3.12 Groundwater, Drainage, and Surface Water Quality

This section presents the effects of the strategies on the groundwater, drainage, and surface water quality within the Study Area.

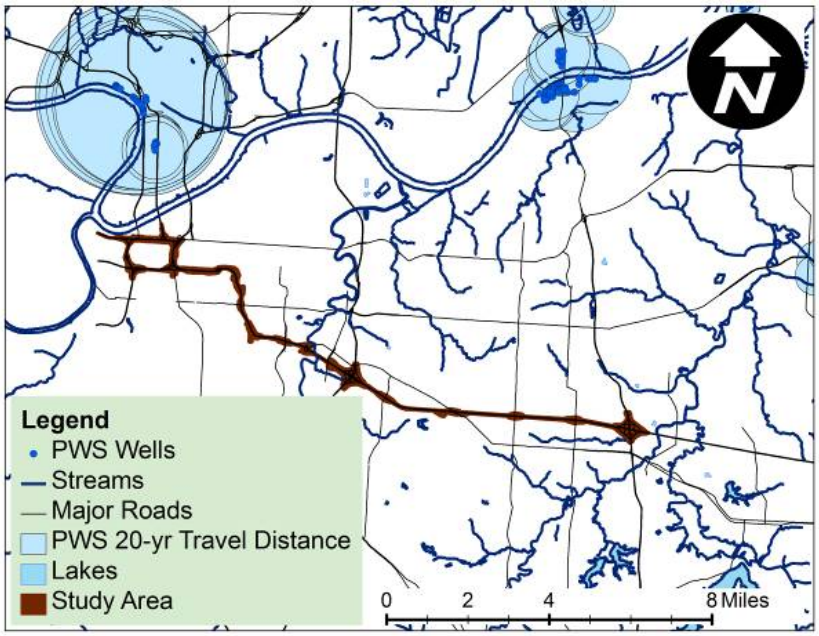
What is the Status of Groundwater Quality within the Study Area?

The Missouri Department of Natural Resources (MoDNR) provided information on the quality of the groundwater in the Study Area. The Study Area is located above a groundwater aquifer. The groundwater aquifers in the vicinity of the Study Area yield water that is too salty for domestic use. Drinkable groundwater in West-Central Missouri is scarce.

Where Do Communities Get Water to Drink?

MoDNR published the locations of Public Water Supply Wells and related Estimated Groundwater Travel in 20 Years in the form of data files on July 28, 2008. This data shows the sensitive areas around public supply wells, referred to as "well-head protection zones," which should be protected from contamination to ensure a safe water supply. This data was obtained and analyzed with respect to the Study Area to identify potential affects to local water supply aquifers.

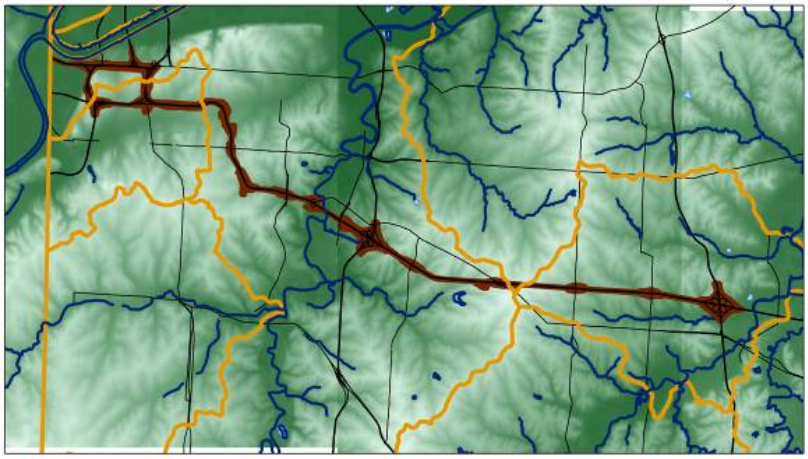
Due to the deep saline groundwater aquifer, there are no municipal or community wells within the Study Area. A review of the MoDNR public water supply well locations shows no well-head protection zones intersect the Study Area. All local public water supply well heads are located near the surface, within the floodplain of the Missouri River. These water supply wells are shallow and fed by the Missouri River. Contamination of the deep saline aquifers would have no consequences on human health. However, the deep saline aquifers are sealed from surface water by water-tight geological formations which prevent contamination from the surface.



Public Water Supply Wells

What are the Potential Effects of Highways on Local Groundwater Resources?

Highway operations could contaminate the river system with oil, grease, fuel, anti-freeze, and trash. Potentially the shallow water supply wells along the Missouri River might subsequently become contaminated. However, the movement of water from the river to the wellheads is slow (it takes more than 20 years based on the estimated 20-year groundwater travel zones). If a large volume of contaminate is released into the river system from I-70, its progress could be monitored, its toxicity neutralized, and mitigation measures implemented long before the contaminate can enter the water supply.



STUDY AREA WATERSHEDS

What are the Surface Waters in the Study Area?

The Study Area intersects a part of the watersheds of the Blue River, Little Blue River, Kansas River, and Missouri River. The Study Area is contained in the southwestern portion of the MoDNR watershed area called "Missouri River Mainstem Kansas City to Glasgow."

A watershed is the area drained by a segment of stream or river. The water quality of a stream or river segment is largely determined by what is in its watershed.

What Other Water Bodies are found within the Study Area?

There are no significant lakes within the Study Area. However, there are a few small wetlands areas, including small ponds, which are identified and described in **Section 3.14 Wetlands**. Except for wetlands in **Section 3.14**, the potential for contamination of ponds and lakes is small due to the location of the Study Area.

What are the Beneficial Uses of Surface Waters in the Study Area?

What is a "TMDL?"

According to the U.S. Environmental Protection Agency, Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources." Discharge standards are allocated based on maintaining the total of all sources, natural and man-made, less than the TMDL for each pollutant.

Listings of the beneficial uses of stream segments were provided in the Total Maximum Daily Load (TMDL) documentation by MoDNR.

The beneficial uses of the Missouri River downstream of the Study Area include:

- Livestock and wildlife watering
- Protection of aquatic life and human health
- Fish consumption
- Whole body contact recreation
- Secondary contact recreation
- Irrigation
- Drinking water supply
- Industrial

The beneficial uses of the Blue River downstream of the I-70 crossing include:

- Livestock and wildlife water source
- Warm water aquatic life
- Human health associated with fish consumption
- Industrial water source
- Boating and canoeing

What is E. coli?

Escherichia coli (abbreviated as E. coli) are a diverse group of bacteria that live in all warm blooded animal's intestines. Some kinds of E. coli are used as markers for water contamination. E. coli are not themselves harmful, but indicate the water is contaminated.

The beneficial uses of Little Blue River downstream of the I-70 crossing include:

- Livestock and wildlife watering
- Protection of warm water aquatic life
- Protection of human health associated with fish consumption

Are There Surface Water Concerns?

According to the MoDNR Watershed Information Sheet for Missouri River Mainstem Kansas City to Glasgow, there was a study of the Blue River that found high levels of E. coli bacteria which is an indication of wastewater contamination. Also reported in the Watershed Information Sheet was

impairment to the Missouri River and the Blue River due to chlordane in fish tissues. Chlordane is an insecticide, now banned, that is leached from treated soils around homes in urban areas.

Water quality data including E. coli counts were collected on the Blue River at Stadium Drive by the United States Geological Survey (USGS) during the recreational seasons of 2003 and 2004. The E. coli data indicated that the Blue River within the Study Area was impaired by bacteria.

What is sediment?

Sediment is small particles of dirt, dust, sand and other materials that are left behind on a surface after water flows over it.

What is the Quality of Stormwater Drainage in the Study Area?

Throughout the Study Area, habitat and flood zones have been modified by the construction of housing, commercial districts, urbanization, and the construction of the interstate highway system, especially I-70. The development in the drainage basins adjacent to the Study Area has altered the hydrology from its original mostly permeable forest and prairie to mostly impermeable urban and suburban surfaces. This has affected water quality. Water flows more quickly on paved surfaces increasing erosion and sediment movement. Lawn fertilizers, pesticides, and herbicides have also increased contamination. Septic systems and domestic animals have increased contamination from wastewater.

Why does urbanization degrade water quality?

Urbanization, by definition, increases the density of human habitation. More humans in an area means more waste products are being generated in that area. In addition, human developments alter the natural landscape from prairie and forest, which are able to absorb and retain water, to streets, sidewalks and roofs which repel water. Water is no longer held and tends to "run-off" faster carrying contamination into the local drainage. Not only is more contamination generated in urban areas, contamination is carried to the drainage before it has a chance to decompose.

Runoff from the Study Area potentially drains directly into the Blue River. The Study Area crosses the Blue River approximately 7.2 stream miles upstream of the confluence with the Missouri River. The Blue River from the confluence with the Missouri River upstream for 22 miles is affected by urban runoff. Impairment includes bacterial contamination and chlordane contaminated fish.

Runoff from the Study Area potentially drains directly into the Little Blue River. According to the Missouri 303(d) report, the Little Blue River within the vicinity of the Study Area and downstream to the Missouri River, is contaminated with mercury from airborne deposition.

Runoff from the Study Area potentially drains into the Missouri River. According to the Missouri 303(d) report, the

Missouri River is affected by urban runoff and is contaminated with chlordane in the vicinity of Kansas City, MO.

How Might The Strategies Affect Water Quality?

The proposed route for I-70 improvements is identical to the existing route. Consequently, the risks associated with any proposed improvement strategy include all the risks associated with the existing I-70 highway:

- Pollution of the river system as a result of fuel, oil, and debris carried from the road surfaces by stormwater runoff.
- Exposure of the river system to airborne particulates and combustion gases from traffic.

What is an impervious surface?

Impervious surfaces are hard surfaces such as asphalt, concrete, rooftops, and highly compacted soils that prevent rainwater from entering into the soil. The rainwater is forced to run off the land until it finds a place to enter the soil or enters a drainage system.

The Build Strategies, including the Identified Preferred Strategy, will increase the impervious surface and increase rainwater runoff. This leads to increased amounts of water flowing in the stream, especially during heavy rainfalls; less groundwater flowing through the soil (base flow); and more erosion of the stream bed because of faster flowing water. These changes to stream flow result in flooding; habitat loss; erosion, which widens the stream channel; and physical changes in how the stream looks and functions.

