Oklahoma's State and Federally listed Endangered, Threatended, Proposed and Candidate species.

Species (Status)*	Adair	Alfalfa	Atoka	Beaver	Beckham	Blaine	Bryan	Caddo	Canadian	Carter	Cherokee	Choctaw	Cimarron	Cleveland	Coal	Comanche	Cotton	Craig	Creek	Custer	Delaware	Dewey	Ellis	Garfield	Garvin	Grady	Grant	Greer	Harmon	Harper	Haskell	Hughes	Jackson	Jefferson	Johnston	Kay	Kingfisher	Kiowa	Latimer	LeFlore	Lincoln
Indiana Bat (LE)	Y																				Y																			Y	
Gray Bat (LE)	Y										Y							Y			Y																				
Ozark Big Eared Bat (LE)	Y										Y										Y																				
Northern long-eared bat (PE)	Y		Y								Y	Y						Y			Y										Y								Y	Y	
Red Cockaded Woodpecker (LE)																																									
Black Capped Vireo (LE)						Y		Y	Y							Y	Y																				Y			
Lesser Prairie-chicken (PT)		Y		Y									Y									Y	Y							Y											
Sprague's Pipit (C)									Y					Y												Y								Y				Y	Y		
Interior Least Tern (LE)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Piping Plover (LT)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Whooping Crane (LE-CH)		C	Y	Y	Y	Y	Y	Y	Y	Y				Y	Y	Y	Y			Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y			Y
Red Knot (LT)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Arkansas River Shiner (LT-CH)		Y		C		C		C	C					C						C		Y	Y	Y	Y	C				C		C					C				
Arkansas Darter (C)				Y							Y							Y			Y									Y											
Neosho Madtom (LT)																		Y																							
Leopard Darter (LT-CH)												Y																												Y	
Ozark Cavefish (LT)																					Y																				
Long-nosed Darter (SE)	Y																																								
Black-sided Darter (SE)	Y																																							Y	
Ouachita Rock Pocketbook (LE)			Y									Y																											Y	Y	
Scaleshell Mussel (LE)												Y																												Y	
Winged Mapleleaf (LE)												Y																												Y	
Neosho Mucket Mussel (LE)	C										C							Y			C																				
Rabbitsfoot Mussel (LT)	Y										Y										Y																				
American Burying Beetle (LE)	Y		Y				Y			Y	Y	Y		Y	Y			Y	Y		Y				Y						Y	Y			Y	Y			Y	Y	Y
Rattlesnake Master Bore Moth (C)																																									
American Alligator (LT-SA)																																									
Harperella (LE)																																								Y	
Oklahoma Cave Crayfish (SE)																					Y																				

* Blue underlined text links to species fact sheet

Oklahoma's State and Federally listed Endangered, Threatended, Proposed and Candidate species.

Species (Status)*	Logan	Love	Major	Marshall	Mayes	McClain	McCurtain	McIntosh	Murray	Muskogee	Noble	Nowata	Okfuskee	Oklahoma	Okmulgee	Osage	Ottawa	Pawnee	Payne	Pittsburg	Pontotoc	Pottawato	Pushmatah	Roger Mills	Rogers	Seminole	Sequoyah	Stephens	Texas	Tillman	Tulsa	Wagoner	Washingto	Washita	Woods	Woodward
Indiana Bat (LE)																							Y				Y									
Gray Bat (LE)					Y					Y							Y										Y					Y				
Ozark Big Eared Bat (LE)																	Y										Y									
Northern long-eared bat (PE)					Y		Y	Y		Y		Y			Y		Y			Y			Y		Y		Y				Y	Y	Y			
Red Cockaded Woodpecker (LE)							Y																Y													
Black Capped Vireo (LE)																														Y						
Lesser Prairie-chicken (PT)																								Y					Y						Y	Y
Sprague's Pipit (C)					Y	Y			Y										Y	Y																
Interior Least Tern (LE)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Piping Plover (LT)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Whooping Crane (LE-CH)	Y	Y	Y	Y		Y		Y	Y	Y	Y		Y	Y	Y	Y		Y	Y		Y	Y		Y	Y	Y		Y	Y	Y		Y	Y	Y	Y	Y
Red Knot (LT)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Arkansas River Shiner (LT-CH)	C		C			C		C			Y			Y					Y	C	C	C		Y		C			Y						C	C
Arkansas Darter (C)					Y												Y								Y											
Neosho Madtom (LT)																	Y																			
Leopard Darter (LT-CH)							C																C													
Ozark Cavefish (LT)					Y												Y																			
Long-nosed Darter (SE)																											Y									
Black-sided Darter (SE)							Y																				Y									
Ouachita Rock Pocketbook (LE)							Y													Y			Y													
Scaleshell Mussel (LE)							Y																Y													
Winged Mapleleaf (LE)							Y										Y						Y													
Neosho Mucket Mussel (LE)					Y							Y				Y	Y								Y							Y	Y			
Rabbitsfoot Mussel (LT)							C																		C											
American Burying Beetle (LE)		Y		Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y				Y	Y	Y			
Rattlesnake Master Bore Moth (C)																Y																				
American Alligator (LT-SA)							Y																													
Harperella (LE)							Y																													
Oklahoma Cave Crayfish (SE)																																				

* Blue underlined text links to species fact sheet

U.S. Fish & Wildlife Service

Indiana Bat

Oklahoma Ecological Service Field Office

Indiana Bat
Myotis sodalis

Description

The Indiana bat is a medium-sized bat with dull gray to brown fur. The bat has a wingspan of 9 to 11 inches, weighs between 5 to 11 grams, and typically is about 2.9 – 3.9 inches long. The calcar (i.e., bone attached to the foot that helps support the tail membrane) is strongly keeled in most individuals. The hind feet appear small and delicate and the hair on the toes does not extend past the claws.

Distribution

The Indiana bat primarily is found in the eastern and Midwestern United States. The species is rare in eastern Oklahoma, which represents the western limit of its range.

Life History

The Indiana bat is a migratory bat that hibernates in cool caves and mines in the winter and wooded areas in the spring and summer. During autumn, they begin their migration towards hibernacula. They swarm and forage around hibernacula to replenish fat stores and mate prior to entering hibernation. Only a small percentage of caves and cave-like structures meet the specific conditions required by Indiana bats, which explains why so much of the known population hibernates in just a few sites. Females become pregnant when they emerge from hibernation in spring. They form small maternity colonies (typically 100 or fewer individuals) under the exfoliating bark of large, often dead, trees. Young bats are able to fly within three to five weeks after birth. The maternity colony begins to disperse after the young can fly. Less is known about the summer life history of males and non-reproductive females. Some males spend the summer near their hibernacula while others disperse widely. Males and non-reproductive females will either roost individually or in small numbers. Indiana bats forage for insects along forest edges, in or beneath forest canopy, over ponds, and along streams.

Conservation

The Indiana bat was federally-listed as endangered on March 11, 1967. Indiana bats are subject to both natural and human threats. Due to the concentration of a large number of individuals in a relatively few hibernacula, human disturbance or natural catastrophes at these sites are serious threats. Other threats include degradation and loss of summer habitat. Conservation efforts include protecting important hibernacula and preventing disturbance to winter populations; protecting foraging and nursery roost habitat from destruction; and educating the public about the danger of disturbing bats and their ecological importance.

Indiana Bat. USFWS

What Can You Do to Help

Do not enter gated caves/mines or caves/mines with a sign at the entrance which indicates it is used by endangered bats. These gates and signs are in place to protect bat colonies that are sensitive to human disturbance. Disturbance during early summer before the young can fly can result in thousands of flightless young becoming dislodged and falling to their deaths. Every arousal during hibernation is energetically expensive. Fat reserves required to sustain the bats are utilized to some extent during each winter arousal. Too many arousals during hibernation can exhaust a bat's limited fat reserves and result in mortality.

References

U. S. Fish and Wildlife Service. 2007. *Indiana Bat (Myotis sodalis) Draft Recovery Plan*: First Revision. Fort Snelling, MN. 258 pp.

For Further Information

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Oklahoma
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August 2011

U.S. Fish & Wildlife Service

Gray Bat

Oklahoma Ecological Service Field Office

GRAY BAT

Myotis grisescens

Description

The gray bat is a medium-sized bat with an overall length of about 3.5 inches and a wingspan of 10 - 11 inches. Weights range between approximately 7 - 16 grams. The gray bat can be distinguished from other species in the genus *Myotis* by the uniform color of its dorsal fur in which hair shafts are the same color from base to tip. The dorsal fur is gray, but often bleaches to reddish-brown by early summer. Additionally, the wing membrane attaches at the ankle of the foot instead of at the base of the toes as in other members of the genus *Myotis*.

Distribution

The gray bat occurs in limestone karst areas (*i.e.*, a landscape marked by caves, sinkholes, springs and other features) of the southeastern and midwestern United States. In Oklahoma, it occurs in the Ozark Highlands ecoregion in the northeastern part of the state.

