# The Glade

*Newsletter of the Missouri Chapter of the Society Conservation Biology*

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## News and Notes

•**New Editor Needed!:** I will no longer be able to serve MOSCB as the Glade editor, so we're looking for someone to help continue the great tradition of putting out this publication. It requires about 7 hours of work twice a year. Interested? Contact our Stacy James at moscb@conbio.org.

•**Annual meeting**: MOSCB held its annual meeting at the Missouri Natural Resources Conference (Feb 2006) where officers were elected. The minutes and executive board can be found on our website.

•**MOSCB-sponsored poster contest at MNRC:** Dustin Martin of the Fisheries and Wildlife Department at MU was the first place winner at our poster contest. Check out his article on page 4!

•**MOSCB-sponsored conservation workshop at MNRC**: The MOSCB conservation workshop at MNRC 2006 entitled "Bringing researchers and practitioners together" was a success. Next year's workshop theme will be biodiversity.

•**Silent Auction Items Sought:** MOSCB is looking for items to auction at the 2007 MNRC. All proceeds will benefit MOSCB. If you have something to donate, please email Tracy Rittenhouse at moscb@conbio.org.

•**Membership:** A separate sheet has been included in this edition of The Glade to try to raise funds for MOSCB. Your contribution will keep The Glade going!

•**Address change?**: If you change your address, please let our secretary know so we can keep up to date on where to send the Glade. Email Esther at moscb@conbio.org.

# Wildlife Conservation Value of Grass Buffers: What Good is a Sink?

*D. Todd Farrand,, University of Missouri-Columbia, Email: farrandD@missouri.edu*

Sometimes I get weird looks when I tell folks I work in agroecosystems. Perhaps it's the word – a combination of agriculture and ecosystem – that throws them off. For many, agriculture is the antithesis of conservation. It has reduced entire ecosystems (e.g., tallgrass prairie) to disconnected shreds. So why would I want to work there? A simple reason. Land.

Most of the U.S. is in private ownership (in Missouri the number is around 95%), and the vast majority of private lands are used for some type of agricultural endeavor. I firmly believe that a system of public reserves is vital for wildlife conservation, but it will never be sufficient to conserve the vast biodiversity of our state, much less our nation or our planet. We need to find more ways to make agricultural practices wildlife friendly while maintaining economic viability so that we can enlist the help of private landowners.

The conservation provisions of national farm policy legislation (i.e., the Farm Bill) are the primary tools available to assist in maintaining viable populations of wildlife in agricultural lands. The challenge is determining which set of practices to use where, because wildlife response is highly variable. It depends upon the species or community examined, the practices chosen, the landscape context of the focal site, and the frequency and type of management practices employed. Add to this complexity the variability within species from region-to-region and year-to-year, as well as across various production systems and the socio-economic states of farmers, and it quickly becomes apparent that one size will not fit all. A scientific knowledge base concerning the likely effects of all alternative practices is needed to guide decision-makers at all levels, from the land owner/operator to law makers in Washington, D.C.

One area where knowledge is lacking is a set of practices called Conservation Buffers. These practices replace annual crops like corn and soybeans with perennial vegetation (grass or trees), usually for a period of 15 years. Buffers can be placed within the field (e.g., grass-backed terraces) or at the edge of fields (e.g., filter strips), and typically occur as long, narrow strips of grass.

Although they are primarily designed to yield water quality benefits, buffers are promoted as being good for wildlife. What does that mean, "good for wildlife?" Well, it depends on how you define the terms "good" and "wildlife." We can assess the wildlife benefit provided by a practice or program on at least 3 levels. At the low end we can measure their use, in the middle we can measure reproductive activity, and at the high end we can measure true habitat quality via survival and population stability or growth.

**Do wildlife species use grass buffers?:** You bet. In my study of filter strips (a grass-based stream buffer practice) in northeast Missouri, my field techs and I documented 4 species of rodents (mice and voles), 33 breeding and 3 migratory species of birds, and 4 species of snakes. Additionally, we observed 13 species of mammals (deer, rabbits, meso-predators), reptiles (turtles and skinks), and amphibians (frogs and toads), plus 9 types of invertebrates. However, species of conservation concern were seen in low numbers, if at all. Other studies in the Midwest (primarily Iowa and Illinois) also have documented a variety of bird species in buffers, and one study documented several snake species. Few of the species documented in these studies were of conservation concern.

