CHAPTER III
Affected Environment and Environmental Consequences

A. Social and Economic Conditions

Section of Independent Utility 3 (SIU 3) is located between Rocheport and Boonville, in Boone and Cooper counties. These counties are largely rural with pockets of developed areas. Boone County's most developed area is the city of Columbia and its surrounding area, which lies outside of the SIU 3 corridor, to the east. Cooper County's most developed area is Boonville with a population of around 8,000 persons. Boonville is located in the northeastern portion of Cooper County near Interstate 70 (I-70) and Highway 40. Only a portion of Boonville is within the study area.

1. Demographics

a. Regional Population Trends

Boone County's population has increased from 1980 to 2000. However, the greatest increase was from 1990 to 2000 (Table III-1). Cooper County's population also increased from 1980 to 2000 with the greatest increase from 1990 to 2000.

Table III-1: State and County Population Trends

Area	1980	1990	2000	% Change 1990-2000
State of Missouri	4,916,766	5,117,073	5,595,211	9.3
Boone County	100,376	112,379	135,454	20.5
Cooper County	14,643	14,834	16,670	12.4

Source: U.S. Bureau of the Census and Office of Social and Economic Analysis, University of Missouri

Population trends within the study area were examined at the block group level, due to the small corridor. In general, the population trend within each block group in Cooper County is consistent with that of the overall county (Table III-2). However, within Boone County, Tract 18.03 Block Group 3 experienced a population decline, while Tract 18.05 Block Group 3 experienced a 16.7 percent increase in population. While the percentage change does give an indication of the trends in the area, the actual numerical change in population has been minimal. The block group with a population decrease experienced a total decrease of only 15 persons, while the two block groups that experienced population increases of over 20 percent, experienced actual increases of 231 persons and 247 persons.

Table III-2: Census Tract Location and Population Trends within the Study Area

County	Census Tract	Location	Block Group	Population		% Change 1990-2000
				1990	2000	
Boone	18.03	Rocheport, north of I-70	3	1,228	1,213	-1.2
	18.05	Rocheport, south of I-70	3	1,061	1,238	16.7
Cooper	9501	Boonville, south of I-70, east of Route 5 and Overton Bottoms	1	789	915	16.0
	9501	Boonville, south of I-70, east of Route 5 and Overton Bottoms	2	1,534	1,778	15.9
	9502	Boonville, north of I-70, east of Route 87	2	870	910	4.6
	9503	Boonville, north of I-70, west of Route B	1	1,150	1,381	20.1
	9503	Boonville, north of I-70, west of Route B	3	1,225	1,472	20.1
	9504	Boonville, north of I-70, between Routes B and 87	2	1,383	1,580	14.2
	9505	Boonville, south of I-70, west of Route B	3	1,159	1,227	5.9

Source: U.S. Bureau of the Census and Office of Social and Economic Analysis, University of Missouri

b. Housing Characteristics

Housing characteristics of the block groups within SIU 3 are provided in Table III-3. Occupancy rates exceed 90 percent in all of the block groups within SIU 3 and are consistent with the county and state occupancy rates. As indicated in the table, the majority of housing units in the corridor are owner occupied, with only Block Group 3 of Census Tract 9503 in Cooper County having an owner occupancy rate lower than 60 percent. The median value of the housing units in the corridor ranges from $62,500 for Census Tract 9502 in Cooper County to $149,500 for Census Tract 18.05 within Boone County.

Table III-3: Housing Characteristics, 2000

Area	Housing Units					Median Value
	Total	Occupied		Owner Occupied		
		Number	Percent	Number	Percent	
Boone County	56,678	53,094	94	30,529	54	$107,400
Census Tract 18.03 BG 3	509	468	92	401	79	$85,600
Census Tract 18.05 BG 3	493	464	94	410	83	$149,500
Cooper County	6,676	5,932	89	4,402	66	$74,200
Census Tract 9501 BG 1	382	348	91	291	76	$80,000
Census Tract 9501 BG 2	770	692	90	570	74	$88,400
Census Tract 9502 BG 2	380	356	94	263	69	$62,500
Census Tract 9503 BG 1	566	519	92	362	64	$67,500
Census Tract 9503 BG 3	700	627	90	398	57	$97,800
Census Tract 9504 BG 2	636	586	92	498	78	$91,100
Census Tract 9505 BG 3	503	458	91	394	78	$92,600
State of Missouri	2,442,017	2,194,594	90	1,542,310	63	$89,900

BG = Block Group

Source: U.S. Bureau of the Census and Office of Social and Economic Analysis, University of Missouri.

c. Age Characteristics

Both Boone and Cooper counties have variations in age characteristics between each other and with the state. As is indicated in Table III-4, the population aged 65 and older in Boone County is

significantly lower than that of either Cooper County or the state. The presence of the University of Missouri in Boone County and its high student population, likely skews this number. By comparison, the percentage of the population aged 65 and older in Cooper County is approximately five percentage points greater than the state and almost 10 percentage points greater than that in Boone County.

Table III-4: Age Characteristics, 2000

Area	Year	Median Age	17 & Under (%)	65 and Older (%)
Boone County	1990	27.8	22.6	8.4
	2000	29.5	22.8	8.6
Cooper County	1990	34.1	24.4	15.2
	2000	35.2	22.8	18.1
State of Missouri	1990	33.5	25.6	14.0
	2000	36.1	25.5	13.5
Source: U.S. Census Bureau, Census 2000				

d. Racial Characteristics

In terms of racial characteristics, the study area can be described as predominantly white (Table III-5). The only block group with a percentage of minorities greater than the county it is within is Census Tract 9502, Block Group 2 in Cooper County, where minorities comprise 18.3 percent of the population.