Life History

Gray bats inhabit caves year-round. They are known to migrate up to 300 miles between summer and winter caves. Gray bats have such specific cave requirements that fewer than five percent of caves are suitable. Winter hibernation sites typically are deep vertical caves that trap large volumes of cold air. Summer caves must be warm or have restricted rooms that can trap the body heat of clustered bats. Gray bats mate in the fall when they begin to arrive at hibernacula. During hibernation, the species typically forms large clusters with some aggregations numbering in the hundreds of thousands of individuals. It is estimated that 90 percent of the species range-wide population hibernates in only nine caves. No hibernating colonies are known from Oklahoma. Adult females begin to emerge from hibernation in late March, followed by juveniles and adult males. Females become pregnant after emerging in the spring, and form maternity colonies in caves of a few hundred to many thousands of individuals. Gray bat summer colonies typically use several roosting caves located along a stream, river, or reservoir.

Gray Bat. © Bat Conservation International

Within Oklahoma, maternity colonies are known from caves in Adair, Cherokee, Delaware, and Ottawa counties. A single offspring is born in late May or early June. Newborns typically become volant within 21-33 days after birth. Gray bats feed on flying insects over bodies of water including rivers, streams, and lakes. Mayflies, caddisflies, and stoneflies make up the major part of their diet, but beetles and moths also are consumed.

Conservation

The gray bat was federally-listed as endangered on April 28, 1976. The gray bat has declined primarily due to human disturbance in caves. Habitat loss and degradation and contamination from pesticides also are considered a cause of decline. Natural flooding and impoundment of waterways has resulted in temporary impacts to some caves and the complete submersion and loss of other important cave sites. Conservation efforts include protecting known gray bat caves and wooded riparian corridors along streams near caves. Recovery efforts also include educating the public about the danger of disturbing bats and their ecological importance.

What Can You Do to Help

Do not enter gated caves/mines or caves/mines with a sign at the entrance which indicates it is used by endangered bats. These gates and signs are in place to protect bat colonies that are sensitive to human disturbance. Disturbance during early summer before the young can fly can result in thousands of flightless young becoming dislodged and falling to their deaths. Every arousal during hibernation is energetically expensive. Fat reserves required to sustain the bats are utilized to some extent during each winter arousal. Too many arousals during hibernation can exhaust a bat's limited fat reserves and result in mortality.

References

U. S. Fish and Wildlife Service. 1982. *Gray Bat Recovery Plan*. Minneapolis, MN. 26pp.

U. S. Fish and Wildlife Service. 2009. *Gray Bat 5-Year Review*. Columbia, MO. 33 pp.

For Further Information

U.S. Fish and Wildlife Service
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August 2011

U.S. Fish & Wildlife Service

Ozark Big-eared Bat

Oklahoma Ecological Service Field Office

Ozark Big-eared Bat
Corynorhinus townsendii ingens

Description

The Ozark big-eared bat is a medium-sized bat with distinctively large ears (1.2 – 1.5-inches long). Prominent lumps occur on either side of the face. The long fur is light to dark brown on the back and paler tan underneath. The bat is about 3.5 – 4.5 inches long, has a wingspan of 12 – 13 inches, and weighs from 5 – 13 grams.

Distribution

The current range of the Ozark big-eared bat includes the Ozark Highlands and Boston Mountains ecoregions of northeastern Oklahoma and northwestern and north-central Arkansas. The population is estimated to currently consist of about 1,800 individual bats.

Life History

The Ozark big-eared bat inhabits caves year-round. The caves typically are located in oak-hickory hardwood forests. Ozark big-eared bats mate during fall and winter. Colonies typically begin to form at hibernacula in October and November. Both sexes hibernate together in clusters that typically range from 2 – 135 individuals. Hibernating colonies gradually begin to break up in spring from April through May. Females also become pregnant during this time and slowly begin to congregate at warm maternity caves to give birth and rear their young over the summer. The formation of maternity colonies usually occurs between late April and early June. Ozark big-eared bats generally return to the same maternity caves each year. Females give birth to a single offspring in May or June after a two-three month gestation period. Young bats grow quite rapidly and are capable of flight at three weeks and are weaned by six weeks. Maternity colonies usually begin to break up in August. Males are solitary during the summer maternity period. The Ozark big-eared bat typically forages in edge and forested habitats. They primarily feed on moths, but also are known to eat beetles and other flying insects.

Ozark big-eared bat. Richard Stark / USFWS

Conservation

The Ozark big-eared bat was federally-listed as endangered on November 30, 1979 due to its small population size, reduced and limited distribution, and vulnerability to human disturbance. Threats to the Ozark big-eared bat include vandalism and human disturbance at maternity roosts and hibernacula, and the loss and fragmentation of foraging habitat. Conservation efforts include locating and protecting caves known to be used by the Ozark big-eared bat and foraging habitat around the caves. Recovery efforts also include educating the public about the danger of disturbing bats and their ecological importance.

What Can You Do to Help

Do not enter gated caves/mines or caves/mines with a sign at the entrance which indicates it is used by endangered bats. These gates and signs are in place to protect bat colonies that are sensitive to human disturbance. Disturbance during the sensitive maternity period can result in cave abandonment. Disturbance during early summer before the young can fly can result in thousands of young becoming dislodged and falling to their deaths. Every arousal during hibernation is energetically expensive. Fat reserves required to sustain the bats are utilized to some extent during each winter arousal. Therefore, too many arousals during hibernation can exhaust a bat's limited fat reserves and result in mortality.

References

U. S. Fish and Wildlife Service. 1995. Ozark Big-Eared Bat Revised Recovery Plan. Tulsa, OK. 50pp.

U. S. Fish and Wildlife Service. 2008. Ozark Big-Eared Bat 5-Year Review. Tulsa, OK. 40pp.

For Further Information

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August 2011

Northern Long-Eared Bat

Myotis septentrionalis

The northern long-eared bat has been proposed to be federally listed as an endangered species under the Endangered Species Act. Endangered species are animals and plants that are in danger of becoming extinct. Identifying, protecting, and restoring endangered and threatened species are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

Photo by Steve Taylor; University of Illinois

This northern long-eared bat, observed during an Illinois mine survey, shows visible symptoms of white-nose syndrome.

What is the northern long-eared bat?

Appearance: The northern long-eared bat is a medium-sized bat about 3 to 3.7 inches but with a wingspan of 9 to 10 inches. Its fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*, which are actually bats noted for their small ears (Myotis means mouse-eared).

Winter Habitat: Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They typically use large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. Within hibernacula, surveyors find them in small crevices or cracks, often with only the nose and ears visible.

Summer Habitat: During summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds.

Reproduction: Breeding begins in late summer or early fall when males begin swarming near hibernacula. After copulation, females store sperm during hibernation until spring, when they emerge from their hibernacula, ovulate, and the stored sperm fertilizes an egg. This strategy is called delayed fertilization.

After fertilization, pregnant females migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies, with young, generally have 30 to 60 bats, although larger maternity colonies have been observed. Most females within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Adult northern long-eared bats can live up to 19 years.

Feeding Habits: Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation. This bat also feeds by gleaning motionless insects from vegetation and water surfaces.

Range: The range of the northern long-eared bat includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and

eastern British Columbia. Within the United States, this area includes the following 39 States: Alabama, Arkansas, Connecticut, Delaware, the District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Why is the northern long-eared bat in danger of extinction?

White-nose Syndrome: No other threat is as severe and immediate as the disease, white-nose syndrome. If this disease had not emerged, it is unlikely the northern long-eared population would be declining so dramatically. Since symptoms were first observed in New York in 2006, white-nose syndrome has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat's range where it was most common before this disease. Numbers have declined by 99 percent in the Northeast. Although there is uncertainty about the rate that white-nose syndrome will spread within the species' range, it is expected to spread throughout the United States.

Other Sources of Mortality: Although significant population declines have not been observed due to the sources of mortality listed below, they may now be important factors affecting this bat's ability to persist while experiencing dramatic declines caused by white-nose syndrome.

Impacts to Hibernacula: Gates or other structures to exclude people from caves and mines restrict bat flight and movement and change airflow and internal cave and mine microclimates. A few degrees change can make a cave unsuitable for hibernating bats. Also, cave-dwelling bats are vulnerable to human disturbance while hibernating. Bats use up their energy stores when aroused and may not survive the winter or females may not successfully give birth or rear young.

Loss or Degradation of Summer Habitat: Highway and commercial development, surface mining, and wind facility construction permanently remove habitat and are prevalent in many areas of this bat's range. Timber harvest and forest management can remove or alter (improving or degrading) summer roosting and foraging habitat.

Wind Farm Operation: Wind turbines kill bats, including northern long-eared bats, although only a small number have been documented to date. However, there are many wind projects within a large portion of the bat's range and many more are planned.

What Is Being Done to Prevent Extinction of the Northern Long-Eared Bat?

Disease Management: Actions have been taken to slow the spread of white-nose syndrome through human transmission of the fungus into caves (e.g. cave and mine closures and advisories; national decontamination protocols). A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect.

