

MISSOURI CONSERVATIONIST

July
2004

Volume 65,
Issue 7



Behind the Scenes

Have you ever wondered who takes care of all the facilities and infrastructure that are available to you on conservation areas? Behind the scenes of the wonderful conservation programs and facilities you enjoy are many dedicated men and women playing a vital support role. These men and women are members of the staff of the Design & Development Section of the Conservation Department's Administrative Services Division. They provide professional engineering, architectural, and construction-maintenance services to the Department and the citizens of Missouri.

The Missouri Department of Conservation owns or leases more than a thousand conservation areas located throughout the State. These areas contain nearly 500 miles of wetland levees, 75 shooting ranges, 500 boat launching ramps, 3,000 fishing lakes and ponds, 1,000 miles of roads, 2,500 parking lots, 3,000 buildings and other infrastructure, all of which must be maintained.

Over the past few decades, the Department has focused on improving the conservation areas acquired as part of the "Design for Conservation" plan implemented with the passage of the 1/8th percent conservation sales tax in 1976. The Department constructed nature centers, fishing lakes, wetlands, shooting ranges, fish hatcheries, trails, river and lake public use access areas and associated infrastructure so that the public could make better use of these areas.

In designing these public use facilities, the Department's Design & Development staff worked closely with resource managers and biologists to acquire a good understanding of the biological functions of a project. They then designed projects that remained in harmony with the environment and enhanced the area's natural resources.

Several Design & Development projects have won honors in national conservation engineering design competition in recent years. These projects include the innovative designs of the wetlands at Eagle Bluffs Conservation Area near Columbia and Four Rivers Conservation Area in Vernon County and the unique design of the Lost Valley Fish Hatchery at Warsaw, the largest sport fish restoration project in the country.

Lots of Conservation Department staff members contribute their work and expertise to creating facilities on conservation areas.

Most jobs for example, require land surveyors to complete topographic mapping of the site before civil,



Cliff White

electrical, and mechanical engineers, as well an architect and drafting technicians, produce construction drawings of the design.

Also, the Conservation Department's contract specialist and clerical staff have to prepare final contract documents for bidding, and contract supervisors would ensure quality construction by the carpenters and heavy equipment operators.

The list of those involved behind the scenes in providing quality conservation facilities is nearly endless. I haven't even brought up the dedicated employees who mow, pick up trash, grade roads and parking lots, clean boat-launching ramps, remedy acts of vandalism, repair infrastructure, clean and maintain public facilities, or those who work to enhance fish and wildlife habitat on conservation areas.

The next time you are enjoying Missouri's beautiful conservation areas and facilities, give a thought to the many people behind the scenes who have contributed to your enjoyment of the great outdoors.

Carter Campbell, Administrative Services Division Administrator

Contents

July 2004
Volume 65, Issue 7

4 A ROADMAP TO MORE QUAIL

—By Elsa Gallagher

Good habitat is the key to more quail—
if you create it, they will come.

8 CARP LEMONADE

—By Duane Chapman

Exotic carp are taking over our rivers,
but the good news is that
they make excellent table fare.

14 MISSOURI'S SILENT THIEF

—By Chris Bove'

sericea lezpedeza reneged on its
promises and has become a noxious weed.

18 REGENERATING OAKS IN MISSOURI'S BOTTOMLAND FORESTS

—By Dan Dey and John Kabrick

Bottomland oaks are strong and
productive—once you get them started.

23 CATFISH IN MINIATURE

—By Mark Goodwin

Prickly, but pleasant, madtoms
reside in many Missouri streams.

DEPARTMENTS

Reflections 2

News & Almanac 28

COVER

Snowy egret and horned rush

Photograph by Jim Rathert

 Printed on recycled paper with soy ink.



4



8



14



18



23

Contact Us: Web page: <http://www.missouriconservation.org>

Subscriptions: free to adult Missouri residents;
out of state \$7 per year; out of country \$10 per year.

Send correspondence to Circulation, P.O. Box 180, Jefferson City, MO 65102-0180.

Phone: 573/522-4115, ext. 3856 or 3249

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E-mail Magazine Subscriptions: subscriptions@mdc.mo.gov



TRASH COLLECTOR

Reading "Stash That Trash!" in your May magazine reminded me of the time when my family and I were camping on the Chariton River. In the evening we heard lots of vehicles and voices coming from the bridge not far away. The people there were evidently having a party

The next morning, my son, my daughter and I spent 20 minutes picking up bottles and cans from under the bridge. I found a piece of cardboard and

used a marker to make a sign on the guard rail that said, "The river is not a trash can. Please pick up your junk."

About a week later, I went by there and was heartbroken when I found someone had intentionally thrown a pile of trash right under the sign.

Some people just don't get it.

Calvin Teeter, Salisbury

BAT CARE

Reading "Stocking Your Bat House the Hard Way" brings mixed reactions to me

as a physician and a nature enthusiast. I have even put up a bat house in the past but am concerned about liability with its location because human rabies is attributed to bats more than any other animal. Granted, rabies is rare in the U.S. (32 human cases from 1990 to 2000), but it is fatal once it develops.

The Center for Disease Control recommends exposure to a bat in a home be evaluated by a physician for prophylaxis (treatment to keep rabies from developing). Bites by bats may be minor or not recognized. Any scratch or bite possibly from a bat needs treatment unless the bat is proven to not have rabies. Bats should not be handled by untrained and unvaccinated people or kept as pets. Bats should be excluded from houses and adjacent structures to prevent direct association with humans.

It may be of value to your readers to be aware that bat houses should be kept remote from human locations and of the precautions that should be used with respect to bats.

George Kerkemeyer, M.D., Hannibal

SNAKES ALIVE!

Thank you for your excellent article on water snakes ("Cottonmouth Confusion"). We live on a lake and my wife refuses to go into the water because she saw a snake swimming near shore last summer. Hopefully, the article will lessen her fear, and we can enjoy the lake once again.

Larry Vaughn, Ste. Genevieve

CANINE AFFECTION

I am not much of a hunter and have never been duck hunting, but I would like to say kudos to Mark Goodwin for a wonderful story, and more kudos to Cliff White for the wonderful photos, especially the one on page 23. This one leaped right out at me and made me believe from the look in the dog's eyes that he is waiting for his master to give him a big hug and hear the words, "I love



Regality!

Donna Plybon of Lincoln, Missouri, sent in this photo of an eagle on its nest in a tall sycamore tree on Cole Camp Creek. Her brother-in-law, Bryan Maine of Lake Forest, California, took the photo while visiting her. He took the photo in April. According to Donna, the same eagle used the nest last year.

you," and the command to Fetch or Back.

I have a stray that came to me 10 years ago, a 17-pound part terrier, and I know when she needs a hug, and she knows just when to come and lay down by my side.

Bud Allen, Fredericktown

DAM AFTERTHOUGHTS

The Clarence Cannon Dam is a good thing. Ditto for Mark Twain Lake, as you say in your article. However, the dam and lake did miss some important objectives. One was that the lake was

going to provide big boosts in employment and economic growth to the "disadvantaged" county that it was in. I guess whoever put the plan together didn't realize that campers generally bring everything they need with them, including groceries, gas, etc.

Maybe with some creative thinking a mile or so of shoreline could have been placed in something like a "trade-free zone," allowing at least hotel and resort interests to be on the water with large marinas.

Jim Hagan, Ellisville

The letters printed here reflect readers' opinions about the Conservationist and its contents. Space limitations prevent us from printing all letters, but we welcome signed comments from our readers. Letters may be edited for length and clarity.

Ask the Ombudsman



Q: Pines and spruce trees grow in northeast Missouri. Why won't they reproduce here?