Table III-5: Racial and Ethnic Characteristics 2000

Area	Census Tract	Block Group	White	Black	Hispanic*	American Indian	Asian/Pacific Islander	Other Race or Two or More Races.	% Minority
State of Missouri			4,746,952	622,087	116,373	26,200	63,500	45,524	13.8
Boone County			116,335	11,351	2,413	663	3,899	719	12.5
	18.03	3	1,088	59	5	0	50	0	9.1
	18.05	3	1,228	10	72	0	0	0	0.8
Cooper County			14,774	1,605	143	40	36	43	10.4
	9501	1	890	12	0	6	0	0	2.0
	9501	2	1,696	2	28	11	6	22	2.4
	9502	2	733	164	13	0	0	0	18.3
	9503	1	1,285	81	0	0	0	0	5.9
	9503	3	1,318	145	3	0	0	4	10.2
	9504	2	1,521	52	0	0	0	7	3.7
	9505	3	1,221	5	5	0	0	0	0.4

** Hispanic is technically an ethnic group, but not a race, therefore not included in minority statistics.*

Source: U.S. Department of Commerce, Bureau of the Census, Census 2000

e. Economic and Labor Force Characteristics

Personal income is an indicator of the economic condition of an area (Table III-6). Within the project area, four block groups in Cooper County have a median household income less than that of the state and all of the block groups have a per capita income less than the state. Within Boone County one block group exceeds the state per capita income, while the other is only

slightly less than that of the state. Poverty levels generally track income levels, with two block groups in Cooper County exceeding the state levels and both block groups in Boone County being below that of the state.

Table III-6: Income Characteristics

Area	Per Capita Income	Median Household Income	Percent Persons Below Poverty Level*
Boone County	$19,844	$37,485	14.5
Tract 18.03 BG 3	$19,043	$45,609	3.9
Tract 18.05 BG 3	$23,305	$50,694	6.2
Cooper County	$15,648	$35,313	10.7
Tract 9501 BG 1	$17,476	$44,135	8.2
Tract 9501 BG 2	$16,428	$36,809	6.9
Tract 9502 BG 2	$13,701	$34,336	15.5
Tract 9503 BG 1	$17,084	$35,833	13.1
Tract 9503 BG 3	$18,245	$36,319	7.1
Tract 9504 BG 2	$18,815	$43,977	10.8
Tract 9505 BG 3	$16,495	$39,405	8.0
State of Missouri	$19,936	$37,934	11.7

** The U.S. Census Bureau uses factors such as family size, income and the number of children to determine poverty thresholds for families with a yearly income below this poverty threshold, all family members are considered to be living below the poverty level. For example, the 1999 poverty threshold for a three-person family with one member below the age of 18 was $13,410.00.*

Source: U.S. Department of Commerce, Bureau of the Census, Census 2000

Businesses located along existing I-70 are primarily retail and service-oriented businesses such as gas stations, convenience stores, hotels and restaurants. Table III-7 identifies the assessed value by land use classification for taxing districts that are included in the study area.

Table III-7: Assessed Value of Real Estate by Select Taxing District, 2002

District	Residential	Agriculture	Utility/ Industrial	Total
Boone County Columbia 93 School District	$705,618,687	$11,761,428	$290,086,192	$1,007,466,307
Cooper County Booneville R-1 School District	$40,876,310	$2,566,980	$1,950,510	$71,039,370

Source: County Assessors' Offices in Boone County and Cooper County, 2003

Although there are no large employment generators within the project area, concentrations of service-oriented businesses are located in Rocheport and Boonville. These businesses provide some employment; however, the largest employers within the region are in a portion of Boonville that is outside of the study area and within Columbia. Table III-8 presents data on employment by industry within the region. Columbia serves as an employment, retail and service center for Central Missouri. The government, retail, healthcare and accommodation and food service sectors provide the greatest number of jobs in the region. This employment distribution reflects the regional market associated with Columbia, coupled with the employment associated with the University of Missouri and ancillary services.

Table III-8: Employment by Job Type, 2001

Sector	Number of Employed	
	Boone County	Cooper County
Total	102,127	8,655
Forestry, Fishing, Hunting, Agricultural Support	133	(D)
Mining	192	(L)
Construction	5,141	496
Manufacturing	5,721	946
Utilities	(D)	(D)
Wholesale Trade	2,844	312
Retail Trade	11,448	972
Finance and Insurance	4,013	248
Services (except Public Admin)	4,345	513
Transportation and Warehousing	(D)	(D)
Real Estate	2,904	223
Information	1,763	86
Prof., Science and Tech. Services	3,799	174
Healthcare and Social Assistance	8,941	(D)
Arts, Entertainment and Recreation	1,513	(D)
Accommodation and Food Services	7,027	(D)
Mgt. of Cos. and Enterprises	2,440	(D)
Admin, Support, Waste Mgt. and Remedial Services	3,853	(D)
Educational Services	1,443	(D)
Government and Government Enterprises	31,266	1,315

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the total.
(L) Less than 10 jobs, but the estimates for this item are included in the total.