Addressing Wind Turbine Mortality: The Service and others are working to minimize bat mortality from wind turbines on several fronts. We fund and conduct research to determine why bats are susceptible to turbines, how to operate turbines to minimize mortality and where important bat migration routes are located. The Service, state natural resource agencies, and wind energy industry are developing a Midwest Wind Energy Multi-Species Habitat Conservation Plan that will provide wind farms a mechanism to continue operating legally while minimizing and mitigating listed bat mortality.

Listing: We are proposing to list the northern long-eared bat as an endangered species under the federal Endangered Species Act. Listing affords a species the protections of the Act and increases the priority of the species for funds, grants, and recovery opportunities.

Hibernacula Protection: Many agencies and organizations have protected caves and mines that are important hibernacula for cave-dwelling bats.

What Can I Do?

Do Not Disturb Hibernating Bats: Comply with all cave and mine closures, advisories, and regulations. In areas without a cave and mine closure policy, follow approved decontamination protocols (see whitenosesyndrome.org/topics/decontamination). Under no circumstances should clothing, footwear, or equipment that was used in a white-nose syndrome affected state or region be used in unaffected states or regions.

Leave Dead and Dying Trees Standing: Where possible and not a safety hazard, leave dead or dying trees on your property. Northern long-eared bats and many other animals use these trees.

Install a Bat Box: Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes can provide additional roost sites.

U.S. Fish & Wildlife Service

Red-cockaded Woodpecker

Picoides borealis

In the world of North American woodpeckers, red-cockaded woodpeckers stand out as an exception to the usual rules. They are the only woodpeckers to excavate nest and roost sites in living trees. Living in small family groups, red-cockaded woodpeckers are a social species, unlike others. These groups chatter and call throughout the day, using a great variety of vocalizations. And they are one of only two woodpecker species protected by the Endangered Species Act. The other protected woodpecker species, the ivory-billed, had been assumed extinct for decades until sightings on a national wildlife refuge in the Southeast. The U.S. Fish and Wildlife Service is working with Federal and State agencies and private landowners to keep red-cockaded woodpeckers from sliding to extinction.

Eric Spadgenske/USFWS

Red-cockaded woodpecker at its nest site, a tree crevice.

It's all about the habitat

Red-cockaded woodpeckers live in mature pine forests—specifically those with longleaf pines averaging 80 to 120 years old and loblolly pines averaging 70 to 100 years old. From the late 1800s to the mid 1900s, red-cockaded woodpeckers declined rapidly as their mature pine forest habitat was altered for a variety of uses, primarily timber harvest and agriculture. Pine savannahs and open woodlands once dominated the southeastern United States and may have totaled more than 200 million acres at the time of European colonization. Longleaf pine communities may have covered 60 to 92 million of those acres. Today, fewer than 3 million acres remain. Listed in 1970 as endangered, red-cockaded woodpeckers once ranged from Florida to Maryland and New Jersey, as far west as Texas and Oklahoma, and inland to Missouri, Kentucky, and Tennessee. About 1 percent of their original range remains.

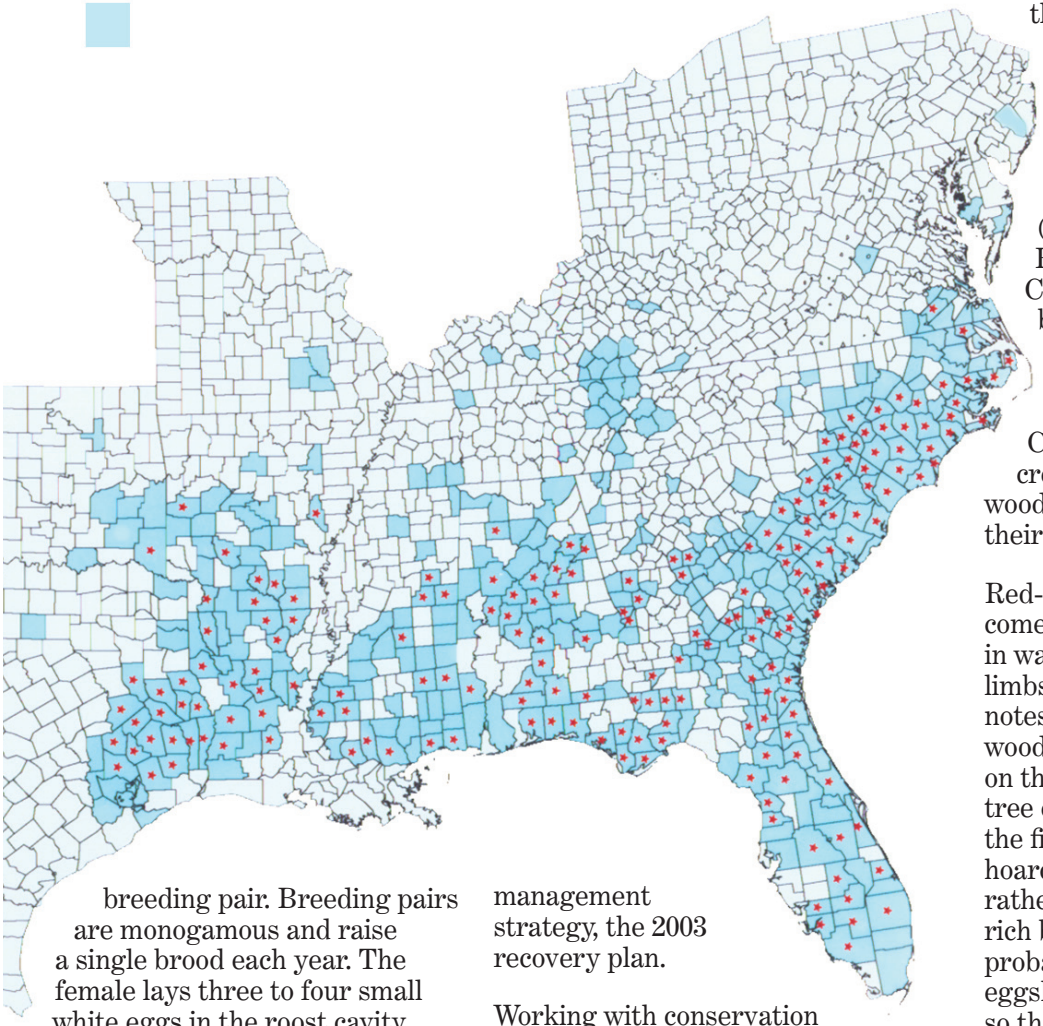
Home is where the trees are

About the size of cardinals, these woodpeckers excavate cavities exclusively in living pine trees, preferring older pines infected with the fungal red heart disease that softens heartwood. The birds need up to three years to excavate the cavities they use for nesting and roosting. The woodpeckers are faithful to their cavity trees, and each member of the group has its own roost cavity. Cavity trees occupied by a group are called a cluster and may include 1 to 20 or more trees on 3 to 60 acres. Red-cockaded woodpeckers peck holes around actively used cavities. These small wells exude resin that coats much of the tree. The birds keep the resin flowing as a defense against rat snakes and other predators.

Red-cockaded woodpeckers play a vital role in the intricate web of life of southern pine forests. A number of birds and mammals use the nest cavities that the woodpeckers excavate—such as chickadees, bluebirds, titmice, and species including the downy, hairy, and red-bellied woodpeckers. Larger woodpeckers may take over a red-cockaded woodpecker cavity, sometimes enlarging the hole enough to allow screech owls, wood ducks, and even raccoons to move in. Flying squirrels, several species of reptiles and amphibians, and insects, primarily bees and wasps, also use red-cockaded cavities.

Raising the roost

Red-cockaded woodpeckers live in groups with a breeding pair and as many as four helpers, usually male offspring from the previous year. Each group needs about 200 acres of old pine forest to support its foraging and nesting habitat needs. Juvenile females generally leave the group before the breeding season to join a solitary male group and form a new



USFWS

breeding pair. Breeding pairs are monogamous and raise a single brood each year. The female lays three to four small white eggs in the roost cavity. Group members incubate the eggs for 10 to 12 days and feed the hatchlings ants, beetles, caterpillars, corn ear worms, spiders, centipedes, wood-boring insects, and other insects that the adults eat. About 15 percent of their diet includes seasonal wild fruit. Chicks remain in the nest cavity for about 26 days.

Build it, and they will come

Planting longleaf pine trees and conducting controlled burns to remove undergrowth to create the open, park-like areas that the woodpeckers like has helped the recovery effort, along with developing artificial cavities and relocating birds. In 10 years, red-cockaded woodpecker groups have increased nearly 30 percent to about 6,000. Artificial cavity construction has enhanced clusters and established new groups. Moving isolated woodpeckers to these new habitats has reduced the likelihood of extinction and increased genetic diversity. Still, even at the current rate of growth, it will take decades to restore the species to a secure status in the wild, according to a management strategy, the 2003 recovery plan.