A: Although these non-native trees may grow well in Missouri, most require special conditions for seeds to germinate and survive. For example, blue spruce needs a bare mineral soil to sprout. Your area—in fact, most of Missouri—doesn't have mineral soil. Many of the pine and spruce trees are likely hybrids that don't produce viable seeds. Even if they were viable, well manicured lawns beneath these ornamentals prevent the seeds from reaching bare soil. Other conifers require fire to start their reproductive process.

To produce trees from seeds, you'll probably have your best success with native species. For additional information have a look at the US Department of Agriculture's Handbook 654, *The Silvics of North America*. You may be able to find it at your local library, or on the web at <www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm>.

Grow Native is a program that promotes native wildflowers and plants, including native trees. For details on this program, go to <www.grownative.org/> or contact your local Conservation Department office.

The Conservation Department also provides seedling trees from the George O. White nursery for a nominal fee from mid-November through the end of April. For details please see www.mdc.mo.gov/forest/nursery/ or contact your local Department office during that time frame.

Ombudsman Ken Drenon will respond to your questions, suggestions or complaints concerning Conservation Department programs. Write him at P.O. Box 180, Jefferson City, MO 65102-0180, call him at 573/522-4115, ext. 3848, or e-mail him at <Ken.drenon@mdc.mo.gov>.

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The *Missouri Conservationist* (ISSN 0026-6515) is the official monthly publication of the Missouri Department of Conservation, 2901 West Truman Boulevard, Jefferson City, MO (Mailing address: P.O. Box 180, Jefferson City, MO 65102). Subscription free to adult Missouri residents; out of state \$7 per year; out of country \$10 per year. Notification of address change must include both old and new address (send mailing label with the subscriber number on it) with 60-day notice. Preferred periodical postage paid at Jefferson City, Mo., and at additional entry offices. Postmaster: Send correspondence to Circulation, P.O. Box 180, Jefferson City, MO 65102-0180. Phone: 573/751-4115. Copyright © 2003 by the Conservation Commission of the State of Missouri.



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Printed in USA



A Roadmap to More Quail

by Elsa Gallagher, photos by Jim Rathert

Missourians naturally associate quail with open lands and brushy draws, fencerows and crop field edges. However, these types of habitat are disappearing from the Missouri landscape. With them, we stand to lose a rich tradition that includes days afield, exciting flushes, hard-hunting dogs and delicious meals of quail.

Quail habitat in Missouri has decreased dramatically in past decades as cedars and honey locusts relentlessly invaded valuable open land.

In addition, a diversified landscape is slowly being replaced by urban developments, larger crop fields and pastures dominated by fescue and brome. These choke out the forbs, legumes and bare ground necessary for quail survival.

Landscapes often change so slowly it's hard to notice differences. It's likely, however, that fencerows that held quail in your grandfather's day have grown from shrubby, connected islands with ample bare ground between 50- to 60-year-old pole-and-sawlog timber with a dense understory of fescue or brome. Over time, large parts of the landscape have become quail deserts.

Habitat that supports quail also sustains a variety of other birds. Many of these, including the Bell's vireo, dickcissel, grasshopper sparrow, Henslow's sparrow, loggerhead shrike, Bewick's wren, field sparrow and brown thrasher, also have experienced drastic population declines.

Fortunately, farmers and landowners are learning that



they play an important role in restoring quail populations in Missouri. Landowners willing to devote 5 to 10 percent of their property to quail management will often see an immediate response of higher quail numbers.

Quail Allies

One influential group looking out for quail is the Southeast Quail Study Group (SEQSG). This partnership, formed in 1995, includes more than 100 wildlife professionals from state and federal agencies, universities and private organizations.

To address the conservation and management needs of northern bobwhite, the SEQSG developed the Northern Bobwhite Conservation Initiative. The NBCI is a landscape-scale habitat restoration plan, the first plan to

address habitat needs of bobwhite throughout most of their historic range.

The goal of the NBCI is to increase quail density on improvable acres to that which existed in the 1980s. The plan is modeled on the successful North American

Waterfowl Management Plan, the Partners in Flight program, and the North American Bird Conservation Initiative. It's also designed to dovetail cooperatively with other existing bird management plans.

The NBCI has identified three general strategies that will help increase quail and associated songbird populations.

The first involves increasing the amount and improving the quality of agricultural lands for nesting, brood-rearing and roosting by bobwhites and other grassland wildlife species. This is best accomplished by conservation plantings of native warm season grasses, shrubs and forbs.

They're also aiming toward better management of pinelands and mixed pine-hardwood areas. This would involve thinning, controlled burning, site preparation and, where possible, increasing the acreage devoted to longleaf pine.

Finally, the strategy targets rangeland improvement through vegetation management and grazing regimes that favor the retention and improvement of native plant communities.

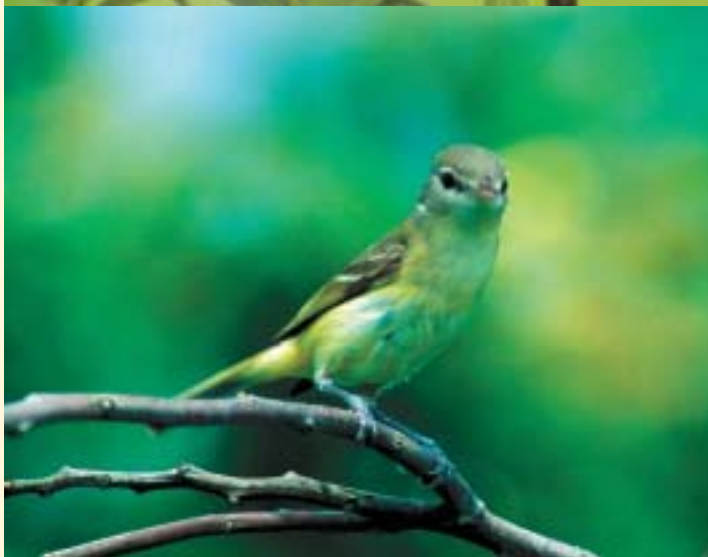
To meet the goals of the Northern Bobwhite Conservation Initiative, Missouri will have to produce habitat to support an additional 206,432 coveys of quail. That task appears daunting, but it is possible. Quail do not require huge expanses of habitat, and local populations respond quickly to beneficial land management.

To reverse the downward trend in bobwhite abundance and bobwhite-related recreation in Missouri, the Conservation Department has developed a plan called "Strategic Guidance for Northern Bobwhite Recovery." The plan addresses quail needs on conservation areas and on private land. It can be found at <www.missouriconservation.org>.

The plan's goal is for a fall bobwhite density of one



Habitat that supports quail also sustains a variety of other birds.



Quail habitat also benefits (clockwise from upper left) Bewick's wrens, dickcissels, Bell's vireos and loggerhead shrikes.



Providing a habitat mosaic that includes open woodlands with edge cover will result in more quail.

bird per two acres on select conservation areas. To achieve this, the Department is increasing early-successional vegetation management on these areas.

In addition, the Quail and Grassland Bird Leadership Council has been formed with the goal of increasing early successional habitat in support of quail and other grassland species.

Improving habitat is the key to restoring quail and other grassland species. In most cases, bobwhite quail habitat can be created or enhanced with some combination of discing, burning, brushpile building, edge feathering, spraying and shrub planting.

The Conservation Department is committed to improving habitat on conservation areas and assisting private landowners to improve their land for bobwhite quail and other grassland species. However, because the

Department controls management on less than 3 percent of the Missouri landscape, the fate of the northern bobwhite in the state will be decided on private land.

