3.6 Energy

Construction of the proposed US 51 improvement would require energy for processing materials, construction activities, and maintenance for the lane miles to be added within the project limits. Energy used by vehicles in the area may increase during construction due to possible traffic delays.

Construction of the proposed improvement would reduce traffic congestion and wait times for safe openings to turn along the route and thereby reduce vehicular stopping and slowing conditions. Additional benefits would be realized from increased capacity and smoother riding surfaces. The roadway improvement would result in less direct and indirect vehicle energy used for the Build Alternatives than for the No Build Alternative. Thus, in the long term, post-construction operational energy requirements should offset construction and maintenance energy requirements and result in a net savings in energy usage.

3.7 Natural Resources

Natural resources describe the plants and animals in the study area. Some of these resources are protected by state and federal regulations and are an important part of the natural environment.

Historically, the lands in the study area are forests and prairies, which have been largely converted to agricultural uses. The Kaskaskia River with its tributaries is the main river system within the study area. Forested wetlands and wet prairies exist within river floodplains and former glacial lakebeds. Forests are found along streams, and there are a few prairie remnants scattered throughout upland areas. Soils are relatively poor due to high clay content.

This Section of the EIS covers the plant communities (cover types), invasive species, wildlife, endangered and threatened species, and natural areas that occur within or adjacent to the project corridors.

3.7.1 Vegetation and Land Cover

The purpose of this section is to describe the important types of vegetation (land cover) that occur within the study area that provide suitable habitats for native plants and animals. The type and structure of the vegetation determines the kinds of plant and animal species that will occur within them.

What types of vegetation (land cover) are located in the study area?

There are 10 land cover types within the study area. Table 3.7-1 provides the acreage of each that occur within the US 51 study area.

Table 3.7-1: Land Cover Types within Study Area

Vegetation/Land Cover Type	Size (Acres)	Percent of Total Land Cover*
Cropland	14,870	65.4
Urban/Built-Up (Developed land)	3,732	16.4
Upland Forest	1,917	8.4
Pasture/Hayland	1,016	4.5
Wetlands**	702	3.1
Non-native grassland	203	0.9
Waterbodies	97	0.4
Shrubland	78	0.3
Other	77	0.3
Prairie	43	0.2
Total	**22,735**	**99.9**

Source: INHS Field Reports 2009- 2012.
**Total may not equal 100 percent due to rounding.*
*** Wetlands shown as land cover type are considered as general land type only and are not based on actual delineation of wetlands as reported in Section 3.11, Wetlands.*

What are the important land cover types for plants and animals?

Though cropland (65 percent of the study area) and Urban/Built-Up land (16 percent of the study area) dominate the landscape in some areas, they do not provide habitats for native plants and animals. The two most important cover types for wildlife species include upland forests and wetlands, which together represent approximately 12 percent of the study area. Prairie, which once dominated the landscape of the study area, is too small in acreage to be of much wildlife value. Its importance lies within its rarity as a plant community.

Native Illinois land cover types, upland forests and prairies, are described below. Wetlands, because of their regulatory importance, are discussed in Section 3.11.

How is the natural quality of cover types (plant communities) determined?

Natural quality measures the effects of disturbance to natural plant communities. A system of letter grades was developed to express degrees of natural quality. The grading system is based on the degree of disturbance.

Plant communities can be graded, based on a variety of characteristics such as number of species present within the community, past uses of the land, as well as past disturbance to the area. Present-day activities and past disturbances to plant communities often determine the natural quality of the forest, prairie, or wetland being evaluated. Under normal conditions, it is unlikely that severely disturbed areas can be restored to their original condition.

Grading natural quality

Grade A: Relatively stable or undisturbed communities that does not show the effects of disturbance by humans

Grade B: Late successional or lightly disturbed communities that has recently been lightly disturbed or moderately to heavily disturbed in the past, but has mostly recovered

Grade C: Mid-successional or moderately to heavily disturbed communities

Grade D: Early successional or severely disturbed so that its structure and species composition has been severely altered and is rapidly changing

Grade E: Very early successional or very severely disturbed such as newly cleared land, cropland, improved pastureland, most highway right-of-way

Upland Forests

Approximately eight percent of the study area is comprised of forests. Of the nearly 1,900 acres of upland forest within the study area, dry upland forest is the main forest type. Oaks and hickories are abundant species within the upland forests. Overall, white oak is the most common tree species, while black oak, red oak, shagbark hickory, sugar maple, and mockernut hickory are next in abundance.

Upland forest areas of varying sizes are scattered throughout the study area. They typically occur along the slopes of streams and adjacent hill tops. The larger forested tracks occur along the bluffs of the Kaskaskia River south and east of Vandalia, along the East Fork of the Kaskaskia River, and the Crooked Creek drainage area around Centralia.

Upland Forest

Forests are a large and important resource in Illinois. Forests make a major economic contribution, providing timber, employment, outdoor recreation, protection of soil and water resources, and habitat for many plant and animal species. Wildlife within forested areas may consist of deer, raccoon, and various species of birds, among other species.

Forested areas within the study area have been grazed and/or selectively logged in the past. These areas are a mixture of submature (40-60 years of age) to mature (60-90 years) second growth forest. Some areas are estimated to be old second growth (90-120 years) forest. Because of past disturbances these areas are considered to have a natural quality of Grade C.

Old Second Growth Forest

A **savanna** is a grassland area with trees being sufficiently small or widely spaced so that the canopy does not close. The open canopy allows sufficient light to reach the ground to support grasses. Savannas are frequently in a transitional zone between forest and prairie.

Savannas are not easily regenerated, and replacement of an impacted savanna can take decades.

One forested area (57 acres in size), located along the bluffs of the Kaskaskia River south of Vandalia has a natural quality ranging from low to high, with many areas trending toward medium quality. The area had been logged in the distant past, and there were occasional scattered cut stumps in some areas. The age was estimated to be old second growth (90-120 years) based on the size of the largest trees (tree diameters at 4.5 feet over 20 inches in diameter). The largest diameter trees were oaks (white, red, and black oaks). This forest has Grade C natural quality.

Savanna

Approximately 29 acres of three savanna habitat communities were located in the study area. The savanna habitats have been degraded by land-use activities such as fire-suppression, logging, and grazing. One of the savannas is a small (about four acres) oak woodland containing a large number of prairie species. This site was located adjacent to US 51 south of Shobonier. There is an old railroad bed extending through the site, has been logged in the past, and has not been burned. The trees represented young second growth (20-40 years of age) to submature growth (40-60 years). The most common tree species are wild black

cherry, American elm, mockernut hickory, and these species are not characteristic of a savanna. White oak and American filbert are the only characteristic woody savanna species at this site. The site does have two (little bluestem, Indian grass) of the three grass species that occur in a savanna. Though the ground layer is dominated by native weeds (common ragweed, common wood sedge) and invasive species (Japanese honeysuckle, wild parsnip, tall fescue) the site contains a very large number of perennial herbs (101 different species) many of which are prairie forbs and some are characteristic (starry campion, common carrion flower) of savannas. The natural quality of this site would be considered Grade C.

Example of an Oak Savanna
Photo By: http://oaksavannas.org/

Prairie

The original tallgrass prairie has been converted into one of the most intensive crop producing areas in North America. Less than one tenth of one percent of the original tallgrass prairie remains in Illinois.

Why are Prairies important?

Illinois is known as the Prairie State. Before settlement, tallgrass prairie covered most of Illinois and helped form the valuable soils that support our current agricultural industries. Remnant prairies harbor unique species of plants that are found in few places outside of Illinois.

