	interior least tern [6, 7]	Endangered
	whooping crane [8c, 9]	Endangered
	piping plover [10]	Threatened
	lesser prairie-chicken [12]	Candidate, Warranted but precluded
Craig	American burying beetle [1, B]	Endangered
	gray bat [3]	Endangered
	interior least tern [7]	Endangered
	Neosho madtom	Threatened
	piping plover [10]	Threatened
	Arkansas darter	Candidate
	Neosho mucket mussel	Candidate
Creek	American burying beetle [1, A]	Endangered
	interior least tern [6, 7]	Endangered
	piping plover [10]	Threatened
Custer	interior least tern [6, 7]	Endangered
	whooping crane [8c, 9]	Endangered
	Arkansas River shiner	Threatened, Critical habitat designated
	piping plover [10]	Threatened
	lesser prairie-chicken [12]	Candidate, Warranted but precluded
Delaware	American burying beetle [1, A]	Endangered
	gray bat	Endangered
	Indiana bat	Endangered
	interior least tern [7]	Endangered
	Ozark big-eared bat [16]	Endangered
	Ozark cavefish	Threatened
	piping plover [10]	Threatened
	Arkansas darter	Candidate
	Neosho mucket mussel	Candidate
	rabbitsfoot mussel	Candidate
Dewey	interior least tern [6, 7]	Endangered
	whooping crane [9]	Endangered
	Arkansas River shiner	Threatened
	piping plover [10]	Threatened
	lesser prairie-chicken [12]	Candidate, Warranted but precluded
Ellis	interior least tern [6, 7]	Endangered
	whooping crane [8c, 9]	Endangered
	Arkansas River shiner	Threatened
	piping plover [10]	Threatened
	lesser prairie-chicken [11]	Candidate, Warranted but precluded
Garfield	interior least tern [7]	Endangered
	whooping crane [8c, 9]	Endangered
	piping plover [10]	Threatened
	lesser prairie-chicken [12]	Candidate, Warranted but precluded
Garvin	interior least tern [7]	Endangered
	whooping crane [9]	Endangered
	piping plover [10]	Threatened
Grady	interior least tern [6, 7]	Endangered

American Burying Beetle (*Nicrophorus americanus*)

Note - Posted May 17, 2011: The 2011 ABB Survey Guidance is now available. Any ongoing projects that may affect the ABB and have already incorporated the current (2005) ABB guidance into their project planning do not need to incorporate the 2011 updated guidance. The Service does not expect ongoing projects to re-address the ABB. However, any new projects that may affect the ABB and have not implemented or incorporated the current (2005) ABB guidance into their planning will need to follow the 2011 updated guidance.

The trap and relocation and bait away guidance has not been changed. However, the trap and relocate guidance refers to the survey guidance. The 2011 survey guidance should be utilized. The same caveat applies to the trap and relocation guidance as to the survey protocol in regards to existing and new projects as described above.

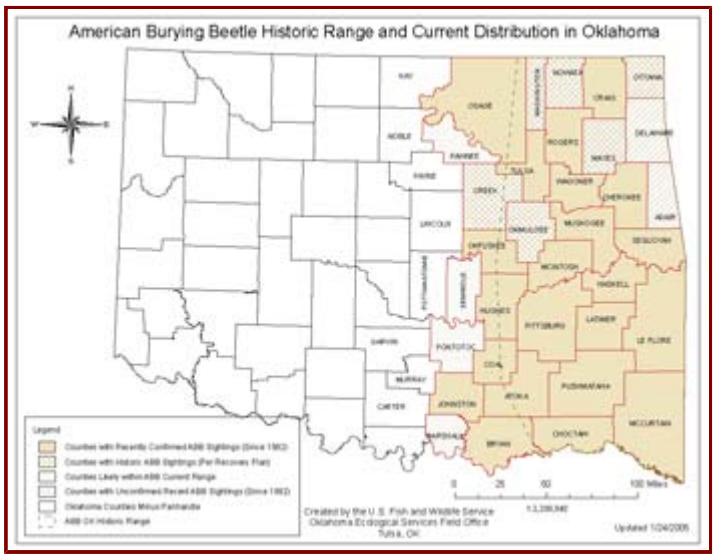
Status: Endangered (54 FR 29652; July 13, 1989). Critical habitat has not been designated. The Final Recovery Plan was signed on September 27, 1991 (Link to Final Recovery Plan, 7 MB)

Description: The American burying beetle is the largest species of its genus in North America, measuring 0.98-1.4 inches in length. It was formerly known as the giant carrion beetle. The body of the American burying beetle is shiny black and has hardened protective wing covers (elytra) that meet in a straight line down the back. The elytra are smooth, shiny black, and each elytron has two scalloped shaped orange-red markings. The pronotum, or shield over the mid-section between the head and wings, is circular in shape with flattened margins and a raised central portion. The most diagnostic feature of the American burying beetle is the large orange-red marking on the raised portion of the pronotum, a feature shared with no other members of the genus in North America. The American burying beetle also has orange-red frons (a mustache-like feature) and a single orange-red marking on the top of the head (triangular in females and rectangular in males). Antennae are large, with notable orange clubs at the tips.