To help landowners develop quality quail habitat, the Department offers one-on-one consulting services and access to several programs, including the Quail Habitat Initiative, a partnership with Quail Unlimited, and increased habitat management on CRP land with CRP-BOB cost-share, as well as a basic cost-share program for landowners without CRP.

The Northern Bobwhite Conservation Initiative has helped the Department include quail management into our planning and made it easier to integrate all-bird conservation into these efforts. Hopefully, the result will be a greater abundance of open land bird species, and, of course, more bobwhite quail. ▲



Carp Lemonade

Making the best out of some big-headed invaders.

BY DUANE CHAPMAN, PHOTOS BY JIM RATHERT, ILLUSTRATIONS BY MARK RAITHEL

You've probably heard the adage, "When life gives you lemons, make lemonade!" Missouri has been given some lemons in the form of bighead and silver carp. These large, plankton-eating fish, native to Asia, were imported into Arkansas in the 1970s to control water quality in fish farms and sewage treatment facilities. It didn't take long for the fish to escape to the wild, and their populations have been increasing ever since.

The Mississippi River and its tributaries were excellent highways for bighead and silver carp, allowing them to expand their range as far as Louisiana, South Dakota and Ohio.

In Missouri they are plentiful in the Missouri and Mississippi rivers. People using nets have taken more than a ton of large Asian carp from the calm area behind a single wing dike on the Missouri River. We don't know yet what the effect these exotic carp are having on native fish, but we are concerned they may have an impact on populations of native plankton feeders like paddlefish and gizzard shad.

A more immediate threat to Missourians is the possibility of Asian carp, especially silver carp, jumping into moving boats. You may imagine it would be quite novel for a 20-pound fish to jump into your boat, but being hit by a large Asian carp would be similar to being hit by a bowling ball.

When you add the speed of the boat to the force of impact, the threat of collisions become even more serious—possibly deadly. Even if the fish don't hit you, they can

break fishing rods, windshields, electronics or anything else in your boat. As if adding insult, the carp will leave slime, blood and excrement on everything it touches.



Silver carp (left) and bighead carp compete for plankton with native paddlefish and gizzard shad.

The Missouri Department of Conservation and the U.S. Geological Survey are studying the threat of Asian carp and hopes to develop some methods to control the populations of these fish. Until then, they are like lemons that we have to deal with.

Fortunately, bighead and silver carp have a redeeming value: Their meat is absolutely delicious. I have eaten them pan-fried, deep-fried, grilled, baked, steamed, smoked, in curries, in soup and even pickled. They are delicious when prepared in any of those ways.

Don't believe all carp taste the same. There is no comparison between the firm, white, flaky meat of bighead and silver carp and the darker, strong-tasting meat of common carp. Silver carp also happen to be a better source of Omega-3 fatty acids (the "good cholesterol") than salmon.

The only drawback to eating bighead and silver carp is that they have lots of intramuscular bones. All carp have these Y-shaped bones. They remain in the fillet in two rows, one above and one below the lateral line. A carp fillet also contains a strip of red meat along the lateral line. This should be removed, much like the "blood strip" of a striped bass or white bass.

Fortunately, bighead and silver carp have a redeeming value:



Their meat is absolutely delicious.



Adult bighead and silver carp might weight more than 50 pounds. The sound, vibration or turbulence caused by boat motors seems to stimulate them to jump out of the water. Sometimes they land in boats.





Duane Chapman

By the time you clean a bighead or silver carp, the remaining fillets will only be about 20 to 25 percent of the weight of the fish you caught. However, because these fish are so large and plentiful, you can still put a large amount of high-quality meat in the boat. For example, 150 pounds of silver carp jumped into my boat one day. After cleaning, I had 30 pounds of great meat.

Scoring the fillets of some “bony” fish chops up the bones. If you then fry them in very hot oil, the bones dissolve to the point that you don’t notice them. Scoring, however, does not work with Asian carp larger than about 2 1/2 pounds because the bones will be too large.

The fish we catch on the Missouri River average between 12 and 15 pounds. The Y-bones on a 15-pound Asian carp can be up to 4 inches long. These are much too large for scoring, but they are large enough that you can easily remove them from the cooked flesh. Take care to not cut through the bones when cleaning the fish because that will simply make the big bones into lots of little bones that are annoying or even dangerous.

Harvesting Asian Carp

Bighead and silver carp are abundant in the Mississippi and Missouri rivers and their larger tributaries. They usually frequent slow-moving water at least 8 feet deep. They often can be found in the calm water behind wing dams.

Bighead and silver carp are filter feeders, so it is hard to capture them with traditional fishing methods. Very rarely will one strike a lure.

Bighead and silver carp can be captured during the paddlefish snagging season and during the nongame fish snagging season by jerking a weighted treble hook through the water in areas where the fish are abundant.

Bighead carp have a habit of feeding by skimming the surface film, which makes them easy (although skittish) prey for bowfishermen. Shooting fish with a firearm is illegal in Missouri, but it is legal to shoot nongame fish, including Asian carp, with a bow.

In Europe, a popular method for catching silver and bighead carp is to make a large, fist-size doughball that slowly disintegrates into tiny pieces.

The doughball is suspended below a large bobber. Several small hooks on short leaders are tied to the line just above the doughball, making a nest of hooks around the bait. A carp will bump and mouth the bait trying to knock off pieces small enough to swallow, and often becomes hooked. You have to be patient and not set the hook too early, because the bobber might bounce and pull under many times before the fish becomes hooked.

Here in Missouri, fishermen report catching many bighead carp on trotlines when using cheese for bait. Likely these fish also hook themselves while trying to dislodge small particles of cheese.

One of the easiest ways to catch an Asian carp in Missouri is when the fish “volunteers” by jumping into your boat. If you spend much time on the Missouri’s big rivers, it will happen to you. When it does, you know it’s time to make lemonade.



Cleaning Asian carp

Remove the fillets from the body of the carp **(1)** as you would any other fish. Cut around the ribs, leaving them attached to the skeleton.

Lay the fillets skin side down on a cutting board and cut them in half lengthwise, cutting through the skin **(2)**. Remove any fatty belly meat from the fillet. It has a strong flavor.

Skin the fillet halves by laying them skin side down on the cutting board and slicing the meat from the skin, starting at the tail section **(3)**. An electric knife works especially well for this, but any sharp knife will do.

Remove and discard the dark red meat from the fillet halves **(4)**. You now have delicious white meat, but there are still Y-shaped intramuscular bones hiding inside.

Cut the rib cage section off. It is now boneless so you can use it without further preparation.

The Y-bones **(5)** lie lengthwise at an angle through the fillets. Slip the fillet knife in between the bones and cut strips that contain two or three bones, taking care to not cut any bones. It won't take long to understand exactly where the bones lie.

Now roll these fillets in cornmeal or your favorite breading and fry them as you would any fish. At the table, break the strip in half. The bones will stay in one half. You can eat the boneless half of the strip, then grab the Y-bones and pull them from the other half and eat it, too. It's a lot like eating hot wings, but not as messy.

Deboning

If your family insists on fish with no bones at all, with a little more work you can remove all the bones from a fillet. The shape of the meat that results is different from what most people are familiar with, but the taste is excellent. You should start with a fish of at least 8 pounds, at least until you are familiar with the technique.

Start with the top half of a fillet. Lay the fillet on your cutting board so that the outside of the fish is up. With your fingers, feel for a hard portion on the first inch of the fillet. There are a couple of unusual pine cone-shaped bones in the first inch or so of the top half of the fillet. These make bone removal from that section impossible. Starting behind this hard section, holding your knife parallel to the cutting board, cut a long strip of meat from the top of the fillet, exposing the Y-bones **(6)**. This will result in a boneless piece of meat about as thick as a crappie fillet, but about two inches wide and very long.