Working with conservation partners, the U. S. Fish and Wildlife Service created the red-cockaded woodpecker recovery plan featuring the participation of other Federal and State agencies and private landowners. Because many large landscapes that provide habitat are on Federal land, the U. S. Forest Service and the Department of Defense have developed special management guidelines for the woodpeckers on national forests and military installations. From 1994 to 2002, red-cockaded woodpecker populations increased as much as 50 percent at six military installations that include primary core populations required for delisting. These are Eglin Air Force Base (Florida), Fort Benning (Georgia), Fort Bragg (North Carolina), Fort Polk (Louisiana), Fort Stewart (Georgia), and Marine Corps Base Camp Lejeune (North Carolina). Recovery initiatives by private landowners are also conserving this species. For example, under a Safe Harbor Agreement, North Carolina's Pinehurst Resort is creating habitat for red-cockaded woodpeckers and helping to ensure their long-term future.

Red-cockaded woodpeckers rarely come to the ground. They even bathe in water-filled depressions on tree limbs. Recent research, however, notes that female red-cockaded woodpeckers search for bone bits on the forest floor and stuff them in tree crevices. Zoologists say that is the first known instance of a bird's hoarding something for its mineral, rather than caloric content. Calcium-rich bone is not rare, but the birds probably seek it to ensure stronger eggshells. They stash it in a tree so they won't have to eat on the ground where they are vulnerable to predators.

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Arlington, VA 22203
703-358-2390
http://www.fws.gov/endangered/

U.S. Fish and Wildlife Service
Southeast Region
1875 Century Boulevard, N. E.
Atlanta, Georgia 30345
404-679-7100
http://www.fws.gov/southeast/

U.S. Fish and Wildlife Service
Northeast Region
300 Westgate Center Drive
Hadley, MA 01035
413-253-8615
http://www.fws.gov/northeast/

January 2008

John Hammond/USFWS

(top): Range map of the red-cockaded woodpecker.

(left): The male has a small red patch, or "cockade" on each side of his black cap.

U.S. Fish & Wildlife Service

Black-capped Vireo

Oklahoma Ecological Service Field Office

Black-capped Vireo
Vireo atricapilla

Description
The black-capped vireo is a small (10 to 12 cm long), insect-eating, migratory songbird. Mature males are olive green above and white below with faint greenish-yellow flanks. The crown and upper half of the head is black with a partial white eye-ring. The iris is brownish-red and the bill black. The plumage of the female is duller than the male. Females have a dark slate gray head.

Distribution
Black-capped vireos have been documented nesting in Blaine, Cleveland, and Comanche counties of Oklahoma in recent years and sightings in Kiowa county during the nesting season indicate they may nest in suitable habitat in that county.

Life History
Black-capped vireos nest from Oklahoma south through central Texas to the Edwards Plateau, then south to the northern portion of Mexico. Breeding habitat is quite variable across its range, but is generally shrublands with a distinctive patchy structure. They arrive in Oklahoma in April to nest and begin to migrate to the wintering grounds on Mexico's western coast in July and are gone from Oklahoma by mid-September. Black-capped vireos may live for more than five years, and usually return year after year to the same territory. More information on the life history is available in the Birds of North America.

Black-capped vireo. © Greg Lasley

Conservation
The black-capped vireo was federally listed as an endangered species on October 6, 1987 (54 FR 37420). At the time of listing, the identified major threats to the black-capped vireo included habitat loss through land use conversion, grazing and browsing by domestic and wild herbivores, and brood parasitism by brown-headed cowbirds. The threat of vegetational succession appears to have been underestimated at the time of listing, although the extent of the effects on the black-capped vireo is not known.

What Can You Do to Help
If you own or control potential habitat near existing black-capped vireo nesting areas, please contact our office for technical and financial assistance in habitat improvement. Black-capped vireo habitat requires periodic disturbance (historically provided by fire) and active management is necessary to maintain quality nesting habitat. Avoid disturbing nesting areas from April to September.

References

U.S. Fish and Wildlife Service. 1991. *Black-capped Vireo (Vireo atricapillus) Recovery Plan*

U.S. Fish and Wildlife Service. *Black-capped Vireo 5-Year Review* 07/26/2007

Birds of North America

For Further Information

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Oklahoma
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9014 East 21st Street
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918/581-7458

August 2011

U.S. Fish & Wildlife Service

Least Tern

Oklahoma Ecological Service Field Office

Least Tern (Interior Population)
Sterna antillarum

Description

The least tern is the smallest member of the tern family at about 9 inches long (23 cm) with a wingspan of 20 inches (50 cm). They have a grayish back and wings, and snowy white undersides. Least terns have a forked tail and narrow pointed wings. They can be distinguished from all other terns by their combination of a black crown, white forehead, and a variable black-tipped yellow bill. First-year birds have a dark bill, a dark gray eye stripe, and a dusky brown cap.

Distribution

Formerly the major river systems of the Midwestern United States. These rivers included the Red, Rio Grande, Arkansas, Missouri, Ohio, and Mississippi river systems. Currently, they occur as small remnant colonies throughout their former range. In Oklahoma, least terns nest along most of the larger rivers, as well as at the Salt Plains National Wildlife Refuge near Jet, Oklahoma. Least terns winter in South America.

Life History

Least terns arrive at breeding sites from late April to early June where they typically spend four to five months. Pairs go through an elaborate courtship period that includes courtship feedings and a variety of postures and vocalizations. Least terns nest in small colonies on exposed salt flats, river sandbars, or reservoir beaches. Nests are small scrapes in the sand, and usually two or three eggs are laid. The young are fairly mobile soon after hatching. Both parents feed the young and remain with them until fall migration. Least terns will travel four or more miles (6+ km) from their breeding colonies to find the small fish that make up the major part of their diet.

Least Tern (Interior Population). USFWS

Conservation

The least tern was federally listed as an endangered species on May 28, 1985 (50 FR 21784). Least terns have declined due to habitat loss from permanent flooding by reservoirs and channelization projects, unpredictable water discharge patterns, and overgrowth of brush and trees. The recreational use of sandbars by humans is a major threat to the tern's reproductive success.

What Can You Do to Help

Avoid disturbing nesting areas from mid-May to late August. Pets, livestock, people, and vehicles should be kept off these areas when terns are present. Promote public awareness and report disturbance of least terns to wildlife law enforcement officials. Private landowners should manage lands to benefit habitat in nesting areas by limiting ATV and off-road vehicles use and blocking access of these vehicles to rivers. Restore or create additional nesting habitat in rivers, navigation systems, or lakes. Purchase land or conservation easements in areas with high-quality least tern nesting habitat.

References

U.S. Fish and Wildlife Service. 1990. *Recovery plan for the interior population of the least tern Sterna antillarum*. U.S. Fish and Wildlife Service, Twin Cities, Minnesota. 90 pp.

For Further Information

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August 2011

U.S. Fish & Wildlife Service

Piping Plover

Oklahoma Ecological Service Field Office

Piping Plover
Charadrius melodus

Description

The piping plover is a 5 ½ inch long pale grayish-brown shorebird with a white breast. During the breeding season, it has a black breast band which is sometimes incomplete and a black bar between its eyes. The bill is dull orange with a black tip and the legs and feet are orange.

Distribution

Piping plovers occur in three disjunct populations in North America: Northern Great Plains, Great Lakes, and Atlantic Coast. This species migrates through Oklahoma each spring and fall.

Life History

In Oklahoma, the piping plover is a bi-annual migrant, traveling between its nesting habitat to the north of Oklahoma (the Great Plains population nests from Kansas to southern Canada), and its wintering grounds on the gulf coast. There is a record of piping plovers nesting at Optima Lake in Texas County.

Migration through Oklahoma is likely to occur from March-May and July-September. Piping plovers usually migrate as individuals or small groups and may be seen along sandbars of major rivers, salt flats, and mudflats of reservoirs. Piping plovers forage on these shoreline habitats and eat small invertebrates.

More detailed information on life history is available at *The Birds of North America* website.

Piping plover. USFWS

Conservation

The Great Plains population of piping plover was federally listed as a threatened species on December 11, 1985 (50 CFR 21784). There is no designated critical habitat for piping plovers in Oklahoma. Conservation of this species has focused on breeding and wintering habitat and relatively little is known about the habitat used during migration. During migration, piping plovers have been documented in many areas of Oklahoma from the panhandle to the eastern border and probably migrate through or over all of Oklahoma.

What Can You Do to Help

Ongoing conservation of large river and salt flat stopover habitat is helpful. Avoid disturbance of any piping plovers that may use river or reservoir shoreline habitat during migration.

References

Great Lakes & Northern Great Plains Piping Plover Recovery Plan, U.S. Fish and Wildlife Service. 1998.