Approximately 43 acres of prairie were identified in 17 prairie remnants in the study area. Prairies were located along roadsides, within abandoned and active railroad rights-of-way, within a small woodland clearing, and at a school prairie planting. A prairie remnant was also identified in the Ramsey Railroad Prairie Nature Preserve, north of Ramsey. This area was classified as an ecologically sensitive site (and an Illinois Natural Areas Inventory [INAI]) site.

The 17 remnant prairies identified are represented by one wet-mesic prairie, three mesic/wet-mesic prairies, one mesic prairie, 11 mesic/dry-mesic prairies, and one dry-mesic prairie. Except for the Ramsey Railroad Prairie Nature Preserve, which received a grade of B, all of the sites received a grade between C and D with one remnant found to be a high grade C. Non-native species were often abundant in the remnants.

Ramsey Railroad Prairie Nature Preserve
Photo By: Illinois Natural History Survey

What are invasive species and are they present in the study area?

Executive Order 13112 (Invasive Species) directs Federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the United States. Approximately 30 percent of the state's flora is composed of alien (introduced) plant species. The U.S. Department of Agriculture Noxious Weeds List for Illinois contains several plant species that occur within the study area.

Approximately 17 percent of the plant species surveyed in the corridor are considered non-native species. Pictured below are some of the commonly-occurring invasive species in the study area.

Garlic Mustard in forested areas
Photo By: Wisconsin DNR

Reed Canary Grass in wetlands and upland swales
Photo By: Wisconsin DNR

Wild Parsnip in grasslands and along roadsides
Photo By: Wisconsin DNR

How will the alternatives impact various cover types/vegetation types?

US 51 Build Alternative

The alternative between the larger towns where there is only one remaining alternative is referred to collectively as the US 51 Build Alternative. The US 51 Build Alternative is shown in orange below. Existing US 51 is shown in pink.

The US 51 Build Alternative is compared against the No Build Alternative. The US 51 Build Alternative and the remaining alternatives near the larger towns are described in Chapter 2.3.

US 51 Build Alternative

Cropland, Urban/Built-up/Developed Land, and forests are the cover types most affected by the US 51 Build Alternative. Detailed impacts to cropland are summarized in Section 3.2, Agriculture. Forest cover is the largest impacted vegetation type (approximately 200.5 acres) in the corridor. Table 3.7-2 summarizes the potential impacts to various land cover types for the Build Alternatives.

CS Alternatives

CS Alt 1 impacts more than approximately 14 acres of forested community than CS Alt 2 (CS Alt 1 = 17 acres/CS Alt 2 = 3 acres). CS Alt 2 impacts over two acres of shrubland and 0.2 acres of prairie while CS Alt 1 does not impact these land cover types. CS Alt 2 impacts 3.0 acres of wetland cover type while CS 1 impacts 0.2 acres.

Vandalia Alternatives

V Alt 1 impacts more than double the acreage of forest cover type than the other V Alternatives individually. V Alt 1 impacts over 92 acres of forest while V Alt 2, V Alt 3, and V Alt 4 impact between 32 to 38 acres each. The higher forest impacts related to V Alt 1 are due to its longer length. V Alt 4 does not impact prairie habitat while V Alt 1, V Alt 2, and V Alt 3 each impact approximately 0.10 acre of native prairie. V Alt 3 impacts over 14 acres of wetland cover type while the other alternatives impacts to wetland land cover range from one to four acres. V Alt 1 has the least overall impacts to Urban/Built-up/Developed land at approximately 30 acres while V Alt 4 impacts more than 300 acres of Urban land cover types.

Ramsey Creek Options

RCOA impacts over 29 acres of forest and savanna cover types compared with 16.5 acres of forest and savanna impacted by RCOB. All other reported land cover types for these two options are similar.

Ramsey Alternatives

R Alt 2 impacts five more acres of forested areas than R Alt 1 (R Alt 2 = 13 acres/R Alt 1 = 8 acres). R Alt 2 also impacts more wetland land cover type than R Alt 1 (R Alt 2 = 0.5 acres/R Alt 1 = 0.09 acre). R Alt 2 impacts 27 acres of pasture/hayland with R Alt 1 impacting only 12 acres of this cover type.

Table 3.7-2: Acres of Cover Type Impacted

Vegetation / Land Cover Type	US 51 Build	CS Alt 1	CS Alt 2	V Alt 1	V Alt 2	V Alt 3	V Alt 4	RCOA	RCOB	R Alt 1	R Alt 2
Cropland	852.2	154.7	159.2	401.8	381.8	370.5	262.5	16.2	12.6	65.2	60.5
Urban/Built-Up(Developed land)	292.6	27.1	36.8	30.1	76.5	79.7	302.7	12.0	11.0	35.8	15.5
Upland Forest	200.5	17.6	3.4	92.1	33.8	32.2	38.9	29.1	16.5	8.0	13.2
Pasture/Hayland	65.8	16.6	7.3	9.5	27.6	40.7	23.9	6.9	6.1	12.2	27.0
Wetlands*	35.0	0.2	3.0	1.3	2.1	14.9	4.1	0.1	0.1	0.1	0.5
Non-native grassland	19.9	0	0	0	18.4	0	51.2	0	0	2.2	2.5
Waterbodies*	4.1	0.1	>0.1	0.4	0.9	1.3	0.2	0.5	0.3	0.4	1.0
Shrubland	5.2	0	2.5	0	0	2.2	2.1	0	0	0	0
Other	0	>0.01	4.8	4.8	0	0	0	0	0	0	0
Prairie	8.8	0	0.2	0.1	0.1	0.1	0	0	0	0	0
Total	**1,484.1**	**216.3**	**217.2**	**540.1**	**541.2**	**541.6**	**685.6**	**64.8**	**46.6**	**123.9**	**120.2**

Source: INHS Field Reports 2009- 2012.

** Wetlands shown as land cover type are considered as general land type only and are not based on actual delineation of wetlands as reported in Section 3.11, Wetlands.*

How will construction activities affect vegetation and forests?

Construction activities would convert non-paved areas to pavement. For the US 51 Build Alternative, widening of the existing pavement would impact adjacent areas used for crops, grasslands, lawns, and edges of forests and woods. Non-paved areas within the proposed right-of-way would be converted to non-native grasses along the road edges.

For proposed bypass areas (US 51 Build Alternative, CS Alts, V Alts, Ramsey Creek Options, Ramsey Alts), new roadways would potentially bisect forests, grasslands, and croplands where roads do not currently exist. The forests and grasslands have been fragmented previously by farming and other human activity regardless of any proposed road improvement. A Memorandum of Understanding between the IDNR and IDOT requires IDOT to determine whether an alignment bisects or fragments forested areas that are greater than 20 acres in size. When this occurs the project is submitted to IDNR for detailed review. Table 3.7-3 summarizes the impacts to forest areas larger than 20 acres by alternative. Of 14 forested areas larger than 20 acres, nine would be impacted by any one of the alternatives.

The US 51 Build Alternative would impact four forest stands larger than 20 acres for a total of just under 14 acres. The Centralia-Sandoval alternatives do not impact any forested areas over 20 acres in size.

V Alt 1 impacts 30 acres of more forest, in four additional forest stands, compared to the other Vandalia alternatives. Forest Stand 13 is bisected by V Alt 1 while the other impacts are located along the edge of the forests.

RCOA impacts nearly 12 acres of Forest Stand 4, while RCOB impacts less than five acres of this 26 acre site. The Ramsey alternatives do not impact any forested areas over 20 acres.