Traffic bottlenecks will be addressed by constructing more capacity, additional lanes, and wider bridges. Demolition and soil disturbance will create sediment which should be managed with carefully maintained sediment control practices. Bridgework will be over sections of rivers and floodplains which will require special diligence to prevent contaminants from entering the drainage and surface waters. Tributary crossings also require diligence to prevent sediment and contaminants from entering drainage and potentially entering water resources. Use of BMPs for the control of erosion and sedimentation is recommended at all construction sites.

Increases in projected traffic would contribute to the runoff pollutant load. Standard measures currently in place would be implemented to reduce impact to receiving waters during construction. The rebuild of the present facility would be

favorable for the implementation of present day best management practices regarding control and treatment of highway runoff to receiving waters. Grassy swales, detention basins and passive treatment systems may be implemented in the new design. Systems such as these may be placed in designated sensitive receptor areas.

What are the Potential Effects of Construction on Local Water Resources?

Movement of sediment and pollutants into the river system as a result of construction and demolition activities potentially will affect water quality and habitat during construction. Pollutants travel with and sometimes bind to sediment. Controlling sediment also controls pollution. Use of Best Management Practices (BMPs) for the control of erosion and sedimentation is recommended.

How Will Water Quality Be Addressed In the Second Tier Studies?

The Second Tier studies will further evaluate and refine the impacts of the Build Strategies on the groundwater, drainage, and surface water in the Study Area.

This will include concepts for best management practices regarding control and treatment of highway runoff to receiving waters drainage and highway runoff. The Second Tier studies will also identify potential measures to avoid and minimize affects on water quality.

3.13 Floodplains, Stream, and River Crossings

This section presents the benefits of floodplains, identifies the locations where the Study Area crosses or encroaches on floodways, streams, and rivers and reviews the potential effects of the strategies. Floodplains and streams are shown in **Figure 3.8.1** at the end of this chapter and on figures in the text in this section.

What are the Benefits of a Floodplain?

The benefits of the floodplains within the Study Area are:

- Reduction of downstream flooding by providing temporary space for flood water volumes.
- Reduction of downstream erosion by providing area for flood water to spread thereby dissipating energy.
- Provide opportunity for sediment removal by deposition.
- Provide temporary habitat for aquatic and semi-aquatic species.

What is a floodplain?

A floodplain is the relatively flat land adjacent to a stream or river that experiences occasional or periodic flooding.

Highway construction activities in a floodplain should avoid reduction of the area and volume available for flood volume storage. Also, highway construction activities in a floodplain should not increase upstream flooding by increasing the depth of flooding. Aquatic habitat may be harmed by increasing the velocity of flood water through the floodway.

Who Is Responsible For Managing Activities In The Floodplain?

The State of Missouri delegated the responsibility of regulating floodplain management "designed to protect the health, safety, and general welfare" to local units of government. The Study Area is entirely contained within the jurisdictional boundaries of the City of Kansas City, MO and the City of Independence, MO. Both local units of government have adopted the recommended Federal Emergency Management Agency (FEMA) regulations for floodplain management.

The City of Independence and the City of Kansas City have adopted the following definitions and requirements:

- The base flood defined by the Federal Insurance Administrator's Flood Insurance Study (FIS), that is, "a flood which could be expected to have a one percent (1%) chance of occurrence in any one year".
- The regulatory floodway is the floodway required to convey the base flood without increasing flood height more than one foot. No development is permitted within the limits of the floodway that would cause any increase in flood height.
- The flood fringe is defined as the "area outside the floodway encroachment lines, but still subject to inundation by the base flood".

What is a "100-year flood?"

The phrase "100-year flood" is a short way of saying "a flood with a high degree of probability of occurring in any 100-year period". The 100-year flood is equivalent to a 1% flood and both are used interchangeably.

The regulations require that no permanent changes in the base flood elevations will be caused by any construction undertaken within the floodway boundaries. In particular, the regulations forbid changes within the designated floodway that increase flood height by more than one foot during a 100-year flood without mitigation measures, as determined by approved FEMA methods.

How does development change floodways?"

Development directly affects floodways when it encroaches on floodway boundaries, narrowing the path water must follow. This occurs where developers are allowed to pave channel bottoms, fill-in channel sides, or straighten water courses. Developments also reduce the amount of stormwater retainage by increasing hard surface coverings (asphalt, concrete, roofs). All of these changes increase the elevation, force, and damaging power of flood water.

Where are the Floodplains and Regulatory Floodways in the Study Area?

There are three areas where the Study Area crosses regulated floodways and potentially affect floodplains of the river system:

- The Kansas and Missouri Rivers
- The Blue River
- The Little Blue River and an unnamed tributary

Figure 3.8.1 shows these locations. Throughout the Study Area, the natural habitat and flood zones have been modified by the construction of housing, commercial districts, urbanization, and the construction of the interstate highway system, especially I-70. The development in the drainage basins adjacent to the Study Area has altered the hydrology from its original forest and prairie to mostly paved urban and

suburban land resulting in changes to channel velocities and peak flood elevations.

What are the Risks of Encroachments on Floodways within the Study Area?

This section reviews each location where the proposed strategy packages for I-70 cross the floodplain or regulatory floodway with respect to:

- The risks associated with I-70 improvements within a floodplain.
- The effects on natural and beneficial floodplain values.

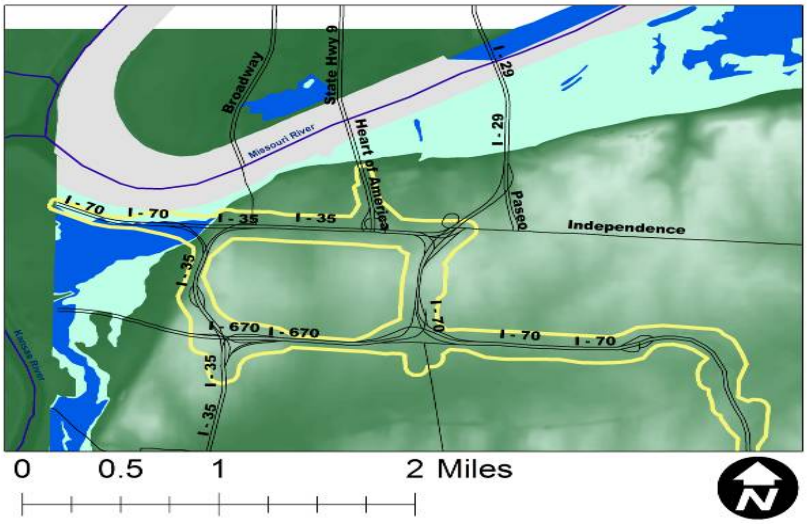
The proposed route for I-70 improvements is on the existing I-70 alignment. Consequently, the risks associated with the Identified Preferred Strategy include all the risks associated with the existing I-70 highway:

- Inundation by flooding, unless the road surface is elevated (as it currently is).
- Movement of sediment and pollutants into the river system as a result of construction and demolition activities.
- Pollution of the river system as a result of fuel, oil, and debris carried from the road surfaces by stormwater runoff.
- Exposure of the river system to airborne particulates and combustion gases from traffic.

Consideration should be given to minimizing the existing risks in the Build Strategies and implementing appropriate pollution control practices.

What is Inundation?

Inundation is the flooding of normally dry land.



Legend: Grey – floodway, blue – 100 year flood, light blue – 500 year flood

Missouri and Kansas Rivers Floodplain

Does the Study Area Encroach on the Kansas River and Missouri River Floodway?

What is Floodway?

A floodway is the portion of the floodplain adjacent to the channel which is required to carry base year floodwater.

The Study Area does not cross the regulated floodway of the Kansas River or the Missouri River, however, it does cross part of the flood fringe including areas subject to inundation by the 100-year and 500-year flood events. The area is currently crossed by a series of bridge spans, each greater than 20 feet. The Study Area is a fully developed industrial zone within the limits of the City of Kansas City, Missouri.

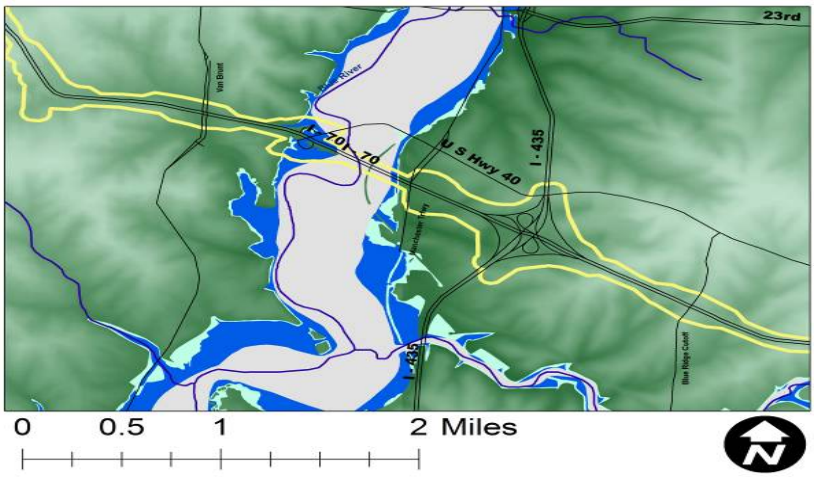
No new risks to the environment or floodplain are expected in the Study Area. However, care should be taken to minimize the existing risks.

Blue River Floodplain

Does the Study Area Encroach on the Blue River Floodway?

The project crosses the Blue River floodway which is approximately 1,716 feet wide at the centerline of the proposed alignment. The Study Area also includes fringe areas inundated by the 100-year flood and subject to inundation by the 500-year flood. The Blue River currently is crossed by a series of bridge spans each greater than 20 feet. The area within the Study Area is a developed urban zone within the limits of the City of Kansas City, MO.

No new risks to the environment or floodplain are expected in the Study Area. If pier replacements or embankments alter the width or depth of the floodplain, hydrology modeling would be required to show that the base flood elevation would not be change either upstream or downstream of the crossing by more than one foot.



Legend: Grey – floodway, blue – 100 year flood, light blue – 500 year flood

Blue River Floodplain

Does the Study Area Encroach on the Little Blue River Floodway?