The Birds of North America, No.2, 1992

For Further Information

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August 2011

U.S. Fish & Wildlife Service

Whooping Crane

Oklahoma Ecological Service Field Office

Whooping Crane

Grus americana

Description

At 5 feet (1.5 m), the whooping crane is the tallest American bird. It is a snowy white, long-necked bird with long legs. Its black primary feathers show only during flight. Adults have a red crown and a patch of black feathers below the eye. Young are whitish overall, but have a rusty-colored head and neck.

Distribution

Whooping cranes pass through western Oklahoma each spring and fall during migration. The Salt Plains National Wildlife Refuge, near Jet, Oklahoma, is a very important migration stopover area and is designated critical habitat. During migration, whooping cranes sometimes are sighted elsewhere in Oklahoma along rivers, in grain fields, or in shallow wetlands. Whooping cranes primarily use shallow, seasonally and semi permanently flooded palustrine wetlands and various cropland and emergent wetlands.

Life History

The whooping crane is a bi-annual migrant, traveling between its summer habitat in central Canada, and its wintering grounds on the Texas coast, across the Great Plains of the U.S. in the spring and fall of each year. Autumn migration normally begins in mid-September, with most birds arriving on the Texas wintering grounds between late October and mid-November. Spring migration departure dates are normally between late March and mid-April, with the last birds usually leaving by May 1. Whooping cranes migrate south as singles, pairs, in family groups, or as small flocks of 3 to 5 birds. They are diurnal migrants and stop daily to feed and rest. Whooping cranes eat a variety of things, including insects, frogs, small birds, rodents, minnows, and waste grains.

Whooping crane. USFWS

Conservation

By the mid- 1940s, only 15 whooping cranes were present in the wild. The whooping was federally listed as an endangered species on March 11, 1967 (32 FR 4001). An intensive captive-breeding program and careful protection of wild flocks have slowly increased the number in the wild to more than 120. Whooping cranes have declined primarily because of loss of wintering and breeding habitat. Current threats to wild cranes include collisions with manmade objects such as power lines and fences, shooting, predators, disease, habitat destruction, severe weather, and a loss of two thirds of the original genetic material.

What Can You Do to Help

Sightings are important for monitoring the status of federally-listed species.

To report whooping crane sightings to the US Fish and Wildlife Service please complete the sighting report form (http://whoopingcrane.com/report-a-sighting/) within the migration corridors, continue to gather sighting reports for whooping cranes and promote public awareness. Ongoing conservation of wetland habitat within historical stopover habitat is helpful. Private landowners should be provided with incentives to manage lands to benefit wetlands in historic migration, breeding, and wintering areas. Additionally, purchase land or conservation easements in areas that still support healthy wetlands.

References

Canadian Wildlife Service and U.S. Fish and Wildlife Service. 2007. *International recovery plan for the whooping crane*. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), and U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 162 pp.

For Further Information

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August 2011

U.S. Fish & Wildlife Service

Rufa red knot

Calidris canutus rufa

Skilled aviator Rear Admiral Richard E. Byrd flew over both the North and South poles. But what this renowned man accomplished with the help of sled dogs, ships and airplanes, a little shorebird weighing less than a cup of coffee completes every year of its life. The red knot is truly a master of long-distance aviation.

On wingspans of 20 inches, some red knots fly more than 9,300 miles from south to north every spring and repeat the trip in reverse every autumn, making this bird one of the longest-distance migrants in the animal kingdom. About 9 inches long, red knots are about the size of a robin. Biologists have identified six subspecies, three of them living in the Western Hemisphere: *C.c. islandica*, *C.c. roselaari*, and *C.c. rufa*. This last, the red knot known as rufa, winters at the tip of South America in Tierra del Fuego, in northern Brazil, throughout the Caribbean, and along the U.S. coasts from Texas to North Carolina. The rufa red knot breeds in the tundra of the central Canadian Arctic from northern Hudson Bay to the southern Queen Elizabeth Islands.

Surveys of wintering knots along the coasts of southern Chile and Argentina and during spring migration in Delaware Bay on the U.S. coast indicated a serious population decline during the 2000. Biologists from the U.S. Fish and Wildlife Service, state natural resource agencies, and non-profit organizations all share a concern for the rufa red knot and are pooling efforts to identify what needs to be done to prevent further losses.

A red knot banded in May 1987 was seen on Delaware Bay in May 2000. During those 13 years, the bird had flown about 242,350 miles, a distance farther than from the earth to the moon.

Strength in numbers

Red knots winter and migrate in large flocks containing hundreds of birds. While we can guess at some of the benefits of traveling in large flocks, such as protection from predators, we can also see the downside - susceptibility to habitat change and loss, oil spills, toxins, red tides, diseases, collisions with wind turbines, storms, and hunting. Red knots were heavily hunted in the early 20th century, and may have never recovered in eastern North America. Knots are still hunted in parts of the Caribbean and South America.

Eating like a bird

For much of the year red knots eat small clams, mussels, snails and other invertebrates, swallowing their prey whole – shell and all. Migrating knots can complete nonstop flights of 1,500 miles and more, converging on critical stopover areas to rest and refuel along the way. In order to endure their long journeys, red knots undergo extensive physical changes. Flight muscles enlarge, while leg muscles shrink. Stomachs and gizzards decrease, while fat mass increases by more than 50 percent. Due to these physical changes, knots arriving from long migration flights are not able to feed maximally until their digestive systems regenerate, a process that may take several days. Thus, migrating birds require stopover habitats rich in easily digested foods – with thin or no shells – in order to gain enough weight to fuel the next flight. In spring, migrating knots seem to follow a northward "wave" in quality prey – by timing their stopovers with the spawning seasons of intertidal invertebrates, knots take advantage of readily digestible food resources like juvenile clams and mussels and horseshoe crab eggs. Red knots arrive at stopovers areas very thin, sometimes emaciated. They eat constantly to gain enough weight to continue their journeys, adding up to 10 percent of their body weight each day and nearly doubling their body weights during some stopovers.

Requirements for survival

The red knot's unique and impressive life history depends on suitable habitat, food, and weather conditions at far-flung sites across the Western Hemisphere, from the extreme south of Tierra del Fuego to the far north of the central Canadian Arctic. Further, red knots need to encounter these favorable habitat, food, and weather conditions within narrow seasonal windows as the birds hopscotch along migration stopovers between wintering and breeding areas. For example, the red knot population decline that occurred in the 2000s was caused primarily by reduced food availability from increased harvests of horseshoe crabs, exacerbated by small changes in the timing that red knots arrived at the Delaware Bay. Red knots may also be particularly vulnerable to global climate change, which is likely to affect the arctic tundra ecosystem where the knots breed; the quality and quantity of coastal habitats due to rising sea levels; the quantity and timing of invertebrate food resources throughout the bird's range; and the severity, timing, and location of storm and weather patterns.

Horseshoe crab harvests are now managed with explicit goals to stabilize and recover red knot populations; red knot number appear to have stabilized in the past few years, but at low levels relative to earlier decades. Red knots fascinate biologists, bird watchers and people who appreciate the complex beauty of the natural world. Together with these partners, the U.S. Fish and Wildlife Service is dedicated to working to conserve this extraordinary bird.

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Hadley, MA 01035
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http://northeast.fws.gov

Federal Relay Service
for the deaf and hard-of-hearing
1 800/877 8339

U.S. Fish and Wildlife Service
http://www.fws.gov
1 800/344 WILD
September 2013

U.S. Fish & Wildlife Service

Arkansas River Shiner

Oklahoma Ecological Service Field Office

Arkansas River Shiner
Notropis girardi

Description

The Arkansas River shiner (ARS) is a small, streamlined minnow with a small, dorsally flattened head, rounded snout, and subterminal mouth. The ARS is silver in appearance with a dark blotch at the base of the dorsal (top) fin. Adults attain a maximum length of about 2 inches (Miller and Robison 1973, Robison and Buchanan 1988).

Distribution

Historically, the ARS was widespread and abundant throughout the western portion of the Arkansas River basin in Kansas, New Mexico, Oklahoma, and Texas. This species has subsequently disappeared from over 80 percent of its historical range and is now almost entirely restricted to about 508 miles of the Canadian River in OK, TX, and NM.

Life History

The ARS historically inhabited wide, shallow, sandy bottomed rivers and larger streams of the Arkansas River basin (Gilbert 1980). The species is considered a habitat generalist, with no obvious selection for any particular habitat (i.e., main channel, side channel, backwaters, and pools (Wilde *et al*. 2000).

The ARS is considered an annual species, with less than ten percent of the population surviving to spawn a second year (Wilde 2005). ARS release their eggs and sperm in open flowing water which drift downstram (Platania and Altenbach 1998, Johnston 1999). ARS have been shown to successfully reproduce from May through September when stream flow exists; however, peak reproduction may take place at moderate to higher flows (Moore (1944); Bestgen *et al*. (1989); Polivka and Matthews (1997); Wilde *et al*. (2000); and Durham and Wild (2006). In the absence of sufficient streamflows, eggs likely settle to the channel bottom, where they are smothered by silt and shifting, hindering oxygen uptake and causing mortality of the embryos.

