



Life in the Rocks



The Newsletter of the Arkansas Game and Fish Commission Nongame Aquatics Program

Keeping our Natural State 'Natural': Preventing the spread of Aquatic Nuisance Species

By Shawn Sanders, Nongame Aquatics Technician

Activities such as boating, fishing, water-skiing, and canoeing are great ways to enjoy Arkansas' lakes and rivers. It is easy to understand why we see so many trailers pulling all types of boats around the state and even into other states. What may go unseen are organisms that may be stowaways on these boats and trailers - harmful plants, animals, and other organisms that may wreak havoc on our state's natural resources.

If you have ever watched YouTube.com, you may have seen flying fish when boaters go down the Mississippi or Illinois Rivers, or you may have heard about zebra mussels. These species were brought to the U.S. by different actions (ballast water and fish farming), but both have caused ecological problems within waterways. There are a number of aquatic nuisance species that have been spread by recreational users, such as boaters, who may not have known it was happening.

Why is it important to worry about the spread of these species? Some reasons relate back to boaters and fishermen. These species may degrade ecosystems and impact gamefish populations. They may clog your boat's cooling system and jam steering equipment. Finally, they may make waterways unusable for recreational purposes.



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Prevent the transport of nuisance species.
Clean all recreational equipment.

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How do responsible boaters stop the spread of 'hitchhikers' that may be on their boats and trailers? First, remove any visible mud, plants, or animals. This action includes flushing the water system of your boat engine, drying your boat for 48 hours when launching into uninfested waters, and cleaning any fouled surfaces with power-washers to remove algae or mussels. Get rid of any water on the boat, including live-wells, and dry your boat. Finally, never release any plants or animals into any body of water unless they came from the same body of water.

What species in Arkansas may be spread?

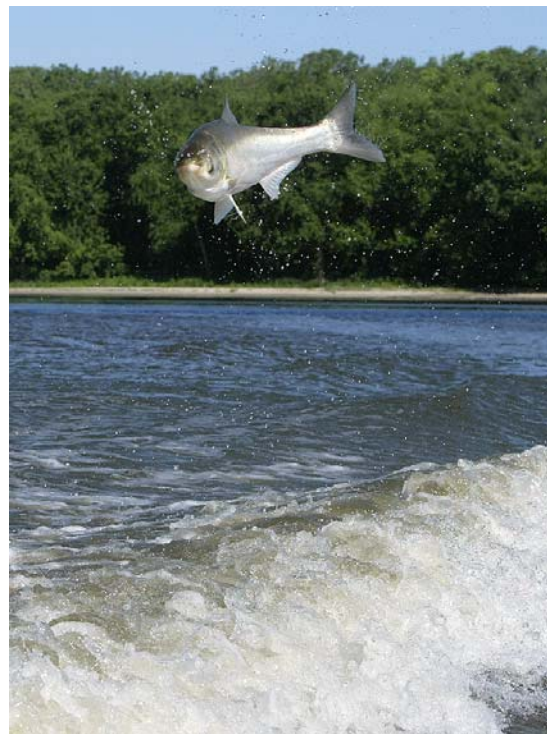
While it could be something we don't yet know about, there are a number of aquatic nuisance species that are recognized to be of concern in Arkansas (listed first by their common name, followed by their scientific name): Silver carp (*Hypophthalmichthys molitrix*), Bighead carp (*Hypophthalmichthys nobilis*), Black carp (*Mylopharyngodon piceus*), Northern Snakehead (*Channa argus*), White Perch (*Morone americana*), Yellow bass (*Morone mississippiensis*), Yellow perch (*Perca flavescens*), Alligatorweed (*Alternanthera philoxeroides*), Brazilian waterweed (*Egeria densa*), Common reed (*Phragmites australis*), Curly pondweed (*Potamogeton crispus*), Didymo (*Didymosphenia geminata*), Duck lettuce (*Ottelia alismoides*), Eurasian watermilfoil (*Myriophyllum spicatum*), Giant Lyngbya (*Lyngbya wollei*), Hydrilla (*Hydrilla verticillata*), Uruguayan waterprimrose

(*Ludwigia hexapetala*), Water hyacinth (*Eichhornia crassipes*), Water lettuce (*Pistia stratiotes*), Asian clam (*Corbicula fluminea*), and zebra mussels (*Dreissena polymorpha*).

The message that all users of aquatic resources within Arkansas need to know is that we all can have an impact on the environment, both in the positive or negative.

For more information, visit
<http://www.protectyourwaters.net/>

Below are two invasive species that can cause problems in Arkansas: left – zebra mussels can encrust and kill native mussels and crayfish, and impact sport and commercial fishing; right – jumping silver carp can be a hazard to boaters (Missouri Department of Conservation photo).



Karst Conservation Planning - International Communication to Aid Local Conservation

By Brian Wagner, Nongame Aquatics Biologist

Nature Conservancy Karst Biologist Mike Slay recently provided me with a unique opportunity. He invited me to be the local partner on the Arkansas team in a Karst Conservation Planning Workshop. The workshop was hosted in Eureka Springs where we spent a week working in teams, and collaborating among teams, to start developing Conservation Action Plans for our various areas of karst habitat. "Karst" refers to limestone areas characterized by numerous springs, caves, sinkholes, and underground streams.

The Arkansas team's effort focused on conservation targets to benefit protection of Ozark cavefish, cave crayfish, bats, and various rare cave invertebrates in Benton and Washington counties. Our scope fell between the Indiana team, which was focusing on two specific sites in hopes of developing a model that could be adapted elsewhere, and the Tennessee team, who aimed at a state-wide plan dovetailing with their State Wildlife Action Plan. Our three teams were similar in the types of resources we were looking at and the level of information at our disposal. This was a contrast to the other two teams.