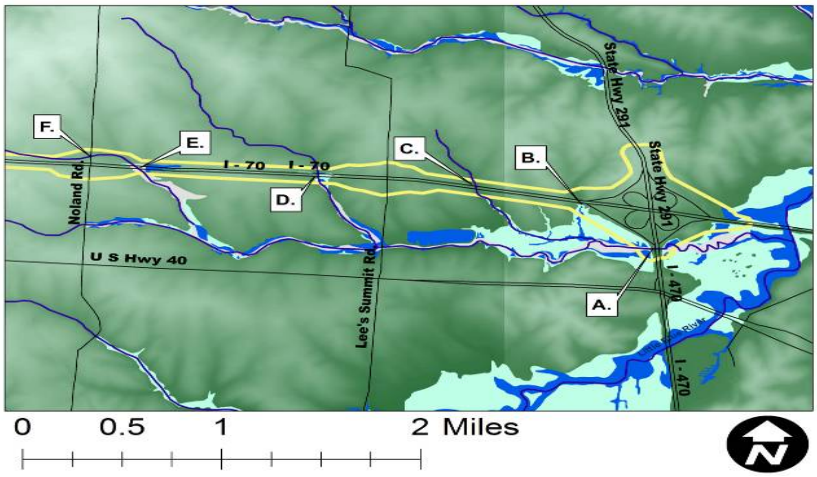
The Study Area crosses the 100-year flood limits and regulated floodway of the Little Blue River and an unnamed tributary that parallels I-70 on the south limits of the Study Area. The Study Area crosses the regulated floodway of the unnamed tributary in six places:

A. Crossing located on the south side of the I-470 interchange. The crossing runs beneath I-470. The unnamed tributary to Little Blue River crosses I-470 through a double 8-foot by 8-foot concrete box culvert.
B. Crossing located on the west side of the 1-470 interchange. The crossing runs beneath I-70. The unnamed tributary to Little Blue River crosses I-70 through a 5-foot by 5-foot concrete box culvert.
C. Crossing located on the east side of the Lee's Summit Road interchange. The crossing runs beneath I-70. The

Little Blue River Floodplain

unnamed tributary to Little Blue River crosses I-70 through a 6-foot by 6-foot concrete box culvert.

D. Crossing located on the west side of the Lee's Summit Road interchange. The crossing runs beneath I-70. The unnamed tributary to Little Blue River crosses I-70 through an 8-foot by 10-foot concrete box culvert.
E. Crossing located on the east side of the interchange at Noland Road, beneath I-70. The unnamed tributary to Little Blue River crosses I-70 through a 6-foot by 7-foot concrete box culvert.
F. Crossing located on the north side of the Noland Road interchange. The crossing runs beneath Noland Road. The unnamed tributary to Little Blue River crosses Noland Road through a 4-foot by 4-foot concrete box culvert.



Legend: Grey – floodway, blue – 100 year flood, light blue – 500 year flood

Little Blue River Floodplain

No new risks to the environment or floodplain are expected in the Study Area. Potential floodway alterations should be avoided if reasonably possible. If floodway alterations are required, box culverts should be replaced with the same type and size as the existing. Hydraulic modeling of floodway alterations may be required to show that the base flood elevation would not change either upstream or downstream of the crossing by more than one foot.

How will the Strategies Affect Floodplains?

The potential for floodplain encroachment exists for all strategies except the No-Build Strategy as shown in **Table 3.13.1**. Floodplains could be affected by earth movement and the impact of heavy equipment during construction. The effects on the floodway can be avoided by appropriate design and verified through hydraulic modeling.

3.13.1 Acres of Floodplain within the Sub-Area Construction Limits

	No-Build	Improve Key Bottlenecks	Add General Lanes	Transportation Improvement Corridor	Identified Preferred Strategy*
Downtown Sub-Area	0	0	0	0	0
Urban Sub-Area	0	0	0	0	0
I-435 Sub-Area	0	16	17	20	16
Suburban Sub-Area	0	3	3	3	3
I-470 Sub-Area	0	0	1	1	1
TOTAL	**0**	**19**	**21**	**24**	**20**

Source: FEMA Floodplain GIS data
* Uses the widest potential footprint between east of I-435 and I-470

No-Build Strategy

The No-Build Strategy will not affect any additional floodplain.

Improve Key Bottlenecks Strategy

The Improve Key Bottlenecks Strategy will affect 19 acres of floodplain, which is the fewest acres of floodplains impacted by any of the Build Strategies. The two areas impacted are the I-435 Sub-Area and the Suburban Sub-Area. The majority of the potential impacts are related to crossing the Blue River.

Add General Lanes Strategy

The Add General Lanes Strategy will affect 21 acres of floodplain. This strategy impacts the I-435, Suburban, and I-470 Sub-Areas. The majority of the potential impacts are related to crossing the Blue River.

Transportation Improvement Corridor Strategy

The Transportation Improvement Corridor Strategy will affect 24 acres of floodplain, which is the most acres anticipated to be impacted by any of the Build Strategies. This strategy impacts the I-435, Suburban, and I-470 Sub-Areas. The majority of the potential impacts are related to crossing the Blue River.

Identified Preferred Strategy

The Identified Preferred Strategy will affect a total of 20 acres of floodplain. The Sub-Area impacted the most by this strategy is the I-435 Sub-Area with some additional impacts in the suburban Sub-Area and the I-470 Sub-Area. The majority of the potential impacts are related to crossing the Blue River.

The floodplain effects are expected to be moderate for all strategies. This means that construction may cause unavoidable permanent water quality degradation that results in permanent aesthetic loss but does not result in either permanent or temporary loss of one or more beneficial uses of the floodplain.

For all strategies, except the No-Build Strategy, potential exists for encroachment to cause permanent destruction of habitat on stream edges by movement of soil and heavy equipment, concrete bridge abutments, and channelization. Also, for all strategies, potential exists for some temporary loss of water quality in the Blue River due to sediment, debris, and dust. Destruction of stream habitat may result in worsening water quality due to the loss of the beneficial affects of marginal and bottom dwelling plants and animals.

During construction, boating, fishing, and full body contact within the construction zone will be prohibited due to safety concerns. However, no temporary or permanent loss of any beneficial use due to water quality degradation is anticipated.

The Improve Key Bottlenecks Strategy and the Identified Preferred Strategy affect the fewest acres in the Blue River. However, the difference between the fewest and most acres impacted in the Blue River floodplain is four acres. This

difference may not result in a measureable difference in the water quality between the Build Strategies especially if appropriate measures to minimize impacts are taken during construction.

What are the Streams in the Study Area?

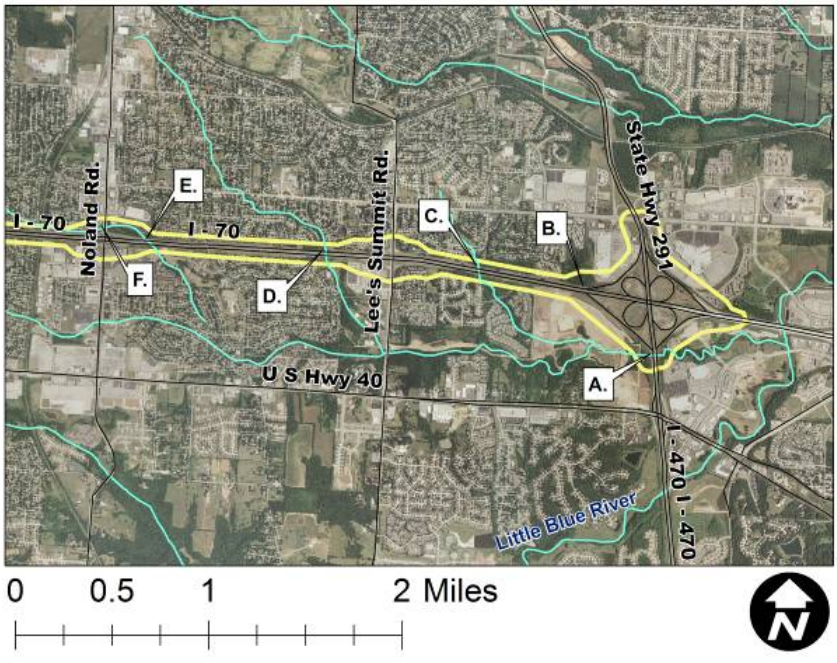
A total of approximately ten streams appear to be crossed by the existing I-70 and connecting roads within the Study Area boundary. The following paragraphs describe the streams crossed in the Study Area:

Stream A: Unnamed tributary to Little Blue River

Stream A is a medium-sized perennial stream. The stream flows from a newly constructed reservoir along a gently-sloped paved spillway, crosses under I-470, and re-enters its natural channel situated within the Little Blue River floodplain east of I-470. The channel is approximately 12 to 15 feet wide, and two to three feet deep with numerous bends downstream of the I-470 crossing. This stream was highly disturbed by recent construction activities on both sides of I-470. The quality of this stream is likely very low due to high levels of disturbance and physical modifications.

What is a Spillway?

A spillway is a paved, sloped pathway for water that allows for a controlled flow of water from a dam or storage location to a downstream area.



Little Blue River and Tributary Crossings

Stream B: Unnamed tributary to afore-mentioned unnamed tributary to Little Blue River

Stream B is a small- to medium-sized stream. North of I-70, the stream has significant amounts of debris within the streambed. The channel is approximately eight to ten feet wide and one to two feet deep. At the time of the evaluation, the water flow within the stream was relatively fast. This stream has relatively steep slopes on the sides of and within the streambed. The quality of this stream is likely low due to high levels of debris within the northern portions. There are some physical characteristics such as the presence of pools and riffles may increase ecological quality.

Stream C: Unnamed tributary to afore-mentioned unnamed tributary to Little Blue River

Stream C is a small-sized stream. North of I-70, the streambed and channel has significant amounts of debris. The stream channel ranges from approximately one to six feet wide and from one to six inches deep. The stream has steep slopes on the sides of and within the streambed. The quality of this stream is likely very low due to high levels of debris within the upper watershed.