Life History: The American burying beetle is nocturnal (active at night), lives for only one year, and typically reproduces only once. During the winter months when temperatures are below 60°F (15°C) American burying beetles bury themselves in the soil to overwinter. When temperatures are above 60°F (15°C) they emerge from the soil and begin the mating and reproduction process. American burying beetles are scavengers, dependent on carrion for food and reproduction. They play an important role in breaking down decaying matter and recycling it back into the ecosystem. Reproduction involves burying a small vertebrate carcass (1-9 ounces; 35-250 grams), laying eggs on the carcass, and then larvae feeding on the carcass until mature. The American burying beetle is unusual in that both parents provide care to their young. American burying beetles must compete with other invertebrate species, as well as vertebrate species, for carrion. Even though American burying beetles are considered feeding habitat generalists, they have still disappeared from over 90% of their historic range. Habitat loss, alteration, and degradation have been attributed to the decline of the American burying beetle.

Habitat: Habitat requirements for American burying beetles, particularly reproductive habitat requirements, are not fully understood at this time. The American burying beetle has been found in various types of habitat including oak-pine woodlands, open fields, oak-hickory forest, open grasslands, and edge habitat. Research indicates that American burying beetles are feeding habitat generalists. Data is lacking pertaining to American burying beetle reproductive habitat requirements, but species experts assume that they are more restrictive in selecting their reproductive habitat than feeding habitat.

Distribution: The historical distribution of the American burying beetle included the eastern half of North America from southern Ontario, Canada and the northern peninsula of Michigan to the southern Atlantic coastal plain. This range included the eastern half of Oklahoma. At the time of listing there were only 3 known areas of occurrence. Two of these were in Oklahoma and one was in Rhode Island. The current distribution encompasses 8 states, including Rhode Island, Massachusetts, South Dakota, Nebraska, Kansas, Arkansas, Texas, and Oklahoma.



In Oklahoma the beetle is currently known to occur in over 20 counties (see map at right; click image for larger map). There are also 2 counties that have unconfirmed sightings in Oklahoma. An unconfirmed sighting is defined as a likely sighting although not confirmed by an entomologist or a Service biologist. In addition, there are 9 counties that are considered likely to support American burying beetles due to their proximity to counties with current American burying beetle occurrences and the presence of suitable habitat. However, no current surveys have been conducted in these counties. The State of Ohio has reintroduced American burying beetles over a 3 year period. To date the status of this reintroduced population is poor. Additional research is needed to properly understand the requirements of the American burying beetle and achieve successful reintroduction efforts.

Causes of Decline: The cause for the decline of this species is not clearly understood. Declines could be a result of habitat fragmentation, habitat loss, carcass limitation, pesticides, disease, light pollution, or a combination of these factors. Species experts believe the primary cause of decline habitat loss and fragmentation.

Recovery Needs: The highest priority recovery tasks as identified by the Recovery Plan include: 1) protecting and monitoring extant population; 2) maintaining captive populations; 3) continuing the Penikese Island reintroduction attempt; 4) conducting ecological studies; and 5) conducting field surveys for additional populations.

Other information: Ongoing projects in Oklahoma include a study of the habitat, soil, and weather preferences of the American burying beetle. In addition, surveys are being conducted to locate additional populations and monitor known populations. The populations on Block Island, RI; Camp Gruber, OK; and Fort Chaffee, AR, are being monitored annually. Genetic comparison research between the Oklahoma populations with the Block Island population has been conducted and has revealed no significant genetic differences between populations.