Using shallow cuts, free the meat from above and below the exposed Y-bones **(7)**.

Turn the fillet over. You will see a row of white dots that indicate where the point of the Y-branch of the bone nears the cut surface of the fillet. Make a cut parallel to and right above the row of dots **(8)**. Cut down until the knife contacts the main shaft of the Y-bone. Cut and scrape sideways with the knife to remove a long, rope-like piece of boneless meat.

Repeat step 3, making your cut just below the row of dots **(9)** and removing the remainder of the usable meat from the top half of the fillet.

Now de-bone the bottom half of a fillet **(10)**. You have already de-boned the meat from the rib cage section when you left the ribs attached to the skeleton. Cut the ribcage section off and put it with your boneless meat. Now repeat steps 3 and 4 with the remaining portion of the bottom fillet. The bones lie very near the surface of the meat on the bottom half of the fillet, so there is no need to repeat steps 1 and 2.

Repeat above with the other side of the fish. Once you become proficient, it takes about 20 minutes to completely de-bone an Asian carp. That may seem like a lot of work, but if you can generate 3 pounds of bluegill fillets in a similar time, you are faster with a fillet knife than Zorro is with his sword.





MISSOURI'S Silent Thief



Sericea lespedeza is an invasive, non-native plant that is cropping up on Missouri roadsides, in pastures, along waterways, and even in the shade of forest edges. Because of its hardiness and ability to spread, this perennial legume threatens to displace native plants.

Like many native plants we see outdoors, sericea lespedeza is lush and green with pretty summer flowers. Planting sericea lespedeza was once promoted as an erosion control measure. The plant was also considered acceptable forage for both cattle and wildlife. We now know that sericea lespedeza is, in fact, aggressive and potentially harmful.

Sericea lespedeza (*Lespedeza cuneata*) is native to eastern Asia. It first showed up in America in the 1800s. Often called “poor man’s alfalfa,” it was initially used on a large scale in the U.S. as a pasture crop. It first appeared in Missouri in the 1930s, when it was planted as forage for livestock and to control erosion on roadsides and strip-mined land. It also was thought to provide wildlife food and cover.

Through recent study, however, we now know that sericea’s disadvantages far outweigh any possible benefits. Its root system, a combination of a taproot and a small set of fibrous roots at the surface, is not like the heavy, deep and fibrous root system of native grasses. Therefore, native grasses work much better for erosion control.

Sericea lespedeza is stealing nutrients, moisture and sunlight from native vegetation.

By Chris Bové

photos by Jim Rathert



Sericea lespedeza is a coarse plant with a dense growth of leaves along its stems and branches. The leaves are wider at the tip than at the base (club-shaped) and have a distinctive point at the tip.

Although it is high in crude protein, sericea is a poor nutritional source for animals. Wildlife, such as quail, will eat sericea seeds, but the energy contained in the seeds will not sustain them through extreme weather conditions. Quail and other ground nesting birds may not even be able to fully digest sericea seeds because of their hard outer layer.

In addition, high tannin levels reduce both the digestibility and the palatability of mature sericea. Cattle will only eat the very young plants. Sericea inevitably stands out as one of the least desirable forages in a heavily grazed pasture. Although a lower tannin variety of sericea has been developed and is commonly baled for hay in the southeastern U.S., its tannin levels are still considered too high for it to be considered a quality food source for cattle.

Currently, sericea lespedeza ranges from the Atlantic coast to the Midwest, and it continues to spread. In Missouri, it can be found in every county. It is most common in the southern, central and western counties. Once you know what to look for, you're sure to spot it everywhere you go, especially along roads.

Sericea lespedeza is a warm season legume that stands 3 to 6 feet tall at maturity. It thrives in dense stands, generally crowding out most other types of vegetation.

Sericea's stems can grow individually or in clusters with many branches. In late summer the stems become coarse and woody.

Its narrow, club-shaped leaves grow in groups of three along the stem and have short petioles. Each leaf measures 1/4-inch to 1 inch long and 1/16-inch to 1/4-inch wide (wider at the tip than the base) and is round at the end with an inconspicuous point at the tip. Clusters of small, cream-colored flowers with purple or pink markings appear on the plant from mid-July to early October.

There are native lespedezas in Missouri that are beneficial and should not be mistaken for sericea. These include violet, roundhead and slender lespedeza. Slender lespedeza is the most similar to sericea. You can tell the species apart by the shape of the leaves and the

It is important to PLANT and MAINTAIN vigorous, diverse NATIVE VEGETATION wherever possible.



A Conservation Department employee treats a patch of sericea lespedeza that has grown up on a conservation area.

color of the flowers. The leaves of slender lespedeza do not have a point at the end, and the plant's flowers are purple to pink.

A single stem of sericea can produce more than a thousand seeds. The seeds float, so the plant spreads easily along riverbanks and lakeshores. Birds and other animals also distribute the seeds. They hitch rides on car bumpers, in tire treads and on haying and mowing equipment.

Fortunately, sericea is fragile during its seedling stages and is slow to establish. Both germination and seedling growth require warm temperatures and an optimum number of daylight hours per day.

Because they can get plenty of sunlight, sericea seedlings thrive in areas where the surrounding vegetation is short, such as grazed or burned pasture. Where other vegetation is dense, however, sericea spreads slowly, if at all.

Sericea most threatens native vegetation when it is mature and well established. The mature sericea plant is tall and dense enough to block sunlight from other plants. It also saps water from the soil. In addition, sericea can emit chemicals from its roots that inhibit the growth of many grasses and decrease their forage quality. Once established, sericea is a tough competitor. Unfortunately for native vegetation, it often gains the upper hand.

Both government and non-government agencies in Missouri are cracking down on the spread of sericea. However, it is a complicated and expensive problem to fix.

Land managers with the Missouri Department of Conservation currently scout statewide conservation lands for sericea. They control its spread by using herbicides in conjunction with late summer burning.

The Missouri Prairie Foundation has been spraying sericea on its land, as well as on select Missouri Department of Conservation lands, using backpack herbicide sprayers. The Foundation plans to employ a crew of four people to combat sericea throughout the summer this year.

For Missouri landowners, the best defense against this invasive weed is early identification and treatment of infested areas. Individual plants in areas of small sericea populations can be treated directly with approved herbicides such as Remedy, Escort or Ally.

Sericea is most successful at taking over disturbed or overgrazed pastures and woodlots, where competing ve-



Once thought to be a boon for wildlife and for erosion control, sericea lespedeza now is the subject of eradication efforts.

tation is short. Therefore, it is important to plant and maintain vigorous, diverse native vegetation wherever possible.

Once it takes hold, sericea may require a combination of measures to control it, including herbicides, mowing and grazing by goats. Cattle will graze around the mature plants, so they are not an effective means of control. Keep in mind that goats must be stocked in sufficient numbers to keep sericea plants under 4 inches tall. Grazing of infested areas should be avoided in September and October because of the risk of spreading seeds during these months.

The use of approved herbicides is very effective in the spring after a mid to late summer mowing. That's when the plants are building root reserves for the following year. Once the sericea infestation has been reduced to only a few plants, spot spraying of herbicides is a good way to protect your land from becoming infested again.

Despite the efforts of government agencies and a handful of informed private landowners to rein in sericea, it continues to propagate at great cost to Missourians. Not only do we have to pay out of pocket to battle this invasive plant, we are also losing our wealth of native natural resources to it.