Stream D: Unnamed tributary to afore-mentioned unnamed tributary to Little Blue River

Stream D is a small- to medium-sized stream. North of I-70, the stream has significant amounts of debris within the streambed. The stream is approximately four to six feet wide and two to eight inches deep. At the time of evaluation, water was flowing in the stream. The stream has steep slopes on the sides of and within the streambed. The quality of this stream is likely low due to high levels of debris within the northern portions

Stream E: Unnamed tributary to afore-mentioned unnamed tributary to Little Blue River

Stream E is a small-sized stream. North of I-70, the streambed and channel has significant amounts of debris. The stream

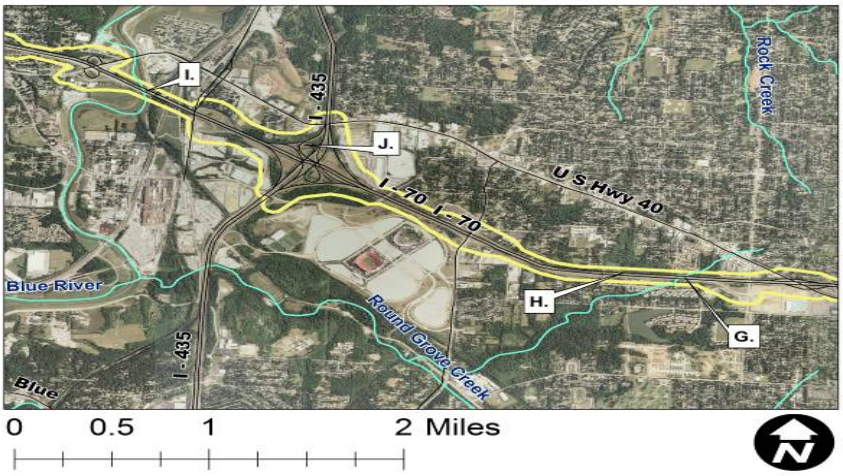
ranges from approximately four to eight feet wide and from one to six inches in depth. At the time of evaluation, water flow was barely evident. The quality of this stream is likely low due to high levels of debris within the northern portions.

Stream F: Unnamed tributary to the unnamed tributary associated with Stream E

Stream F is a drainage way that has been radically modified.

Stream G: Unnamed tributary to Round Grove Creek

Stream G is a small-sized stream. North of I-70, the streambed and channel have significant amounts of debris. The stream ranges from approximately four to six feet wide and from one to twelve inches in depth. Water flow was minimally evident at the time of evaluation. The stream has steep slopes on the sides of and within the streambed. The quality of this stream is likely low due to high levels of debris.



Blue River and Tributary Crossings

Stream H: Unnamed tributary to Round Grove Creek

Stream H is a very small-sized stream that may not satisfy the criteria for jurisdictional waters of the U.S. The streambed and channel are a little more than a ditch approximately two feet wide and two feet deep north of I-70.

Stream I: Big Blue River Bridge

Stream I is the Big Blue River discussed in more detail in the prior floodplain discussion.

Stream J: Drainage of Cloverleaf on I-70

An unnamed tributary to the Big Blue River acts as a drainage way inside the cloverleaf from westbound I-70 to southbound I-435. This is a small-sized intermittent stream that traverses the I-70 interchange through a series of underground culverts.

Are any of these Streams Protected?

Streams are often protected because they are defined as Waters of the United States. The term, Waters of the United States, applies to the jurisdictional authority of the U.S. Army Corps of Engineers under the Clean Water Act. All streams that meet the definition are subject to the protection of the Corps of Engineers and permits will be required to modify these streams. All of the stream crossings discussed above were determined to be Waters of the United States except Streams F and J.

How will the Strategies Affect Stream and Tributary Crossings?

The main difference between the Build Strategies is in the I-470 Sub-Area where two fewer streams are affected in the Improve Key Bottlenecks Strategy. **Table 3.13.2** shows the number of new or modified stream and tributary crossings for each of the strategies.

Downtown Sub-Area: There are no stream or tributary crossings in this Sub-Area of the Study Area.

Urban Sub-Area: There are no stream or tributary crossings in this Sub-Area of the Study Area.

Table 3.13.2 New or Modified Stream and Tributary Crossings by Sub-Area

	No-Build	Improve Key Bottlenecks	Add General Lanes	Transportation Improvement Corridor	Initial Preferred Strategy*
Downtown Sub-Area	0	0	0	0	0
Urban Sub-Area	0	0	0	0	0
I-435 Sub-Area	0	1	1	1	1
Suburban Sub-Area	0	5	5	5	5
I-470 Sub-Area	0	2	4	4	4

Source: GIS database verified by field study.
* Uses the widest potential footprint between east of I-435 and I-470

I-435 Sub-Area: The I-70 Bridge over the Blue River, in the I-435 Sub-Area, is proposed for reconstruction in all of the Build Strategies. Potential for encroachment on the floodplain of the Blue River, as measured by the area of the floodplain within the construction limits of the strategies, is shown in **Table 3.13.1**.

Suburban Sub-Area: All five tributaries in the Suburban Sub-Area cross under I-70 in culverts. However, stormwater drainage systems that feed into these tributaries are potentially in the construction areas. Demolition and reconstruction of the highway is anticipated in the Suburban Sub-Area for all Build Strategies.

The potential for drainage water quality degradation in the Suburban Sub-Area during construction appears to be equal among all strategies except the No-Build Strategy.

I-470 Sub-Area: The Improve Key Bottlenecks, the Add General Lanes, the Transportation Improvement Corridor, and the Identified Preferred Strategies include the I-70 crossing of the Little Blue River and an I-470 crossing of an unnamed tributary to the Little Blue River within construction limits.

The Add General Lanes, Transportation Improvement Corridor, and potentially the Identified Preferred Strategies will include the construction of flyover lanes at the I-70/I-435 interchange and reconstructing I-470 bridges over the Little Blue River. Also, the construction limits of these projects will

potentially affect on an unnamed tributary to the Little Blue River at a crossing of I-470.

What are Federal Emergency Management Agency (FEMA) Buyout Lands?

The Flood Disaster Protection Act of 1973, as amended by the Disaster Relief and Emergency Assistance Act of 1988 (The Stafford Act), identified the use of disaster relief funds under Section 404 for the Hazard Mitigation Grant Program (HMGP), including the acquisition and relocation of flood damaged property. The Volkmer Bill further expanded the use of HMGP funds under Section 404 to "buyout" flood damaged property, which had been affected by the Great Flood of 1993.

There are numerous restrictions on these FEMA buyout properties. No structures or improvements may be erected on these properties unless they are open on all sides. The site shall be used only for open space purposes, and shall stay in public ownership. These conditions and restrictions (among others), along with the right to enforce same, are deemed to be covenants running with the land in perpetuity and are binding on subsequent successors, grantees, or assigns. Any decision involving these properties should take into consideration that two to three years is necessary to process an exemption from FEMA to utilize this parcel. This exemption would likely be a permanent easement rather than a transfer of property.

There are no known FEMA buyout properties in the Study Area.

How will Floodplains, Streams, and River Crossings be Analyzed in the Second Tier Studies?

The Second Tier studies and additional design efforts will likely narrow the impact area and work to avoid, minimize, and mitigate impacts to the floodplains, rivers, and streams in the Study Area. Careful maintenance of best management practices for the control of sediment and runoff can reduce and mitigate the potential for temporary degradation of the water quality in the Blue River and the Little Blue River.

3.14 Wetlands

The section discusses the potential effects of I-70 improvements on wetlands. Information for this section was collected by telephone, searches of online databases, National Wetlands Inventory (NWI) mapping, and limited field investigations.

What is a wetland?

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year.

Why are Wetlands Important?

Long regarded as wastelands, wetlands are now recognized as important features in the landscape that provide numerous beneficial services for people and for fish and wildlife. Some of these services, or functions, include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods. In addition, wetlands provide recreational opportunities, aesthetic benefits, sites for research and education, and commercial fishery benefits. These beneficial services are the result of the inherent and unique natural characteristics of wetlands.

Little Blue River

What Wetlands are located in the Study Area?

The U.S. Fish and Wildlife Service (USFWS) NWI maps indicate that a total of five small areas within the boundaries of the Study Area are classified as wetlands. The U.S. Army Corps of Engineers (USACE) is the primary regulatory agency with jurisdiction over wetlands. Thus, areas identified as NWI wetlands are therefore considered potential wetlands. **Table 3.14.1** identifies each of the wetlands potentially meeting USACE criteria. These wetlands are described in the paragraphs and shown on exhibits that follow the table.

What is the National Wetlands Inventory?

The National Wetlands Inventory is an inventory the nation's wetlands.

Table 3.14.1 Identified Wetlands

Identification Number	Jurisdictional or Non-jurisdictional	Area (Acres)	Potential Acres of Impact
1	Jurisdictional	5.1	2.8
2	Jurisdictional	13.4	9.4
3	Non-jurisdictional	0.3	0.3
4	Non-jurisdictional	0.9	0.9
5	Non-jurisdictional	0.9	0.9

What is a Jurisdictional Wetlands?

U.S. Army Corps of Engineers definition used for jurisdictional wetlands requires that all three attributes: hydrophytes, hydric soils, and hydrology must be present.

What is hydrophytic vegetation?

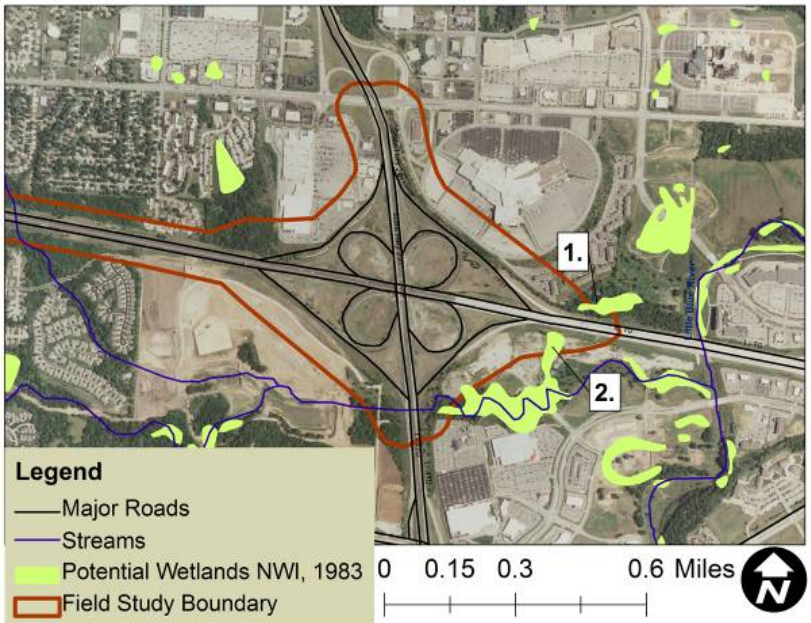
Hydrophytic vegetation, or hydrophytes, includes the vegetation that has adapted to life in water or in waterlogged soils.