Table 3.7-3: Acres Impacted of Large Forest Stands

Forest Stand Number	Total Forest Stand Size	US 51 Build	V Alt 1	V Alt 2	V Alt 3	V Alt 4	RCOA	RCOB
1	33	1.15	-	-	-	-	-	-
3	32	6.93	-	-	-	-	-	-
4	26	-	-	-	-	-	11.57	4.52
7	72	3.08	0.77	0.77	0.77	0.77	-	-
8	32	2.73	-	-	-	-	-	-
11	20	-	1.1	-	-	-	-	-
12	27	-	4.3	-	-	-	-	-
13	82	-	15.3	-	-	-	-	-
14	109	-	9.3	-	-	-	-	-
Total Acres Impacted		**13.89**	**30.77**	**0.77**	**0.77**	**0.77**	**11.57**	**4.52**

3.7.2 Wildlife Resources

What types of wildlife are found in the study area?

Eighty-two percent of the study area is in agricultural land and Urban/Built-Up lands (Table 3.7-1). Row crops and residential/commercial areas provide little habitat value to wildlife. Pasture/Hayland and Grasslands (approximately five percent of the study area) do provide wildlife habitat value to some species of grassland birds. The remaining nearly 13 percent of land cover represent very good wildlife habitat (upland forests, wetlands). The wildlife resource field surveys included studies of mammals, amphibians, reptiles, and birds.

Birds

During the 2008 to 2011 surveys, 142 different species of birds were recorded. Forty-nine bird species recorded within the study area are designated as Illinois species in greatest need of conservation in the Illinois Wildlife Action Plan [The *Illinois Comprehensive Wildlife Conservation Plan and Strategy;* Illinois DNR 2005] . The Illinois Wildlife Action Plan is a comprehensive plan to manage public and private lands in the best way possible to benefit all Illinois wildlife and especially those with declining populations. Of these, 44 species are known to breed within the study area. The most common habitats in which these bird species occur within the study area include, from most utilized habitat to least, forests and savannas, grasslands, wetlands, scrub/shrub areas, farm fields, and urban/suburban built up land. Seven of these bird species utilize interior forests, five bird species utilize forests, 10 bird species utilize scrub/shrub habitat, 15 bird species utilize wetland habitats, three species utilize farm fields, 14 species use grassland areas, and five species utilize savannas. It should be noted that most of the birds recorded within the study area utilize multiple habitats.

The European starling, red-winged blackbird, American robin, horned lark, common grackle, chimney swift, killdeer, Canada goose, barn swallow, and rock dove were the most common bird species observed during the 2008, 2009, and 2011 surveys.

Neotropical Migratory Birds

Neotropical migratory birds overwinter in the American tropics and breed in the US and Canada. The taking (killing), possession, transportation, sale, purchase, importation, exportation, banding, or marking of birds, or their parts, nests, or eggs, of birds that are protected under the Migratory Bird Treaty Act of 1918 (50 CFR 22) are prohibited without a permit from the USFWS.

Sixty-six species of Neotropical migrants were identified in the study area with 36 of the identified Neotropical migrant birds nesting in the study area.

The most abundant species of Neotropical migrant birds within the study area include chimney swifts, barn swallows, tree swallows, palm warblers, indigo buntings, and yellow-rumped warblers. The most commonly noted chimney swift and swallows forage in many habitats. The indigo bunting nests in a variety of habitats, from gaps in forests to grasslands. The palm and yellow-rumped warblers are found in open woodlands and forests.

There are several area-sensitive Neotropical migrant species that require large contiguous tracts of land for habitat. These species typically avoid habitat edges and do not nest in small isolated patches of habitat that have been fragmented.

What does "area sensitive species" mean?

Area sensitive species are species that are present only when the size of the habitat they require is larger than normal and species that can only survive within a narrow range of environmental conditions.

Area sensitive species are also those species which rely on specific habitat conditions that are limited in abundance, restricted in distribution, or are particularly sensitive to development.

Species are described as either "highly sensitive" or "moderately sensitive" to fragmentation. Although only 14 forest stands larger than 20 acres are located within the study area, many of these large forests are connected. Some of the connected forested areas comprise upwards of 500 acres total. These large, connected forest stands provide habitat for many area sensitive bird species and species dependent on large forested tracts of land.

For Neotropical migrants that rely on grasslands, there are only approximately 237 acres of native and non-native grasslands present within the corridors in various tract sizes. The lack of large contiguous grassland areas limits available habitat for grassland dependent birds. Dependent on the management techniques as well as the level of disturbance, hayfields and pastures may support some grassland sensitive bird species.

Grassland birds designated as species in greatest need of conservation within the study area include the American bittern, American woodcock, barn owl, bobolink, dickcissel, field sparrow, grasshopper sparrow, Henslow's sparrow, loggerhead shrike, northern bobwhite, northern flicker, northern harrier, savanna sparrow, and the upland sandpiper.

What are some effects of fragmented habitats on birds?

Fragmented forested habitats can lower reproductive success of forest-interior birds due to increased rates of both parasitism and nest predation.

Mammals

No field surveys for mammals were conducted within the study area with the exception of mist netting to census bat species (specifically the federally endangered Indiana bat) and live trapping to assess presence of state threatened Franklin's ground squirrel. No Indiana bats, northern long-eared bats, or Franklin's ground squirrels were found in the study area.

Based on records of occurrence, approximately 40 species of mammals occur within the study area. The majority of mammals residing within the study area are rodents. Woodchucks, prairie voles, deer mice, white-footed mice, and house mice are the most common and widespread rodents in the study area. The

Virginia opossum and white-tailed deer are common mammal species within the study area. Both species inhabit all habitat associations. Nine species of carnivorous mammals occur in the study area, which include the coyote, red fox, long-tailed weasel, American mink, American badger, North American river otter, eastern striped skunk, raccoon, and bobcat.

Eight species of bats are known to occur within the study area. Of these, three species are migratory and five species hibernate in caves and buildings during winter months. Occasionally, big brown bats remain in some of the counties within the study area during winter, hibernating in buildings. The remaining species of bats occur in the study area during the summer months.

What is mist netting?

Mist netting is a trapping method used by ornithologists and bat biologists to capture wild birds and bats for banding or other research projects.

Mist netting was conducted at eight locations within the study area. Creeks within the study area that were too small or narrow or that did not have suitable habitat were not surveyed for bats. Four species of bats, the eastern red bat, eastern pipistrelle bat, big brown bat, and evening bat, were captured during the mist-net surveys conducted within the study area.

Reptiles and Amphibians

Reptile and amphibian surveys were conducted at eleven locations within the study area. A total of 19 amphibian and 35 reptile species have been documented in the study area with only 12 amphibian species and 11 reptile species observed during the surveys. The majority of the amphibians and reptiles encountered during the field surveys are considered common or abundant in Illinois. None of the species encountered during the surveys are considered species in greatest need of conservation.

Since the completion of the field surveys, a state threatened mudpuppy (an aquatic salamander) was captured in fall 2012. A record of occurrence was prepared for the IDNR documenting the find. The mudpuppy was collected near the US 51 corridor in the Kaskaskia River. More information is provided in Section 3.7.3, Threatened and Endangered Species.

There are four important use areas for amphibians and reptiles in the study area. Important use areas for amphibians and reptiles are defined as areas (pond, marsh, or similar feature) having high amphibian or reptile species diversity relative to other areas in the region.