**Does reproduction occur in grass buffers?:** Yes. We recorded reproductive activity in 3 of 4 species of rodents, and found nests of 10 avian species. We also recorded young of opossum (*Diadelphis virginiatum*), white-tailed deer (*Odocoileus virginianus*), and several woodland-nesting birds. Other studies have documented avian nesting in buffers, but little attention has been paid to non-avian species.

**Is reproductive success in grass buffers sufficient to maintain populations?:** Not for birds. Various

studies have shown that predation pressure is high and nest success is likely too low to maintain stable populations over time. Thus, buffers are avian population sinks in the Midwest. Grass buffers likely are not ecological traps for birds; species I observed nest in other vegetation types at higher densities. Based on my observations in filter strips, rodent reproduction in most grass buffers is probably sufficient to maintain populations.

**What don't we know about wildlife-buffer relationships?:** There is quite a lot we don't know, especially about non-avian species. My study is the only study I am aware of to examine small mammal use of buffers. Two studies in the Midwest have examined snake use. For other vertebrates and invertebrates, we have virtually no information at all. Even for birds, there is much to learn about, including post-fledgling use and survival, winter use, and how the spatial arrangement of various types of buffers across the landscape may influence wildlife response.

**What good is a sink?:** I would not advocate removing grass buffers from the 2007 Farm Bill simply because they are sinks. Grass buffers do have a positive effect on aquatic systems by reducing the movement of sediment, nutrients and chemicals from crop fields to water bodies. However, some policy changes could mitigate some of the negative effects for birds.

The primary wildlife benefit afforded by grass buffers is an increase in usable space throughout the year for species that use grass cover exclusively (e.g., rodents) as well as for wider-ranging species (e.g., deer). This buttresses existing populations against declines and can be thought of as preventative medicine. That is, grass buffers help to "keep the common species common."

To help achieve conservation goals, however, we need to incorporate habitat needs of species of concern into the design and implementation of buffers. A current example of this is the new CP33 buffers, which include a shrub component to benefit northern bobwhite (*Colinus virginianus*). A similar tactic could improve filter strips for field sparrows (*Spizella pusilla*), a shrubland species of conservation concern in the tallgrass prairie Bird Conservation Region. Field sparrows were the most frequent nester in my study.

Planting mixtures of native grasses and forbs may increase the conservation value of buffers. Monocultures of exotic cool-season grass are the primary planting type in Missouri, and are dominant in other Midwestern states, because the seed is cheap and establishment is reliable. However, such plantings tended to have lower wildlife response than monocultures of native warm-season grass in northeast Missouri. Mixtures of native grasses and legumes have been planted only recently in Missouri. These have not been studied anywhere, but I suspect they will be at least as good as a native grass monoculture.

Of course, grass buffers will do more for achieving some conservation goals than others. Most grassland-dependent birds of conservation concern were rare in my study, as well as others in the Midwest. We need whole-field enrollments to help maintain these species (provided they are managed properly), but buffers may offer additional food sources.

So, back to our original question: What good is a sink? If we are content to provide more usable space for deer mice, white-tails, and red-winged blackbirds, grass buffers are good practice as is. However, if we want to stem the decline of many grassland and shrubland birds in agroecosystems, we need to think carefully about how we design and implement buffers. This includes plant composition, required maintenance, cost-share structures, and innovative compensation methods (e.g., biomass harvests for energy production or harvest of native seed). By themselves buffers appear to contribute little to conservation, but we know virtually nothing about cumulative landscape effects. Obtaining wildlife conservation benefits from buffer practices may be possible if we can fill the knowledge gaps to better inform our decisions.