Additional Documents and Information:

Section 7 Consultations

- Project Evaluation Form for the American Burying Beetle (*being updated*): This form is to be completed and submitted with projects that are within the American burying beetle Range (as depicted in the map above) and that are required to comply with Section 7 of the Endangered Species Act.
- Biological Opinions
  - ***NULL AND VOID*** - Programmatic Biological Opinion on the American Burying Beetle for the Environmental Protection Agency. Due to the Energy Policy Act of 2005, this Programmatic Biological Opinion is null and void. The Energy Policy Act modified the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) regulations. These modifications exempted certain oil and gas field activities from storm water discharge permit requirements. For a complete description of the modified regulations, refer to the Federal Register, Vol. 71, No. 112 / Monday, June 12, 2006, pages 33628-33460. This document is available HERE

Surveying

- U.S. Fish and Wildlife Service (2011) American Burying Beetle *Nicrophorus americanus* Rangewide Survey Guidance (PDF, 196KB); this is the Service's recommended survey protocol
  - Appendices and Figures
    - Appendix 1. American burying beetle Survey Data Form 4-4-11
    - Appendix 2. American burying beetle Survey Summary Report (Electronic Copy) 4-4-11
    - Appendix 3. Carrion Types Tested and Found Effective at Attracting American burying beetles 4-4-11
    - Appendix 4. Description of Nicrophorus Species in Oklahoma 4-4-11
    - Appendix 5. Identification Key to Nicrophorus Species in Oklahoma 4-4-11
    - Appendix 6. American burying beetle accidental death form 4-4-11
    - Appendix 7. American burying beetle Survey Summary Report (Hard Copy) 4-4-11
    - Appendix 8. American burying beetle Summary Report column header descriptions 4-4-11
    - Figure 1. American burying beetle Survey Transect Diagram 4-4-11
    - Figure 2. American burying beetle Baited Cup Pitfall Trap with Cover 4-4-11
    - Figure 3. American burying beetle Baited Bucket Pitfall Survey Trap with wood cover 4-4-11
    - Figure 4. Baited Bucket Pitfall Trap Baited Bucket Pitfall Survey Trap with Wire Mesh 4-4-11
    - Figure 5. Identification of American burying beetle Gender 4-4-11

Section 10 Permittees, and Accidental Death Reporting

- American Burying Beetle Service Permittees (PDF): This is a comprehensive list of Section 10 Permitted Biologists, located in Oklahoma and surrounding states, approved by the Service to conduct American burying beetle surveys.
- American Burying Beetle Service Permit Requirements (PDF): This is a description of the required qualifications for obtaining a Section 10 Recovery Permit. General permit information is

available HERE. The permit application form for a Section 10 Recovery Permit is available HERE .

- American Burying Beetle Accidental Death Form (PDF): This form is to be filled out by a Section 10 Permitted Biologist when an American burying beetle is accidentally killed.
- American Burying Beetle Accidental Death Summary Report (MS Excel Spreadsheet): This form is to be completed annually by a Section 10 Permitted Biologist for all American burying beetles accidentally killed. This report must be submitted by October 31 of each year.

Baiting Away

- American Burying Beetle Baiting Away Protocol (PDF, 64 KB)
    - Reporting Form for American Burying Beetle Baiting Away Protocol (MS Excel Document)

Trapping and Relocating

- American Burying Beetle Trapping and Relocating Protocol (PDF, 65KB)
    - Reporting Form for American Burying Beetle Trapping and Relocating Protocol (MS Excel Document)

Databases

- Surveys
    - Database of presence/absence surveys conducted in Oklahoma for the American burying beetle (PDF). Every attempt is made by the Service to update this on a regular basis. *Last updated on 8-6-2010.*
    - Heading and Field Codes for survey database (Excel Spreadsheet, 43 KB)

Maps

- Historical and Current Range of the American Burying Beetle in the United States (JPG Image, 300 KB)
- Current Range of the American Burying Beetle in the Eastern United States (JPG Image, 122 KB)
- Current Range of the American Burying Beetle in the Central United States (JPG Image, 398 KB)
- Current Range of the American Burying Beetle in Oklahoma (JPG Image, 396 KB)

BACK

Gray Bat (*Myotis grisescens*)

Status: Endangered (41 FR 17740; April 28, 1976). Critical habitat not designated.

Description: The gray bat is a medium-sized bat with a wingspan of 10 to 11 inches (25-28 cm). It has grayish-brown fur and is the only bat in its range with unicolored dorsal hairs. The dorsal hairs of other bats within its range are bi- or tricolored. The wing membrane of the gray bat connects at the ankle instead of the base of the first toe as in other members of the genus.

Life History: Gray bats migrate each year between winter and summer caves. Mating occurs at winter caves in September. After copulation, females enter hibernation - males and juveniles continue feeding for several weeks. By early November, most gray bats are in hibernation. Adult females begin to emerge in late March, followed by juveniles and adult males. Females store sperm during the winter and become pregnant after emerging in the spring. A single offspring is born in late May or early June. Young begin to fly 20 to 25 days after birth. Gray bats feed on flying insects over bodies of water. Mayflies make up the major part of their diet.