For assistance or information about identifying and controlling sericea lespedeza, contact your Conservation Department office or an office of the Natural Resource Conservation Service, soil and water conservation district or university extension. The Sericea Lespedeza Multi-State Work Group has a website at <www.oznet.ksu.edu/sericeawork>. ▲

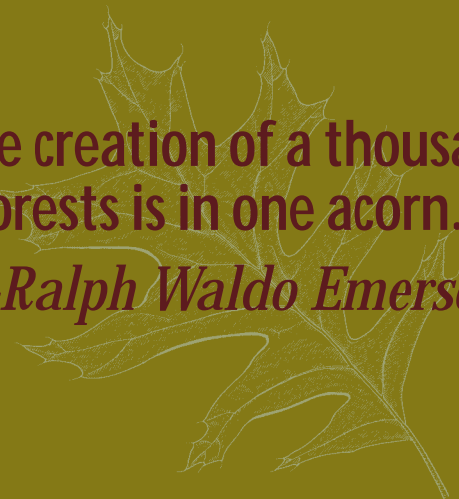


Bottomland oaks are valuable timber species that are also important for wildlife, but regenerating them is about as easy as training blackbirds to plant acorns.



"The creation of a thousand forests is in one acorn."

—Ralph Waldo Emerson





Regenerating oaks
in BY DAN DEY AND JOHN KABRICK, PHOTOS BY JIM RATHERT
Missouri's bottomlands

In ancient Greek, Roman and Celtic mythologies, oak trees symbolized strength and virility. Oak groves were sacred places to Celtic and Druid cultures of the British Isles. Oak has long symbolized strength, endurance, military prowess, victory, royalty and fertility.

In addition to their symbolic, cultural and aesthetic values, oaks have also proven useful throughout history. Military and merchant sailing ships were built of oak. Because of its strength and endurance, oak wood was favored for building homes, crafting furniture and manufacturing household items. Charcoal produced from oak wood fueled the iron and glass industries in the 18th and 19th centuries. Oak bark, with its high tannin content, was important in the leather tanning process. Acorns have also provided nourishment for humans around the world.

Missouri once had an estimated 5 million acres of wetlands, much of which were bottomland forests that included some oak. Today, less than 15 percent of those historical wetlands remain in the state. Many landowners and public land managers are interested in restoring oak trees on the bottomlands of Missouri's rivers for wildlife and timber purposes. However, creating forests from acorns is not as easy as Ralph Waldo Emerson makes it sound.

Young oaks growing in bottomlands face serious chal-

lenges. Seedlings must compete with the lush growth of other plants. Because oak seedlings grow slowly, they are often shaded out by Johnson grass, Reed canary grass, giant ragweed, marehail, cottonwood, willow and other fast growing species that are better adapted to colonizing bare, open bottomland fields.

In bottomlands, animal damage often limits oak regeneration. Squirrels and other small rodents eat acorns planted in forests or fields, and many wildlife species eat planted nursery seedlings. White-tailed deer can slow tree development for years by repeatedly browsing on the twigs and buds of seedlings. If they eat the terminal or uppermost bud they can prevent a tree from growing taller. In winter, cottontail rabbits may completely sever the stems of small oaks, or chew through the bark and cambium of larger seedlings, killing them. Mice, voles and other small mammals also damage tree seedlings.

It's important to properly match the species of oak with the soil and the flooding tendency of the planting site. Several oak species are native to Missouri bottomlands, but their ability to tolerate flooding varies. Bur oak, swamp white oak, Nuttall oak, overcup oak, water oak and willow oak do well in frequently flooded areas. Pin oak, Shumard oak and cherrybark oak can survive frequent flooding, but they don't thrive in these conditions. Despite its name, swamp chestnut oak won't grow well in swampy or wet ground.

Bottomland oaks are better able to survive and prosper when flooding occurs during their dormant season. They also fare better on well-drained soils on higher elevations in floodplains. Floods in the late spring, when trees have leafed out, can kill oak seedlings. This is especially true when flood waters are stagnant and flooding persists for a month or more.

Give oaks a chance!

Landowners can improve the success of oak regeneration in bottomlands. Using cover crops, such as redtop grass, sown at the time of oak planting, helps control competing vegetation. Redtop, a cool-season grass adapted to moist soil conditions, only reaches heights of 18-24 inches. Its sod, however, thwarts the growth of other plants that would otherwise shade out oaks.

Landowners can limit animal damage to oak seedlings by managing vegetation canopy so that it is low to the ground during winter. The goal is to reduce the cover that protects rabbits from predators. This can be achieved with low-growing grasses, such as redtop, or by mowing natural vegetation around oak seedlings in the fall. Although trees planted near field edges will be vulnerable to rabbits, those in the interior portion of large fields are less likely to be damaged.



Acorns are an important food to many wildlife species living in bottomland forests.



Reduce cover near field edges to protect young oaks from rabbits. Plant with cover in open fields to protect them from deer.

Young oak trees in open fields still may be targeted by deer. Growing oak seedlings with a little cover may reduce their exposure to browsing. You can protect them further with wire mesh seedling cages or by wrapping their stems with spiral plastic strips.

You can limit an oak's exposure to damage or competition by planting large, vigorous seedlings and providing them with optimal nutrition for rapid growth. Deer usually won't browse the terminal shoots of trees that are taller than 5 feet. Larger diameter trees also have thicker bark, which makes it harder for rabbits and other rodents to girdle or damage their cambium. In addition, vigorous seedlings have the best chance of recovering from injuries.

The taller the seedling, the more likely its crown will remain above growing season floodwaters. Planting trees on natural or man-made mounds and ridges increases the seedling relative height, decreasing their susceptibility to flooding. You can construct raised beds or soil mounds with a rice plow or other implements. These will also improve soil drainage, aeration and conditions for good root growth. Mounding is most beneficial when planting trees in poorly drained, clay-rich soils. Coarse, well-drained soils probably do not need to be mounded.

Oak from acorns

Landowners can also sow acorns to regenerate bottomland oaks. Acorns collected from local bottomland oak trees are best because they produce seedlings that are adapted to life in the floodplain. Burying them in the top several inches of soil keeps acorns from drying out, ensures a good environment for germination and reduces acorn loss to small mammals.

Seedlings that develop their roots in place may do as well or better than seedlings that have been transplanted from a nursery. However, acorns may be eaten or destroyed by a host of insects, diseases and animals. After germination, small seedlings are subject to intense competition from other plants, floods and animal browsing. During early shoot growth, oak seedlings use most of their energy to build a root system rather than grow tall. Regenerating oaks by seed usually requires sowing thousands of acorns per acre to get the desired number of mature trees.

State and private tree nurseries usually sell bare root seedlings. These are mechanically lifted from the soil after one or two years of growth, packed into bundles and shipped to planting sites. Bare root seedlings lose much of their root system and experience stress during this process.

Recovering from this shock and injury after planting requires time and energy, which puts them at a disadvantage with competing vegetation. Because the survival rate of bare root seedlings is lower, landowners should plant extra trees to obtain the desired number of oaks. Again, the larger the seedling, the better its chances of survival.

Large, container-grown hardwood seedlings recently have become available in Missouri. These seedlings are grown in 3- and 5-gallon plastic pots in a way that creates a dense, fibrous root system. Trees may be 5 feet tall or more after one to two years growth in the nursery. Container-grown trees experience less stress after planting than bare root seedlings because their root systems remain intact and are ready to expand into the soil when conditions are right.

Another advantage of large container stock is that some trees produce acorns at a very early age. In some plantings, 2-year-old swamp white oaks and 5-year-old pin oak seedlings have produced acorns. This food production helps turkey, deer, ducks, songbirds and mammals. Although the initial cost of planting large container stock is higher than planting bare root seedlings or directly seeding acorns, their survival and growth rates are higher.