Arkansas River Shiner. Daniel Fenner / USFWS

Platania and Altenbach (1998) determined that eggs could be transported 45-89 miles downstream before hatching and developing larvae could then be transported an additional distance before capable of direct swimming. This lead Bonner and Wilde (2000) to speculate the ARS needs 135 miles of free flowing river to complete its life history. Direct and indirect evidence suggests the presence of a directed, upstream movement by the ARS over the course of their adult lifespan, which is necessary to maintain upstream source populations and complete the ARS's life cycle.The ARS is believed to be a generalized forager, with its diet consisting of grass seeds, detritus (decaying organic material), sand, sediment, and aquatic and terrestrial invertebrates (Jimenez 1999, Bonner *et al*. 1997, Polivka and Matthews 1997).

Conservation

The Arkansas River Basin population of the ARS was listed as a threatened species on November 23, 1998, based on reductions of the species' range and numbers due to habitat destruction and modification, channelization, construction of impoundments, stream dewatering, diversion of surface water, groundwater pumping, and water quality degradation (USFWS 1998). Critical habitat was designated in October 2005 (FR Vol. 70, No. 197, October 13, 2005). An introduced non-native population of ARS occurs in the Pecos River in New Mexico, which is not protected under the Endangered Species Act.

What You Can Do To Help

Building partnerships focused on conserving the quantity and quality of water (ground and surface water) within ARS's range will be essential to recovering the species. Any efforts to conserve water will help to maintain essential flows for the species. Additionally, maintaining riparian buffers promotes natural stream morphology and filters pollutants from entering the river. Control of invasive salt cedar, which effects water quantity and stream morphology, is an on-the-ground measure that benefits the species.

References

A full list of references is available at: www.fws.gov/southwest/es/oklahoma/shiner.htm

For Further Information

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August 2011

U.S. Fish & Wildlife Service

Neosho Madtom

Oklahoma Ecological Service Field Office

Neosho Madtom
Noturus placidus

Description

The Neosho madtom is a small catfish, like most North American catfish, that lacks scales and has sensory barbells on the head. In the wild, adults average less than three inches (8 cm) in length and have an overall mottled appearance.

Distribution

The Neosho madtom occurs in Kansas, Missouri, and Oklahoma. In Oklahoma, the Neosho madtom is currently found in the Neosho and Spring River drainages in Craig and Ottawa counties in the northeastern corner of the State.

Life History

Neosho madtoms are found year-round but only rarely survive more than three years in the wild. Little is known about their reproductive habits. They reach sexual maturity in one year and are believed to spawn in June and July. Eggs are deposited in nests excavated under small stones. Some parental care is provided. Adults will bury themselves in the gravel during the day and emerge during the night to feed. Aquatic insect larvae are the major food source of Neosho madtoms. The preferred habitat of adult Neosho madtoms is shallow riffles with loose, uncompacted gravel bottoms. They are occasionally found in areas with sandy bottoms covered with leaf litter. Young Neosho madtoms may be found in deeper pools, downstream from riffles.

Neosho madtom. Daniel Fenner / USFWS

Conservation

The Neosho madtom was federally listed as threatened on May 22, 1990 (55 FR 21148). Critical habitat has not been designated. The Neosho madtom has declined due to habitat destruction. Construction of dams, dredging of gravel, and an increase in water demands have contributed to habitat loss. Pollution caused by runoff from mining operations and livestock feedlots has impacted the fish as well.

What Can You Do to Help

Top recovery tasks for the Neosho madtom include further investigations on the biology of the fish, protecting current populations, and developing a reintroduction plan. Removal of in-stream dams can restore habitat and facilitate movement into suitable areas. Conservation and restoration of riparian areas can improve habitat conditions. Please consult the Neosho madtom recovery plan and numerous other scholarly publications for specific details on ecology, threats, and conservation needs.

For Further Information

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August 2011

U.S. Fish & Wildlife Service

Leopard Darter

Oklahoma Ecological Service Field Office

Leopard darter
Percina pantherina

Description

Leopard darters rarely exceed three inches in length. They have 11-14 large, dark spots on their sides. These spots contrast against a light background that ranges from pale olive on the back to yellowish-olive on the underside. The back of the fish has numerous saddles and bars (Miller and Robison 1973; Robison and Buchanan 1988).

Distribution

Historically, leopard darters occurred in upland, large stream habitats of the Little River drainage in Oklahoma and Arkansas. Currently, scattered populations are found within its historic range (Miller 1972; Cloutman and Olmstead 1974; Robison *et al*. 1974; Hubbs and Pigg 1976). In Oklahoma, it has been located within the Mountain Fork, Glover, Little Rivers and their larger tributaries, in LeFlore, McCurtain, and Pushmataha counties. In Arkansas, the leopard darter has been found in the Cossatot, Robinson Fork, and Mountain Fork Rivers in Howard, Polk, and Sevier Counties (USFWS unpublished data).

Life History

Leopard darters typically live less than two years, but individuals older than three years have been found (Robinson 1978; Jones *et al*. 1983; James *et al*. 1991). Most of the population lives to spawn only once in their lifespan. Spawning occurs in riffles during March and April, but may occur as early as February. Fertilized eggs are buried in gravel and average clutch size is about 65 eggs (James 1988; James and Maughan 1989, James *et al*. 1991. Young leopard darters begin to appear in May of each year. Food items include aquatic insects and microcrustaceans (Page 1983; James *et al.* 1991; Williams *et al*. 2006).

Leopard darter. Daniel Fenner / USFWS

Leopard darters are found in intermediate to larger streams. Typically, they are not found in smaller, headwater streams, however may occupy the downstream portion of those streams during spawning. From May to February, leopard darters prefer large, quiet pools with a rubble and boulder substrate. Schaefer *et al.* (2003) observed leopard darters moving to deeper cooler water when preferred habitat exceeded 29 degrees Celsius.

Spawning occurs on gravel substrates; however, the dominant riffle substrate may be gravel, rubble, boulder, and bedrock (Jones 1984, Lechner *et al*. 1987, James 1988, James and Maughan 1989.

Conservation

The leopard darter was listed as threatened under the Endangered Species Act on January 27, 1978 (43 FR 3715). Critical habitat has also been designated.

Leopard darters have never been common. The greatest threat to the survival of the species is the loss of habitat due to the construction of reservoirs. Logging activity, agricultural and industrial runoff, and gravel removal all pose threats as well (43 FR 3715; January 27, 1978).

What You Can Do To Help

Recovery of the leopard darter primarily involves managing and protecting its habitat and individual populations from known threats. Maintain natural riparian barriers to minimize the chances of pollutants from entering the river. Also, a revised draft recovery plan for the species is available, which outlines specific tasks necessary to recover the species. The recovery plan is available at: www.fws.gov/southwest/es/oklahoma/ldarter.htm.

References

A full list of references is available at: www.fws.gov/southwest/es/oklahoma/ldarter.htm.

For Further Information

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August 2011

U.S. Fish & Wildlife Service

Ozark Cavefish

Oklahoma Ecological Service Field Office

Ozark Cavefish
Amblyopsis rosae

Description

Ozark cavefish are small fish reaching a total length of about two inches. The fish are true troglobites or obligatory cave inhabitants, and live most of their life in total darkness. They have only rudimentary eyes and no optic nerve. They also lack pigment, but appear pinkish-white because their translucent skin reveals blood and organs.

Distribution

The species occurs in caves within the Springfield Plateau of the Ozark Highlands in northwest Arkansas, southwest Missouri, and northeast Oklahoma.

Life History

Knowledge of cavefish life history is limited. The species is believed to have low reproductive capacity and to be slow to reproductive maturity. Only about 20 percent of the population is believed to breed in any given year. Infrequent reproduction may be an adaptation to a limited food supply which is typical of cave environments. The size and shape of the gill chamber indicate that the species may be a gill chamber brooder. The Ozark cavefish is considered the most adapted of all the cavefish for cave life due to well-developed sensory papillae. They tend to occur in caves with groundwater recharge and generally are acknowledged to be a groundwater obligate. Ozark cavefish occur in flowing cave streams with chert rubble substrate and pool areas. They also have been found in wells and sinkholes. This species primarily feeds on small crustaceans such as copepods, isopods, and amphipods. Cavefish also prey upon small crayfish, oligochaetes (e.g., segmented worms), small salamanders, and salamander larvae.

Conservation

The Ozark cavefish was listed as threatened on November 1, 1984 due to habitat alteration and over-collecting. In the past, removal for scientific purposes and the aquaria trade had a demonstrated impact. Habitat degradation and pollution due to agricultural activities and development currently are considered primary threats to the Ozark cavefish. Conservation efforts include protecting caves used by the cavefish and the recharge area (the area involved with input of water into the cave system) of these caves. Recovery efforts also include educating the public about the sensitive nature of cave ecosystems, the highly specialized and often rare fish and wildlife species that inhabit caves, and land use practices that help prevent pollution of caves.

