Endangered Species Act (ESA)

Federal laws require the Federal Highway Administration (FHWA) and MoDOT to thoroughly assess and consult on any potential impacts their projects might have on federally listed threatened or endangered species and eliminate or minimize those impacts. If the Information for Planning and Conservation website (IPaC) returns any federally listed species as potentially present in the action area then the applicant must determine if suitable habitat for these species occurs within the project area and if species may be affected by project activities. There are currently 37* federally listed threatened and endangered species of wildlife and plants that are believed or known to occur in Missouri. These are typical suitable habitat descriptions for all species on the Missouri USFWS list.

Bats

Gray bats are cave obligate species which congregate in maternity or bachelor colonies in the summer, utilizing dome *cave and mine habitat,* and mixed colonies during winter hibernation in vertical or pit-type caves and mines. They utilize mainly *stream corridors* for foraging spring through fall. Gray bats have been recorded *statewide except for NW Missouri*.

Indiana bats and northern long-eared bats *winter in caves* and spend summer in forested areas of the state where they may utilize suitable *summer roost trees.* Roosting and maternity habitat consists primarily of live or dead hardwood trees which have shingle-like bark providing *space for bats to roost underneath the bark.* Suitable summer roost habitat for the threatened northern long-eared bat overlaps greatly with Indiana bat habitat and includes additional use of trees with *cavities, splits, crevices, hollow sections, and other damage*. These two species could occur anywhere in Missouri where suitable habitat exists. *All trees three inches in diameter and above should be assessed* for these characteristics. *Removal of suitable summer roost trees at any time of the year may affect both species*.

Ozark big-eared bats *prefers caves in limestone karst* formations in mature hardwood forests. Maternity caves tend to be closer to food sources than are hibernation caves, which are better protected from cold and wind. This species is only *known from SW Missouri*, NE Oklahoma, and northern Arkansas.

Birds

Least Tern, Piping Plover, Red Knot: These three *coastal migratory shorebirds* could utilize sandy shores and sand bar/gravel bar habitats in larger Midwestern river systems. Though the Least Tern has been observed near the Grand River in Chariton Co, the *most likely habitat for these species is the Mississippi River south of St. Louis*.

Amphibians

Ozark hellbenders live in *large permanent streams and rivers in south-central Missouri* and northern Arkansas. They need clean, *clear and cool rivers with an abundance of large, flat-bottomed rocks* for refuge.

Fishes

*the Red-cockaded Woodpecker shows up on many USFWS online lists for Missouri, one of 38 current species. However, this species has been declared extirpated from the state since the 1940's.
https://www.fws.gov/ncsandhills/rcw.html

The **Topeka shiner** occurs in runs and pools of *small, moderately clear upland creeks* with substrates of sand, gravel, rubble and bedrock and spawn in silt-free gravel from late May to mid-July. They are *typically found in small, low order, prairie streams with high water quality and cool temperatures*. These streams generally flow year around; however, some may become intermittent during late summer and fall. (Known from 8-9 counties in *northern and central MO*)

The **Neosho madtom** is the smallest catfish in Missouri, inhabiting only 5 to 7 stream miles on the *Spring River in SW Missouri*, and has also be found in the *Maries River in central Missouri.* It inhabits *medium-sized to moderately large streams* with moderate gradients, *permanent flow and clear water* where adults are found on riffles, and young live in quieter waters.

Pallid sturgeon are associated with the *Missouri and Mississippi Rivers and some of their major tributaries* in Missouri. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats, and gravel bars.

The **Niangua darter** *prefers clear, shallow pools in medium-sized streams in the Ozark highlands* of Missouri with gravel or rocky bottoms and cannot live in silty water. The majority of all known populations are known from a few *streams in central Missouri*.

Ozark cavefish inhabit *cave streams and springs* with a gravel bottom, or occasionally in pools over silt and sand bottoms. They are restricted to areas of limestone and *dolomite bedrock containing caves, sinkholes, and springs in SW Missouri.*

The **grotto sculpin** is a *cave-adapted fish* endemic to just a few sites in *Perry County Missouri cave systems*. There are designated recharge protection areas for these Perry Co caves and streams.

Freshwater Mussels

Rabbitsfoot mussels prefer *shallow areas with sand and gravel along the bank and next to shoals*, which provide a refuge in fast-moving *small to medium-sized rivers*. The only known records in the state are from the *Spring River and Shoal Cr in SW and the St. Francis River system in SE Missouri.*

Snuffbox occur in *small to medium sized creeks and rivers in clear water with gravel riffles*, inhabiting areas with a swift current usually buried in the sand, gravel, and cobble substrate. Most Missouri records are from the *Bourbeuse, Meramec, and St. Francis Rivers*.

The **scaleshell** mussel is found in *medium to larger streams in the Gasconade River, Meramec River, and Bourbeuse River drainages*. It primarily inhabits stable *riffles and runs with gravel or mud* substrate and moderate current velocity.

In Missouri, the **Neosho mucket** is restricted to the *Spring and Elk River drainages in the southwest part of the state* and is generally found in a variety of habitats in *large streams and small rivers* with moderate currents. It is typically found in *riffles and shallow to deep runs with stable gravel substrates*.

The **Curtis' pearlymussel** requires good water quality and occurs in *shallow stable riffles and runs*. The species is limited to stream segments that *are transitional between headwater and lowland streams reaches*. Though there are older records in the *Black and Little Black Rivers in SE Missouri*, *the Spring River in SW Missouri* may also provide suitable habitat.