Source: U.S. Department of Commerce, Bureau of Economic Analysis

f. Summary of Demographic Conditions

The rate of population growth within Boone and Cooper counties has exceeded that of the state of Missouri from 1990 to 2000. The percent increase in Boone County is over twice that of the state. The rate of change within the Census block groups that include the corridor has been more varied than that of the counties. These variations are due in part to the fact that the block groups have much smaller populations and relatively small numerical changes are reflected as 10 to 20 percent changes. Over 90 percent of the housing units in the corridor are occupied, with the majority being owner occupied. The majority of the residents are white, with only one block group having a minority population that exceeds the overall percent for the state. Income characteristics for the area are similar to those of the state. The vast majority of jobs are located in Boone County, with the primary employment sectors being government, retail, healthcare and accommodation and food service.

2. Community Facilities and Characteristics

a. Parks, Recreation and Open Space

No recreational facilities within the study area were recipients of Section 6(f) Land and Water Conservation Funds. Similarly, no facilities were the recipient of Pittman-Robertson Funds.

Cooper County Fairgrounds

The Cooper County Fairgrounds owned by the Cooper County Agricultural and Mechanical Association is a 36–acre (14.6-hectare) site located south of I-70 approximately 1.5 miles (2.4 kilometers) west of Route 5 at the western terminus of SIU 3 (see Figure III-1, Sheet 1). The fairgrounds are privately owned by a non-profit youth organization. The site is used for various public and private recreational events (e.g., weddings, family reunions, flea markets and a yearly fair). No recreational features (i.e., playgrounds, picnic facilities, etc.) occur on the site.

Proposed improvements to I-70 would encroach upon the property but would not impact any buildings or structures on the site. Approximately four acres (1.6 hectare) (or approximately 11 percent) of the site would be impacted by the proposed improvements to I-70. No impacts to access are anticipated. The Cooper County Fairgrounds are not considered to be a Section 4(f) resource because it is not located on public land (see letter from Federal Highway Administration [FHWA] dated Feb. 11, 2003 in Appendix D). Additionally, it is not designed for recreational use and it does not contain recreational features located on-site.

Katy Trail State Park

The Katy Trail State Park is a hiking and biking trail that traverses the state of Missouri for approximately 225 miles (362.1 kilometers) from St. Charles to Clinton. The Katy Trail was built on the former corridor of the Missouri-Kansas-Texas Railroad (known as the Katy). The trail is still being developed from St. Charles to Machens. The entire trail is part of the American Discovery Trail and has been designated as a Millennium Legacy Trail. The segment between St. Charles and Boonville is part of the Lewis and Clark National Historic Trail (Missouri Department of Natural Resources [MDNR], 2003).

The proposed widening and realignment of I-70 would cross the Katy Trail in two locations: approximately 1.5 miles (2.4 kilometers) west of Route 5 in Cooper County and approximately 0.5 mile (0.8 kilometer) west of Route BB in Boone County (east of Rocheport) (see Figure III-1, Sheets 1 and 5). The Katy Trail is a publicly owned recreational facility and qualifies as a Section 4(f) resource. Potential effects to the Katy Trail State Park are provided in detail in Chapter V, Draft Section 4(f) Evaluation and are summarized below.

The Katy Trail is a linear recreational resource that cannot be avoided by the proposed project. In the western portion of the study area, a bridge originally built in 1958 carries the Katy Trail over I-70. At this location, the recommended preferred alternative includes widening the median and adding an additional lane of traffic in each direction and would require approximately 1.08 acre (0.44 hectare) of the Katy Trail State Park. Given the fact that a new bridge would need to be constructed to span the widened roadway, a temporary detour of trail traffic is likely necessary during the time of construction. Proposed improvements to I-70 in the western portion of the study area would entail the removal and replacement of the old bridge. As a result, a short segment of the Katy Trail would be closed to public use while I-70 is under construction. As a mitigative measure, Katy Trail traffic would be redirected along the north outer road (Old Highway 40), Dunkles Drive and Prairie Lick Road to provide for continuous access and use during the construction phase. This mitigative measure would ensure that the Katy Trail would not be closed to pedestrian and bicycle traffic for any period of time (see Chapter V). Coordination with MDNR will result in an intergovernmental agency agreement between Missouri Department of Transportation (MoDOT) and MDNR that addresses project construction under and over the Katy Trail and details mitigation measures to be followed to minimize any disruptions in the use of the trail.

In the eastern portion of the study area, I-70 crosses over the Katy Trail at the base at Manitou Bluffs. At this location, the existing bridge is proposed to be used as the westbound lanes for the recommended preferred alternative. A companion bridge is proposed south of the existing bridge for the eastbound lanes. The new bridge piers for the companion bridge would not be placed on the Katy Trail State Park. The recommended preferred alternative would not require any property from the Katy Trail State Park at this location. The continuity of the Katy Trail would be preserved by maintaining the existing trail underneath the companion bridge. The manner in which trail users cross I-70 (underneath the bridge) would remain the same. For safety reasons, the trail could be temporarily closed for short periods of time during construction of the companion bridge. Either a roofed structure over the trail or a safety net could be installed to protect the trail users and minimize temporary closures.

Rest Areas

There are two rest areas located on either side of I-70 approximately one mile (1.6 kilometer) east of Route B. The rest areas consist of a rest stop building, three picnic pavilions, a rest stop kiosk, a vending machine structure and a sewage lagoon on the south side.