Important Use Area 1: This site is located just south of Vandalia along the western banks of the Kaskaskia River. Habitat at this site consists of low lying woodlands, a floodplain lake, old field, and wooded hillsides. Three amphibian species (Fowler's toad, northern cricket frog, and southern leopard frog) and three reptile species (five-lined skink, red-eared slider, North American racer)

were observed at this site, and many additional species are likely to inhabit this area including western chorus frog, boreal chorus frog, Cope's/grey treefrog, bullfrog, green frog, painted turtle, snapping turtle, eastern box turtle, grey rat snake, northern water snake, and ring-necked snake. This Important Use Area coincides with the area in which the mudpuppy salamander was collected.

Important Use Area 2: This site, located north of Vandalia on US 51 at Hoffman Creek, consists of wooded ravines with seeps that drop north into Hoffman Creek. Four species of amphibians (American toad, northern cricket frog, southern leopard frog, slimy salamander) and one reptile species (eastern box turtle) were observed at this site and it is likely that several other reptile and amphibian species utilize this area.

Important Use Area 3: This site is located along US 51 in a bend of Turkey Creek, just north of Central City. This woodlot contains two ravines that fill up to form vernal pools and were utilized by six species of amphibians (Fowler's toad, northern cricket frog, boreal chorus frog, Cope's/grey treefrog, marbled salamander, smallmouth salamander) and one reptile species (eastern box turtle). This site likely provides habitat for spring peepers and grey rat snakes.

Important Use Area 4: Ramsey Railroad Prairie Nature Preserve was categorized as an Area of Concern (Important Use Area 4). Ramsey Railroad Prairie Nature Preserve is located on the northwestern edge of the village of Ramsey. This site contains suitable habitat for threatened or endangered amphibians or reptiles. Three species of amphibians (Fowler's toad, boreal chorus frog, southern leopard frog) and one reptile (prairie kingsnake) were observed at this site. In addition to these species this site provides excellent habitat for North American racers, the state threatened Kirtland's snake and the state endangered eastern massasauga snake.

The three photos below show the important use areas near the Kaskaskia River, Hoffman Creek, and Turkey Creek.

Important Use Area 1: Kaskaskia River
Photo by S.J. Taylor (INHS).

Important Use Area 2: Hoffman Creek
Photo by S.J. Taylor (INHS).

Important Use Area 3: Turkey Creek
Photo by S.J. Taylor (INHS).

How will the alternatives impact wildlife and their habitat?

Wildlife would be impacted by construction and operational activities that reduce habitat/cover types, fragment existing habitats, or obstruct and eliminate wildlife travel corridors. The existing natural communities are currently fragmented by agricultural land as well as urban areas, roads, pipelines, electric transmission lines, and other development. Increased fragmentation of natural habitats from the proposed project would have a negative effect on wildlife species.

Important Use Areas 1, 3, and 4 will not be impacted by any of the alternatives. Important Use Area 2, which is adjacent to existing US 51 at Hoffman Creek, would be impacted if existing US 51 were expanded under alternatives V Alt 2, V Alt 3, and V Alt 4 all of which use the existing US 51 in this area. Important

Use Area 2 is approximately 4.2 acres. The expansion of existing US 51 under alternatives V Alt 2, V Alt 3, and V Alt 4 would require approximately 1.6 acres from this area. The impact is localized to the eastern portion of the Important Use Area, which is right next to existing US 51, so the site is not bisected. The remaining 2.6 acre site will still retain some of its functions.

Loss of habitat within the proposed alternatives could also impact wildlife species by severing travel routes and increasing the potential for collisions with vehicles. Minimal to no loss of species groups is anticipated as a result of operations of the roadway.

Habitat loss is summarized for each alignment in Table 3.7-4. Habitat loss is the reduction of living, eating, and reproductive space for the wildlife identified within the study area. In order for a species to be viable it must have a sufficient habitat acreage which provides necessary food and water and a range of necessary physical features to facilitate such activities such as breeding, hibernation, and nesting. These features can include tree cover, rocky hills or deep pools, as well as the organisms and ecosystems that are needed to complete the life cycle.

Habitat loss is generally more serious for the large animals because they need a greater area in which to have a healthy breeding population.

Table 3.7-4: Acres of Predominant Wildlife Habitat Impacted by Cover Type

Habitat / Land Cover Type*	US 51 Build	CS Alt 1	CS Alt 2	V Alt 1	V Alt 2	V Alt 3	V Alt 4	RCO A	RCO B	R Alt 1	R Alt 2
Upland Forest	200.5	17.6	3.4	92.1	33.8	32.2	38.9	29.1	16.5	8.0	13.2
Pasture/Hayland	65.8	16.6	7.3	9.5	27.6	40.7	23.9	6.9	6.1	12.2	27.0
Wetlands	35.0	0.2	3.0	1.3	2.1	14.9	4.1	0.1	0.1	0.1	0.5
Non-native grassland	19.9	0	0	0	18.4	0	51.2	0	0	2.2	2.5
Waterbodies	4.1	0.1	>0.1	0.4	0.9	1.3	0.2	0.5	0.3	0.4	1.0
Shrubland	5.2	0	2.5	0	0	2.2	2.1	0	0	0	0
Other	0	>0.01	4.8	4.8	0	0	0	0	0	0	0
Prairie	8.8	0	0.2	0.1	0.1	0.1	0	0	0	0	0
Total	**339.3**	**34.5**	**21.2**	**108.2**	**82.9**	**91.4**	**120.4**	**36.6**	**23**	**22.9**	**44.2**

** Habitat/Land Cover Types assessed include cover types identified as primary habitat for wildlife within the study area.*

What are some of the operational impacts that may occur to wildlife?

Deer-vehicle collisions and other vehicle collisions of wildlife are anticipated as part of the operation of the proposed roadways.

Several potential deer concentration areas along US 51 have been identified based on deer-vehicle collision reports from 2003 to 2007. Three hundred forty-eight deer/vehicle collisions occurred between mile marker 109.4, south of Centralia, to mile marker 174.8 in Shelby County.

What measures are proposed to avoid or minimize impacts to wildlife and their habitat?

With avoidance of natural resources as a primary objective, most of the US 51 Build Alternative is located along the existing roadway where wooded land and wetlands have already been cleared or filled for past construction. Many reptiles and amphibians along with smaller mammals use river and stream corridors for movement. The use of bridges allows for wildlife movement which can minimize impacts to wildlife. Culverts would most likely be used for smaller waterway crossings. To enhance wildlife movement, culverts should be planned with a natural bottom. This can be accomplished by using a three sided box culvert or installing a typical four-sided box culvert below the substrate of the waterway. In this way, the roadway becomes less of a barrier and reduces potential vehicle/wildlife collisions.

Some of the proposed alternatives would bisect large forest stands. Impacts to Neotropical migratory birds can be minimized by reducing impacts to their habitat, which primarily consists of large tracts of forests, savannas, and grasslands. Replacement of trees and mitigation of grassland habitat loss can help to provide new habitat for such species.

How will construction activities affect wildlife and their habitat?

Wildlife would be affected by construction activities, such as stripping and clearing vegetation, grading, utility installation, moving heavy equipment, and sediment deposition in receiving waters. Larger mobile species (birds and large mammals) would generally avoid construction areas. These species can move from the construction area to surrounding habitats during construction. Some mortality is expected with slower-moving wildlife (e.g., young animals) or smaller, less mobile animals (e.g., small rodents, reptiles, and amphibians), as habitat is removed. Construction noise and activity, in certain instances, can prompt wildlife movement, disrupt travel patterns or behaviors, and result in additional wildlife impacts.