# Status of the Blacknose Shiner, *Notropis heterolepis* in Western Missouri

*Dustin Martin, University of Missouri, Email: drmhcd@mizzou.edu*

**Introduction:** The blacknose shiner (*Notropis heterolepis)* is a small minnow that lives in prairie streams and glacial lakes with considerable amounts of aquatic vegetation and low turbidity. Its range spans from southern Canada through the Great Lakes and into the Midwestern United States (Trautman 1981). In Missouri, this species is limited to prairie and Ozark border streams that have a substrate consisting of sand, gravel, or cobble with overlying muck or organic debris (Pflieger 1997).

The blacknose shiner is in decline in the entire southern portion of its range throughout the Midwest. In Missouri, the blacknose shiner is listed as state imperiled (S2) (Missouri Natural Heritage Program 2005). Other studies have shown that the blacknose shiner has been declining in other states in the southern portion of its range. In Illinois, the blacknose shiner is listed as an endangered fish due to the decline in range (Page 2000). Similar studies have shown the same results in Iowa, Wisconsin, Ohio, and South Dakota (Backlund 1995, Becker 1983, Bernstein 2000, Trautman 1981). This decline has been attributed to several factors including the removal of aquatic vegetation, habitat degradation, land use changes, siltation of streams, and the introduction of predator species (Becker 1983, Bernstein 2000, Page 2002, Pflieger 1997, Trautman 1981).

According to the Missouri Natural Heritage Program, there are 66 sites where the blacknose shiner has been found in Missouri streams (2005). These sites occur in three areas of Missouri, while ours focuses only on the west-central area. The objectives of our study were to examine the presence/absence of the blacknose shiner in the west-central Missouri historical populations. This study will also serve as a foundation for future studies on this species and others small prairie stream species that are declining in numbers.

**Methods:** Sites were selected using maps created from the Missouri Natural Heritage Database and the Missouri Resource Assessment Partnership (MORAP) model (GAP Report 2005). The Missouri Natural Heritage Database was used to identify and locate stream segments that have previously held blacknose shiners. The MORAP model was used to identify those that have suitable habitat for the blacknose shiner.

These models were used in seven 8-digit hydrologic units historically known to contain blacknose shiners in west-central Missouri. The potential sites were then limited to facilitate sampling. The limits placed on these streams included: limiting streams to Strahler orders one through four (Strahler 1957), to those within 100 meters of a road access, and also including those streams that fell on Missouri Department of Conservation land. This resulted in 272 potential stream segments (N=272).

From this initial population of 272 stream segments, we used Statistical Analysis Software (SAS) to generate a simple random selection of 50 sites with a set of fifty replacement sites. We further divided each stream segment selected into five 200-meter reaches with a 100-meter buffer around roads and randomly selected two reaches to sample.

Sampling was focused on pools due to the known habitat preferences of blacknose shiners (Pflieger 1997), and data was recorded separately for each pool. Sampling was done by seining because of the possibility of encountering the Niangua darter, *Etheostoma nianguae*, a federally threatened species and state endangered species (Missouri Natural Heritage Program 2005). All fish captured were identified in the field using Pflieger's *Fishes of Missouri* (1997) and released unharmed with the exception of difficult to identify specimens. These fish were then preserved in a 10% formalin solution and identified in the laboratory.

Data was entered into a Microsoft Access database created for this project. Analysis was run using Microsoft Access and Excel to examine relationships between sites and the relationships between other fish and the presence/absence of the blacknose shiner.

**Results:** Sampling was restricted to a total of 34 sites due to drought conditions that existed late in the sampling season and difficulty in achieving permission to sample on private property. In those 34 sites, we found blacknose shiner present in 3 sites (8.8%). These sites included two sites in Little Weaubleau Creek and one in Dry Auglaize Creek. Blacknose shiners have not previously been sampled in Little Weaubleau Creek, creating two new Heritage sites for this species in Missouri.

In those sampled sites that were also Heritage sites for blacknose shiners, we found the blacknose shiner present in one out of six sites sampled (16.6%). In general, this site had less siltation, less turbid water, and more aquatic vegetation than did those that did not contain blacknose shiners. Also, most pools that had blacknose shiners present had no predatory species present (60%).