As discussed in the Rest Area Site Location Study in Section II.D.3, the preferred rest area locations are an expansion of the existing rest area sites. The rest area on the north would be impacted during construction of the new rest area and may need to be temporarily closed during the expansion. The proposed expansion requires the conversion of approximately 8.8 acres (3.6 hectares) of land that is primarily agricultural; however, the proposed layout minimizes environmental impacts. The rest area to the south will be displaced by the proposed improvements. Relocation of the south rest area entailed the consideration of several factors related to traffic (distance from interchange, merge distance, etc.), avoidance of environmental or socioeconomic impacts and proximity of existing utilities to serve the facility. Figure III-1 (Sheet 2) illustrates the location of a relocated rest area that is of sufficient size to accommodate future needs. In total, the proposed relocated rest area will require the conversion of approximately 7.5 acres (3.1 hectares) of land that is primarily agricultural. As a result, the proposed layout minimizes environmental impacts and maintenance service of the local road system (i.e., Route U). In addition, the proposed eastbound and westbound rest areas are in close proximity to city utilities (electric, water, sanitary); therefore the existing lagoon system can be removed.

Overton Bottoms Conservation Area

Overton Bottoms Conservation Area is a 3,662-acre (1,482.0-hectare) tract of land in the Missouri River floodplain located south of I-70 along the west bank of the Missouri River. This tract of land is leased to Missouri Department of Conservation (MDC) by the U.S. Army Corps of Engineers (USACE) (see Figure III-1, Sheet 4). As a result of coordination between MoDOT, FHWA, USACE and MDC (see letter from USACE dated Jan. 6, 2000 in Appendix D), a 300-foot (91.4-meter) reserved space has been established with both the Overton Bottoms Conservation Area and the Big Muddy Refuge along existing I-70 for potential future roadway expansion. The Overton Bottoms Conservation Area was acquired in order to reconnect the Missouri River to its floodplain and to restore fish and wildlife riverine habitat. Primary uses include fishing, bird watching and hunting. The USACE acquired the land in 1998 from private owners after the area experienced extensive flooding in 1993 and 1995. The area is considered by the USACE as mitigation for wetland and habitat loss due to channelization and bank stabilization along the river as the result of many projects over the course of several decades (USACE, 2003). Notable features include an extensive scour hole (approximately 40 acres [16.2 hectares]) just west of the Missouri River located underneath the interstate that extends both north and south of the highway. Future developments are expected to include a public fishing access area to the scour

hole consisting of an entrance road, a small parking lot and a gravel boat ramp. However, no specific location design plans for this access area have been developed to date.

The USACE has recently established a setback levee system that extends from I-70 approximately four miles (6.4 kilometers) to the southeast. The levees next to the river will be breached so that floodwaters can expand into the floodplain 0.38 to 0.5 mile (0.6 to 0.8 kilometer) to create backwater areas to restore and enhance wetlands. The area is available for passive day use only. There are no developed trails or interpretive features; no picnicking is allowed on site and primitive camping is allowed in designated areas only. Portions of the area are still used for agricultural purposes.

Because the Overton Bottoms Conservation Area is located entirely to the south of existing I-70, no impacts to the conservation area would occur with the North Alternative. In contrast, the recommended preferred alternative would impact approximately 14.9 acres (six hectares) (or less than one percent) of the Overton Bottoms Conservation Area. The areas east of the levee are primarily wooded, whereas areas west of the levee consist primarily of herbaceous species. Access to the site would not be impacted by the proposed improvements to I-70. From a recreational standpoint, there are no features or facilities within the Overton Bottoms Conservation Area that would qualify this area as a Section 4(f) resource. The Federal Highway Administration also concurred as to the non-applicability of Section 4(f) to the Overton Bottoms Conservation Area.

Compensation for impacts to these lands may include the acquisition of adjacent lands and their subsequent title transfer to MDC. Additionally, compensation for impacts may include the dedication of funds for habitat enhancements (i.e., wetland establishment and tree planting) and ecosystem restoration.

Big Muddy National Fish and Wildlife Refuge

The Big Muddy Refuge extends along the Missouri River from Kansas City to St. Louis and contains 8,145 acres (3,299 hectares) (see Figure III-1, Sheet 4). The portion of the Big Muddy Refuge that is located in the study area is situated along the western bank of the Missouri River north of I-70. The Big Muddy Refuge was established on Sept. 9, 1994 by the U.S. Fish and Wildlife Service (USFWS) for the development, advancement, management, conservation and protection of fish and wildlife habitats and to provide compatible public uses. Additional uses include hiking and wildlife-dependent recreational uses such as fishing, hunting and bird watching. The site is not designed to support more intensive development such as the creation of trails, levees, dikes or other water control structures.

A portion of the Big Muddy Refuge is owned by the USACE and a portion is owned by the USFWS; the entire area is managed as one unit by the USFWS. As a result of coordination between MoDOT, FHWA, USACE and MDC, a 300-foot (91-meter) wide space has been reserved along existing I-70 to accommodate potential future roadway improvements (see letter from USACE dated Jan. 6, 2000 in Appendix D).

The North Alternative would impact approximately 12.5 acres (5.1 hectares) of the refuge. By comparison, the recommended preferred alternative would be located to the south of existing I-70 and would not impact the Big Muddy Refuge. Access to the site will remain unchanged with both the North and South alternatives.

Taylor's Landing

Taylor's Landing is a 9.5-acre (3.8-hectare) parcel owned by MDC which is located immediately north of I-70 and west of the Missouri River (see Figure III-1, Sheet 5). Taylor's Landing is used for bank fishing and it provides a boat launch for access to the river. Access to the boat ramp was severely restricted during the last two major flood events. Consequently, a new entrance road for boat access to the Missouri River was constructed. No hunting is allowed on this land.