Amphibian species use aquatic areas for reproduction and other habitats for foraging and hibernation and often move from one habitat type to another. Reptiles also may use different habitats for hibernation, reproduction, and foraging. Reptiles and amphibians can be impacted by roads during seasonal migration, breeding, and nesting. Impacts to wildlife in the study area would not eliminate or threaten the populations of these species in the state.

Project construction is anticipated to impact some species of Neotropical migratory birds by impacting a few of the large forest stands in the project corridors. The migratory birds most affected by the impacts to forests are those that require large tracts of forest for nesting and habitat.

3.7.3 Threatened and Endangered Species

What federal and state-listed threatened and endangered species exist in the study area?

Information for Federal and state listed, threatened and endangered species potentially occurring within the study area were gathered using data from the USFWS (accessed October 2012), the IDNR EcoCAT consultation process (December 16, 2013), field surveys by the INHS, and other information provided by INHS.

Federally-Listed Species

Table 3.7-5 lists federally threatened and endangered species by county in Illinois.

Table 3.7-5: Federally Threatened or Endangered Species by County

Species	Counties	Type	Habitat
Endangered			
Indiana Bat	Jefferson, Washington, Clinton, Marion, Fayette, Shelby, Christian	Mammal	Caves, mines (hibernacula); small stream corridors with well-developed riparian woods; upland forests (foraging)
Piping Plover	Jefferson, Clinton, Fayette, Shelby	Bird	May be present during migration
Threatened			
Eastern Prairie Fringed Orchid	Washington, Clinton, Marion, Fayette, Shelby, Christian	Plant	Mesic to wet prairies
Lakeside Daisy	Clinton	Plant	Dry rocky prairies
Prairie Bush Clover	Fayette	Plant	Dry to mesic prairies with gravelly soil
Proposed for Listing			
Northern Long-eared Bat	Jefferson, Washington, Clinton, Marion, Fayette, Shelby, Christian	Mammal	Caves, mines (hibernacula), wooded areas, forests

Source: USFWS, February 2012

Indiana Bat
Photo By: USFWS; Adam Mann

- *Indiana Bat:* Suitable habitat for the Indiana bat includes caves and mines (hibernacula) which are used for hibernation during the winter months, small stream corridors with well-developed riparian woods and upland forests are used for foraging and breeding.

Caves and mines are not present within the study area. Riparian woods and upland forests are present within the study area. The Illinois Natural History Survey conducted specific surveys to determine the presence/absence of Indiana bats within the study area, as records of its occurrence are documented in southern and central Illinois. According to the IDNR, the Indiana bat was last observed in Clinton County in 2003.

Mist-net surveys for the Indiana bat occurred at eight locations (along Ramsey Creek, Hoffman Creek, North Fork of the Kaskaskia River, East Fork of the Kaskaskia River, two locations at Turkey Creek, and Crooked Creek) following standard USFWS methodology. Twenty-nine bats (four species) were captured, none of which were Indiana bats.

- *Northern Long-eared Bat:* Suitable habitat for the northern long-eared bat includes caves and mines (hibernacula) which are used for hibernation during the winter months. 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. Caves and mines are not present within the study area. Forests and wooded areas are present within the project study area. The INHS conducted surveys for the Indiana bat within the study area. During these surveys, the northern long-eared bat was not encountered.

Piping Plover
Photo By: USFWS

- *Piping Plover:* Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Piping plovers are migratory birds. In the spring and summer they breed in northern United States and Canada. Breeding habitat for the piping plover does not occur in the study area. While the piping plover migrates through the area it prefers reservoir shoreline with predominately mudflat substrate. The piping plover was not observed during the spring and fall bird migration surveys.

- *Eastern Prairie Fringed Orchid:* The eastern prairie fringed orchid occurs in a wide variety of habitats, from mesic prairie to wetlands 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. This species was not observed during field surveys of prairies and wetlands such as sedge meadows and marsh edges.
- *Lakeside Daisy:* This plant is found in dry, rocky prairie grassland underlain by limestone. It requires open sites with full sun. This species was not observed during field surveys of prairies, grasslands, and savannas.
- *Prairie Bush Clover:* This species is found in dry, gravelly upland prairies. The prairie bush clover was not found during field surveys of prairies, grasslands, and savannas.

Eastern Prairie Fringed Orchid
Photo By: USFWS; Mike Redmer

The proposed project is not likely to adversely affect the Indiana bat or the northern long-eared bat and will not affect the piping plover, eastern prairie fringed orchid, lakeside daisy, or the prairie bush clover.

Lakeside Daisy
Photo By: USFWS;
Megan Seymour

Candidate species are plants and animals for which the U.S. Fish and Wildlife Service (USFWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

The **Migratory Bird Treaty Act** protects migratory birds and their eggs from being taken, killed, or possessed. Additional to the Migratory Bird Act, the Bald and Golden Eagle Protection Act protects bald and golden eagles in the same manner.

Heart-leaved Plantain

Northern Harrier
Photo By: Sarah Nystrom

Osprey
Photo By: NASA

State-Listed Species

Based on coordination with the Illinois Department of Natural Resources and observations during the field surveys, there are 12 Illinois State threatened and/or endangered species located within the study area.

State-Listed Plants

- *Heart-leaved Plantain – Illinois Endangered:* One population of the state-endangered, heart-leaved plantain was observed during field surveys. This population is located within a forested wetland/seep, south of Vandalia in the Kaskaskia River floodplain.
- *Ear-leaf False Foxglove – Illinois Threatened*: This species has been identified as being within the study area by the IDNR. The ear-leaf false foxglove was not observed during the field surveys conducted for this project. Habitats for the ear-leaf false foxglove include mesic black soil prairies, thickets containing grasses and occasional shrubs, savannas, woodland borders, abandoned fields, and areas along railroads (particularly where remnant prairies occur). The ear-leaved false foxglove is found in both high quality habitats and somewhat disturbed areas.

State-Listed Birds

Two state-listed bird species were observed during the bird census (the northern harrier and the osprey) and two state-listed birds have been identified by the IDNR as being within the study area (the loggerhead shrike and the black-billed cuckoo).

- *Northern Harrier– Illinois Endangered*: A northern harrier was observed during the fall and spring migration during the 2008 bird censuses of the study area. No evidence of breeding by this species was found in the Study Area. Northern Harriers require 'large grassland tracts' for breeding and will breed in both dry and wet grasslands.
- *Osprey – Illinois Endangered*: Ospreys were observed in pastureland during the fall 2008 bird census of the study area. No evidence of breeding by this species was found in the study area. It was not observed in other recent bird censuses.
- *Black-billed Cuckoo – Illinois Threatened*: Black-billed cuckoos were observed during previous annual breeding bird surveys and annual spring bird counts. INHS did not observe black-billed cuckoos within

their bird censuses. The black-billed cuckoo is known to occur at Ramsey Railroad Prairie Nature Preserve.

Loggerhead shrike – Illinois Endangered: There is a record of at least one loggerhead shrike occurrence in the study area, and the species has occurred in the surrounding counties. Suitable habitat for this species is located within study area. INHS did not observe the loggerhead shrike during the bird censuses.

Loggerhead Shrike
Photo By: Gerrit Vyn

State-Listed Mammals

An INHS literature review indicates that one state-endangered and one state-threatened mammal species are known to occur within or near the study area.