Habitat: Gray bats almost always roost in caves year-round. Historically, hibernation caves could contain well over a million individuals. Summer colonies can reach 250,000 individuals. Gray bats have very specific cave requirements. As a result, fewer than five percent of available caves are suitable. Winter caves must be very cold with a range in temperature between 42° and 52°F (6-11°C). Winter caves are deep with vertical walls. Summer caves must be warm (57-77°F or 14-25°C) or with restricted rooms that can trap the body heat of roosting bats. Summer caves are located close to rivers or lakes where the bats feed. Bats are known to range at least 12 miles (20 km) from their colony to feed.

Distribution: Gray bat distribution is limited to limestone cave areas of the southeastern United States. Major populations are found in Alabama, Arkansas, Kentucky, Missouri, and Tennessee. Smaller populations may occur in surrounding states. In Oklahoma, the historic population probably was limited to the limestone region of the northeastern part of the state. At present, this bat is found in only four counties in northeastern Oklahoma - Adair, Cherokee, Delaware, and Ottawa. Gray bats may occur in caves in other counties, but there have been no recent sightings. No hibernation caves are known in Oklahoma.

Causes of Decline: The gray bat is extremely vulnerable to human disturbances at roosting caves. This is especially true at hibernation and maternity caves. The gray bat is also threatened by pesticides, loss of habitat due to flooding by man-made impoundments, commercializing of caves, and improper gating of caves.

Recovery Needs: The top recovery tasks for the gray bat include: 1) acquiring and protecting caves; 2) controlling habitat destruction; and 3) educating the public about the danger human disturbance represents to the bat and about the ecological importance of the gray bat.

Other information: Human disturbance at winter caves is energetically costly for bats and can significantly decrease their chances of surviving the winter. Disturbance of maternity caves in the summer can cause large-scale mortality of flightless young. Gates, fences, and signs are often used to

keep people out of active gray bat caves.

NEW! Funds are currently available through the Healthy Forest Reserve Program (HFRP) in northeastern Oklahoma to protect and enhance forested wildlife habitat for threatened and endangered species and other declining wildlife populations. The federally listed species for habitat and population recovery activities include the gray bat, the Ozark big-eared bat, and the Ozark cavefish. The HFRP is administered by the Natural Resources Conservation Service (NRCS). The HFRP in Oklahoma is being implemented in coordination between NRCS, the U.S. Fish & Wildlife Service (USFWS), and Oklahoma Forestry Services (OFS).

White-nose syndrome (WNS) is a new bat malady first observed in four caves in New York during the winter of 2006-2007. The primary agent of concern is a white fungus (*Geomyces destructans*) that thrives in the cold and humid conditions characteristic of caves. Affected bats have the fungus growing around their nose and other parts of their body. Experts estimate that over 1,000,000 bats in the northeastern United States already have died due to WNS. WNS has not been documented in Oklahoma. However, WNS threatens to spread to the south and the west. For more information about WNS, including the current occurrence map, fact sheets, photographs, and information about research and monitoring, please go here.

BACK

Interior Least Tern (*Sterna antillarum*)

Status: Endangered (50 FR 21784; May 28, 1985). Critical habitat has not been designated.

Description: The interior least tern is the smallest member of the tern family with a wingspan of 20 inches (50 cm). They have a grayish back and wings, and snowy white undersides. Least terns can be distinguished from all other terns by their combination of a black crown, white forehead, and a variable black-tipped yellow bill.

Life History: Interior 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. 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.

Habitat: Interior least terns favor islands or sandbars along large rivers for nesting. The sand must be mostly clear of vegetation to be used by terns. Least terns prefer shallow water for fishing. Water levels must be low enough so that nests stay dry.

Distribution: The historic distribution of the interior least tern was 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, interior least terns nest along most of the larger rivers, as well as at the Salt Plains National Wildlife Refuge near Jet, Oklahoma. Interior least terns winter in South America.

Causes of Decline: Many nesting areas have been permanently flooded by reservoirs and channelization projects. Unpredictable water discharge patterns below dams flood nesting areas. Overgrowth of brush and trees also eliminates remaining habitat. This prevents terns from using these areas as nesting sites. The recreational use of sandbars by humans is a major threat to the tern's reproductive success.

