great-spangled fritillary, eastern tailed-blue, spring and summer azure, various skippers and others. Swamp darner, black-shouldered spinyleg, common blue darner, blue-tipped dancer, ashy clubtail, dragonhunter, and wandering glider are some of the dragonflies that might be seen around Stonewall Jackson Lake.

Nine species of common salamanders such as the spotted, slimy, Northern spring, and marbled live on the area. Knowledgeable observers might see the uncommon green salamander. Among toads and frogs, a searcher could find the Eastern American toad, Fowler's toad, spring peepers, gray treefrogs, mountain chorus frog, bullfrog, green frogs, and pickerel frogs.

Turtles of the area include common snapping, box, map, stinkpot, and eastern spiny softshell. Lizard lookers might see Northern fence lizards and five-lined skinks. Visitors interested in snakes should look along the lake shoreline for the queen snake and Northern water snake. Snakes more likely to be seen on land include the Eastern garter, Eastern hognose, Northern ringneck, Northern black racer, black rat, Eastern milk, Northern copperhead, and timber rattlesnake.

Directions: The WMA can be accessed several ways. From I-79, take exit 96, turn onto state Rt. 30 south. This takes you right past the dam turnoff. You can also take exit 91 off I-79, turn south on U.S. Rt. 19, past the State Park turnoff and either stay on Rt. 19 or turn onto state Rt. 44. If you're traveling from the east on U.S. Rt. 33 from Buckhannon, you can take state Rt. 15 (Georgetown Rd.) past Stonecoal Lake to reach the eastern part of the WMA.

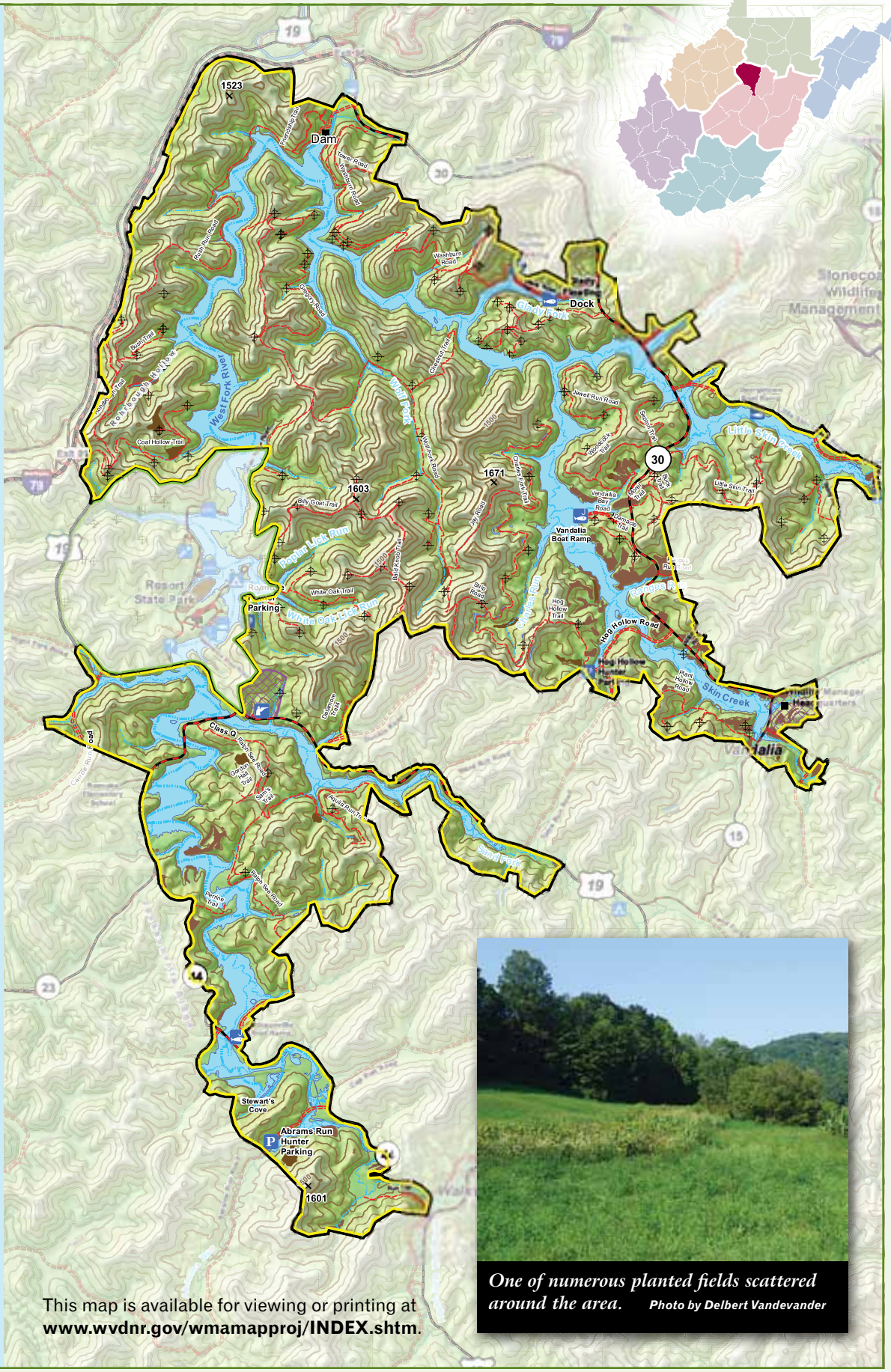
Note: Stonewall Jackson Lake WMA is a public hunting area. Please check the current West Virginia Hunting and Trapping regulations or call the DNR office listed below for hunting season dates.

Camping: Camping is not permitted on the WMA, but the adjacent Stonewall Resort, located on a state park, has 40 RV campsites. Call 304-269-8889 for more information.

Shooting: A 300-yard rifle range with 10 covered shooting benches is located on U.S. Rt. 19 south of the state park entrance.

Ownership: US Army Corps of Engineers (304-765-2816 or 304-765-2705) manages the dam and water level in the lake; West Virginia Division of Natural Resources (304-924-6211) manages the WMA.

Contacts: Marina: 304-269-8895; Lake Conditions: 304-269-7463; Resource Manager: 304-269-4588.