- *Franklin's ground squirrel – Illinois Threatened:* Suitable habitat for the Franklin's ground squirrel, which is characterized as tall, dense, relatively undisturbed cover of vegetation is present within the study area at Ramsey Railroad Prairie Nature Preserve. Franklin's ground squirrel surveys were conducted in 2008 at this site. No Franklin's ground squirrel or other mammals were captured or observed during these surveys.

Franklin's Ground Squirrel
Photo By: University of IL at Urbana-Champaign

State-Listed Fish

- *Western Sand Darter – Illinois Endangered:* The survey of aquatic habitats observed four western sand darter individuals in the Kaskaskia River near the public boat ramp southeast of Vandalia. The western sand darter has been documented at two sites within the study area. The area are the boat ramp site southeast of Vandalia and at CR 2700 N, approximately seven miles east of Ramsey.

Western Sand Darter
Photo By: Konrad P. Schmidt

Western sand darter preferred habitat is spotty throughout the Kaskaskia River downstream of Lake Shelbyville to Vandalia in Shelby County. Suitable habitat for this species is also found in the Kaskaskia River, approximately 330 to 650 feet upstream of the Vandalia boat ramp. Due to the small size or impounded nature of the other sites sampled for the US 51 project in 2009, INHS concluded that other populations of the Western sand darter are not likely in the study area.

State-Listed Amphibians and Reptiles

One state-threatened turtle, one state-threatened snake, one state-endangered snake, and one state threatened amphibian are known to occur within or near the study area. Reptiles and amphibians were identified through general field reconnaissance and observational methodologies.

Eastern Massasauga Rattlesnake
Illinois Natural History Survey

Kirtland's Snake
Illinois Natural History Survey

- *Eastern Massasauga – Illinois Endangered*: Suitable habitat for the eastern massasauga rattlesnake is present in the study area. Ramsey Railroad Prairie Nature Preserve provides excellent habitat for eastern massasauga snake. The eastern massasauga rattlesnake is a candidate for Federal protection. This species was listed as an endangered species in Illinois in 1994. An eastern massasauga specimen was found in Ramsey Lake State Park in 1956, and suitable habitat for the species remains there. According to the IDNR, there is a 2011 record of occurrence for the eastern massasauga in Clinton County.

- *Kirtland's Snake – Illinois Threatened:* One specimen of Kirtland's snake was recorded approximately 0.6 mile from the project alignments in 1962. Suitable habitat for the Kirtland's snake exists in the study area. Ramsey Railroad Prairie Nature Preserve provides excellent habitat for Kirtland's snake. A second Kirtland's snake specimen was collected south of the study area in Irvington, but that area does not currently contain suitable habitat for the species.

- *Mudpuppy – Illinois Threatened:* One specimen of the mudpuppy salamander was collected within the US 51 corridor 0.2 miles south of Vandalia in the Kaskaskia River in 2012. Suitable habitat for the mudpuppy is present within the study area. Habitat for the mudpuppy includes muddy canals, large fast-flowing rivers, and large cool water lakes.

- *Smooth Softshell – Illinois Endangered:* One specimen of the smooth softshell turtle was found just east of Vandalia within the Kaskaskia River. Suitable habitat for the smooth softshell is present within the study area. Suitable habitat for the smooth softshell includes rivers and large streams with sandy substrate, bars, and banks.

How will the alternatives impact threatened and endangered species?

Six of the state and federally listed, or proposed for listing, species listed above will potentially be impacted by the proposed project. The species potentially impacted by the project include the Indiana bat, northern long-eared bat, heart-leaved plantain, western sand darter, mudpuppy salamander, and the smooth softshell turtle.

Suitable habitat for the Indiana bat, which includes small stream corridors with well-developed riparian woods and upland forests used for foraging and breeding are located within the study area. Suitable habitat for the northern long-eared bat, which includes forested areas used for foraging and breeding are located within the study area. A review was conducted to assess potential impacts to upland forests and riparian woods for each alternative. Section 3.7.1

describes the impacts to upland forest stands.

The US 51 Build Alternative will impact 25 riparian wooded crossings, four of which are along the existing US 51 roadway. The four crossings on the existing US 51 roadway will have minimal impacts to Indiana bat habitat since the riparian woods have already been fragmented by the existing roadway. The US 51 project would require some additional tree removal on either side of the existing roadway. The other 21 riparian wooded crossings for the US 51 Build Alternative would fragment wooded corridors and require the removal of trees that may provide habitat for the Indiana bat.

CS Alt 1 would require the crossing of four wooded riparian corridors with CS Alt 2 requiring the crossing of two wooded riparian corridors. The proposed crossings would introduce fragmentation where none exist and trees that provide potential habitat for the Indiana bat will be removed.

V Alt 1 will introduce nine new crossings of wooded riparian corridors that would require tree removal. V Alt 2 and V Alt 3 will introduce three new crossings of riparian corridors, two of which are shared between the two alignments. V Alt 4 has two new crossings of riparian corridors, both of which are shared with the V Alt 2 and V Alt 3 alignments. All the crossings of riparian woods will potentially impact Indiana bat habitat through the removal of trees for the new roadway.

R Alt 1 will require two new crossings of wooded riparian corridors, while R Alt 2 will require only one new crossing. The crossings will require the removal of trees that provide potential habitat for the Indiana bat.

RCOA and RCOB both will require the crossing of one wooded riparian corridor each. Both of the corridor crossings will require tree removal for the proposed roadway construction.

The US 51 Build Alternative will impact approximately 200 acres of forested areas. This will require the removal of trees that may provide habitat for the northern long-eared bat. Approximately 14 of these acres will be from four large forest stands that are larger than 20 acres.

CS Alt 1 will impact 17.6 acres of forested areas with CS Alt 2 impacting 3.4 acres. This will require the removal of trees that may provide habitat for the northern long-eared bat. Neither CS Alt 1 or CS Alt 2 impact large forest stands that are larger than 20 acres.

V Alt 1 will impact approximately 92 acres of forested areas with V Alt 2 impacting 34 acres, V Alt 3 impacting 32 acres, and V Alt 4 impacting 39 acres. This will require the removal of trees that may provide habitat for the northern long-eared bat. Approximately 31 of the V Alt 1 acres will be from five large

forest stands that are larger than 20 acres. V Alt 2, V Alt 3, and V Alt 4 only impact 0.77 acres from one large forest stand.

RCOA will impact approximately 29 acres of forested areas with RCOB impacting approximately 17 acres. This will require the removal of trees that may provide habitat for the northern long-eared bat. Approximately 11.6 of the RCOA acres will be from one large forest stand that is larger than 20 acres with RCOB impacting 4.5 acres from the same stand.

R Alt 1 will impact approximately eight acres of forested areas with R Alt 1 impacting approximately 13 acres. This will require the removal of trees that may provide habitat for the northern long-eared bat. Neither R Alt 1 or R Alt 2 impact large forest stands that are larger than 20 acres.

The US 51 Build Alternative south of Vandalia will potentially affect the western sand darter in the Kaskaskia River and the heart-leaved plantain; however, the proximity of this alternative to the heart-leaved plantain is at a distance great enough, that direct impacts can be avoided.

The mudpuppy and the smooth softshell are located in the Kaskaskia River. The US 51 Build Alternative south of Vandalia will cross the Kaskaskia River and have the potential to impact the species. Impacts can be minimized or avoided depending upon whether piers will be required in the river for the proposed bridge crossing.

What measures are proposed to avoid or minimize impacts to threatened and endangered species and their habitat?