Pink mucket mussel is found in *mud and sand and in shallow riffles and shoals* swept free of silt in *major rivers and tributaries.* This mussel buries itself in sand or gravel. Reproduction requires a stable,

undisturbed habitat and a sufficient population of fish hosts to complete the mussel's larval development. This species has been found in the *Sac, Osage, Gasconade, Bourbeuse, Big, and Meramec Rivers.*

The **Higgins eye** is a pearlymussel of *large rivers, usually found in deep water* with moderate currents where it buries itself in *sand and gravel substrate*. The historical natural range extended down the *Mississippi River* to St. Louis, but the only documented occurrence in the last 30 years is in *Marion Co*.

Spectaclecase mussels are found in *large rivers* where they live in areas sheltered from the main force of the river current. This species often clusters in *firm mud* and in sheltered areas, such as *beneath rock slabs, between boulders, and even under tree roots*. Medium to large rivers where this species has been found include, *Sac, Osage, Gasconade, Bourbeuse, Big, and Meramec Rivers.*

The **sheepnose** mussel has a range that includes the *Mississippi River* north of St. Louis, and mostly larger rivers in east central Missouri including *Meramec, Big, and Bourbeuse Rivers*. Sheepnose mussels live in *larger rivers and streams* where they are *usually found in shallow areas* with moderate to swift currents that flow over *coarse sand and gravel*. However, they have *also been found in areas of mud, cobble and boulders*, and in large rivers they may be found in deep runs.

The winged mapleleaf mussel can inhabit *medium to large streams and rivers where it can be found in gravel or sandy substrate* and less commonly in mud. It requires clean, pollutant-free water with swift current in depths of roughly 1-7 feet. There are recent records in Missouri from the *Bourbeuse River in Franklin Co*.

Fat pocketbook mussel *prefers sand, mud, and fine gravel bottoms of large rivers*. It buries itself in these substrates in water ranging in depth from a few inches to eight feet. In Missouri, this species is associated with *Mississippi River locks and dams and islands north of St. Louis and a tributary to the St. Francis River in southern Dunklin Co*.

Snails

Tumbling Creek cavesnail is *endemic to a single cave in Taney County, MO* where it lives on the underside of large rocks in the cave stream that have little or no silt. It occurs in areas of the cave stream that are adjacent to large deposits of bat guano, so it is thought that they may be dependent, indirectly, on the deposits.

Insects

The **Hine's emerald dragonfly** lives in calcareous spring-fed marshes and sedge meadows overlaying dolomite bedrock. In Missouri, *many Ozark fens provide suitable habitat* in several *south-central Missouri counties*.

Crustaceans

The **Benton Cave Crayfish** (Cambarus aculabrum) is native to *northwestern Arkansas and McDonald County, MO* and feeds on bat guano and organic matter washed into *caves*.

Plants

Running buffalo clover is *a remnant plant of forest/prairie* transition areas and can occur in rich soils along *creeks, trails, and floodplains with moderate disturbance*. Natural and reintroduced populations occur in the *eastern half of Missouri*.

Virginia sneezeweed is a plant of *wet prairies and wet ditches in SW and south-central Missouri*. Preferred habitat includes shorelines and plains around sinkholes, low lying fields and wet meadows.

Western prairie fringed orchid is a plant of *wet prairie and meadow habitat* and only known to occur in *NW Missouri from very limited locations.*

Decurrent false aster is a *wetland plant* of wet prairies, marshes, lake shores, riverbanks, old fields, roadsides, and mudflats, and in *Missouri natural populations have only been found north of St. Louis.*

Mead's milkweed is a plant of dry-mesic tallgrass and upland prairies with sandstone or chert bedrock. It can occur in *prairie remnants, prairie hay meadows, railroad rights-of-way, and glade habitat*. Most populations occur south of the Missouri River in *west-central Missouri* with a few populations *also known from Iron and Reynolds Counties*.

In Missouri, **Geocarpon** grows on moist, sandy soils on exposed *sandstone outcrops or glades*. It is only known from a few counties in *SW Missouri*.

Natural habitat for **Missouri bladder-pod** is *primarily open limestone or dolomite glades*. It has occasionally been found on *highway rights-of-way and pastures* where mowing and grazing have kept the area open or in open rocky woods. Populations are known from very few *SW Missouri* counties.

Pondberry is a shrub that occurs in *inundated wet woodlands* with small sand dunes and only occurs naturally in *southeastern Ripley County* in Missouri on Missouri Department of Conservation protected lands.

The **eastern prairie fringed orchid** can occur in *mesic prairie to wetland habitat* such as sedge meadows, marsh edges, even bogs. It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. *Only known to occur in a small area of Grundy Co*.

Migratory Bird Treaty Act (MBTA)

Several bird species protected by the MBTA commonly construct their nests on the underside of bridge decks, on the bridge substructure, and in concrete box culverts. These most often include cliff swallows, barn swallows, Eastern phoebes, and American robins. If nests are noted, a Job Special Provision will need to be placed in the contract that provides guidance on how to avoid violating the MBTA. Often, removal of the old, inactive nests (those without eggs or young) before the project starts, and maintenance of the bridge in a nest-free condition until construction, is necessary. Nest removal should be done in the non-breeding season.

Provide a *presence/absence assessment with current photos (less than one year old)* of the underside of the bridge, pier caps, the tops of the piers, and inside box culverts for any bird nests. *If any are present, the MBTA Job Special Provision (JSP) will be required*. The JSP prohibits disturbance of active nests during breeding season which is generally, but not exclusively, April 1 to July 31.