Your schedule, budget and equipment will dictate your strategy for regenerating bottomland oaks. Whether you sow acorns or plant seedlings, you can improve survival rates by reducing competition from other plants and damage by animals.

Your efforts will be rewarded in a more diverse, native bottomland forest that offers better habitat for wildlife and improved timber production. ▲



Large container-grown seedlings are better able to compete with other vegetation, tolerate deer browsing, and survive floods. Your efforts to establish trees go a long way toward helping restore bottomland forests.



Catfish in MINIATURE

Madtoms are smaller than the hooks used on most catfish trotlines.

By Mark Goodwin
photos by Jim Rathert



Checked madtom

To most people, the word “catfish” means channel, blue and flathead catfish. Those are the species most commonly pursued by Missouri anglers. Madtoms, Missouri’s most varied group of catfish, are seldom mentioned.

Nine of the 15 species of catfish native to Missouri are madtoms. Though common in many streams across the state, madtoms are overlooked because of their small size. Seldom reaching 5 inches in length or weighing more than 2 ounces, madtoms hold no sporting value. In form and behavior, however, they are catfish in every way, and they represent part of the rich variety of wildlife of Missouri’s streams.

Madtom Identification

All madtoms are small, but so are young channel cats and flatheads. How can you distinguish madtoms from catfish fingerlings?

Like all catfish in Missouri, madtoms belong to the family Ictaluridae. Like their bigger cousins, madtoms have eight whiskers or barbels—four on their upper jaw and four on their lower jaw. Like all Missouri catfish,



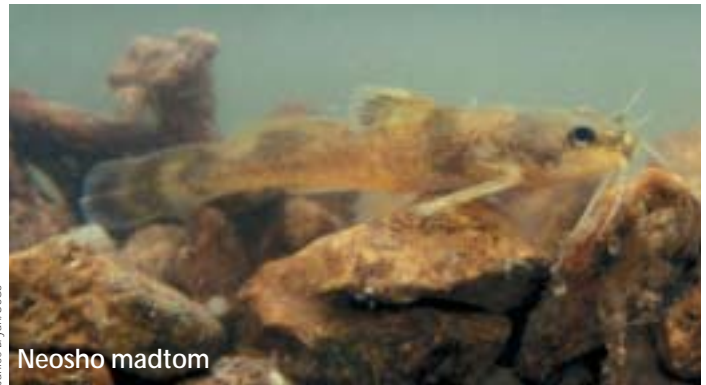
Slender madtom

madtoms have scaleless skin. A madtom's adipose fin—a fleshy, rayless lobe behind the dorsal fin—is different from the adipose fin of other catfish, however.

Madtom adipose fins form a low, keel-like ridge that either connects to the tail fin or has only a slight notch between it and the tail fin. On larger catfish, the adipose fin is free and more widely separated from the tail fin. The genus to which madtoms belong, *Noturus*, means “back tail,” referring to this distinctive connection of the adipose and tail fin.

Madtom Ecology

Madtoms are part of the complex web of feeding relationships that occur in streams. Though small, madtoms are often abundant in streams, and their populations



Janice Bryan/USGS

represent a significant link in the food chain.

Like bigger catfish, madtoms are mostly nocturnal. During the day they hide under rocks and leafy debris. At night madtoms emerge and forage voraciously. They eat a variety of small, aquatic insects, including the nymphs of mayflies, dragonflies and damselflies. They also eat small crustaceans, including aquatic pill bugs and immature crawdads.

In turn, madtoms are eaten by larger fish, including smallmouth bass, walleye and trout. Some anglers collect them for bait.

Most of Missouri's madtoms live in the riffles of streams, where they reside under rocks and stones. A good way to catch them is by “kick seining.” Holding a short seine downstream with the lead line held tight to the bottom, slowly walk backward upstream while kicking the gravel or rocks on the bottom. The current will sweep dislodged madtoms into your net. Because madtoms are small, the seine should have no larger than 1/4 inch mesh.

Three people can seine more efficiently by having two holding the seine while the “kicker” walks slowly downstream toward them.

You can also catch madtoms at night in riffles using a small-mesh dip net and a flashlight. Most youngsters

HANDLE WITH CARE!

These diminutive catfish can inflict a painful puncture wound with the spines on their pectoral and dorsal fins. Like all of Missouri's catfish species, madtoms have venom glands at the base of these fins. The glands secrete venom that becomes incorporated in the slime and cells that make up the spine.

Because madtoms are so small, it's difficult to avoid their tiny, sharp spines, especially if you are trying to impale them on a fishing hook. Many describe the pain that comes from being “horned” by a madtom as similar to a bee sting. Others claim it to be much worse. It's best to handle madtoms carefully.

love to try catching madtoms on overnight camping trips along Missouri's clear streams.

Madtom Species

The Fishes of Missouri, by William L. Pflieger, contains information and classification facts concerning all the fish species found in our state. You can purchase or order this book through your regional conservation office or at a conservation nature center or online at the <www.mdcnatureshop.com>.

You are unlikely to come across the mountain madtom, *Noturus eleutherus*, or the Neosho madtom, *Noturus placidus*. Both have very limited distribution in Missouri. The mountain madtom has only been collected at four locations in Missouri, including 18 specimens collected from the Black River and St. Francis rivers.

The Neosho madtom has been collected only a few times from the Spring River just upstream from Kansas-Missouri border. You should avoid kick seining where mountain and Neosho madtoms are known to occur, and it's always important that you correctly identify the species of madtoms so you can release mountain or Neosho madtoms.

However, you have a good chance of collecting Missouri's other seven species of madtoms.

The tadpole madtom, *Noturus gyrinus*, is the most abundant madtom in the lowland streams and ditches of southeast Missouri. It is also found in the creeks and backwaters of the Missouri and Mississippi rivers. The tadpole madtom is most often collected from quiet waters that have thick growths of submergent plants or accumulations of leaves, sticks and other organic debris.

The distribution of the freckled madtom, *Noturus nocturnus*, is similar to that of the tadpole madtom, but they are typically found in riffles or in portions of the stream that have gravel or rocky bottoms.



Checkered madtom

Noturus miurus, the brindled madtom, also inhabits many of the same lowland streams and ditches as the tadpole madtom, and is nearly as common. Brindled madtoms are more often found in pools, however. The species also inhabits the Spring River system in southwest Missouri.

In the western and northern Missouri Ozarks, the slender madtom, *Noturus exilis*, is the most common madtom in small- and medium-size streams that have gravel bottoms,



Stonecat madtom

Janice Bryant/USGS



clear water and permanent flow. This madtom is scarce in the southern Ozarks.

The stonecat, *Noturus flavus*, is the most common madtom in the large streams in the northern Ozarks and Prairie region. In the headwaters of these streams, it is often replaced by the slender madtom.

In the southern Ozarks of Missouri, the Ozark madtom, *Noturus albater*, is the most abundant madtom. It thrives in clear, steep streams with strong, permanent flow.

The checkered madtom, *Noturus flavater*, has a similar distribution to that of the Ozark madtom, except that it is absent from the St. Francis and Black rivers. In streams where it co-exists with Ozark madtoms, it is generally less abundant. Unlike the checkered madtom, it prefers backwaters and margins of quiet pools that offer thick accumulations of leaves, sticks and other organic debris. ▲

The next time you seine bait for a stream-fishing trip, take a look at the occasional small catfish you net. Chances are it's not a fingerling catfish, but a madtom. ▲

MADTOMS IN HOME AQUARIUMS

Madtoms make ideal aquarium inhabitants. Even as adults, they are too small to eat most aquarium fish.

During the day, madtoms typically hide under rocks or other aquarium structures, with maybe only their whiskered chins sticking out. Place food in the aquarium, however, and they quickly swim out to feed.