Strict adherence to erosion and sediment control regulations would minimize the potential for sediment entering streams and thereby avoiding indirect impacts to the western sand darter, mudpuppy, and smooth softshell turtle. Due to the distance between the alternatives and the heart-leaved plantain, no accidental intrusions of construction equipment would occur. Therefore no special measures would be taken for the heart-leaved plantain. Proper adherence to sediment and erosion control measures would minimize any off-site impacts to all vegetation and wildlife.

It appears that piers will be required in the river. As a result, it is not feasible to completely avoid impacting a small area of habitat in the Kaskaskia River. Due to the presence of the western sand darter no in stream work is allowed in the Kaskaskia River between June 16 and August 16.

The Alternatives would cause some fragmentation and loss of habitat for the Indiana bat. There are large areas of wooded riparian habitat adjacent to the project that can provide habitat for areas where tree removal will occur, but the habitat loss can be minimized with tree replacement in suitable habitat areas.

Fragmentation of the habitat cannot be avoided due to the position of the riparian areas relative to the existing and proposed roadway. Because bat surveys conducted in the corridor did not identify the Indiana bat or the northern long-eared bat, it is unlikely that there will be direct impacts to the bats during roadway operation. In order to protect the Indiana bat and the northern long-eared bat no tree clearing shall occur between April 1 and September 30th.

How will construction activities affect threatened and endangered species in their habitat?

The heart-leaved plantain is located between 700 and 900 feet from the US 51 Build Alternative and the V Alts 1 through 4. Construction activities are not expected to impact this species due to distance from the site. The western sand darter fish, the mudpuppy, and the smooth softshell turtle are all located in the Kaskaskia River within approximately two miles from the proposed construction activities. Direct impacts are not anticipated; however, these three species could be temporarily impacted by an increase in suspended sediment generated during construction. As bridge piers are required for the crossing of the Kaskaskia River, construction activities will impact potential habitat for the western sand darter, the mudpuppy, and the smooth softshell turtle. Because of the mobility of these species, it is unlikely that direct mortality of animals will occur from construction; however, temporary or permanent loss of habitat would occur in the Kaskaskia River if piers for the US 51 Build Alternative bridge south of Vandalia are required. Work in the river to construct the piers may require cofferdams and causeways. These temporary construction measures will disturb habitat during construction. Once the in stream work is completed, cofferdams and causeways will be removed then the river bed can be restored for habitat.

Although numerous threatened and endangered species of birds have been observed flying through the study area, none are known to nest in the study area. Construction activities would not impact listed bird species.

To avoid direct impacts to the Indiana bat and the northern long-eared bat, tree removal should be scheduled between October and March along wooded riparian corridors and upland forest areas. Conducting tree removal during this time frame will prevent direct impacts to bats that may be roosting in trees along the riparian and upland forest areas during the summer months.

Illinois Natural Areas are natural areas selected by Illinois Natural History Survey (INHS) based on one, or any combination of the following criteria:

- Areas with high quality natural plant communities (Grade A or B),
- Areas that possess habitat for endangered species,
- Areas that provide unique research and/or educational opportunities,
- Areas with outstanding geologic features, and
- Areas with outstanding aquatic features.

3.7.4 Natural Areas

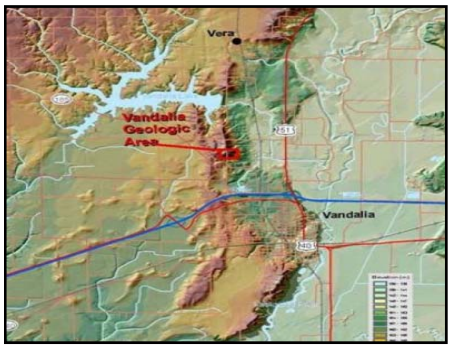
What Illinois designated natural area lands exist in the study area?

Four Illinois Natural Areas Inventory (INAI) sites are located in the study area. Figure 3.7-1 identifies the location of the four INAI sites.

INAI 1: Ramsey Lake Railroad Prairie is north of Ramsey along an abandoned railroad line, west of the existing US 51 alignment. The site contains prairie and three state listed species (kirtland's snake, eastern massasauga and black-billed cuckoo). This site was dedicated as an Illinois Nature Preserve (Ramsey Railroad Prairie) in 1997 and is owned by the IDNR. The 11.3-acre nature preserve was designated based on the presence of high quality prairie.

INAI 2: Ramsey Creek is located immediately south of Ramsey and is bisected by the existing US 51 alignment. This site was designated as a Biologically Significant Stream by the IDNR from its juncture with the Kaskaskia River and northward into Montgomery County.

INAI 3: Vandalia Geologic Area is north of Vandalia, west of the existing US 51 alignment and south of Thrill Hill Road. The Vandalia Geologic Area is a 50.3 acre INAI site representative of the Kaskaskia Ridged Drift. The area is on privately owned land and development has occurred on the ridge.



Location of Vandalia Geologic Area

INAI 4: Burnside Forest occurs on the bluffs of the Kaskaskia River and is located approximately one mile south of Vandalia. The site is 48.5 acres in size and is a Grade B upland forest.


The Vandalia Geologic Area as seen from the east on Thrill Hill Rd.

Figure 3-7.1 – Illinois Natural Areas Inventory Sites (Page 1 of 2)