What are hydric soils?

Hydric soils are saturated long enough during the growing season to deprive the root system of oxygen, likely indicating a wetland.

1 - Northeast quadrant of the I-70/I-470 interchange

This potential wetland is associated with the forest situated along an unnamed tributary to the Little Blue River that originates south of the Independence Center shopping center. This 2.8 acre area is a forested wetland that is temporarily flooded. With the exception of the presence of hydrophytic vegetation communities, no other indicators of jurisdictional wetlands were observed at this location. The U.S. Department of Agriculture (USDA) on-line soil mapping indicates that the soils at this location are classified as partially hydric due to occasional flooding (USDA 2008).



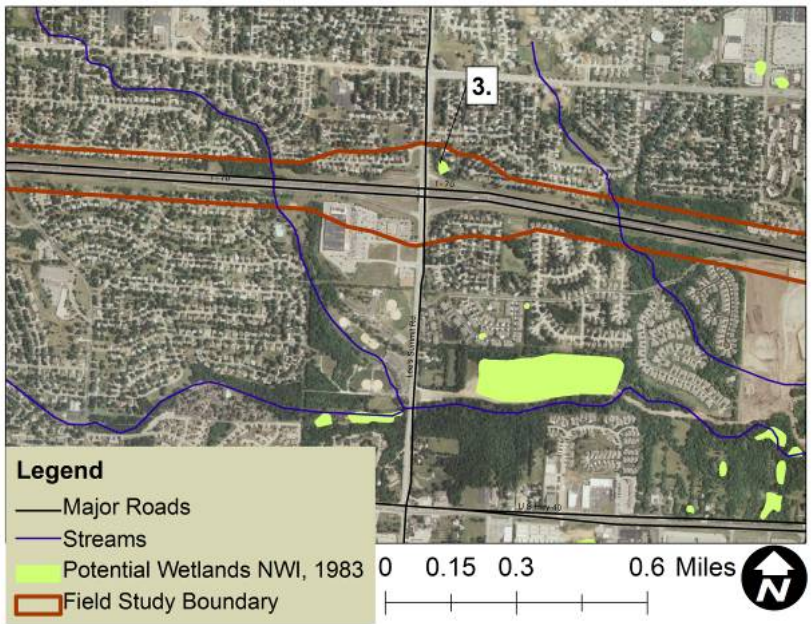
Wetlands near I-470

2 - Southeast quadrant of the I-70/I-470 interchange.

This potential wetland is associated with the forest situated along an unnamed tributary to the Little Blue River that originates in the urbanized neighborhoods to the west. This 13.4 acre area is a forested wetland that is temporarily flooded. With the exception of the presence of hydrophytic vegetation communities, no other indicators of jurisdictional wetlands were observed at this location. The portion of the wetland in the Study Area has been heavily disturbed by recent earthmoving activities. The USDA on-line soil mapping indicates that the soils at this location are classified as partially hydric due to occasional flooding (USDA 2008).

3 - Northeast quadrant of the I-70/Lee's Summit Road interchange.

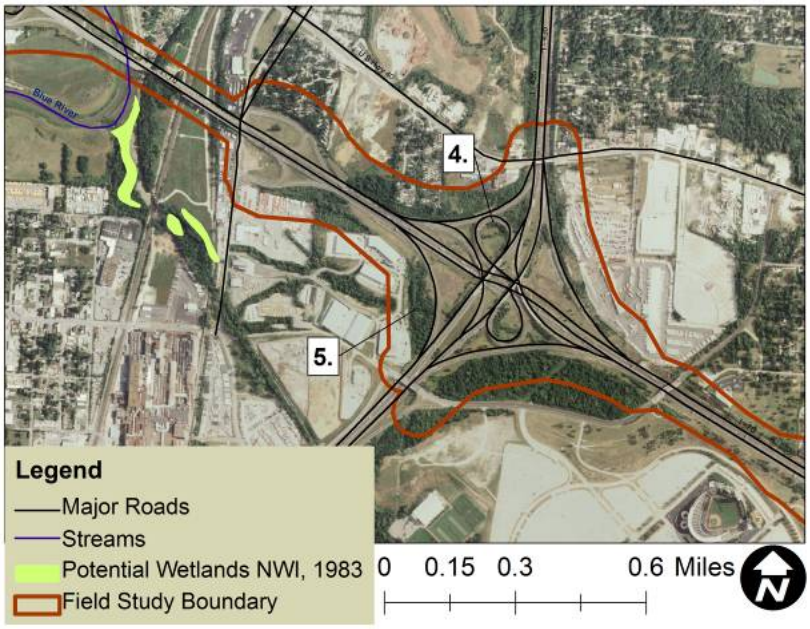
This potential wetland is associated with a small pond located on private property. This 0.30 acre area is a man made pond probably constructed as a retention basin. Due to its location on private property, this potential wetland was not observed. The USDA on-line soil mapping indicates that this location is classified as non-hydric (USDA 2008).



Wetlands near Noland Road

4 - Inside the cloverleaf from westbound I-70 to southbound I-435.

This potential wetland is associated with a drainage way that flows through the inner cloverleaf area from east to west. A small stand of cattail has become established along the south bank and standing water as present. This 0.9 acre area is a result of construction activities. The USDA on-line soil mapping indicates that this location is classified as non-hydric (USDA 2008).



Wetlands near I-435

5 - Southwest of the exit ramp from eastbound I-70 to southbound I-435.

This potential wetland is associated with the heavily forested area between the exit ramp and the built-up industrial area to the southwest. This 0.9 acre area is a forested wetland that is temporarily flooded. Due to its location in a heavily wooded and rugged terrain, this potential wetland was not observed. The USDA on-line soil mapping indicates that the soils at this location are classified as non-hydric (USDA 2008).

How will the Strategies Affect Wetlands and Habitat?

The potential for wetland and habitat loss was measured by estimating the area of wetlands within the boundaries of the construction limits. Although the Improve Key Bottlenecks Strategy potentially may disturb the least amount of wetlands, the difference is little more than half an acre across the entire Study Area. The I-470 Sub-Area is the primarily location where wetland disturbances occur between the Build Strategies. **Table 3.14.2** shows the breakout of potential wetland area disturbance by strategy and location.

Table 3.14.2 Acres of Wetlands Area within the Sub-Area Construction Limits

	No-Build	Improve Key Bottlenecks	Add General Lanes	Transportation Improvement Corridor	Identified Preferred Strategy*
Downtown Sub-Area	0	0	0	0	0
Urban Sub-Area	0	0	0	0	0
I-435 Sub-Area	0	0.90	0.90	0.90	0.90
Suburban Sub-Area	0	0.02	0.13	0.13	0.13
I-470 Sub-Area	0	0.46	1.00	0.96	1.00
Total	0	1.38	2.03	1.99	2.03

Source: National Wetlands Inventory GIS data modified based on Field Investigations
* Uses the widest potential footprint between east of I-435 and I-470

The pond listed in the Suburban Sub-Area is a man-made water feature on private property which was identified as wetland 3. The total area of this pond is 0.30 acres about a third of which may be affected by construction of the Add Lane Capacity Strategy, the Transportation Improvement Corridor Strategy, or the Identified Preferred Strategy.

How will the Identified Preferred Strategy Affect the Wetlands and Habitat?

Since the all of the wetlands and habitats are located at or east of the I-435 Interchange, the Identified Preferred Strategy impacts will mirror the impacts of the wider footprint of the Add General Lanes Strategy. The Identified Preferred Strategy is anticipated to impact 2.03 acres of wetlands.

What are the Next Steps?

The Second Tier studies and additional design efforts will likely narrow the impact area and work to avoid, minimize, and mitigate impacts to wetlands and habitats in the Study Area. During the Second Tier studies, wetland delineation and habitat preservation efforts will occur.

3.15 Wildlife, Plants, and Threatened and Endangered Species

This section discusses the effects the strategies may have on wildlife, plants, and protected species.

The Endangered Species Act (ESA) of 1973 assigned the Department of the Interior, U.S. Fish & Wildlife Service (USFWS) to establish a list of federally protected species. The ESA states that each federal agency must insure that "any action authorized, funded, or carried out" by that agency "is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of officially designated critical habitat of these species. The Study Area is highly urbanized with only scattered areas of undeveloped land. These mostly consist of open lots, small forests, and land adjacent to stream and river crossings.

Who Supplied the Information in this Section?

The Missouri Department of Conservation (MDC) is responsible for the determination of the state-level protection status of wildlife and plants in Missouri. The MDC maintains a Natural Heritage Database for occurrences of natural heritage resources, including habitats of rare, threatened, or endangered plant and animal species, and unique or exemplary natural communities.

According to various on-line databases including the MDC Natural Heritage Database and the USFWS Threatened and Endangered Species System (TESS), a variety of threatened and endangered species are listed for Jackson County in Missouri.

The Study Team wildlife biologist verified habitat for identified threatened and endangered species by first-hand observation in the field. The wildlife biologist also verified, as part of the habitat field investigations, locations of forest, wetlands, streams and other important habitat features.

Bald Eagle

Barn Owl

Peregrine Falcon

Pallid Sturgeon

What Species Are Likely Found in the Study Area?

Searches by the Study Team indicate that three protected wildlife species are known to occur in Jackson County and have a State designated endangered status:

- The bald eagle (Haliaeetus leucocephalus),
- The barn owl (Tyto alba)
- The peregrine falcon (Falco peregrinus).

Terrestrial habitat for any of the above three birds does not appear to be present within the Study Area boundaries. Peregrine falcons have managed to survive in urbanized environments by nesting on top of tall buildings. In 2002, a peregrine falcon nesting on the Commerce Bank Towers in downtown fledged four young. However, tall urban buildings are a creation of humans and do not constitute a terrestrial habitat simply because a species is adaptable enough to use it.