Ozark Cavefish. © Dante Fenolio

What Can You Do to Help

Do not enter gated caves or caves with a sign at the entrance which indicates it is used by federally-listed species. These gates and signs are in place to protect unique cave environments and rare cave fauna that are sensitive to human disturbance. Learn about land use practices that help prevent unnecessary pollution of caves such as avoiding the use of chemicals near caves, streams, and sinkholes, and leaving vegetated buffers along streams and around sinkholes. These land use practices not only help protect caves and cave fauna but also will help protect the quality of drinking water of the people that live in the area. Tell others what you have learned.

References

Graening, G. O., D. B. Fenolio, M. L. Niemiller, A. V. Brown, and J. B. Beard. 2009. *The 30-year recovery effort for the Ozark cavefish (Amblyopsis rosae): Analysis of current distribution, population trends, and conservation of this threatened species*. Environmental Biology of Fishes 87:55-88.

U. S. Fish and Wildlife Service. 1989. Ozark Cavefish Recovery Plan. U. S. Fish and Wildlife Service. Atlanta, Georgia. 15 pp.

For Further Information

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August 2011

Best Management Practices

MISSOURI DEPARTMENT OF CONSERVATION

Longnose Darter

Percina nasuta

Common name • Longnose Darter
Scientific name • *Percina nasuta*
State status • Endangered

Ecology

The longnose darter is an inhabitant of medium to large Ozark rivers in Missouri, Arkansas and Oklahoma. During most of the year, these darters prefer riffles in quiet backwaters with thick growths of aquatic vegetation. During spawning in the spring, they move into areas of stronger current. Longnose darters forage on aquatic insects. Adults typically reach a length of 2-3.8 inches.

Reasons for Decline

Longnose darters were historically found in several rivers in southwestern Missouri. In the mid-1900s, construction of impoundments to form reservoirs likely eliminated much of their habitat. Stray longnose darters may be found in reservoirs, but they are likely not part of a self-sustaining population. In addition, activities that increase sedimentation and non-point source pollution may affect remaining habitat.

Specific Recommendations

Free-flowing rivers provide habitat for many species, including the longnose darter. Any projects that alter this type of habitat should be modified to minimize impacts.

→ Project activities should not occur between March 15 and June 15 below the high water level of streams within the range of the longnose darter.

→ Sand and gravel removal should be avoided in streams with potential habitat for longnose darters.

→ Creation of impoundments should be avoided in longnose darter habitat.

→ Sand bars and similar riverine features should be maintained, and project activities should not occur on or near them in order to maintain habitat for longnose darters.

→ Erosion and sediment controls should be implemented, maintained and monitored for the duration of the project.

→ Avoid altering water levels in streams where longnose darters are found.

→ For culvert installation, the top elevation of the floor should be approximately the same as the existing streambed to avoid upstream headcutting and provide fish passage at low flows.

General Recommendations

Refer to Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers and Management Recommendations for Construction Projects Affecting Missouri Wetlands.

Information Contacts

For further information regarding regulations for development in rivers, streams and wetlands, contact:

Missouri Department of Conservation
Policy Coordination Section
P.O. Box 180
2901 W. Truman Blvd
Jefferson City, MO 65102-0180
Telephone: 573/751-4115

Missouri Department of Natural Resources
Division of Environmental Quality
P.O. Box 176
Jefferson City, MO 65102-0176
Telephone: 573/526-3315

U.S. Army Corps of Engineers
Regulatory Branch
700 Federal Building
Kansas City, MO 64106-2896
Telephone: 816/983-3990

U.S. Environmental Protection Agency
Water, Wetlands, and Pesticides Division
901 North 5th Street
Kansas City, KS 66101
Telephone: 913/551-7307

U.S. Fish and Wildlife Service
Ecological Services Field Office
608 E. Cherry Street, Room 200
Columbia, MO 65201
Telephone: 573/876-1911

Disclaimer

These Best Management Practices were prepared by the Missouri Department of Conservation with assistance from other state agencies, contractors, and others to provide guidance to those people who wish to voluntarily act to protect wildlife and habitat. Compliance with Best Management Practices is not required by the Missouri wildlife and forestry law nor by any regulation of the Missouri Conservation Commission. Other federal, state or local laws may affect construction practices.

2/2000

U.S. Fish & Wildlife Service

Ouachita Rock Pocketbook

Oklahoma Ecological Service Field Office

Ouachita Rock Pocketbook
Arkansia wheeleri

Description

The Ouachita Rock Pocketbook occurs in the Kiamichi River in southeastern Oklahoma, the Little River in southeastern Oklahoma and southwestern Arkansas, and the Ouachita River in central Arkansas. Shells of the species also have been recovered from Pine and Sanders creeks in northeast Texas. Its shell reaches a maximum length of about 4.5 inches, is subovate in outline, and moderately inflated. The outer shell layer is chestnut-brown to black with a silky luster. It is distinguished from other, similar appearing species by distinctive details of its shell.

Distribution

The Ouachita rock pocketbook lives in pools, backwaters, and side channels of certain rivers and large creeks in or near the southern slope of the Ouachita Mountains. The species inhabits stable stream bottoms containing gravel, sand, and other substrate materials. The Ouachita rock pocketbook always occurs within large mussel beds containing a diversity of mussel species.

Life History

Adults feed by filtering algae, other protoctists, microscopic animals, bacteria, and detritus from their surroundings. As with most freshwater mussels, the life cycle includes sexual reproduction and a required parasitic stage. During spawning, males release sperm into the water column, some of which are taken into females of the species, which carry eggs in their gills. The resulting larvae (known as glochidia) are released from the females into the water column and must attach to a suitable fish host to continue development. Once metamorphosis is complete, juvenile mussels drop off the fish host and continue life in the stream bottom. Known fish hosts for this species include the golden shiner (*Notemigonus crysoleucas*), duskystripe shiner (*Luxilus pilsbryi*), and freshwater drum (*Aplodinotus grunniens*).

Ouachita rock pocketbook. Patricia Mehlhop / USFWS

Conservation

The Ouachita rock pocketbook was federally listed as an endangered species on October 23, 1991. This species has experienced losses in range and abundance due to human degradation of its habitat. Specific factors involved in this degradation include construction and operation of large impoundments, channelization, water quality degradation from point sources and nonpoint sources of pollution, gravel excavation, and operation of land vehicles in streams. Many of these factors are expected to continue and may increase, posing future threats to the Ouachita rock pocketbook. Additional potential threats include impacts from invasive aquatic species and extreme conditions associated with human-caused climate change.

What You Can Do To Help

If you have property within a watershed inhabited by the Ouachita rock pocketbook, maintain an ample buffer of natural vegetation alongside any stream channels. Treat eroding roads, slopes, and other sources contributing sediments to streams. Reduce or eliminate use of lawn-care/agricultural chemicals, and install fencing to prevent livestock from entering streams. Take other steps to protect water quality, restore and protect natural watershed conditions, conserve instream flows, and prevent the spread of aquatic invasive species. Learn more about the Ouachita rock pocketbook, the threats to its existence, and its identified conservation needs by consulting the species' recovery plan.

References

Harris, J.L. and others. 2009. *Unionoida (Mollusca: Margaritiferidae, Unionidae) in Arkansas, third status review*. Journal of the Arkansas Academy of Science. 63:50-86.

U.S. Fish and Wildlife Service. 2004. *Ouachita Rock Pocketbook* (*Arkansia wheeleri* Ortmann and Walker, 1912) *Recovery Plan*. Albuquerque, New Mexico.

For Further Information

U.S. Fish and Wildlife Service
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Tulsa, OK 74129
918/581-7458

August 2011

U.S. Fish & Wildlife Service

Scaleshell Mussel

Oklahoma Ecological Service Field Office

Scaleshell mussel
Leptodea leptodon

Description

The scaleshell mussel occurred historically across much of the eastern U.S., but recently is known only from scattered populations in Arkansas, Missouri, Oklahoma, Nebraska, and South Dakota. In Oklahoma, the species survives in the Kiamichi River in southeastern Oklahoma, and historical records exist from the Little and Mountain Fork rivers, also in southeastern Oklahoma. Its thin, elongated shell reaches a maximum length of about 4.75 inches. Males and females have differently shaped shells, most apparent in a broad, ruffled extension of the females' posterior end. The outer shell layer is yellowish-brown with fine green rays. It is distinguished from other freshwater mussel species by additional distinctive details of its shell.

Distribution

The scaleshell mussel lives in medium-sized to large rivers with stable channels and good water quality. The species inhabits sand and gravel stream bottoms where individuals bury themselves, with only the edge of their partially-opened shells exposed.

Life History

Adults feed by filtering algae, other protoctists, microscopic animals, bacteria, and detritus from their surroundings. As with most freshwater mussels, the life cycle includes sexual reproduction and a required parasitic stage. During spawning, males release sperm into the water column, some of which are taken into females of the species, which carry eggs in their gills. The resulting larvae (known as glochidia) are released from the females into the water column and must attach to a suitable fish host to continue development. Once metamorphosis is complete, juvenile mussels drop off the fish host and continue life in the stream bottom. Known fish hosts for this species include the freshwater drum (*Aplodinotus grunniens*).