This map is available for viewing or printing at **www.wvdnr.gov/wmamapproj/INDEX.shtm**.

One of numerous planted fields scattered around the area. **Photo by Delbert Vandevander**

Mussel Restoration in West Virginia Streams

Story and photography by Janet L. Clayton

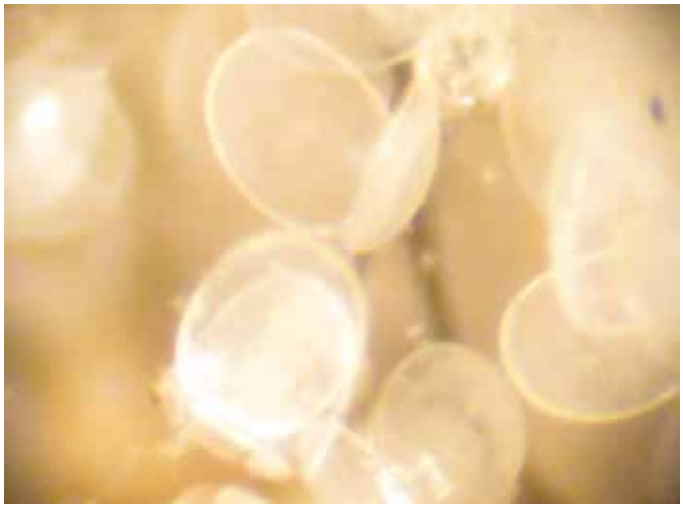
Biologists have identified 62 mussel species living in West Virginia. Just as the canary was historically an indicator of clean air in our coal mines, mussels are indicators of clean water in our streams. Mussels depend on clean water to provide them with food and oxygen, and stable stream bottoms to provide sure footing. At the same time, mussels help filter water in our streams. It has been estimated that 100 mussels can filter 500 gallons of water per day. A bed containing 200,000 mussels can filter one million gallons of water per day – free of charge. Imagine how much money we could save in water treatment costs if our native mussel communities were restored?

As mussels filter water, removing the oxygen and food they need, particulate matter the mussels don't eat is bound up and expelled as pseudofeces that becomes available as a food source for other aquatic life living on the stream bottom. The large muscular foot mussels use to hold themselves in place helps to stabilize the stream bottom, and also to loosen it, again benefiting other aquatic life.

Mussel populations nationwide have been declining in recent years, and those in West Virginia are no exception. Many of West Virginia's mussel populations have been impacted by acid mine drainage (AMD), other poor water quality conditions, and habitat loss. Since the late 1990s, West Virginia has had six significant mussel kills. The most significant of these were the kill on the Ohio River downstream of Parkersburg in 1999 and the complete kill of Dunkard Creek in Monongalia County in 2009. Since 2006 the DNR Wildlife Resources Section (WRS) has been working to restore lost populations. This is a difficult process because mussels have a precarious life cycle. The young must first attach to a fish, or in one known case a mudpuppy, and go through a metamorphosis (change in form) before they drop off, hopefully in suitable habitat, to begin their typically sedentary lifestyle.

Female pocketbook mussel attempts to attract a fish host with its minnow-like lure which is an extension of its mantle. Note the swollen gills (segmented sections between the two black dots) containing mussel larvae. This is typical of long-term brooders.

Mussels brood their young, known as glochidia, in pockets within their gills and have three main strategies to get them attached to a host. One group of mussels are generalists that disperse their larvae into the water column, chancing that the larvae come into contact with the correct species of fish host. Some



Mature Washboard mussel glochidia (larvae). The two valves of mature larvae uiver and partially close and open. When they come into contact with fish slime, they clamp shut. These larvae are smaller than salt crystals.

mussel species can attach to many different species of fish, while others can only use one species as a host. A second group of mussels release packets of glochidia, called conglutinants, that resemble some fish food item, such as a maggot. Ideally, the correct host fish will come along and bite down on the conglutinant, breaking it open and releasing the glochidia. A third group of mussels have modified mantle flaps that mimic some type of food for the fish host, such as a minnow-like lure. One example is the pocketbook mussel. The host comes down to what it assumes is an easy meal, and when it attempts to bite the lure, the mussel shoots out a cloud of glochidia, which attach to

WRS biologist Mike Everhart collects a bag of mussels from the Allegheny River in Pennsylvania. Allegheny River mussels have been relocated to help restore lost populations in the Monongahela, Ohio and Elk rivers in West Virginia.

WRS biologists Mike Everhart and Dave Wellman place mussels collected from the Allegheny River into trays for transport to the Monongahela River above Morgantown. The trays allow water to circulate around the mussels and allows mussels to extract oxygen from the water during transport.

WRS personnel have constructed a specialized mussel hauling tank which has shelves in which bags of mussels can be laid out. This eliminates the need for trays and reduces handling of the animals.

the host and absorb nutrients from the fish.

Mussels employ two main brooding strategies. In short-term brooders, the period from egg fertilization to larval dispersal occurs over a short period. Gravid females (having mature larvae) can be found generally during a period of less than a month. With long-term brooders, gravid females can be found during a period of several months, including over winter. Historically, most propagation efforts by biologists have involved long-term brooders because it is much easier to collect gravid females with mature larvae. Short-term brooders have to be observed over a period of time to find them at peak gravid condition. This condition is related mostly to stream temperature which has not been documented for most species, and which can fluctuate greatly depending on weather conditions. Gravid individuals are also more difficult to handle because they tend to readily abort their larvae when stressed. Recent research shows that glochidia that attach to a host within 24 hours of release have the best transformation success rates. For this reason, it is best to have the fish and mussels nearby when extracting the glochidia so that they can be attached to the host fish as soon as possible.

Short-term brooders when gravid, like these pimplebacks, don't have the heavily swollen gills like the long-term brooders, making extraction of the larvae difficult. As a result, many more individuals are needed to obtain the desired number of larvae. Initial efforts by the WRS in short-term brooder propagation involved stressing the mussels by cooling and warming the water which causes them to abort their larvae. If the larvae were determined to be mature, fish were then inoculated with larvae. More recently, biologists have begun collecting larger batches of mussels after they have been determined to be holding mature larvae and allowing them to release the larvae naturally. These mussels are held at the Belleville Complex, monitored daily, and as mature larvae are released, host fish are infested. Release of mature larvae may occur over a few days to a few weeks. The number of fish infested is determined by the number of larvae released.