The USFWS TESS database indicates that one wildlife species is known to occur in Jackson County and have a Federal designated threatened or endangered status:

- The pallid sturgeon (Scaphirhynchus albus).

Aquatic habitat for the pallid sturgeon is definitely not present within the Study Area boundary. The bald eagle is no longer federally listed as threatened or endangered. The bald eagle is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Terrestrial habitat for the bald eagle does not appear to be present within the Study Area boundaries.

Due to the absence of habitat for listed threatened and endangered species within the Study Area, effects on these species from the proposed strategies are unlikely.

A wide variety of other animal species have adapted to the fragmented forested areas and habitats. Deer, turkeys, rabbits, skunks, raccoons, opossums, squirrels, a variety of birds, other small mammals, reptiles, and amphibians likely frequent the forested and open areas in the Study Area. These species have adapted to the human disturbance and seem to thrive in these

areas. During construction, these animals will move into areas away from the disturbance. However, they will quickly re-populate suitable areas once construction has ceased and vegetation re-growth has occurred.

Clearing and grading during construction will likely affect the habitat areas for some of these species. Nearby areas of similar habitat are expected to support the wildlife potentially relocated by the project. Clearing of trees and other vegetation would be confined to construction limits to preserve as much existing natural growth as possible.

Forested Areas

Treed and forested areas are important as they are among the most likely locations for wildlife and non-cultivated plants.

Trees were found growing within the I-70 existing right of way from the Missouri-Kansas state line to the Little Blue River. However, most of these groups of trees were cultivated plantings, deliberately placed as an aesthetic wind-break. The Study Team defined forested areas in the Study Area as large continuous groups of trees and undergrowth which appeared to have "voluntarily" sprouted where they were found. These areas were identified from 2006 digital aerial photography and verified by comparing the 2007 digital aerial photography and field investigations. **Table 3.15.1** was prepared by measuring the forested areas within the anticipated boundaries of the construction for each of the strategies.

Table 3.15.1 Acres of Potential Forested Area Loss

	No-Build	Improve Key Bottlenecks	Add General Lanes	Transportation Improvement Corridor	Identified Preferred Strategy*
Downtown Sub-Area	0	0	0	0	0
Urban Sub-Area	0	0	0	0	0
I-435 Sub-Area	0	36	40	42	40
Suburban Sub-Area	0	13	10	12	10
I-470 Sub-Area	0	8	19	15	19
TOTAL	0	57	69	69	69

Source: GIS database, Aerial Photography 2006 and Aerial photography 2007, verified by Field Investigation.
*Uses the widest potential footprint between east of I-435 and I-470

The I-435 and the I-470 Sub-Areas of the Improve Key Bottlenecks Strategy will potentially lose significantly less forested area compared to the other Build Strategies. However, in the Suburban Sub-Area of the Improve Key Bottlenecks Strategy, the potential loss of forested area is greater than the potential loss of forested area in the other Build Strategies. Overall, the Improve Key Bottlenecks Strategy minimizes potential loss of forested areas compared with the other strategies.

What are the Next Steps?

During the Second Tier studies more detailed identification of potential species sites will be completed. This will include surveys for habitat in all identified locations where threatened or endangered species may exist. As no such locations have been identified, minimal survey work may be needed. The Second Tier studies will identify potential measures to avoid, minimize, and mitigate effects of I-70 improvements on natural areas, plants, and wildlife regardless of their status.

3.16 Farmland and Soils

The entire Study Area is located in the urbanized cities of Kansas City and Independence, Missouri. Over time, development has transformed any farmland in this area to urban uses including homes and businesses. As a result, there are no farmlands located within the Study Area of the I-70 First Tier EIS.

How Will the Strategies Affect Farmland and Soils?

There are no farmlands or prime agricultural soils remaining undeveloped within the Study Area, as a result none of the strategies will impact farmland or prime soils. A farmland conversion impact rating form is not needed for this project.

3.17 Energy

This section discusses the effect the proposed strategies will have on the consumption of energy. The principal energy consuming activity of highway transportation is vehicle operation.

How Will the Strategies Affect Energy Consumption?

All strategies, other than the No-Build Strategy, will improve traffic flow and reduce vehicle fuel consumption on a per vehicle basis. However, the improved traffic flow is forecast to cause additional trips and vehicle miles traveled. The additional trips and vehicle miles traveled for the Build Strategies is a direct effect of increasing the travel efficiency through the Study Area and attracting rerouted trips from elsewhere in the local transportation network.

Overall, the higher amount of trips and vehicle miles traveled resulting from any of the Build Strategies may have a slightly larger impact on energy use when compared to the No-Build Strategy. On the other hand, an increase in travel efficiency through the Study Area, as well as advancing vehicle technology (electric and hybrid vehicles) will likely improve the average miles-per-gallon fuel economy for the overall vehicle fleet leading to reduced energy consumption over time. The anticipated improvements to vehicle fuel efficiencies will also reduce the energy usage throughout the Study Area for all of the strategies.

All strategies, except the No-Build, include provisions such as bus on shoulder and potential enhanced express bus service that may increase use of transit and reduce the energy used per traveler in the corridor.

No-Build Strategy

The No-Build Strategy will not improve traffic flow and reduce vehicle fuel consumption. In fact, an increase in congestion will lead to more vehicle fuel consumption as vehicles are in stop and go traffic for a longer period of time. In addition, the No-Build Strategy would likely require more frequent maintenance which often requires temporary lane

closures resulting in traffic congestion and increased energy use due to stop and go traffic.

Improve Key Bottlenecks Strategy

The Improve Key Bottlenecks Strategy will reduce the consumption of energy for individual vehicles on I-70. The Improve Key Bottlenecks Strategy will improve traffic flow and reduce vehicle fuel consumption through the corridor. During construction, lane restrictions or closures may be required which would lead to increased congestion and energy use.

Add General Lanes Strategy

The Add General Lanes Strategy will reduce the consumption of energy for individual vehicles on I-70. The Add General Lanes Strategy will improve traffic flow and reduce vehicle fuel consumption through the corridor. During construction, lane restrictions or closures may be required which would lead to increased congestion and energy use.

Transportation Improvement Corridor Strategy

The Transportation Improvement Corridor Strategy will reduce the consumption of energy for individual vehicles on I-70. The Transportation Improvement Corridor Strategy will improve traffic flow and reduce vehicle fuel consumption through the corridor. During construction, lane restrictions or closures may be required which would lead to increased congestion and energy use.

Identified Preferred Strategy

The Identified Preferred Strategy will reduce the consumption of energy over time. The Identified Preferred Strategy will improve traffic flow and reduce vehicle fuel consumption through the corridor. During construction, lane restrictions or closures may be required which would lead to increased congestion and energy use.

How Will Energy Use Be Further Evaluated During Second Tier Studies?

The Second Tier studies will further investigate potential changes in energy uses due to improvements on I-70. This may include further analysis of how specific improvements and design considerations may reduce energy use in the corridor.

3.18 Utilities

The Study Area contains the following major utility services for Kansas City and Independence: sanitary sewer, water, gas, electric, and communications. The Study Team used basic web site searches in identifying the key utilities in the corridor.

Electrical Distribution

The Kansas City Power and Light Company provides the electric service in Kansas City. The Study Area contains a 161 Kilovolt (kV) electrical power line that runs southeast parallel to I-70 from approximately the Kansas City-Independence border to Sterling Avenue. Independence's electrical service is provided by the Independence Power and Light Company. According to the Independence Comprehensive Plan (1993), the City plans on extending this 161 kV line southeast to US-40 and along US-40 to Lee's Summit Road.

Overhead electric power lines across I-70

Gas Distribution

Kansas City gas service is provided by the Missouri Gas Energy Company. Independence's gas service is provided by the Missouri Gas Energy or the Kansas Gas Service Company (formally "Gas Service Company"). The Study Area is well served with gas lines to the nearby residential, retail, and industrial areas.

Water Distribution

Several water lines run parallel to or cross the I-70 Study Area. Within Kansas City, the municipal Water Services Department provides water. Within Kansas City, water lines 4 to 30 inches in diameter and sewer lines less than 10 to 52 inches in diameter frequently parallel the I-70 corridor.

Within Independence, the municipal Water Department provides water. Within Independence, water lines up to 36 inches in diameter run in a north-south direction along Noland Road and MO-291. The Study Area is well served with water distribution lines serving local residences and businesses.

Sanitary Sewer Distribution

Several sanitary sewer lines run parallel to or cross the I-70 Study Area. Within Kansas City, the Water Services Department provides the sanitary sewer system.

The Kansas City Water Pollution Control Department controls the sanitary sewer system. The Little Blue Valley Sewer District owns an interceptor line that intersects the Study Area close to the I-435/I-70 interchange. The interceptor line, ranging from 114 to 126 inches in diameter, also runs in a north-south direction and collects sewage from adjoining sewer lines throughout central Independence. The Study Area is well served with sanitary sewer lines serving local residences and businesses.

Television Tower located near the study area

Communications

Kansas City has telephone service through AT&T and cable service is provided by Comcast, Time Warner, or Everest dependent on the location in the city. Independence telephone service is provided by AT&T. Independence cable service is either provided by Comcast or Time Warner, dependent on the location in the city. The Study Area is well served with communication lines to the nearby residential, retail, and industrial areas.

How Will the Strategies Affect the Utilities?

No-Build Strategy

The No-Build Strategy would not result in utility impacts for the community, neighborhoods, or natural resources.

Identified Preferred and Build Strategies

Temporary impacts in service may occur to any of the described utility services, however, temporary telephone and cable service impacts are most probable. Public and private owners subject to utility easements for either above or below ground utilities on their property could be restricted from certain uses on that portion of their property. Prior written

consent from an easement grantee would be required in order to place temporary or permanent buildings, structures, other improvements, or terrain alterations. The easement grantee would also retain the right of access to that portion of property. It is not expected that any property owners would be denied reasonable economic use of their property as a result of utility easements.

How Will Utilities be addressed in the Second Tier Studies?

The Second Tier studies will further evaluate and refine the utility impacts. Additional engineering design for the Identified Preferred Strategy will be completed in the Second Tier studies which will allow for greater analysis of effects on specific utility lines or corridors. Second Tier studies will preliminarily identify any needs for relocating utilities along the corridor.