Recovery Needs: Primary recovery tasks for interior least tern populations include determining population trends and habitat requirements, increasing breeding populations, and developing public awareness of the needs of least terns through educational programs.

Other information: The recovery plan for the interior least tern was released in 1990. The United States Fish and Wildlife Service is working with various state and federal agencies to monitor and protect the least tern. In Oklahoma, they are working with the Nature Conservancy to protect tern habitat along the Arkansas River near Tulsa, and along the Canadian River near Norman.

Information current as of April 1992

BACK

Neosho Madtom (*Noturus placidus*)

Status: Threatened (55 FR 21148; May 22, 1990). Critical habitat has not been designated.

Description: The Neosho madtom (see image on right; click on image to see a larger version) has features characteristic of all North American catfish, including scaleless skin and a relatively large head with sensory barbels. Adult Neosho madtoms average less than three inches (8 cm) in length. They have a brownish midline stripe and an overall mottled appearance. The light-colored edge of the adipose fin is the best characteristic to distinguish it from similar species.

Life History: Neosho madtoms are short-lived fish, only occasionally surviving more than three years. Little is known about the reproductive habits of the Neosho madtom. They are believed to spawn in June and July. In closely related species, eggs are laid under small stones, and the eggs and sometimes young fish are guarded by a parent. Adults will bury themselves in the gravel during the day and come out to feed at night. Larval, aquatic insects are the major food source of Neosho madtoms.

Habitat: 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.

Distribution: Historically, the Neosho madtom was found in the Neosho, Cottonwood, Spring, and Illinois Rivers in Kansas, Missouri, and Oklahoma. It is believed to be no longer present in the Illinois River and scattered through the rest of its historic range. In Oklahoma, it is present only in Ottawa and Craig counties.

Causes of Decline: 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 from cattle feedlot runoff has adversely affected the fish as well.

Recovery Needs: Top recovery tasks for the Neosho madtom include further investigations on the biology of the fish, protecting current populations, and developing a reintroduction plan.

Other information: The recovery plan for the Neosho madtom was approved in September of 1991.

Photo by Daniel Fenner; Information current as of October 1997

BACK

Piping Plover (*Charadrius melodus*)

Status: Endangered in the watershed of the Great Lakes, threatened in the remainder of its range (50 FR 50726; December 11, 1985). Critical habitat has not been designated.

Description: The piping plover is a small shorebird about seven inches (18 cm) long with a wingspan of about 15 inches (38 cm). Adults have sand-colored upper parts and white undersides. During the breeding season, piping plovers have a single dark band across the breast and forehead. They can be distinguished from similar species by their bright orange legs.

Life History: Piping plovers arrive on their breeding grounds along the Atlantic Coast in late March and on their prairie breeding grounds in early May. Males defend territories and attract females with aerial displays. Piping plovers are monogamous and both parents participate in all stages of parental care. Four eggs are typically laid in a shallow nest scrape and hatching occurs 25 to 31 days after completion of the clutch. Adults depart from breeding areas as early as the first week in July. Piping plovers feed on a variety of invertebrates, including worms, crustaceans, and insects.

Habitat: Piping plovers nest on sandy beaches along the ocean or lakes. Along rivers, piping plovers use the bare areas of islands or sandbars. They also nest on the pebbly mud of interior alkali lakes and ponds. Birds nesting on gravel have higher reproductive success than those nesting on alkali. During the winter, piping plovers use algal, mud, and sand flats along the Gulf Coast. Spoil islands in the intracoastal waterway are also used.

Distribution: Historically, piping plovers bred along the Atlantic Coast, on the Northern Great Plains, and around the Great Lakes. Piping plovers winter along the southern Atlantic and Gulf coasts, and in the Bahamas and West Indies. Although drastically reduced, remnant populations occur throughout their historic range. Piping plovers migrate through Oklahoma each spring and fall.

Causes of Decline: Piping plovers have been drastically reduced in number, due to the loss of beach habitat and to the modification of habitat through the channelization and damming of rivers. These practices eliminate sandbars and allow the growth of vegetation on nesting areas. Nesting success of piping plovers on beaches used by humans is much lower than on isolated beaches, because of disturbance.

Recovery Needs: Top needs for piping plover recovery include monitoring population trends, managing and protecting populations and their habitat, and further research on the general ecology of the species.

Other information: The piping plover recovery plan was completed in 1988. Hunters almost eliminated the species in the early 1900s. However, because of strict protection, populations recovered by the 1940s. The current decrease in numbers has resulted from habitat loss. Currently, the population of piping plovers is estimated at approximately 5,000 individuals.

Information current as of April 1992

BACK