Mussels coming into West Virginia go through a two-week quarantine at the Belleville Complex to minimize chances of disease and parasite transmission.

Federally endangered Northern Riffleshell mussels, are being stocked by WRS and U.S. Fish and Wildlife Service personnel into the Elk River. Mussels were tagged so they can be electronically monitored, even if buried in the substrate. The transmitter can be seen attached to the mussel in the photo at left.

Relocation

The easiest method to restore mussel populations is relocating adult individuals from an existing population. This provides sexually mature individuals which naturally repopulate the new area. This method has several drawbacks, however. First, it "robs Peter to pay Paul," as there is no net gain of mussels. Additionally, stealing mussels from the existing population may permanently harm that population. Second, given the intricate life cycle of mussels, the population will probably take decades to recover even if reproduction is successful. There are advantages to relocating at least a few individuals to allow limited natural reproduction to begin immediately, while additional mussels are bred artificially for stocking. Biologists believe that stocking adult mussels also improves the stream bottom for juvenile mussels. Many times while conducting mussel surveys, biologists have found juveniles taking advantage of the loosened substrate around the adult mussels in order to bury themselves.

In 2006, Wildlife Resources Section biologists conducted the first mussel restoration attempt in West Virginia in cooperation with the Pennsylvania Fish and Boat Commission and the U.S. Fish and Wildlife Service (USFWS). Mussels were salvaged from the Allegheny River in Pennsylvania where they needed to be relocated as the result of a bridge demolition project. Over a period of several years, mussels were moved to re-establish populations in the Monongahela River (which was historically impacted by acid mine drainage), the Ohio River (following the massive mussel kill in 1999), and the Elk River (which has had a loss of mussel diversity from historic levels).

West Virginia currently has nine mussel species listed as federally endangered. In order for a species to be removed from the endangered species list, viable reproducing populations must be re-established. In September 2010, in cooperation with the USFWS and Kentucky Department of Fish and Wildlife Resources, WRS biologists received 400 individuals of the federally endangered fanshell mussel. These were stocked into two locations; one on the Kanawha River

Glochidia can be flushed from the gills of long-term brooders such as this fatmucket mussel. This is done by puncturing the gill and then flushing it with water.

The host fish, in this case fingerling largemouth bass, are being infested with larval mussels. The water/glochidia mixture is aerated during the process to keep the glochidia suspended in the water to increase chances they will attach to the host fish.

Mike Everhart

below Kanawha Falls, and one on the Ohio River at Muskingum Island. Both locations already had small numbers of reproducing fanshells, and it is hoped that the added broodstock will allow for increased reproduction and expansion of this species. In 2012, again working with the Pennsylvania Fish and Boat Commission and the USFWS, Wildlife Resources Section biologists collected 200 endangered northern riffleshell mussels from another bridge demolition project and augmented the existing population in the Elk River. Both of these projects are part of much larger multi-state restoration efforts.

Freshwater drum were used as hosts for the pink heelsplitter as part of the Dunkard Creek restoration efforts. Because there were fewer large fish, infestations were conducted by inoculating the glochidia directly onto the gills on one side of the fish as seen here by WRS mussel biologist Janet Clayton. The infested fish were then stocked directly into Dunkard Creek.

Photo by Dave Wellman

Propagation

As part of the Ohio River Restoration Project, WRS personnel are working with The Ohio State University, White Sulfur Springs National Fish Hatchery, and the Ohio River Islands National Wildlife Refuge to propagate mussels for restoration of the area killed by the 1999 toxic event. While Ohio State University and the national hatchery have facilities to actively propagate mussels, Wildlife Resources Section biologists are conducting some propagation efforts by inoculating fish hosts with mussel larvae. They then placed the fish in cages long enough to allow the juvenile mussels to transform and fall off into trays (called cage culturing), or they release the fish directly into the stream to be restored. The WRS provides fish to the White Sulphur Springs hatchery for their propagation efforts, and, with help from national wildlife refuge

For the Ohio River Restoration Project, infested host fish are caged until the mussel larvae mature and fall to the bottom of the cages. Initially most of the caging was conducted at Stonewall Jackson Lake where the cages were suspended under the marina docks. Here WRS biologists Scott Morrison and Mike Everhart place inoculated fish into one such cage.

Photo by Pam Glasser

Mussel cages are checked in the spring following infestations. Here juvenile fat muckets at Stonewall Jackson Lake in May 2011 still have byssal threads which are single protein strands that they use to hold onto the substrate. At this point the mussels are combined into fewer cages to let them grow large enough to tag, as seen in these 17 month olds. As the mussels grow, they lose the byssal thread and rely on the large muscular foot to maintain position in the stream bottom. These mussels are tagged and ready for stocking into the Ohio River restoration area. Mussels are tagged so that propagated mussels can be distinguished from mussels that are the result of natural reproduction during future monitoring efforts.

The main restoration efforts on Dunkard Creek consists of releasing inoculated fish directly into the creek. WRS biologists Janet Clayton and Mike Everhart conducted the first fish stocking on Dunkard Creek in March 2012. They stocked bluegill inoculated with fat mucket, giant floater, and creeper larvae near Blacks Run.

personnel, spends numerous hours collecting gravid female mussels for all these propagation efforts. More recently, Genoa National Fish Hatchery and Tennessee Technological University have also provided assistance with propagation.

Wildlife Resources Section biologists expanded mussel restoration efforts in 2012 when they began active restoration of Dunkard Creek in Monongalia County. A complete mussel kill occurred in 2009 within the entire length of the stream, which included nearly 14 miles in West Virginia as well as additional miles in Pennsylvania. Mussels and fish died as a result of poor water quality conditions that led to a toxic golden algae bloom. Initial efforts consisted of inoculating and releasing host fish. In the near future, WRS biologists plan to find sources of adult mussels that can be relocated into Dunkard Creek.

Janet Clayton is a wildlife biologist with the DNR Wildlife Resources Section stationed in Elkins.