3.19 Indirect and Cumulative Impacts

This section analyzed indirect and cumulative impacts of the proposed project. The analysis looked at other major reasonably foreseeable roadway projects within Jackson County, Missouri. The greatest potential for indirect or cumulative impacts from the project includes commercial relocations and traffic flow impacts.

What are Indirect Impacts?

Indirect (secondary) impacts are caused by the project that become evident later in time or are farther removed in distance than direct impacts, but are still "reasonably foreseeable." An example of an indirect impact would be land use changes that occur along a newly constructed highway, such as the development of motels. While the new highway did not directly cause the construction of motels, it encouraged their construction by providing improved access to the properties. The construction of the motels may in turn cause the filling of wetlands, which would also be an indirect impact. Any such foreseeable indirect impacts to land use were identified with the help of local, state, and federal agencies regarding land use issues.

The development in the drainage basins adjacent to the Study Area has altered the hydrology from its original mostly permeable forest and prairie to mostly impermeable urban and suburban surfaces. This has affected water quality. Water flows more quickly on paved surfaces increasing erosion and sediment movement.

What are Cumulative Impacts?

Cumulative impacts are those impacts that result when adding the incremental impacts of a project to other past, present, and foreseeable future projects. The incremental impacts of a project may be minor. However, when these impacts are added to impacts from other projects over time, the overall impact could be considerable. Cumulative impacts can be positive or negative for many potential resources being evaluated.

What are Direct Impacts?

Direct impacts are caused by the construction of the project. Direct impacts are covered mostly in **Chapter 3** and are a simple cause and effect.

Example: A wetland is filled to accommodate construction of a roadway.

Projects considered in cumulative analysis would consist of past, present, and future transportation and land development projects. The time frame to be used for considering past, present, and future projects is from 1985 to 2035 and the area of analysis includes the cities of Kansas City and Independence, Missouri as well as consideration of other projects along I-70 in Missouri and other interstates in the Kansas City Metropolitan area. Mid-America Regional Council's current Long Range Transportation Plan was also reviewed for any major projects that may add to cumulative impacts.

What Other Projects were Considered for Cumulative Impacts?

The original construction of I-70 in Kansas City was completed over 45 years ago. At that time, approximately 2,000 parcels were impacted. The primary impacts were to residential parcels, however, some businesses and agricultural lands were also impacted. The interstate split neighborhoods and disconnected streets that once provided community access. The interstate also provided limited interchange access which promoted growth of service type industries around these new junctions. Although this did not occur within the timeframe for the cumulative impacts analysis for this project, it is still important to consider the long-term effects of I-70 construction from the time it was first constructed.

The Study Team considered the following other projects in detail while assessing potential cumulative impacts.

I-29/35 EIS

I-29/35 corridor leading into downtown Kansas City is already heavily used and forecasts show traffic volumes will continue to rise. The project will upgrade Interstate 29/35 to six lanes from just north of the Route 210/Armour Road interchange to Independence Avenue. An additional southbound lane will be built from the northeast corner of the downtown loop to Oak Street.

U.S. 71

U.S. 71 (Bruce R. Watkins Drive) is a freeway constructed from I-435 to I-70 at the southeast corner of the downtown loop. Bruce R. Watkins Drive is primarily six lanes with a transition to four lanes near the south end of the freeway.

I-70 and I-435 Interchange

As part of an existing project in the STIP, MoDOT has committed to modifying the freeway access along I-70 and I-435 to relieve congestion in the I-435 and I-70 interchange. The improvements include:

- Adding lanes to I-70.
- Modifying ramps on I-70 eastbound into a collector distributor system and extending ramps at several locations for additional weave, merge, and diverge area.
- Adding partial access at I-435 and U.S. 40 and modifying access at I-70 and Manchester Trafficway.
- Modifying the ramp terminals at U.S. 40/31st Street
- Replacing the Blue Ridge Cutoff Bridge.

These improvements reduce congestion, improve safety and address two bridge maintenance needs in the interchange area.

The ultimate interchange configuration will build off of the initial work in the STIP. MoDOT will continue to modify the freeway access along I-70 and I-435 to relieve congestion and improve the condition of the system in the I-435 and I-70 interchange area. Similar to the programmed STIP project, the proposed improvements include:

- Adding lanes to I-435.
- Modifying ramps into a collector distributor system on I-70 and I-435 and extending ramps at several locations for additional weave, merge, and diverge area
- Reconstructing and relocating the fully directional ramps to eliminate left-side exits from the interstate.

These proposed improvements reduce congestion, improve safety and address bridge maintenance needs in the interchange area.

Proposed I-70 Statewide (MARC area)

MoDOT has completed a Supplemental EIS across the state incorporating truck-only lanes on I-70 between Kansas City and St. Louis. This project connects with the I-70 improvements considered in this document at the I-70/I-470 interchange. Coordination between the two projects is needed to address the transition between the truck-only lane improvements and I-70 in the Kansas City Metro area.

I-470 Purpose and Need

MoDOT is evaluating the potential needs for improvement on I-470 between Blue Ridge Boulevard and 39th Street. This study will not propose solutions; rather an analysis of root causes will be performed on the information gathered to create a Purpose and Need Statement. The Purpose and Need Statement will summarize the findings and identify deficiencies associated with the I-470 corridor. The study will prioritize short-term and long-term needs for future improvements, but will not make recommendations on what those future improvements will be. There are no alternatives developed to date for this project.

Proposed Missouri River Corridor (Lewis and Clark Expressway)

The cities of Independence, Sugar Creek, and Kansas City Missouri teamed up to study a 28 mile corridor in northeast Jackson County. The corridor is in varying phases on completion. Some elements such as Front Street, Chouteau Trafficway, and Little Blue Expressway have been completed. The Missouri River Corridor will provide a new four lane connection from I-70 to M-291 to I-435.

Proposed South Loop Link

The City of Kansas City, Missouri is currently studying the potential to develop over I-670. The proposed project would cover I-670, creating an enclosed tunnel for I-670 and expanding the development opportunities above the highway. This potential project is still in the study phase.

I-35 (I-670 to Kansas State Line)

MoDOT is currently conducting a study to evaluate the deficiencies of the existing I-35 from the Kansas State Line to I-670. This study will develop viable improvement concepts to address the needs of the corridor and make recommendations with the most feasible improvements. The recommendations will be added as an attachment to the I-70 Final FTEIS and will guide future MoDOT activity in the I-35 corridor and downtown loop.

Will FTEIS Strategies Cause Cumulative Impacts?

There are only two major projects near the Study Area between 1985 and 2035 which would have cumulative community impacts. The two projects are the future I-29/35 EIS/Northland Downtown MIS construction and the past construction of the U.S. 71 connections into the southeast corner of the downtown loop. This section will analyze the cumulative impacts on commercial relocations and traffic flow because they have the greatest potential to be affected cumulatively by the project.

The I-29/35 EIS preferred alternative identified one business to be relocated. The business property is currently vacant. The initial phase of the I-70/435 Interchange will relocate two hotels. One is currently vacant and the second has four occupied rental apartments associated with the motel. The U.S. 71 construction relocated approximately 50 commercial properties over 12 square blocks near the I-70 FTEIS Study Area.

No-Build Strategy

The No-Build Strategy would result two motels and four associated residential apartments in cumulative impacts on the community.

Improve Key Bottlenecks Strategy

The following cumulative impacts were identified for the Improve Key Bottlenecks Strategy.

Commercial Relocations: The I-70 FTEIS identifies up to seven commercial relocations in the Downtown Sub-Area. The cumulative impacts in the Downtown Sub-Area between 1985 and 2035 are anticipated to be approximately 57 commercial relocations from the various transportation projects.

Transportation Impacts: The Improve Key Bottlenecks Strategy would improve traffic flow and reduced congestion through the downtown loop and along I-70. The proposed improvements in combination with past and future projects along and connecting with I-70 would result in a positive cumulative impact to the overall travel, goods movement, and bicycle/pedestrian access across the freeway.

Add General Lanes Strategy

The following substantial cumulative impacts were identified for the Add General Lanes Strategy.

Commercial Relocations: The I-70 FTEIS identifies up to 14 commercial relocations in the Downtown Sub-Area. The cumulative impacts in the Downtown Sub-Area between 1985 and 2035 are anticipated to be approximately 64 commercial relocations from the various transportation projects.

Transportation Impacts: The Add General Lanes Strategy would improve traffic flow and reduced congestion through the downtown loop and along I-70. The proposed improvements in combination with past and future projects along and connecting with I-70 would result in a positive cumulative impact to the overall travel, goods movement, and bicycle/pedestrian access across the freeway.

Transportation Improvement Corridor Strategy

The following substantial cumulative impacts were identified for the Transportation Improvement Corridor Strategy.

Commercial Relocations: The I-70 FTEIS identifies up to eight commercial relocations in the Downtown Sub-Area. The cumulative impacts in the Downtown Sub-Area between 1985 and 2035 are anticipated to be 58 commercial relocations from the various transportation projects.

Transportation Impacts: The Transportation Improvement Corridor Strategy would improve traffic flow and reduced congestion through the downtown loop and along I-70. The proposed improvements in combination with past and future projects along and connecting with I-70 would result in a positive cumulative impact to the overall travel, goods movement, and bicycle/pedestrian access across the freeway.

Identified Preferred Strategy

The following substantial cumulative impacts were identified for the Identified Preferred Strategy.

Commercial Relocations: The I-70 FTEIS identifies up to seven commercial relocations in the Downtown Sub-Area. The cumulative impacts in the Downtown Sub-Area between 1985 and 2035 are anticipated to be approximately 57 commercial relocations from the various transportation projects.

Transportation Impacts: The Identified Preferred Strategy would improve traffic flow and reduced congestion through the downtown loop and along I-70. The proposed improvements in combination with past and future projects along and connecting with I-70 would result in a positive cumulative impact to the overall travel, goods movement, and bicycle/pedestrian access across the freeway.

Will FTEIS Strategies Cause Indirect Impacts?

No-Build Strategy

The No-Build Strategy would not result in any indirect impacts.