**Discussion:** The percentage of sites at which we found the blacknose shiners, 8.8%, was lower than our expectations. Therefore, the status of the blacknose shiners in west-central Missouri seems to be precarious and warrants further study. They currently exist in highly isolated populations in Ozark border streams and appear vulnerable due to the strict habitat requirements of the species.

Sites where blacknose shiners were present had an extensive amount of aquatic vegetation. The streams in this region were once upland prairie streams that had little siltation, more aquatic vegetation, and less turbid waters. Most of the pools (60%) with blacknose shiners present had no predatory species of fish collected. The two exceptions included a pool with extensive aquatic vegetation for cover that would seemingly allow an escape from predation and a remnant pool, the only remaining pool during a drought.

During sampling, we encountered two main difficulties: contacting landowners to obtain permission and weather. During early summer, there was enough rain to flood most of our sites for a period of about one week. After this, there was no significant rainfall until the end of our sampling season. This led to many of our sites being dry upon arrival.

Despite these difficulties, we feel that this study provides a reasonable indication of the blacknose shiner's present distribution in west-central Missouri. As this study shows, and other previous studies have shown, there has been and seems to continue to be a decline in the species in its southern range. Further studies should be done to assess the central Missouri populations before considering any further action to the current listing of this species in Missouri.

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# What does MoDOT do for Bears and Shiners and Darters

*John Mehuys, Missouri Department of Transportation, email: John.Mehuys@modot.mo.gov*

Most devotees of conservation biology may ask what the Missouri Department of Transportation (MoDOT) has to do with their chosen field. At first glance one might think that no relationship exists. However, there is much that MoDOT does behind the scenes of roadway construction and maintenance that is directly related to conservation biology.

MoDOT has an active environmental section that carries out a distinct and ever-evolving environmental policy. MoDOT's environmental policy is driven primarily through compliance with, but not limited to the following federal laws:

- National Environmental Policy Act (NEPA), used primarily as a decision document
- Clean Water Act (CWA) specifically Sections 401, 402 and 404 dealing with state water quality certification; NPDES (National Pollution Discharge Elimination System) program, dealing primarily with erosion and sediment control; and dealing with the discharge of fill material into streams, wetlands and special aquatic sites, respectively
- Endangered Species Act (ESA), dealing primarily with Federally listed species and with close coordination with Missouri Department of Conservation (MDC) and US Fish and Wildlife Service (FWS) on state-listed and other sensitive plant, aquatic and wildlife species and their habitats
- Department of Transportation Act, Section 4(f) dealing with public park lands

NEPA is used as a tool for prescreening, planning and as a decision document. It is an opportunity for public input on larger projects and for all resource agencies to pre-screen for a wide range of environmental and socio-economic impacts. By evaluating various alternate corridors, planners can avoid or minimize impacts to the environment and society.

CWA and its applicable sections have a large role in highway construction and maintenance activities. Highways, being linear in nature, will sooner rather than later cross a stream with its associated floodplains and wetland areas. Both streams and wetlands are subject to regulation under Sections 401 and 404. Section 401 is administered by the Missouri Department of Natural Resources (MDNR)and is coordinated with US Army Corps of Engineers (COE) in issuance of permits and setting ratios for mitigation. Section 404 requires approval from the regulating authority, COE, to discharge fill materials into waters of the United States.

CWA compliance, specifically Section 404, has resulted in MoDOT creating approximately 90 wetland mitigation sites, totaling in excess of 500 acres and ranging in size from 0.1 - 185 acres. Many of these sites have been created within the watershed of impact and are associated with or near highway right of way. The single largest mitigation wetland to date is the 185-acre Grand River Wetland Mitigation site near Chillicothe, MO. This wetland site includes a 52-acre oxbow and two large moist soil management units. Several acres have been planted to hard mast forest trees, and a large transplanting of wetland plant species were established within exclosure units to ensure establishment success. Since construction completion the site has been surveyed regularly by a professional ornithologist and at last count, nearly 200 bird species had been identified as either permanent or migratory residents of the site.