Evaluation and Assessment

In 2012, after five years of active restoration on the Ohio River, WRS and USFWS personnel conducted an assessment of the main restoration area. The results were very promising.

Mike Everhart

In 2008, Mitch Osborne (USFWS) and WRS mussel biologist Janet Clayton ready to make the first stocking of mussels produced by the WRS into the restoration area on the Ohio River in Wood County.

Mussels are recovering within the kill zone on the Ohio River. These are washboard mussels collected from the main restoration area during 2012 monitoring surveys. The top mussel is approximately seven years old based on the growth rings, believed to be similar to the growth rings on a tree. The bottom two mussels are in their second year.

Nine of the 21 species of mussels observed during the 2012 restoration monitoring. They include black sandshell, pink heelsplitter, butterfly, paper pondshell, pimpleback, threehorned wartyback, mapleleaf, fragile papershell, fanshell and fawnsfoot. It is believed that at least 15 species are now naturally reproducing.

Wildlife Diversity Notebook: Spring Peeper

By Karen McClure

Common Name: Spring Peeper

Scientific Name: Pseudacris crucifer

West Virginia Status: Common

Description: The spring peeper is a small, tan to gray frog which usually has an -shaped darker brown mark on its back. Females are larger than males, possibly reaching 1 inches long. Males are close to to one inch long. Both sexes have small toe disks. Males have enlarged thumbs, used during egg fertilization.

Habitat: Spring peepers live in wooded areas, but are most often noticed when they come to temporary puddles or vernal pools in late winter and early spring to sing and reproduce. These frogs are known to hop along the forest floor, and hide under the leaf litter, not in trees like "treefrogs." Spring peepers are so well camouflaged and quiet when not singing that they go unnoticed by the average hiker.

Diet: Like all frogs in West Virginia, spring peepers are carnivores, eating a variety of invertebrates, mostly spiders, ants and beetles. Spring peepers are not known to eat aquatic species, only terrestrial organisms.

Range: Spring peepers live in the eastern half of the United States, except for southern Florida. They also live in southeastern Canada. In West Virginia, spring peepers live throughout the state.

Life History: In spring, when the temperatures and photoperiods (length of days and nights) are just right and a good rain comes along, the males move downhill to find a pool of water, sometimes singing on the way. This pool can be a permanent pond, a puddle, or a roadside ditch. Males sing individually or in small to large choruses, depending on the local population size. These calls, which many mountaineers love to hear as a sign of spring, lure females out of the relative safety of the woods. Males are more abundant than females at the pools at any one time.

Tom Allen

The darker brown " -shaped mark on the back is a key characteristic of the spring peeper.

Kieran Malley

As the females arrive, males fertilize the eggs which attach to plants under water. The females return to the woods after laying their eggs, while the males wait around for more females to arrive. The eggs hatch in a few days. The tadpoles, which are herbivores, transform into froglets (immature frogs) in about three months. Egg and larval development are dependent on temperature and rainfall. A warm, dry season will speed up the process, while a cool, wet one will slow it down, resulting in larger froglets.

Karen McClure is a public information specialist with the DNR Wildlife Resources Section stationed in South Charleston.

WEST VIRGINIA'S Big Game

By Steven E. Rauch

The sun was beginning to lighten the eastern horizon when the morning's first gobble thundered from the ridge above. A hunter set up about 100 yards from the old Tom. After a few seductive calls, the gobbler flew down from his roost tree. Anticipating the direction the gobbler might come from, the hunter shifted his position and shouldered the shotgun. The hunter's heart was pounding when the strutting "long beard" appeared just 25 yards away. The gobbler just needed to move from behind the tree trunk and then…

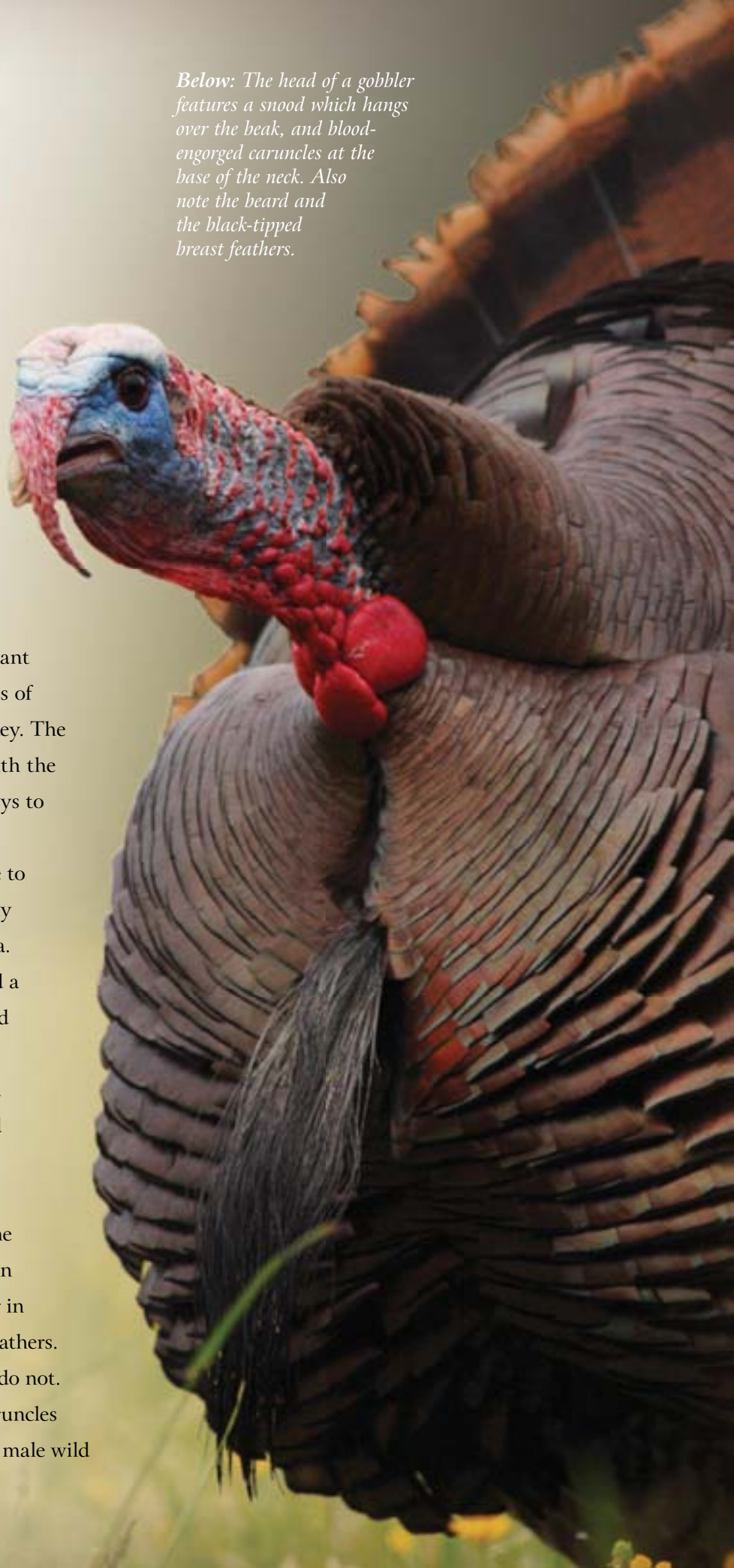
Similar scenes are repeated each year during the spring gobbler season in West Virginia; but this has not always been the case. Sound management practices and laws developed and enforced by Division of Natural Resources personnel, combined with hard work by hunters and conservation organizations over the past 75 plus years have contributed to getting the turkey population to where it is today.