Identified Preferred and Build Strategies

Potential Redevelopment Opportunity

Each Build Strategy may create redevelopment opportunities throughout the corridor. Improved access through improved ramps or rebuilt interchanges could lead to changes in property uses to support the traffic using the roadway. The Study Area has little undeveloped property. Thus most development that may be encouraged by improvements to I-70 will be redevelopment of existing sites as opposed to new property development on fields or other undeveloped land. There is unlikely to be substantial indirect impacts to wetlands or natural areas. During the Second Tier studies, the effects of individual improvements on neighboring businesses and development should be evaluated for potential indirect impacts.

How will the Second Tier Studies Evaluate Indirect and Cumulative Impacts?

The Second Tier studies will look at the more detailed effects of specific projects and improvements and their potential to cause indirect impacts on development. For example the impacts of changes at specific interchanges may indirectly affect development and locations near those interchanges. The Second Tier studies will also examine and consider any more localized or neighborhood level cumulative affects due to proposed I-70 improvements and other transportation or development projects.

3.20 Joint Development

A joint development or multi-use concept proposes that roadway right of way be used for purposes other than the movement of traffic. Uses could include utility lines and services, parks, bicycle and pedestrian trails, parking facilities, and others. The I-70 FTEIS right of way could incorporate the multi-use concept through the accommodation of water and sanitary sewer lines, telephone conduits and poles, natural gas lines, electric cables and poles, and fiber optic lines. The Build Strategies and Identified Preferred Strategy do not include any specific joint development proposals for utilities, trails, parks, parking lots, or other uses. The individual Second Tier studies may identify the need for one or more of these joint development projects in the future.

3.21 Relationship between Short-Term Environmental Uses and the Maintenance and Enhancement of Long-Term Productivity

All of the I-70 First Tier Strategies (including the No-Build) will involve short-term and long-term tradeoffs. In the case of the I-70 FTEIS improvements, the money, labor, and construction materials used to construct the project will be substantial. Based on all of the improvements included in the strategies, the benefits should justify the initial costs. These costs and benefits are not limited to the spending of public dollars, but also include items hard to quantify such as improved travel, driver stress reduction, and economic development benefits as well as others.

How Will the Strategies Affect the Short-Term Uses versus Long-Term Productivity?

For this discussion, "short-term" refers to immediate, direct consequences of the project while "long-term" refers to its direct or indirect affects on future generations. The short-term consequences to the environment resulting from any of the strategies are discussed throughout this section.

No-Build Strategy

The No-Build Strategy will maintain the existing land uses. Over time congestion and delays will likely increase as traffic volumes grow on I-70 and other streets in the Study Area. The No-Build Strategy would not provide any long-term benefits.

Identified Preferred and Build Strategies

For the Identified Preferred and the Build Strategies, the short-term environmental uses would include:

- Temporary air, noise, and visual effects caused by the construction of improvements.
- Increased cost to motorists in time and fuel efficiency due to construction delays and detours.

- Disturbances to businesses, homes, and institutions because of construction.
- Conversion of open space and wetlands to transportation uses.
- Relocation of people and businesses, including expenses that would be incurred as compensation to these people and businesses.
- Reduction of property tax revenues resulting from the relocation of people, businesses, and other land uses.
- Cost of public funds to build roadway improvements.

Most of the long-term benefits from making improvements in the Study Area are addressed in **Chapter 1**. The long-term benefits of any of the Build Strategies include:

- Improvements in driver convenience, safety, travel time, and emergency response.
- Reduction of air pollution due to more efficient travel routes.
- Economic opportunities for local contractors in the region.

What are the Next Steps?

The next step in the environmental stage of this project is to conduct Second Tier studies. The Second Tier studies will refine the Identified Preferred Strategy and footprint to avoid or minimize impacts where possible. This may affect the short-term impacts and long-term tradeoffs.

3.22 Irreversible or Irretrievable Commitments of Resources

This section discusses the irreversible and irretrievable commitments of resources involved in the selection and construction of the No-Build and Build Strategies. Irreversible commitments of resources occur when you permanently convert something like wildlife habitat to a transportation project. You could try to convert it back later or replace it, but the habitat will never quite be the same. Irretrievable commitments of resources are the money, materials, and labor put into the project. Some of these resources, like materials, could possibly be recycled. Others would be gone forever.

How Will the Strategies Affect Irreversible and Irretrievable Resources?

No-Build Strategy

The irretrievable commitments of the No-Build Strategy include money, time, and personal hardship related to increasing congestion. As traffic delays and operational inefficiencies increase, air pollution, noise, and crashes would affect the local environment to a greater extent than exists today.

Identified Preferred and Build Strategies

Construction of the Identified Preferred Strategy or any of the Build Strategies involve the commitment of a range of natural, physical, and human resources, as well as public tax dollars. Land used for construction of any of the strategies is considered a permanent commitment during the time period the land is used for a highway facility. Land resources may be converted from natural, residential, and commercial areas to accommodate additional right of way needs. However, if a greater need arises for the land or if the highway facilities are no longer needed the land can conceivably be converted to another use. At present, there is no reason to believe such a conversion would ever occur.

Construction of any of the Build Strategies would utilize considerable amounts of fossil fuels, labor, and construction materials such as cement, stone, and asphalt. Such use of resources would be permanent although it would be possible to recycle these resources to a limited extent. Any construction would also require a substantial one-time expenditure of funds which are irretrievable. The commitment of these resources is based on the concept that the residents in the Study Area, the cities of Kansas City and Independence and the state of Missouri will benefit from these improvements.

3.23 Construction Impacts

This section discusses the potential effects of the strategies during construction. Actual construction activities often have additional short-term environmental effects that differ from the permanent environmental effects of the project.

What are the Construction Impacts of the No-Build Strategy?

MoDOT Construction

Over time, routine maintenance of the existing roadway would periodically impact travelers passing through the Study Area. These impacts would be temporary during the period when the maintenance would occur. The No-Build Strategy would create construction noise and vibration during the maintenance activities. In addition, the No-Build Strategy would likely require more frequent maintenance which often requires temporary lane closures resulting in increased traffic congestion.

What are the Construction Impacts of the Build Strategies?

MoDOT Construction

Construction of any of the Build Strategies would result in certain short-term environmental impacts associated with construction activities. These impacts are discussed in the following sections.

Noise

Noise from heavy construction equipment and haul trucks is a short-term but nonetheless disturbing impact upon sensitive land uses near the construction site. To minimize the adverse effects of the construction period, noise abatement measures should be considered as described in MoDOT's Engineering Policy Guide.

MoDOT Construction

Air Quality

Air quality would also be subjected to short-term impacts in the construction areas. Grading operations and the transportation and handling of materials, such as earth and aggregates, would result in the release of dust into the air.

Emissions from construction machinery would add to the motor vehicle classes of air pollution. If practical, the use of off road construction equipment that has been retrofitted with air pollution control devices would further reduce the emissions related to the project. During construction, the contractor would be responsible for adequate dust-control measures to avoid causing detriment to the safety, health, welfare, or comfort of the neighboring population or to avoid causing damage to any property, residence, or business.

MoDOT Work Zone

Contractors involved with the construction would be required to comply with MoDOT's Engineering Policy Guide. Specifically, adherence to the sections concerning fugitive dust, visible emissions, and permits would be required in the construction contracts in an effort to minimize the short-term effects upon air quality within the Study Area.

If practical, the project should consider limiting the use of heavy construction equipment on days with orange or red air quality alerts.

Water Quality

Temporary deterioration of surface water quality would result from grading, bridge construction, and other construction activities. Increased cloudiness and siltation, caused by erosion of exposed land and disturbance of the stream beds, would be the greatest construction impact on water quality. Runoff from disturbed areas may also increase the levels of metals, pesticides, and nutrients in the streams, depending on the land use and rainfall at the time of construction. Groundwater quality is not expected to be affected by construction operations.

To reduce impacts on water quality, contractors would be required to minimize the amount of area cleared during a given time period and would employ erosion control measures at all stages of construction. MoDOT's Engineering Policy Guide would be required as a contract document. Control measures would include silt fences, silt basins, temporary berms, dikes, drains, gravel, mulches, and grasses as appropriate. These measures would apply to haul roads and borrow sites as well as the permanent right of way.

What is Siltation?

Siltation is the build-up of a fine sediment of mud or clay that is deposited by moving water.

What is a Haul Road?

A haul road is a road used by construction vehicles.

What is a Borrow Site?

A borrow site is a staging area used during the construction process, which may be outside the project's footprint. Borrow sites can also provide fill dirt for a project.

Sanitary facilities would be required at the construction sites. Suitable storage areas and careful handling of potentially harmful materials would be required by the contractor.

Traffic Circulation

Traffic patterns and existing access points near the proposed improvements would be affected by construction activities. Construction schedules would be coordinated in advance to minimize the effects of such disruption. Suitable detours would be required to maintain traffic circulation, and areas under construction would be controlled to limit the extent of disruption to traffic flow. Contractors would be required to maintain access within a specified distance of any inhabited areas to assure continued fire protection and emergency services. Maintaining proper traffic circulation is particularly important to the surrounding businesses and freight carriers, who count on the reliability of the transportation system to conduct business and maintain profit.

Disposal of Surplus or Waste Material

Construction of the Identified Preferred Strategy or any of the Build Strategies will generate surplus and waste material including excess dirt, remnants of demolished structures, old pavement, and removed vegetation. Inert debris may be used for fill material as applicable at other locations of the project. MoDOT should consider the use of recycled materials, when possible, particularly those materials resulting from demolition of buildings and existing pavement. Surplus and waste material will be handled and disposed of according to standard provisions contained in MoDOT's Engineering Policy Guide and Section 260.210 RSMo of the Missouri Solid Waste Management Law and Regulations. The contractor shall obtain written permission for any disposal of material on private land and no temporary or permanent disposal of material will occur in any public or private wetland, water course, or floodplain without prior approval and permit by the appropriate regulatory agencies.

What is Inert Debris?

Inert debris is solid waste, such as brick, concrete, rock, gravel, and clean soil.

In the event that unexpected buried wastes are discovered, contractors will follow MoDOT's technical bulletin "Managing Solid Waste Encountered during Excavation Activities".

How Will The Analysis of Construction Impacts Be Refined in the Second Tier Studies?

The next step in the environmental process is to conduct Second Tier studies which will further evaluate and refine the construction impacts. The Second Tier studies will refine the Identified Preferred Strategy and footprint to avoid or minimize the identified construction impacts where possible.