Neither the North Alternative or the recommended preferred alternative (South Alternative) would result in impacts to Taylor's Landing or its access.

Other Recreational Facilities

Boonville High School (Figure III-1, Sheet 1) has recreational/athletic facilities that are available for use by the public during the summer months and in the evenings and weekends during the school year. These facilities consist of a track and field northeast of the school, four tennis courts, one practice baseball field and two football fields south of the school. Additionally, the Empyreal Golf Course (Figure III-1, Sheet 2) is located along the proposed north outer road, north of the Route 87 interchange.

The recommended preferred alternative, South Alternative, would not result in any impacts to Boonville High School or its associated facilities and access to the site will likewise not be affected. Minor land acquisition impacts may occur to the Empyreal Golf Course as a result of the construction of the north outer road. No impacts to the golf course operation or access would result. The Empyreal Golf Course is a privately owned facility and is not Section 4(f) eligible.

b. Pedestrian and Bicycle Facilities

An inventory and analysis of designated bicycle routes and pedestrian walkways was conducted within the study area. The Katy Trail is the only bicycle and pedestrian walkway located within the study area. For a description of the Katy Trail (see Chapter III.A.2.a and Chapter V).

Though not a primary purpose, the provision of continuous frontage roads could provide a continuous bicycle facility across the state. Where reasonable, the shoulder along the new frontage road construction could serve as a one-way bicycle facility.

c. Churches

There are numerous churches and church facilities located in the cities of Boonville and Rocheport and surrounding areas, outside of the study area. However, only three are located within the immediate project vicinity. Lighthouse Baptist Church of Boonville is located south of I-70 along the east side of Route B in the interchange area. Lighthouse Bible Church of Rocheport and Yahweh's Assembly in Messiah church office are both located south of I-70 at the Route BB interchange. Proposed improvements to the eastbound off-ramp would likely impact the church office.

Proposed improvements would result in the displacement of the Lighthouse Baptist Church. Right of way expansion would also require the acquisition of undeveloped church camp lands owned by the Yahweh's Assembly in Messiah within the Manitou Bluffs area. No other impacts to churches are anticipated.

d. Schools

There are two school districts that serve the study area: one in Cooper County and the other in Boone County. No schools are located in the immediate study area; however, Boonville High School is located in the vicinity of the study area. Boonville High School is located on a five-acre (two-hectare) plot of land in the northeast corner of the I-70 and Route 5 interchange, just off Route 5 (Figure III-1, Sheet 1).

The planned improvements would not impact Boonville High School or any other schools in the study area.

e. Cemeteries

The Hail Ridge Cemetery is located north of existing I-70 and west of Route 87. There are approximately 15 to 20 graves located on site. Although there are planned improvements to the outer roads at the I-70/Route 87 interchange, these improvements would not impact the cemetery. The Clayton Cemetery is located approximately 1.5 mile (2.4 kilometers) east of the 98-179 and I-70 interchange, north of existing I-70. This cemetery is located outside the study area and would not be impacted by the widening and realignment of I-70. In addition, a single headstone was found south of I-70 in the Manitou Bluffs area on lands owned by the Yahweh's Assembly in Messiah church camp. The headstone within the Manitou Bluffs is south of the proposed limits of construction of the South Alternative and will not be impacted by either the north or the south alternative.

There would be no impacts to cemeteries as a result of the planned improvements to I-70.

f. Emergency Services

Police

Police protection for the city of Boonville is provided by the Boonville Police Department. Areas outside of Boonville are served by the Cooper County Sheriff's Department. Both the Boonville Police Department and the Cooper County Sheriff's Department are located in Boonville. Incidents that take place along I-70 would be responded to by the Missouri State Highway Patrol.

In Boone County, the Boone County Sheriff's Department provides service to Rocheport and the entire portion of the study area that is located within Boone County. The Boone County Sheriff's Department is located in Columbia, Missouri.

There would be no adverse impacts to police or emergency services as a result of the planned improvements to I-70. However, the proposed improvements would provide for a more efficient mainline facility that would improve response times. Additionally, a continuous outer road system would also enhance circulation and the capacity for incident management.

Fire Protection

Fire protection for Boone County is provided by the Boone County Fire Protection District. There is a fire station located in Rocheport.

Fire protection for Cooper County is provided by four stations located within the Cooper County Fire Protection District. Three Cooper County fire stations are located within one mile (1.6 kilometer) of existing I-70. A volunteer fire station is located in the southwest corner of the I-70/Route 87 interchange and may potentially be affected by planned improvements at that

interchange. Fire protection for the city of Boonville is provided by the Boonville City Fire Department and the station is located in the city of Boonville.

There would be no adverse impacts to fire departments or services as a result of the planned improvements to I-70. However, the proposed improvements would provide for improved safety due to greater ramp length, greater access management and a more efficient mainline facility that would improve response times. Greater median widths would also allow for enhanced safety of response vehicles at median breaks. Additionally, a continuous outer road system would also enhance circulation and the capacity for incident management.

Hospitals

The largest metropolitan area in the vicinity of the study area is the city of Columbia, which is located approximately 15 miles (24 kilometers) east of the study area. University Hospital, Boone Hospital Center and Columbia Regional Hospital are located in Columbia and serve Rocheport and the surrounding area in Boone County. Cooper County Memorial Hospital is located in Boonville and serves Boonville and the surrounding area in Cooper County.

There would be no impacts to hospitals as a result of the planned improvements to I-70. However, improved responsiveness of emergency medical technicians and ambulance services would enhance the ability of these facilities to provide needed and timely emergency health care.