Wild turkeys were abundant in the mid-1700s when the European settlers arrived. Although the settlers logged the forests, the abundance of wild turkeys continued until the advent of the steam engine making large-scale logging operations possible. The use of railroads increased access to forested land, making timber removal easier and faster. In addition, uncontrolled fires often followed logging activities. This combination spelled disaster for the wild turkey. The period between 1902 and 1925, the peak of logging activity in West Virginia, witnessed the lowest wild turkey populations. The wild turkey had become rare except in the most inaccessible mountain regions of West Virginia. Today, due to restoration efforts, the wild turkey once again lives throughout West Virginia, with all 55 counties reporting a spring gobbler harvest annually.

Restoration of the wild turkey in West Virginia has been the result of a combination of several factors, including the acquisition of state and federally owned lands, wildlife management practices, hunting regulations, maturing forests following wide-scale logging and public cooperation. Wildlife Resources Section (WRS) biologists have conducted turkey research for 50 years. The knowledge gained from these projects has helped them wisely manage this valuable resource. The first steps in wild turkey management began in 1903 with regulations that outlawed market hunting, baiting and trapping. Early efforts with restocking wild turkeys used pen-reared birds and were a complete failure. These turkeys lacked the ability to survive in the wild. With the development of cannon and rocket-launched nets, wild turkeys could be

Bird

Photography by Thomas Kirkland



Below: *The head of a gobbler features a snood which hangs over the beak, and blood-engorged caruncles at the base of the neck. Also note the beard and the black-tipped breast feathers.*

captured in areas with an abundant population and relocated into suitable habitat in other regions of the state. State and federally owned lands were very important for this period of restoration, providing areas of suitable habitat to re-establish the wild turkey. The trap-and-relocate program ended in 1989 with the successful moving of more than 2,200 turkeys to 32 counties across West Virginia.

Five sub-species of wild turkey are native to the North American continent. Of those, only the eastern wild turkey lives in West Virginia. The adult male wild turkey is typically called a tom or gobbler, and the juvenile male is called a jake. The female is called a hen. Several characteristics distinguish between the sexes. Toms are much larger than hens, and a beard hangs from the breast of male wild turkeys. Although hens can have a beard, it is usually shorter and thinner. The breast feathers of the male wild turkey are black tipped and have an iridescent appearance, while the hen is duller in appearance with tan- or buff-tipped breast feathers. Male wild turkeys have spurs, while females do not. Additionally, males have fleshy wattles or caruncles while hens do not. The head and neck of the male wild

A wary hen keeps a lookout while her poult feeds in a field.

turkey is primarily featherless, and during the spring will be colored red, white and blue. The hen's head is usually drab in color and will have feathers up the back of the neck onto the top of the head.

Two sexual characteristics discovered by WRS biologists decades ago, especially important to hunters, are the differences in foot size and shape of the droppings. The distance from the tip of the middle toe to the back of the heel is approximately four inches or longer in the male, while the female's is approximately four inches or less in length. The droppings of hens are usually curled and those of male wild turkeys are usually straight or J-shaped

Biologists distinguish the age of adult and juvenile (jake) male wild turkeys primarily by observing the tail feathers and the outermost wing feathers. The central tail feathers of a juvenile are longer than the outer tail feathers when the tail is fanned out. The adult's tail feathers are even or uniform in length when fanned out. The one to two outermost wing, or flight, feathers of the juvenile male are pointed and black towards the tips. The adults' flight feathers are rounded and the white bars extend to the feather's tips.

Wild turkeys are social birds, especially within the sexes. Hens flock together almost year around but will disband to prepare for breeding and nesting. In the fall, the young male birds tend to remain with the hen flocks until they separate to form their own flocks. Adult male wild turkeys form exclusive flocks and discourage younger males from joining them. Adult male wild turkeys don't associate with females except during the breeding season.

The diet of wild turkeys consists of a wide array of food items, which varies throughout the year. Turkeys eat numerous types of grass and forb leaves and seeds. They also consume many types of wild fruits and berries, including blackberry, dogwood, grape and cherry. During the warm months of the year, insects are important food items. This is especially true for the development of the poults, or young wild turkeys, during the summer. In the fall and winter, acorns and beechnuts are very important food sources.

Wild turkeys breed in the spring. In West Virginia, the second peak of gobbling and the peak of incumbation usually occurs during the fourth week of April, which is why the spring gobbler season opens on the fourth Monday of April. Gobblers establish breeding grounds and begin elaborate courtship displays to attract females. After the female has been bred, she locates a suitable nesting area to lay her eggs. Nests are commonly located under trees, in brushy patches, beside woodland roads, under treetops left after logging, or in abandoned fields.