Madtoms are particularly well suited for aquariums set up for native fish. Minnows, madtoms, darters and topminnows all adapt well to aquarium life and are resistant to the diseases that often plague tropical fish. With a valid Missouri fishing permit, you can possess up to 150 bait fish. However, you cannot collect or possess endangered or threatened species, such as mountain or Neosho madtoms.



Beat high fuel prices with natural Missouri getaways

Missourians who have decided to vacation close to home this summer can get trip-planning help from a bevy of books and tapes from the Conservation Department's Nature Shop.

Natural Adventures Close to Home are 20- to 30-minute video tapes describing natural getaways within a two-hour drive for most Missourians. The videos provide visual tours of dozens of areas, including nature centers, lakes, rivers, prairies, caves and glades. The tapes focus on the St. Louis, Kansas City or Springfield areas and cost \$7.50 each, plus shipping and handling, and sales tax where applicable.

Kansas City Wildlands is an excellent companion to the Kansas City video tape. The 88-page book contains maps, color illustrations and a wealth of detail about 12 outdoor destinations in the Kansas City area. The soft-cover book costs \$10.75, plus shipping and handling, and sales tax where applicable.

To order these and other resources to help plan a Missouri outdoor vacation, visit www.mdcnatureshop.com or call toll-free 877/521-8632.

Mini-dugout race declared a 124-way tie

At first light April 24, a flotilla of 124 miniature dugout canoes prepared by grade-school classes in communities along the Missouri River embarked downriver from Brunswick, Mo. The canoes were expected to bob 184 miles downstream at the river's leisurely pace of 3 mph, reaching the finish line of the "race" at Augusta two days later.

The river had other ideas. Wind pushed most of the 14-inch boats into wing dikes or onto sand bars during the first week of the event.

By April 26, two boats had reached Jefferson City, but a week later there was still no sign of dugouts at Augusta. On May 9, event organizers declared all 124 classes winners and called off the active search.

"As the Big Muddy rolls on, some of your canoes will surely be found well downstream," wrote Jack Ryan, one of the event's organizers, to participating classes. "We will let you know if we become aware of such findings."

If you discover one of the dugout canoes, use the information contained in a film canister on the stern of the boat to contact the sponsoring class, or notify Ryan at lrryan@socket.net.

Bass tournament benefits Spinal Cord Society

Bass anglers have until midnight July 25 to register for the ninth Spinal Cord Society Buddy Bass Tournament July 31 and Aug. 1 at Bucksaw Marina on Truman Lake. Contestants will have a chance at winning a part of the \$50,000 worth of cash and prizes donated by sponsors. Participants also can attend an auction and barbecue the evening before the tournament. For registration information, contact Irvin McCoy at 913/451-6253, imccoy@massman.net.



Nevada youth in national limelight

Joshua Simpson, 12, of Nevada, Mo., hit the jackpot in the International Hunter Education Association's annual drawing for a dream hunt.

Simpson's name was drawn from thousands of newly certified hunters throughout North America. For this he won a hunt on the 3,000-acre J.B. Hunt Big Horn Lodge in Barry County. He will be accompanied by retired astronaut Gen. Joe Engle. The pair will co-host a half-hour Outdoor Life Network television show filmed during the hunt.





FIREARMS DEER SEASON SET FOR NOV. 13-23

Archers and hunters in urban areas will get extra days of deer hunting this year. Other portions of the firearms season remain the same length as last year for a total of 36 days. Seasons are:

- ▲ Archery Deer Season —Sept. 15-Nov. 12 and Nov. 24-Jan. 15
- ▲ Urban Portion of Firearms Deer Season—Oct. 8-11
- ▲ Youth Portion of Firearms Deer Season—Nov. 6 and 7
- ▲ November Portion of Firearms Deer Season—Nov. 13-23
- ▲ Muzzleloader Portion of Firearms Deer Season—Nov. 26-Dec. 5
- ▲ Antlerless Only Portion of Firearms Deer Season—Dec. 11-19.

This year, the urban deer hunting area will include Boone, Cass, Christian, Clay, Cole, Greene, Jackson, Platte, St. Charles, St. Louis and Webster counties.

Full details of deer hunting regulations are contained in the 2004 Fall Deer and Turkey Hunting Information booklet, available wherever hunting permits are sold.

Diana Bend trails win national acclaim

A national group dedicated to excellence in hiking trails has honored the Conservation Department's Design and Development Section for work on trails at Diana Bend Conservation Area.

The Coalition for Recreational Trails gave the Conservation Department its Trail Achievement Award for design and construction of the project. Matching funds from the federal Recreational Trails Program helped develop a disabled-accessible wooden boardwalk trail with viewing decks off Katy Trail State Park near Rocheport. A second trail included in the project leads to a viewing platform overlooking the Missouri River. Interpretive signs explain the value of wetlands visible from the trail. The award was presented during the Great Outdoors Week celebration last month in Washington, D.C.



Spring turkey harvest tops 60,000

Hunters checked a record 56,882 turkeys during the three-week spring hunting season. Young hunters killed 3,269 gobblers during the two-day youth hunting season, bringing the 2004 spring harvest total to 60,151. Despite widespread rain and wind, they bagged a record 29,018 turkeys the first week of the season.



Following in Lewis & Clark's PADDLE STROKES

If you want to retrace the Lewis and Clark journey through Missouri, you have to get out on the Missouri River. Fortunately, two canoe outfitters offer Big Muddy floating opportunities. To see the vistas that so enchanted the explorers 200 years ago, contact Mighty Mo Canoe Rentals, 573/698-3903, or Hilkemeyer's Canoe Rentals, 573/744-5245.

Outdoor Calendar

HUNTING	OPEN	CLOSE
Coyotes	5/10/04	3/31/05
Crow	11/1/04	3/3/05
Deer/Turkey, Archery	9/15/04	11/12/04
	11/24/04	1/15/05
Deer, Firearms		
Urban Anterless Only	10/8/04	10/11/04
Youth	11/6/04	11/7/04
November	11/13/04	11/23/04
Muzzleloader	11/26/04	12/5/04
Antlerless	12/11/04	12/19/04
(permits and regulations available in July)		
Groundhog	5/10/04	12/15/04
Squirrels	5/22/04	2/15/05
Rabbits	10/1/04	2/15/05
Turkey, fall firearms	10/11/04	10/24/04
Pheasants		
North Zone	11/1/04	1/15/05
South Zone	12/1/04	12/12/04
Quail	11/1/04	1/15/05
Ruffed Grouse	10/15/04	1/15/05
Doves*	9/1/04	11/9/04
Sora and Virginia Rails*	9/1/04	11/9/04
Common Snipe*	9/1/04	12/16/04
Woodcock*	10/15/04	11/28/04

* Subject to final Federal approval

FISHING

Black Bass (most southern streams)	5/22/04	2/28/05
Trout Parks	3/1/04	10/31/04
Bullfrog & Green Frog	Sunset 6/30/04	Midnight 10/31/04
Nongame Fish stream Gigging	9/15/04	1/31/05

TRAPPING

Beaver	11/15/04	3/31/05
Furbearers	11/15/04	2/15/05
Otters and Muskrats	11/15/04	varies
See regulations for otter zones, limits and dates		

For complete information about seasons, limits, methods and restrictions, consult the *Wildlife Code* and the current summaries of *Missouri Hunting and Trapping Regulations* and *Missouri Fishing Regulations*, the *Fall Deer and Turkey Hunting Information*, *Waterfowl Hunting Digest* and the *Migratory Bird Digest*. To find this information on our Web site go to <http://www.missouriconservation.org/regs/>.