3. Residential and Business Relocations

a. Residential Impacts

The recommended preferred alternative would require the relocation and/or widening of the existing highway. Additional right of way needed for these improvements would necessitate the relocation of some existing households, businesses and other facilities along the corridor. Buildings located within the right of way for the recommended preferred alternative were considered to be displacements. The number of residences and individuals that would be displaced, the number of properties to be acquired and the types of property acquisitions for the recommended preferred alternative are presented in Table III-9. Displacements are shown within the proposed right of way on Figure III-2. Property acquisition would include the purchase of vacant land, farmland, residential land, homes, businesses and land associated with public uses.

Table III-9: Displacements, Property Acquisitions and Costs Associated with SIU 3 Improvements

Alternative/Segment	Recommended Preferred Alternative	North Missouri River Alternative	South Missouri River Alternative
Number of Homes/Residents*	10/25	0/0	0/0
Number of Businesses	25	7	7
Number of Public Buildings (MoDOT only)	3	0	0
Total Acres	580	58	76
Number of Acquisitions Total/Partial	23/173	7/29	7/21
Land Cost	$14,745,000	$1,332,000	$1,292,000
Structure Cost†	$6,600,000	$2,250,000	$1,750,000
Relocation Cost	$1,612,000	$562,000	$438,000
Total Right of Way Costs**	$35,248,000	$5,492,000	$4,892,000

* *The number of homes that will require total relocation (acquisition) and the number of residents being relocated based on an average household size of 2.5.*
† *The cost of purchasing any impacted structures.*
** *Not a summation of the previous three costs.*

Source: Zambrana, 2004; MACTEC, 2004

b. Neighborhood Impacts

With the exception of the Timber Lake subdivision in the far western portion of the study area north of I-70, there are no neighborhoods in the study area. The study area is characterized by predominantly agricultural land with occasional houses and businesses. Although the recommended preferred alternative may result in the displacement of approximately 10 residences, these residences are not located together in a subdivision or neighborhood.

No impacts to neighborhoods would result from the proposed widening and realignment of I-70.

c. Business Impacts

Potentially displaced businesses associated with the recommended preferred alternative are shown in Table III-10. For business owners that choose to be relocated, adequate vacant land area exists throughout the project area. Businesses may choose to locate outside the project area, elsewhere along the corridor, or not to reopen. Reestablishment of commercial uses would most likely occur on vacant land along the highway, as market conditions warrant.

Table III-10: Business Displacements Resulting from the Recommended Preferred Alternative

Business Name/Type	County	Location
Antiques Store/Retail (vacant)	Boone	Interchange at Route BB
Courtyard Wine Garden/Retail	Boone	Interchange at Route BB
Hoops Unlimited/Retail	Boone	Interchange at Route BB
Vacant Putt Putt Business	Boone	Interchange at Route BB
Vacant Gas Station	Boone	Interchange at Route BB
Vacant Commercial	Boone	Interchange at Route BB
River City Antiques/Retail	Boone	Interchange at Route BB
Conoco/Service	Cooper	Interchange at Route 87
JD Auto Sales	Cooper	Interchange at Route 87
Jim's Auto Body/Service	Cooper	Route B
Tractor Sales and Service	Cooper	Route 179
Mo River Tire Co./Retail	Cooper	Route 179
Morrison Repair/Service	Cooper	East of Interchange at Route B
Passion's XXX/Retail	Cooper	Interchange at Route B
Phillips 66/Retail, Service	Cooper	Interchange at Route 179
QT Inn/Lodging	Cooper	Interchange at Route B
Roy Cary Sales/Retail	Cooper	Interchange at Route B
Warehouse/Commercial	Cooper	Interchange at Route 87
Warehouse/Commercial	Cooper	Interchange at Route 87
Warehouse (under construction)	Cooper	East of Interchange at Route B
Strip Mall (Mr. Goodcents)/Retail	Cooper	Interchange at Route B
Storage/Commercial	Cooper	Interchange at Route 179
Calvert's DJ Recycling	Cooper	West of Interchange at Route B
Vacant Office Building	Cooper	Interchange at Route 179
Business in trailer	Cooper	West of Interchange at Route 5
Source: Zambrana Engineering, Inc., 2004		

In addition to land acquisition, the project may require temporary or permanent easements for construction or utility location. Property acquisitions include purchases of entire parcels as well as

partial property purchases. Parcel sizes along the recommended preferred alternative vary in size from small residential lots to large undeveloped or agricultural tracts. In some cases, existing structures are set back from the existing right of way by a large distance and would not necessitate building acquisition for the proposed right of way. In many of these situations, only a portion of land (or partial acquisition), would be required. The remaining useable land would be retained by the property owner.

In some cases, after required right of way is purchased from a parcel, the remaining property may not be feasible for development due to lack of access or deficient size. A parcel of the real property in which the owner is left with an interest after the partial acquisition of the property and which the acquiring agency has determined to have little or no value or utility to the property owner, is called an uneconomic remnant. If acquisition of only a portion of property leaves the owner with a remnant, MoDOT will determine whether the remnant maintains utility or value to the present owner. If MoDOT determines that the portion of property is an uneconomic remnant, they would offer to acquire the remnant along with the portion of property needed for the project. The owner would retain the choice to sell the uneconomic remnant.

d. Mitigation for Residential and Business Relocations

The Missouri Department of Transportation's right of way acquisition and relocation program is carried out in compliance with the Uniform Relocation Assistance and Real Properties Acquisition Policies Act of 1970 (Uniform Act), as amended in 1987 (42 United States Code 4601). The Uniform Act, as well as Missouri law, requires that just compensation be paid to the owners of private property taken for public use. An appraisal of fair market value is the basis for determining just compensation to be offered the owner for the property to be acquired. The Uniform Act defines an appraisal as a written statement independently and impartially prepared by a qualified appraiser setting forth an opinion of defined value of an adequately described property as of a specific date, supported by the presentation and analysis of relevant market information.