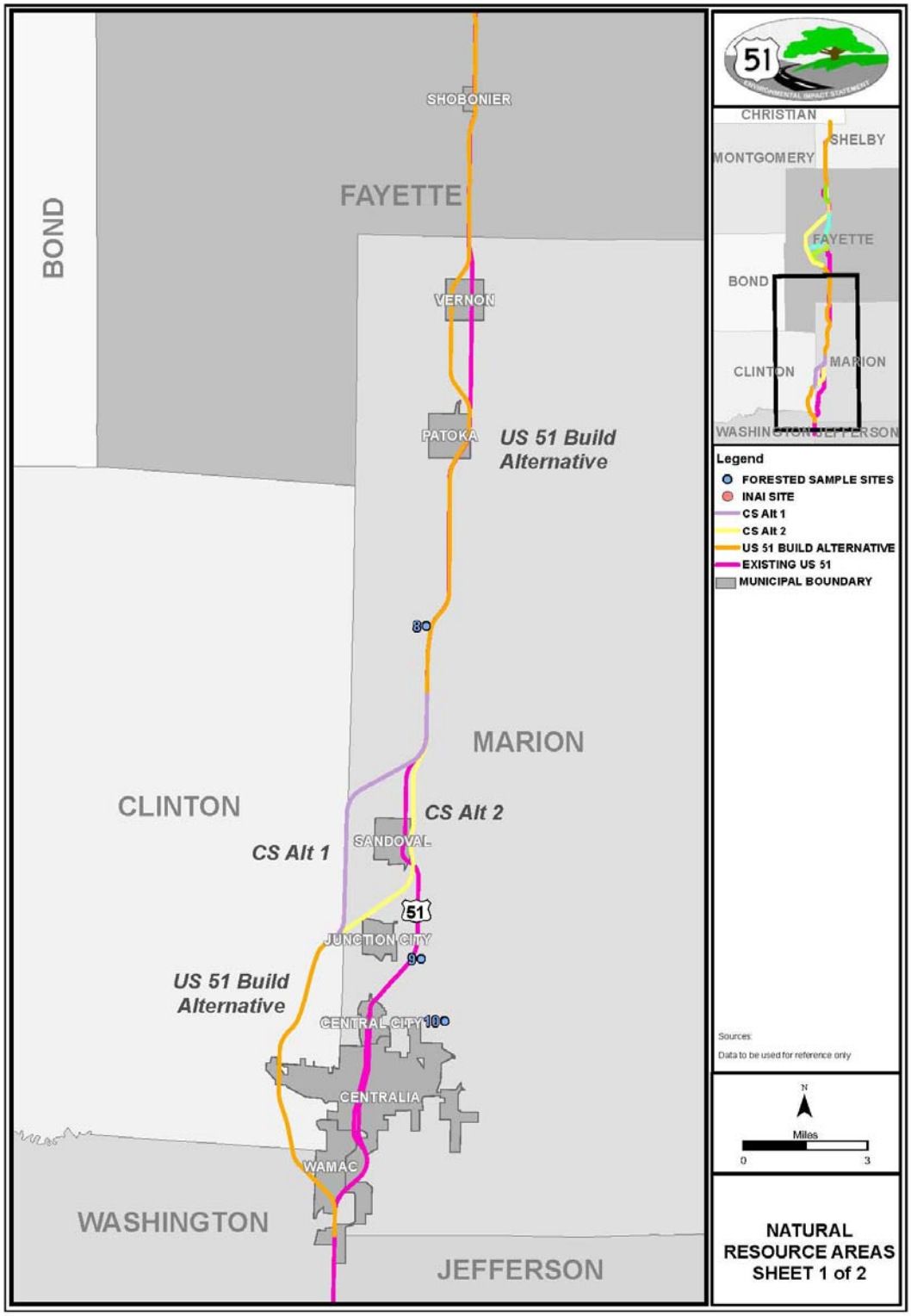
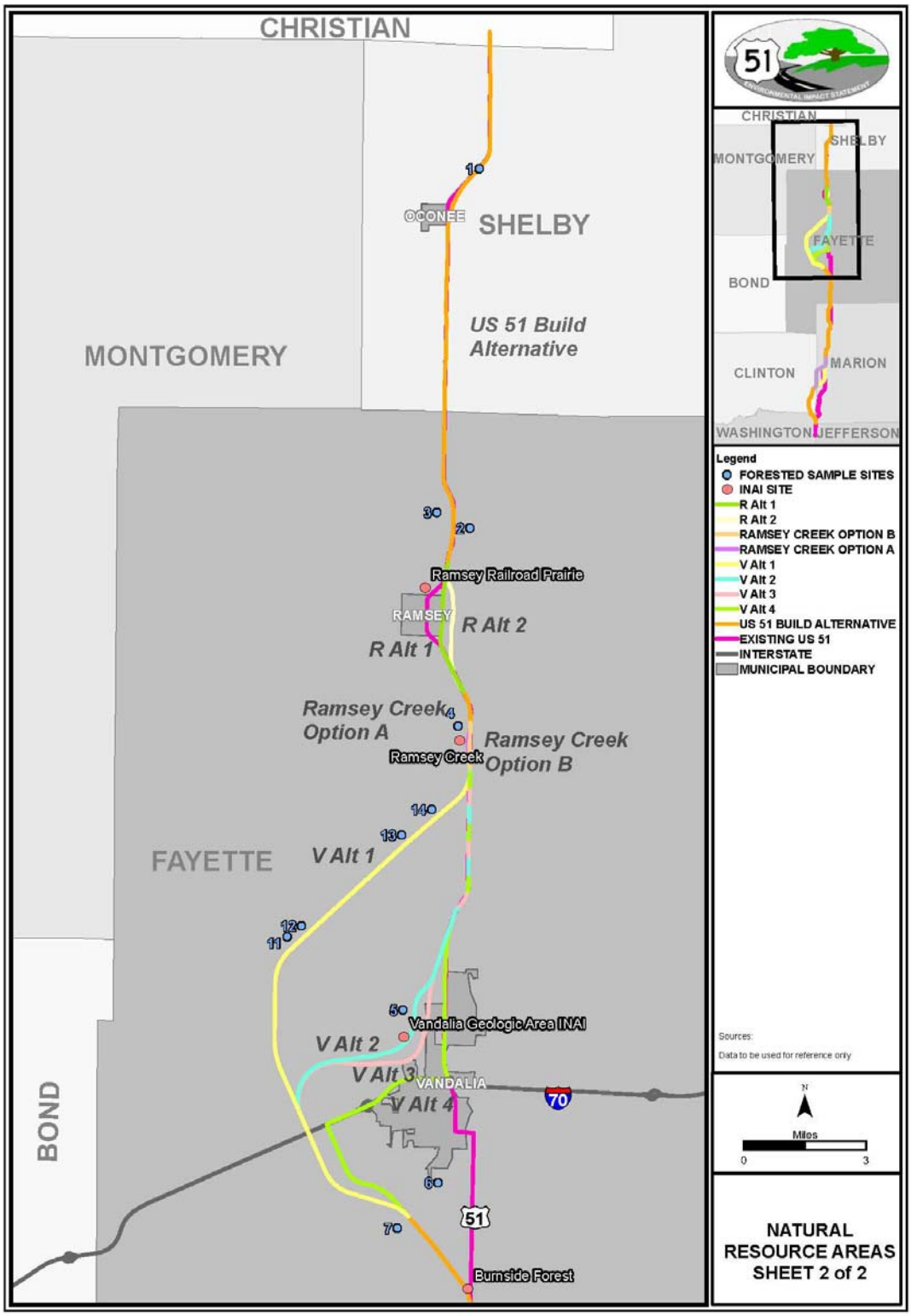


Figure 3-7.1 – Illinois Natural Areas Inventory Sites (Page 2 of 2)



How will the alternatives impact INAI sites?

Ramsey Creek Option B (RCOB) would require the improvement of the existing US 51 bridge over Ramsey Creek including widening. RCOB would impact approximately 0.16 acres of the INAI site. Ramsey Creek Option A (RCOA) would require the reconstruction of an abandoned bridge west of the existing US 51 bridge. RCOA would impact approximately 0.29 acres of the Ramsey Creek INAI site. Direct effects with each alternative that cannot be avoided include converting a small amount of riparian habitat to pavement and right-of-way and additional shading over the stream and the vegetation on the banks. Construction activities of a bridge over Ramsey Creek would temporarily increase turbidity and sediment in Ramsey Creek. Coordination with IDNR will occur on any impacts to INAI sites.

V Alt 2 crosses the southeast buffer portion of the Vandalia Geologic Area. A total of 11.5 acres of the Vandalia Geologic Area, which has highly erodible soils, would be disturbed by construction of V Alt 2. This alternative avoids the ridge area and was aligned to minimize its impact on the buffer zone. Alternatives V Alt 1, V Alt 3, and V Alt 4 lie outside of the buffer and would not impact the Vandalia Geologic Area.

V Alt 2 crossing the Vandalia Geologic Area

None of the Alternatives impact Ramsey Lake Railroad Prairie or Burnside Forest.

What measures are proposed to avoid or minimize impacts to INAI sites?

To minimize and avoid direct impacts, the proposed construction and reconstruction of the new bridge would span the entire Ramsey Creek. This would allow for continuous flow of the stream and would provide a corridor for the movement of wildlife that utilizes the stream for migration. No in-stream work would be allowed to prevent equipment from destroying the banks and bed of the stream. Strict adherence to sediment and erosion control measures would minimize impacts related to water quality of Ramsey Creek.

Because the Vandalia Geologic Area has highly erodible soils, strict adherence to erosion and sediment control during construction would minimize the impact. Furthermore, quick re-vegetation of final graded areas not under pavement would stabilize soils and prevent erosion.