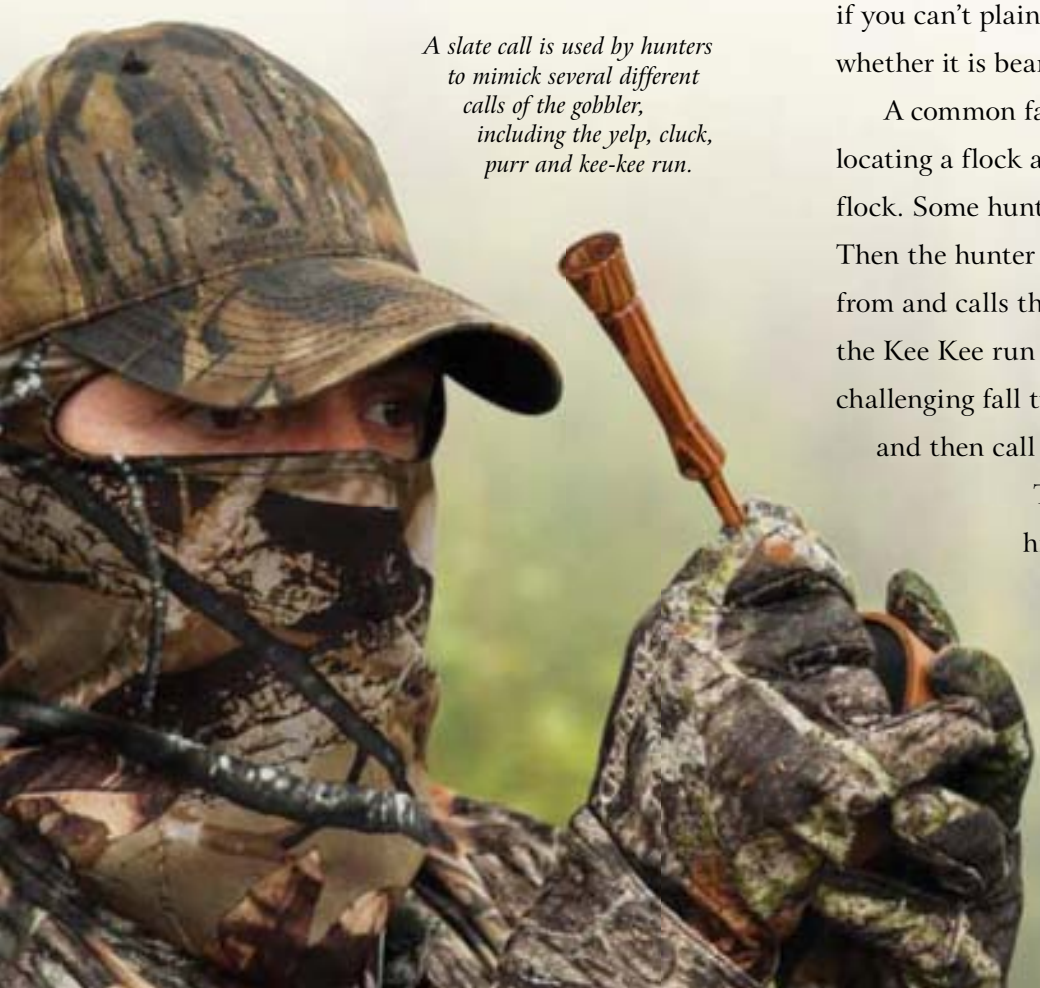
The hen lays a clutch of about 10 to 12 eggs over a period of approximately two weeks, with most hens laying one egg per day. Incubation lasts approximately 28 days. Disturbance of the hen during incubation may cause the hen to abandon the nest, so it is very important to quickly leave the area when a hen is flushed off her nest. All the eggs hatch at the same time. The wild turkey hatchlings are precocious and the poults are ready to leave the nest in a short period of time, usually about two days. This occurs in late May through June in West Virginia.

The first 30 days for the wild turkey poults are the most important for survival, with the first 10 to 14 days being the most critical time. Predators and poor weather, especially cold and wet conditions, can take a toll on the young birds during this period. The poults begin to fly well enough to escape predators when they are two to three weeks old. The poults will spend the next couple months feeding on insects in fields, pastures, road edges or similar habitat where the vegetation is tall enough to provide overhead cover, but not too thick to restrict movement. Insects provide protein essential for growth.

Wild turkeys are hunted in both the spring and fall in West Virginia. Regulated hunting is an important component of a sound turkey management program. Typically in the spring, a hunter will imitate the various calls of a hen and attempt to bring the male into range for a clean kill. Several types of calls are available, including mouth, box, slate, glass and push button to name a few. Even the wing bone of a wild turkey can be made into a very good call. Camouflage is important to conceal oneself when hunting, because the wild turkey has very good eyesight. Hunters should exercise extreme care when choosing a set-up location, however. For safety reasons the set-up location should be in open woods or the edge of a field, not in heavy brush. It is best to sit against a large tree or stump. Never, under any circumstance, shoot at a target that is not plainly visible. Remember that during the spring gobbler season only bearded birds are legal, so if you can't plainly see the turkey you can't determine whether it is bearded or not.

A common fall turkey hunting technique entails locating a flock and then deliberately scattering the flock. Some hunters use a well-trained dog for this. Then the hunter sets up where the flock scattered from and calls the flock back together by imitating the Kee Kee run call of a lost poult. One of the most challenging fall turkey hunts is to scatter adult gobblers and then call one back into shooting range.

The next time you're hunting or hiking, or just driving down the road and see a wild turkey flock, take the opportunity to reflect on the restoration success of West Virginia's big game bird.



A slate call is used by hunters to mimick several different calls of the gobbler, including the yelp, cluck, purr and kee-kee run.

Steve Rauch is the District Wildlife Biologist stationed in Farmington.

Fishing for Fun

Background:

Many West Virginians fish and can identify some of the fish they catch. For more of a challenge, learning to identify fish when they are in the water can be lots of fun. The following fish identification cards will help the beginning (and sometimes experienced) angler learn how to correctly identify four of the most common fish caught in the Mountain State.

Objectives:

Beginning anglers have fun learning how to identify commonly caught fish, and learning more information about the fish living in West Virginia.