Scaleshell mussel. © Dr. M.C. Barnhart

Conservation

The scaleshell mussel was federally listed as an endangered species on October 9, 2001. This species has experienced severe losses in range and abundance due to human degradation of its habitat. Specific factors involved in this degradation include construction and operation of large impoundments, and water quality degradation from point sources and nonpoint sources of pollution. Many of these factors are expected to continue and may increase, posing future threats to the scaleshell. Additional potential threats include impacts from invasive aquatic species such as the introduced zebra mussel (*Dreissena polymorpha*), and extreme conditions associated with human-caused climate change.

What You Can Do To Help

If you have property within a watershed inhabited by the scaleshell mussel, maintain an ample buffer of natural vegetation alongside any stream channels. Treat eroding roads, slopes, and other sources contributing sediments to streams. Reduce or eliminate use of lawn-care/agricultural chemicals, and install fencing to prevent livestock from entering streams. Take other steps to protect water quality, restore and protect natural watershed conditions, conserve instream flows, and prevent the spread of aquatic invasive species. Learn more about the scaleshell mussel, the threats to its existence, and its identified conservation needs by consulting the species' recovery plan.

References

U.S. Fish and Wildlife Service. 2010. *Scaleshell Mussel Recovery Plan*. Fort Snelling, Minnesota.

U.S. Fish and Wildlife Service. 2011. *Scaleshell Mussel* (*Leptodea leptodon*) *5-year Review: Summary and Evaluation*. Columbia, Missouri.

For Further Information

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August 2011

U.S. Fish & Wildlife Service

Winged Mapleleaf Mussel

Oklahoma Ecological Service Field Office

Winged mapleleaf
Quadrula fragosa

Winged mapleleaf mussel. © D.E. Spooner

Description

The winged mapleleaf occurred historically across thirteen, largely Midwestern U.S. states, but recently is known only from remnant populations in Minnesota, Wisconsin, Missouri, Oklahoma, and Arkansas. In Oklahoma, the species survives in the Little River in southeastern Oklahoma. Historical records exist from the Boggy and Kiamichi rivers, also in southeastern Oklahoma, and from the Neosho River, very near the Kansas/Oklahoma border. Its thick shell reaches a maximum length of about 4 inches, is pentagonal in outline, and is moderately inflated. The outer shell layer is greenish-brown to dark brown, and small shells may exhibit faint rays. Two rows of bumps separated by a furrow run from the top of the shell to the lower edge. Additional distinctive details of the shell distinguish the winged mapleleaf from other freshwater mussel species.

Distribution

The winged mapleleaf lives in medium-sized to large rivers with high water quality. The species inhabits stream bottoms of sand, gravel, or rubble.

Life History

Adults feed by filtering algae, other protoctists, microscopic animals, bacteria, and detritus from their surroundings. As with most freshwater mussels, the life cycle includes sexual reproduction and a required parasitic stage. During spawning, males release sperm into the water column, some of which are taken into females of the species, which carry eggs in their gills. The resulting larvae (known as glochidia) are released from the females into the water column and must attach to a suitable fish host to continue development. Once metamorphosis is complete, juvenile mussels drop off the fish host and continue life in the stream bottom. Known fish hosts for this species include the channel catfish (*Ictalurus punctatus*) and blue catfish (*Ictalurus furcatus*).

Conservation

The winged mapleleaf was federally listed as an endangered species on July 22, 1991. This species has experienced severe losses in range and abundance due to human degradation of its habitat. Specific factors involved in this degradation include construction and operation of large impoundments, and water quality degradation from point sources and nonpoint sources of pollution. Many of these factors are expected to continue and may increase, posing future threats to the winged mapleleaf.

Additional potential threats include impacts from invasive aquatic species such as the introduced zebra mussel (*Dreissena polymorpha*), accidental commercial harvest, and extreme conditions associated with human-caused climate change.

What You Can Do To Help

If you have property within a watershed inhabited by the winged mapleleaf, maintain an ample buffer of natural vegetation alongside any stream channels. Treat eroding roads, slopes, and other sources contributing sediments to streams. Reduce or eliminate use of lawn-care/agricultural chemicals, and install fencing to prevent livestock from entering streams. Take other steps to protect water quality, restore and protect natural watershed conditions, conserve instream flows, and prevent the spread of aquatic invasive species. Learn more about the winged mapleleaf, the threats to its existence, and its identified conservation needs by consulting the species' recovery plan.

References

U.S. Fish and Wildlife Service. 1997. *Winged Mapleleaf Mussel* (*Quadrula fragosa*) *Recovery Plan*. Fort Snelling, Minnesota.

U.S. Fish and Wildlife Service. 2009. *Spotlight Species Action Plan: winged Mapleleaf Quadrula fragosa*. Bloomington, Minnesota.

For Further Information

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August 2011

American Burying Beetle (ABB) – *Nicrophorus americanus*

Status: Listed as endangered on July 13, 1989 (54 FR 29652). Critical habitat not designated for this species.

Description: A large beetle with a maximum length of approximately 1.4-inches. It is shiny black with distinctive orange-red marking on its wing covers, mid-section, face and has orange clubs at the tips of its antennae.

Residency: Year-round

Habitat Types: ABB are regarded as a habitat generalist when it comes to seeking out carcasses to forage on. They have been found in upland grassland, woodland and forest habitats as well as bottomland hardwoods forest. Habitat suitability appears more aligned with soil properties that allow excavation.

Because they occur across numerous habitat types it is easier to describe where they are unlikely to be found. The U.S. Fish and Wildlife have described "Unfavorable" habitat characteristics that are likely to preclude ABB use to include;

1. Land that is tilled on a regular basis, planted in monoculture, and does not contain native vegetation.
2. Pasture and grassland that have been maintained through frequent mowing, grazing, or herbicide application as a height of 8 inches or less.
3. Land that has already been developed and no longer exhibits surficial topsoil, leaf litter, or vegetation.
4. Urban areas with maintained lawns, paved surfaces or roadways.
5. Stockpiled soil without vegetation.
6. Wetlands with standing water or saturated soils (defined as sites exhibiting hydric-soils, and vegetation typical of saturated soils, and/or wetland hydrology).*

* This does not eliminate areas immediately adjacent to wetlands and/or riparian areas.

Life History: ABB are nocturnal scavengers that rely on the carcasses of small animals to reproduce. They bury themselves at an average depth of 2.4 inches in the soil where they remain inactive during the cooler months. In Oklahoma this inactive period is thought to occur from late September through mid-May. Upon emerging in mid-May ABB attempt to secure a mate and a carcass for reproduction. Carcasses of small birds and mammals (1-9 oz.) are sought out using receptors on their antennae. ABB are strong fliers that have been found to move up to18 miles

with the aid of wind; however, nightly movements are likely less than 3.7 miles. Once an appropriate carcass is located the paired beetles will bury it and the female will lay up to 30 eggs on or alongside. The hatched larvae will use the carcass as food. Adult beetles will provide some parental care to the eggs and larvae.

Following metamorphosis newly matured ABB, called tenerals, will emerge from underground in late summer. During this time ABB feed on a variety of carrion as well as live insects. They return to the soil in late September to over-winter as adults. ABB may opportunistically overwinter in association with carrion which may increase survival. ABB are considered an annual species since they live just one year.

Threats: Habitat loss and fragmentation are cited as the principle reason for the decline of the ABB at the time of listing. ABB had disappeared from 90% of its historic range which extended from central Oklahoma to the east coast. In areas where habitat remains, ABB populations may be depressed by increased competition for available carcasses. The prevailing theory is that habitat fragmentation has contributed to increased populations of competitors (opossums, raccoons, skunks, etc.) for carcasses and concurrently reduced small mammal densities.

Potential threats include soil disturbance or compaction from vehicles and equipment, vegetation removal, use of herbicide/pesticide, use of artificial lighting or any other activity that may impact soil or vegetation.

Conservation Measures: When possible, projects should be located within unfavorable habitat as a means to avoid harm to ABB. Conservation practices that are entirely within “unfavorable” habitat have been designated by the USFWS as activities that “May Affect, Not Likely to Adversely Affect” the ABB. Unfavorable habitat should be properly benchmarked on the CPA-52 in order to make a NLAA determination.

Projects within favorable habitat that involve vehicle traffic, soil disturbance or vegetation clearing (roots) create potential for take and these activities have been assigned a “May Affect, Likely to Adversely Affect” determination from the USFWS. Conservation implementation will be planned in consultation with the U.S. Fish and Wildlife Service.

References:

Crawford, P.H. and B.W. Hoagland. 2010. Using species distribution models to guide conservation at the state level: the endangered American burying beetle (*Nicrophorus americanus*) in Oklahoma. J. Insect Conserv. 14:511-521.

U.S. Fish and Wildlife Service. 2014. American burying beetle impact assessment for project review. 20pp.