The Dominican Republic team was planning for a preserve with much less development threat than we see. While they have limited information about the fauna of their caves, they

have the advantage of being able to maintain the status quo.

At the other end of the spectrum fell the Mexico team, working in the state of Quintana Roo on the Yucatan Peninsula. In their area, there is little surface water other than "cenotes" (pronounced sin-o-tays...they are water-filled sinkholes characteristic of the Yucatan) connected to vast underground rivers. The groundwater in their area is under severe threat, due to rapid development for tourism spreading from Cancun and Cozumel. They are already seeing significant groundwater pollution, impacting the reefs where the water upwells off the coast – the same reefs the tourists travel there to enjoy.

The broad range of concerns across these groups made for useful input as we worked to refine our conservation targets, assess their viability, and identify key threats. The collaboration will continue this fall when we reconvene as a group to develop strategies to address these threats, define measures of success, and develop monitoring plans.

Through this international teamwork, and the fresh perspectives it provides, I believe better plans will be developed to conserve resources right here in *The Natural State*. I am grateful for the opportunity to be part of it!

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Fayetteville Shale Exploration: An Economic Boom with possible Long-Term Environmental Risks

By Shawn Sanders, Nongame Aquatics Technician

The Fayetteville Shale is a Mississippian-age rock strata that is the geologic equivalent of the Caney Shale in Oklahoma and the Barnett Shale in North Texas. The Fayetteville Shale extends across several counties within the Arkoma basin with production already established over north central Arkansas.

The thickness of the Fayetteville Shale ranges from less than 50 feet in the western portion to over 500 feet in the eastern portion. Drill depths of the Fayetteville Shale range from 1,500 to 6,000 feet. During the period ranging from 2005 to 2007, approximately 2.5 million acres were leased. The Arkansas Geological Survey reported, as of August 2006, over 330 natural gas wells had been drilled and completed (M.R. Ratchford, Arkansas Geologic Commission).

Natural gas is extracted from the shale by fracturing the shale with water (hydraulic fracturing – “frac”), using large amounts of water to break through the rock. Environmental groups are concerned about the volume of water used and the impacts associated with storage of used frac-water. Generally, frac-water and other harmful chemicals resulting from the process are stored in steel tanks and eventually pumped into old gas reservoirs.

State and Federal agencies permit, oversee, and regulate natural gas wells. The Arkansas Oil and Gas Commission is responsible for most aspects of exploration and permitting of wells, while the Arkansas Department of Environmental Quality (ADEQ) is responsible

for aspects related to frac disposal, storage pits, and related runoff of materials. Finally, the Arkansas Natural Resources Commission (ANRC) and the Army Corps of Engineers are responsible for water quality issues linked to well exploration and drilling.

State agencies and non-governmental organizations (NGO’s) have asked the Arkansas legislature to increase funding for more ADEQ and ANRC inspectors throughout the state, and for more natural gas well exploration oversight. However, the natural gas industry contends that it is a self-regulating industry, and there is no danger to the environment.

The increased gas exploration within Arkansas has prompted an economic ‘boom’ felt by many local communities and landowners. With proper education of landowners and residents on the environmental effects of this type of industry, and with proper and timely oversight and regulation, this may provide some much needed fuel. However, it is possible that exploitation of this resource will result in long-term environmental problems within our aquatic environments. State and Federal natural resource agencies are working to develop and encourage implementation of best management practices (BMP’s) to protect stream resources in mined areas, but it will take the support of Arkansas landowners to ensure their lands are not degraded by environmentally insensitive gas extraction. Let’s keep our rivers, streams, and lakes “Natural!”

Pebbles...

(Quick notes on what we've been up to...)

- Brian and Shawn did a two-day display on crayfish at Earth Day at the Little Rock Zoo.
- Bill and Kelly attended the AGFC – US Forest Service Coop meeting.
- Brian attended the Arkansas Water Resource Conference where he presented the results of AGFC's research on Williams' crayfish as part of a group of talks on State Wildlife Grants research.
- Kelly conducted a herpetological survey at Grassy Lake in Hempstead County.
- Brian, and particularly Shawn, provided assistance on surveys of northern snakehead fish populations found in east Arkansas.
- Brian and Shawn did surveys for burrowing crayfish at locations in Grant and Hot Spring counties.
- Brian, Kelly, and Bill, along with several other Fisheries Division staff, attended the Ozarks Summit in West Plains, Missouri.
- Brian met several times with staff of the Nature Conservancy (TNC) to work on the Arkansas Aquatic GAP project.
- Kelly conducted numerous salamander surveys in the southwestern Ouachitas.
- Brian completed training to renew CPR certification.
- Bill, Kelly, and Shawn assisted with the Youth Expo at Lake Sylvia.
- Brian assisted USFWS, TNC, and University of Arkansas – Pine Bluff personnel to collect yellowcheek darters for propagation research at Greers Ferry National Fish Hatchery.
- Kelly hosted an Alligator Management Team meeting in Benton.
- Brian, Kelly, and Bill attended a Budget Unit Managers meeting in Mayflower.
- Brian and Assistant Chief Steve Filipek represented the Fisheries Division at a Partners for Fish and Wildlife program grant application meeting.





Photograph by Lee Holt, AGFC.

The northern snakehead fish, *Channa argus*, is the latest in a series of foreign species to make their way into waters of the *Natural State*.



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