Threatened and endangered species issues arise from time to time giving MoDOT opportunities to survey for existing populations, thus updating known information, and to plan for remediation and/or relocation. Typical ESA compliance involves consultation with FWS and MDC and involves concurrence on incidental takes or no adverse impact. However, many times MoDOT has had the opportunity to plan for and initiate relocation, enhancement and protection projects along with highway

construction. An example is the *Geocarpon minimum* (an endangered plant) relocation in St Clair County adjacent to new Route 13 lane additions. MoDOT was able to secure the purchase of a 5-acre sandstone glade adjacent to the new highway construction and within-site of the *G. minimum* population to be displaced. This project to date is considered a highly successful relocation with the Geocarpon showing signs of population increase. Other ESA efforts have included construction of an artificial shoal and relocation of Pink Mucket, *Lamsilis abrupta,* and relocation of other Pink Mucket populations within nearby stream habitat as well as a Neosho Mucket, *Lampsilis rafinesqueana,* relocation within Shoal Creek in Jasper County. Most recently a population and habitat for Missouri Bladder-pod, *Lesquerella filiformis,* was damaged during a bridge replacement. MoDOT purchased enough extra right of way to recreate Bladder-pod habitat and then covered the site with propagule-bearing soil. This site will be monitored for re-establishment success for a 2-year period. If plants do not reestablish at the site, MoDOT will coordinate with MDC to obtain seed from a known Bladder-pod population, on the nearby Rocky Barrens Conservation Area. During the last few years MoDOT has been upgrading Route 60 in Butler, Carter, Shannon and Howell Counties. Incorporated into the lane additions are several bear crossings. These are variable in width and length but are intended to be a minimum of 1000 feet in length and roughly 300 feet wide. These crossings have been shown to be more attractive to bears moving around their territory since the bears prefer to cross open areas the width of two lanes of traffic. MoDOT has gated caves within right of way to protect potential bat habitat and has worked with both MDNR and MDC to reduce off-site impacts (related to roadway construction activities) to sensitive aquatic species such as Niangua Darter, *Etheostoma nianguae,* Topeka Shiner, *Notropis Topeka,* Pallid Sturgeon, *Scaphirhynchus albus,* and Tumbling Creek Cavesnail, *Antrobia culveri.*

The Department of Transportation Act, Section 4(f) has enabled MoDOT, both incidentally and deliberately, to create habitat where habitat had been lost due to farming or other anthropogenic perturbations. A prime example of this is the parkland mitigation purchased for and added to Creve Coeur Park in St Louis County. This land purchase was associated with the Page Avenue Bridge and expressway expansion through the park and into St. Charles County. Approximately 1,100 acres were purchased, a 75-acre wetland mitigation site was constructed and a large farmed wetland known locally as Little Lake was restored. Since being purchased and added to St. Louis County parklands, Little Lake has been allowed to function as a seasonal wetland and has become a well-established birding site with known breeding pairs of American Bittern, *Botarus lentiginosus,* and a summer population of adult Ruddy Ducks, *Oxyura jamaicensi,* a species seldom observed as a summer inhabitant in Missouri. Since incorporation into the park, much of the acreage has been planted to native grasses and forbs creating a large and diverse area of habitat within an urban context.

Most recently a MoDOT employee, (Chris Shulse) has initiated a research project in partnership with MDC and researchers at the University of Missouri – Columbia to examine the success of mitigation and man-made wetland construction as it relates to amphibian population health.

MoDOT does maintain its basic goal of building a safe and economical roadway system for the taxpayers of Missouri. However, underlying roadway construction and maintenance is the important work of creating habitat, protecting endangered species and actively using environmental policy and BMP's to protect waters and wildlife of the state. MoDOT biologists and wetland specialists are always evaluating and incorporating innovative ways to improve restoration projects while actively avoiding and minimizing impacts to sensitive habitats and species.

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*When one tugs at a single thing in nature,*
*he finds it attached to the rest of the world. --John Muir*

## Membership Information

The goal of MOSCB is to promote communication among conservation biologists throughout the state of Missouri. Membership in MOSCB is free. Please visit our MOSCB web page for more detailed information (http://www.snr.missouri.edu/moscb).

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