Method:

Cut out and use the fish cards to identify common species, and learn about these species. Then, go fishing to see if you can catch any of the featured fish.

Materials:

Fish cards, fishing equipment, ruler, pencil, journal (optional), fish scale (optional)

Fish online:

- Commemorate catching a first fish with a cool certificate at: wvdnr.gov/Fishing/First_Fish.shtm
- Catch a whopper? You might qualify for a trophy fish citation. Visit this link for details: wvdnr.gov/fishing/TroFishCitPrgm.shtm
- Want to learn about more fish? Check out: wvdnr.gov/fishing/sport_fish.asp
- Want to know all of the records for largest fish caught in the Mountain State? See: wvdnr.gov/fishing/Regs13/State_Records.pdf
- For license information, go to: wvdnr.gov/fishing/license.shtm

WV Dept. of Commerce/Steve Shaluta

What to do:

1. Cut out and read the fish identification cards. Look at the map of West Virginia to see where each species lives. Figure out which fish live in your area.
2. Plan a fishing trip. Make a list of what you will need, including clothing, shoes, equipment, bait, snacks, water, and license for anyone 15 or older who will be fishing or handling fishing equipment or bait.
3. Look on a map to see where you will be fishing.
4. Check the weather forecast to make sure you dress appropriately, and that lightning will not be an issue.
5. Go fishing! Note in your journal the fish you caught. A data sheet might have the following information: date, time, location, temperature and precipitation. For each fish caught, you might want to note: species, length, weight, and where you caught it (near shore, far from shore, near vegetation, open water), and what lure or bait you used.
6. As you are fishing, see if you can tell the different species of fish apart while they are still in the water.

If you don't catch any fish, enjoy being outside, noticing all the sights and sounds of other kinds of wildlife. You might even see some fish in the water that you just can't catch.

Channel Catfish

Scientific Name:
Ictalurus puntatus

Length: Up to 40.3 inches.

Weight: Up to 33.42 pounds.

Key Features:
Barbells, or "whiskers", fleshy adipose fin behind dorsal fin, forked tails, and spots along their sides.

Habitat: Deep waters in rivers and lakes.

Facts:
Catfish spawn in hidden places, like under rock ledges or in hollow logs.

Distribution: All major river systems in West Virginia.

Bluegill

Scientific Name:
Lepomis macrochirus

Length:
Up to 13.75 inches

Weight:
Up to 2.75 pounds

Key Features:
Small, dark "ear" fin, dark spot at back of dorsal fin.

Habitat:
Streams, ponds or lakes with dense aquatic vegetation.

Facts: Male bluegills build and defend nests.

Distribution:
All major river systems in West Virginia.

Largemouth Bass

Scientific Name:
Micropterus salmoides

Length: Up to 25.75 inches.

Weight: Up to 12.28 pounds.

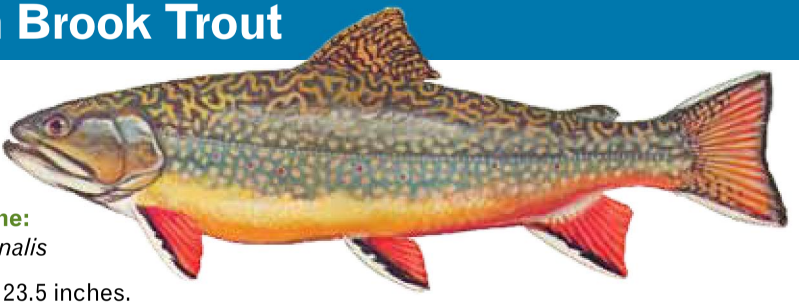
Key Features: Mouth extends beyond eyes to each side.

Habitat: Clear, slow water with underwater plants.

Facts:
A largemouth bass nest can be under water 90 feet deep.

Distribution: All major river systems in West Virginia.

Eastern Brook Trout



Scientific Name:
Salvelines fontinalis

Length: Up to 23.5 inches.

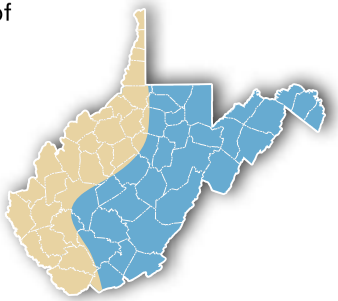
Weight: Up to 7.6 pounds.

Key Features:
Fleshy adipose fin behind dorsal fin. White bars in front of bottom fins.

Habitat: Clear, cold, fast-moving streams.

Facts:
The brook trout is West Virginia's only native trout, and our state fish.

Distribution: Naturally reproducing populations limited to Eastern mountain counties; stocked in a majority of counties.



Bluegill

Lepomis macrochirus

WV Dept. of Commerce/Steve Shaluta

Channel Catfish

Ictalurus puntatus

WV Dept. of Commerce/Steve Shaluta

Eastern Brook Trout

Salvelines fontinalis

U.S. Fish and Wildlife Service/Eric Engbretson

Largemouth Bass

Micropterus salmoides

WV Dept. of Commerce/Steve Shaluta

DNR Wildlife Resources Asks Public to be on the Lookout for Asian Carp

DNR Wildlife Resources Section officials are asking the public to keep an eye out for invasive Asian carp which are native to eastern China. They were introduced into the United States for use as biological control in aquaculture ponds and wastewater treatment facilities. They escaped into the Mississippi River Basin, and now pose a threat to West Virginia's aquatic ecosystems. They are well-suited to the climate in the Ohio River basin. Biologists expect that Asian carp could disrupt the food chain that supports the native fish of the Ohio River basin.

U.S. Fish and Wildlife Service/Colby Wrasse

Asian carp: bighead (top) and silver

While not yet established in West Virginia's waters, two species of Asian carp, the silver and bighead carp, pose the greatest threat. These fish grow quickly and can weigh up to 100 pounds. They are also highly prolific, producing up to one million eggs. In states where they have become established, Asian carp make up as much as 90 percent of the total mass of living things in the entire fish community.

They are also voracious feeders. Their diet consists of plankton, aquatic vegetation, aquatic insects and native fish larvae, which puts them in direct competition with native mussels, other filter feeders such as the paddlefish and bigmouth buffalo, and plankton-eating forage fishes like the gizzard shad, threadfin shad and emerald shiner. Nearly all fish feed on zooplankton at some point in their life cycle, thus the potential exists for an adverse effect on all fishes in the Mississippi and Ohio River basins.