The Conservation Department's computerized point-of-sale system allows you to purchase or replace your permits through local vendors or by phone. The toll-free number is 800/392-4115. Allow 10 days for delivery of telephone purchases. To purchase permits online go to <http://www.wildlifelicense.com/mo/>.

AGENT NOTEBOOK

On those early spring

fishing trips to my favorite pond the action can be fast and furious. The bass and bluegill seem unable to get enough of the small plastic lures I cast into the water. But the fast action never seems to last through the summer months.

So what do I do in the summer at my favorite fishing pond when the fishing action slows? I turn to froggin'.

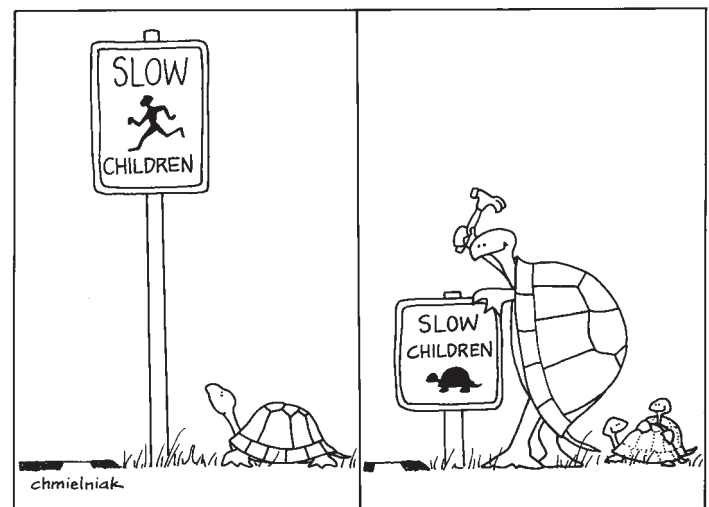
There is no better way to enjoy summer nights with kids than at the pond searching for frogs. The kids love trying to spot frog eyes with their flashlights. They also have a great time exploring the grass for bugs or grasshoppers, or shining their lights into the air at passing airplanes.

The frogging season in Missouri begins at sunset June 30 and runs through October 31. It's legal to take bullfrogs and green frogs. The daily limit of frogs is eight (8) in the aggregate with a possession limit of sixteen (16) frogs in the aggregate. On the water or the shore or banks, you can only possess the daily limit of frogs.

Hunters possessing a hunting permit may take frogs with a .22 caliber rim-fire rifle or pistol or by pellet gun, longbow, crossbow, hand or handnet. An artificial light may be used.

Anglers possessing a fishing permit may take frogs by hand, handnet, gig, longbow, trotline, throwline, limb line, bank line, jog line, snagging, snaring, grabbing or by pole and line. An artificial light may be used. The same daily and possession limits apply to both hunters and anglers.

When the summer fishing action slows, take a kid froggin'. You will be making memories that will last forever.— *Thomas M. Strother III*





Program Schedule

Television the way Nature intended!

Broadcast Stations

- Cape Girardeau** UPN "The Beat" WQTV / Saturdays 8:30 a.m.
- Columbia** KOMU (Ch 8 NBC) / Sundays 11:00 a.m.
- Hannibal** KHQA (Ch 7 CBS) / Weekends, check local listing for times
- Kansas City** KCPT (Ch 19 PBS) / Sundays 7:00 a.m.
- Kirkville** KTVO (Ch 3 ABC) / Saturdays 5:00 a.m.
- St. Joseph** KQTV (Ch 2 ABC) / Weekends, check local listings for times
- St. Louis** KSDK (Ch 5 NBC) / Sundays, 4:30 a.m.
- Warrensburg** KMOS (Ch 6 PBS) / Sundays 6:30 p.m.

Cable Stations

- Branson** Vacation Channel / Fri., Sat. 8:00 p.m.
- Brentwood** Brentwood City TV / Daily, check local listing for times
- Cape Girardeau** Charter Cable Ed. Ch. 23 / Thursdays 6:00 p.m.
- Chillicothe** Time Warner Cable Channel 6 / Wednesdays 7:00 p.m.
- Hillsboro** JCTV / Mondays 12 p.m. & 6 p.m.
- Independence** City 7 / Thurs. 2 p.m., Sat. 10 a.m. & Sundays 8 p.m.
- Joplin** KGCS / Sundays 6 p.m.
- Mexico** Mex-TV / Fridays 6:30 p.m. & Saturdays 6:30 p.m.
- Noel** TTV / Fridays 4:30 p.m.
- O'Fallon** City of O'Fallon Cable / Wednesdays 6:30 p.m.
- Parkville** City of Parkville / First and third Tuesdays of the month 6:30 p.m.
- Perryville** PVTV / Mondays 6 p.m.
- Raymore** Govt. Access-Channel 7 / Various, check local listings for times
- Raytown** City of Raytown Cable / Wed. 10:00 a.m. & Saturdays 8:00 p.m.
- St. Charles** City of St. Charles-Ch 20 / Tues. 5:00 p.m. and Wed. 10:00 a.m.
- St. Louis** Charter Communications / Saturdays 10:30 a.m.
- St. Louis** City TV 10 / Mondays 11:30 a.m., Wednesdays 3:30 p.m.
- St. Louis** Cooperating School Districts / Wednesdays 9 a.m.
- St. Louis** DHTV-21 / Mondays 10:30 a.m.
- St. Louis** KPTN-LP/TV58 / Thursdays 10:00 a.m.
- St. Peters** City of St. Peters Cable / Various, check local listings for times
- Ste. Genevieve** Public TV / Fridays 1 p.m., 6 p.m. & 12 midnight
- Springfield** KBLE36 / Nine times a week, check local listing for times
- Sullivan** Fidelity Cable-Channel 6 / Wed. 11:00 a.m. and Fri. 7:00 p.m.
- Union** TRC-TV7 / Tuesdays 3:00 p.m.
- West Plains** OCTV / Mondays 6:30 p.m.

Meet our Contributors

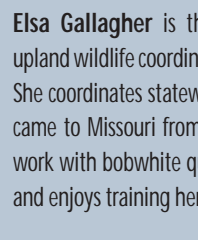


Chris Bove says his labor of love is conservation, and he's found ways to earn his living at it. Sometimes his job entails snorkeling with salmon, designing wildlife habitat and wading through paperwork. He lives with his wife and two daughters in Naches, Washington.

Research Fisheries Biologist **Duane Chapman** is employed by the U.S. Geological Survey. He has been working in fisheries since 1980. Duane lives in Columbia with his family of five. He is an avid fisherman, with a life-list of 216 species caught by hook and line.



Dan Dey is a USDA Forest Service research forester with 25 years experience in forest management and research. He and his wife, Mavis, live in New Bloomfield with their children, Laurel, Cabe and Clara.



Elsa Gallagher is the Conservation Department's upland wildlife coordinator in the Jefferson City office. She coordinates statewide quail recovery efforts. Elsa came to Missouri from New Mexico 10 years ago to work with bobwhite quail. She is an avid bird hunter and enjoys training her dogs.



Freelance outdoor writer **Mark Goodwin** lives in Jackson and teaches biology at Jackson Senior High School. He enjoys a wide variety of outdoor recreation and spends the bulk of his free time with family and friends in the Missouri Ozarks.

John Kabrick is a research forester with the USDA Forest Service's North Central Research Station. He lives north of Columbia with his wife, Laura, and sons, Thomas and Andrew.





Fog Patches

Warm summer evenings along cold Ozark spring branches are magical. In this view of the lower boil at Big Spring in Carter County, patches of fog drift down the valley in the soft and dimming light. — *Jim Rathert*