The Missouri Department of Transportation's right of way acquisition and relocation program is designed to provide uniform and equitable treatment for those persons who are displaced from their residences, businesses or farms. The program is carried out without discrimination and in compliance with Title VI, the President's Executive Order on Environmental Justice, Limited English Proficiency and the Americans with Disabilities Act. It provides advisory assistance to owners and tenants who are displaced and relocation assistance payments designed to compensate displaced persons for costs which have been imposed on them by a MoDOT highway project. Relocation assistance under this program is made available to all affected parties without discrimination.

Any displaced owner-occupant or tenant (of a dwelling) who qualifies as a displaced person is entitled to payment of his or her actual moving and related expenses, as MoDOT determines to be reasonable and necessary. A displaced owner-occupant who has occupied an affected dwelling for at least 180 days is also eligible to receive up to $22,500 for a replacement housing payment, which includes the amount by which the cost of a replacement dwelling exceeds the acquisition cost of the affected dwelling, increased interest costs and incidental costs. A displaced owner-occupant who has occupied an affected dwelling for at least 90 days but less than 180 days or a tenant who has occupied an affected dwelling for at least 90 days is entitled to a payment not to exceed $5,250 for either a rental or down payment assistance.

Any displaced business, farm operation or nonprofit organization which qualifies as a displaced person is entitled to payment of actual moving and related expenses, as MoDOT determines to be reasonable and necessary. In addition, a business, farm or nonprofit organization may be eligible to receive a payment, not to exceed $10,000, for expenses incurred in reestablishing the business, farm operation or nonprofit organization at a replacement site.

A displaced business may be eligible to choose to receive a fixed payment in lieu of the payments for actual moving and related expenses and actual and reasonable reestablishment expenses. The payment amount for this entitlement alternative is based on the average net earnings of the business. This fixed payment amount cannot be less than $1,000 or more than $20,000.

The Uniform Act requires that comparable, decent, safe and sanitary replacement housing within a person's financial means be made available before the person may be displaced. Should this project include persons who cannot readily be moved using the regular relocation program benefits and procedures (i.e., when there is a unique housing need or when the cost of available comparable housing would result in payments in excess of the $22,500 or $5,250 statutory payment limits), MoDOT's relocation policy commits to utilizing housing of last resort. Housing of last resort involves the use of payments in excess of statutory maximums or the use of other unusual methods of providing comparable housing. The Missouri Department of Transportation would utilize housing of last resort as needed on a case-by-case basis.

The Missouri Department of Transportation relocation program is designed to ease the property transition for the property owner or renter who is displaced. The Missouri Department of Transportation's relocation agents work closely with relocates, as needed or requested, and provide the needed guidance to relocate any eligible party. Housing of last resort would be provided as needed but the local residential and commercial property market is expected to more than absorb the displacements associated with this project.

4. Community Cohesion/Accessibility

The proposed improvements to I-70 and the frontage roads would not substantially disrupt current land use patterns or community components, cause a considerable change in communities, or result in segmentation. Although some residential and business displacements would result from the recommended preferred alternative, no neighborhood segmentation or isolation of communities would occur due to the proposed improvements.

Existing travel patterns would continue along I-70, although some of the anticipated future congestion would be greatly alleviated. Changes in travel patterns would occur along the proposed frontage roads as there is currently no access in those areas where a frontage road does not currently exist. The proposed improvements would not impose barriers among neighborhoods, separate residents from community facilities or services, or adversely affect traffic patterns within the community. In addition, extensive field work was performed to identify land use and other characteristics of the socioeconomic environment. No minority or low income populations were observed during field activities.

5. Environmental Justice

A comprehensive public involvement program was implemented to allow for citizen participation throughout the location study. Public information meetings were held to gather feedback from the community. Notification of the public meetings was made through news releases, advertisements in the local newspapers and flyers in the project area. Other communication tools were used such as newsletters, meetings with elected officials, neighborhood groups and news articles. Details of this public interaction are included in Chapter IV. Throughout this extensive public involvement process, no concentration of minority populations was observed by project team members. In addition, extensive field work was performed to identify land use and other characteristics of the socioeconomic environment. No minority or low income populations were observed during field activities.

The 2000 population in the block groups that encompass the proposed project area, as shown in Chapter III.A.1.d, indicate a total minority population of less than 10 percent. In most of these block groups, the minority percentage is much less than the overall percentage for both Cooper and Boone counties. The percentage of persons below poverty level in the project area is comparable to the state, although higher in some block groups. Census data, public involvement activities and field work did not indicate a concentration of low income or minority persons in the area to be directly impacted. Furthermore, the residential impacts associated with the recommended preferred alternative are not concentrated in one area, but spread out over the 16-mile (25.7-kilometer) length of the project. Given the lack of concentration and the overall consistency of socioeconomic characteristics within the two-county area, no disproportionate adverse impacts to minority and/or low-income populations as defined by Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority and Low-Income Populations) and FHWA Order 6640.23 would occur.