Additionally, silver carp pose a direct threat to human health due to their propensity to leap up to 10 feet out of the water when disturbed by the sound and vibration of boat motors, posing a threat to boats, personal watercraft and their passengers.

The West Virginia section of the Ohio River is close to the leading edge of invasion of the bighead and silver carp, and it is important that we work toward slowing their advances, potentially stopping their invasion into West Virginia waters.

The DNR has begun monitoring efforts employing both targeted sampling and eDNA sampling to determine the extent to which these fish have proliferated in West Virginia waters. For more information on Asian carp or to report a suspected sighting, go to the DNR website at: wvdnr.gov/Fishing/Asian_Carp.shtm.

2013 WV Wildlife Calendar Correction

The 2013 West Virginia Wildlife Calendar has a few errors that hunters need to note. In 2013, the buck gun season will begin on November 25, not on November 18 as listed in the calendar. It will end on December 7. "We apologize for any inconvenience this error has caused anyone," Taylor said.

The Wildlife Calendar goes to the printer in August of the year preceding the year of the calendar. For example, DNR staff sent the 2013 calendar to the printer in August 2012, eight months before the big game seasons for the fall of 2013 are set by the Natural Resources Commission. Therefore, all the big game season dates listed in the Wildlife Calendar are proposed dates which haven't been officially approved.

"That's why the dates say 'due to open' on the calendar," said Taylor. "In addition, we say at the beginning of each month that hunters need to check the current hunting and trapping regulations for accurate season dates.

"The only season basically set in stone is the buck gun season, which opens the Monday before Thanksgiving," Taylor said. "This should satisfy the needs of most hunters who need to request vacation a year in advance.

"Our wildlife management program is a dynamic one, dependent on several variables," noted Taylor. "Our biologists have to wait until January to analyze the check tags to come up with season proposals for that fall. By that time, the calendar has already been out for four months."

Hunters Harvest Record 2,683 Bears

West Virginia hunters harvested 2,683 black bears during the combined 2012 archery and firearms seasons. This total was 12 percent higher than the previous record of 2,392 established in 2010.

"As predicted in the 2012 DNR Mast Survey and Hunting Outlook publication, mast conditions had a tremendous influence on the distribution of this year's bear harvest," said Colin Carpenter, Black Bear Project leader. "The statewide oak mast index for 2012 was much higher than in 2011 but the distribution was spotty. This fact, combined with two additional weeks of archery hunting, allowed archers to locate bears effectively and led to an increased archery harvest."

Abundant oak mast keeps bears active into the winter and makes these bears vulnerable to harvest during concurrent buck-gun and bear seasons and the traditional December firearms season. Favorable mast conditions, combined with multiple counties open during September, led to a large increase in the firearms harvest."

Bowhunters took 746 bears. Firearms hunters harvested 681 bears in September, 266 during the concurrent buck/bear season, and 990 during the traditional December season. A full report is available in the 2012 Big Game Bulletin, available online at www.wvdnr.gov and in limited supply at DNR district offices.

Calendar of Events

APRIL

20, 27, May 4 Spring Bird Walks
Prickett's Fort State Park
Join DNR biologists and volunteers to observe birds and learn ID. Call 304-363-3030 or email prickettsfortsp@wv.gov.

MAY

3-5 Bird Banding Weekend
Tygart Lake State Park
Great for experienced or novice birders. Experience birds up close and personal. Overnight packages available. Call 304-265-6144 or email tygartlakesp@wv.gov.

4 42nd Annual Spring Bird Count
Pipestem Resort State Park
Join the search for 100 species in one day. Call 304-466-1800 x 344.

9-12 52nd Annual WV Wildflower Pilgrimage
Blackwater Falls State Park
Participate in a fun and educational weekend of field trips and presentations about plants and animals.

11 Spring Bird Walk
Watters Smith State Park
Learn basic birding skills. Call 304-745-3081.

MAY continued ...

11 Migration Celebration
Little Beaver State Park
Join Three Rivers Avian Center for various activities and displays related to migratory birds. Free event. Call 304-466-4683.

JUNE

8-9 Free Fishing Days
Statewide
Fish without a license! Great time to try fishing for the first time or to renew an old pastime.

8 Bowden Fishing Derby
Bowden Fish Hatchery
Free fishing for kids; casting contest, catch-and-release pond and catch-and-keep pond. Call 304-637-0245.

8 Kids Fishing Derby
Little Beaver State Park
Kids 14 and under receive lunch, t-shirts and prizes. Begins at 9 a.m. Call 304-763-2494.

8 Youth Fishing Derby
Tygart Lake State Park
Free fishing for kids in cooperation with Hooked on Fishing, Not on Drugs program. Call 304-265-6144.

Nature Note: Fawn Facts

Photography courtesy of Joe Kosack/P C Photo

The spots on the fawn s auburn fur coat simulate the sunlight filtering through the trees to the ground. This protective coloration usually prevents detection by predators.

The arrival of summer is heralded by the birth of the fawns of white-tailed deer. In West Virginia the peak fawning time occurs during the first two weeks of June. It is this time of year that many people find apparently abandoned fawns lying in thick vegetation. If you come upon a fawn in the forest or fields, do not disturb it. Chances are that its mother is nearby waiting for you to leave before returning to care for its offspring.

A fawn's spotted coat affords it protection. While the mother is away finding food for herself, the fawn lies motionless in the vegetation. The spots on the fawn's auburn fur coat simulate the sunlight filtering through the trees to the ground. This protective coloration usually prevents detection by predators.

Taking fawns from their natural surroundings can have serious consequences. Humans make poor substitute parents for wild animals and we cannot teach them the skills necessary to survive in the wild. In addition, fawns raised by people lose their fear of humans and come to depend upon them for food. A dependent deer cannot be truly wild and free.

If you do find a fawn lying on the forest floor, consider that its apparent vulnerability is actually a strategy for survival. Leave it alone and give yourself the opportunity to appreciate its wild beauty another day.

West Virginia
Wildlife