6. Employment

Changes in employment impacts are measured by jobs lost and jobs generated by the recommended preferred alternative. Under the recommended preferred alternative, no major employers in the corridor are displaced and it is likely that job losses would be offset by businesses relocating elsewhere in the study area. Table III-11 presents the employer and the approximate number of employees that are affected by the recommended preferred alternative.

Table III-11: Estimated Employment Impacts

Business Name/Type	Number of Employees (estimated)	Business Name/Type	Number of Employees (estimated)
Antiques Store/Retail	5-10	Passion's XXX/Retail	<5
Courtyard Wine Garden	5-10	Phillips 66/Retail, Service	5-10
Hoops Unlimited/Retail	<5	QT Inn	<5
River City Antiques/Retail	<5	Roy Cary Sales/Service	<5
Conoco/Service	5-10	Warehouse/Commercial	5-10
JD Auto Sales/Retail	<5	Warehouse/Commercial	5-10
Jim's Auto Body/Service	<5	Strip Mall (Mr. Goodcents)/Retail	5-10
Tractor Sales and Service	<5	Storage/Commercial	<5
Mo River Tire Co./Retail	<5	Calvert's DJ Recycling	5-10
Morrison Repair/Service	<5		
Source: Zambrana Engineering, Inc., 2004			

Employment would occur during the construction of the recommended preferred alternative. Employment generated by the construction of the project is based on construction cost estimates.

While construction employment would be a direct impact from construction of the proposed facility, construction employment and payroll would also generate induced impacts as a result of payroll dollars being spent.

No changes in employment levels within the study area would occur as a result of the No-Build Alternative as this alternative would not result in construction phase employment gains. Similarly, the No-Build Alternative would not result in induced employment as a result of increased payrolls of construction workers.

7. Tax Impacts

The acquisition of land and improvements for right of way associated with the recommended preferred alternative would result in the direct loss of property that is subject to property taxes by local taxing districts. The reduction of assessed valuation by the recommended preferred alternative is shown in Table III-12.

Table III-12: Potential Reduction of Assessed Value Associated with the Recommended Preferred Alternative

Taxing District	Total 2002 Assessed Value	Estimated Reduction of Assessed Value	Percentage Reduction of Assessed Value
Boone County	$1,561,715,763	$897,400	0.06%
Columbia 93 School District	$1,007,466,307	$384,523	0.04%
Cooper County	$115,454,163	$3,464,170	3.0%
Boonville R-1 SD	$71,039,370	$3,464,170	4.9%

Source: Zambrana Engineering, Inc., 2004 and County Assessors' offices in Boone County and Cooper County 2004

Reduction in assessed valuation would be minimal in each county. Tax revenue loss in the study area as a result of converting taxable land into tax exempt is expected to be short-term as most displaced residents and businesses would likely relocate within the county or region.

No impacts to the tax base would occur with the No-Build Alternative as it does not convert any taxable lands to tax-exempt status.

B. Land Use and Zoning

1. Existing Land Use

The project is located in Central Missouri where regional land uses generally consist of rural residential, agricultural and concentrated urban-type land use patterns located in the incorporated cities and towns.

A field inventory of existing land uses outside of the existing MoDOT right of way was conducted as part of the location study and environmental documentation processes in 2003. This inventory utilized aerial photography and a windshield survey. Land uses are shown in Figure III-3. Undeveloped land includes land that is vacant, forested or is used for agricultural production. In the study area most land classified as agricultural is actively farmed for crops. Public lands within the study area include the Katy Trail State Park, the Big Muddy Refuge and the Overton Bottoms Conservation Area as is discussed in Chapter III.A.2.a.

Most development within the study area has taken place within incorporated areas where retail, educational and medical services are located.

2. Land Use Planning

Comprehensive land use plans are adopted by communities to direct growth and ensure its diversity, efficiency and balance of land uses. Boone County and Boonville have adopted land use planning or zoning regulations. Cooper County does not exercise its powers of zoning and does not have a comprehensive plan.

3. Land Use Impacts

Impacts to existing land uses are through direct acquisition of right of way for highway construction. Land use impacts, therefore, reflect the acquisition and conversion of land uses outside of the existing highway right of way. The amount and type of land that would be acquired by land use classification and/or ownership for the recommended preferred alternative are presented in Table III-13.

Land use impacts are classified as agricultural/undeveloped, residential, commercial, industrial and public/semi-public. Agricultural/undeveloped land use includes farmland or vacant areas that have been cleared for agricultural purposes or those properties where no development exists. The majority of the study area is agricultural/undeveloped. Consequently, the largest land use impact is in this category. Development of the recommended preferred alternative would require the acquisition of 474.1 acres (191.9 hectares) of agricultural/undeveloped land along the existing I-70 corridor.

Table III-13: Potential Existing Land Use Impacts Associated with the Recommended Preferred Alternative

	Recommended Preferred Alternative		North Missouri River Alternative		South Missouri River Alternative	
Land Use Category	Acres Impacted	Hectares Impacted	Acres Impacted	Hectares Impacted	Acres Impacted	Hectares Impacted
Agricultural/Undeveloped	474.1	191.9	37.3	15.1	35.8	14.5
Single Family Residential	11.4	4.6	0.1	<0.1	0.3	0.1
Commercial	42.5	17.2	4.7	1.9	9.3	3.8
Industrial	1.0	0.4	--	--	--	--
Public/Semi-Public	14.1	5.7	--	--	--	--
Conservation Area/Wildlife Refuge	14.9	6.0	15.2	6.2	14.9	6.0
State Park	1.1	0.4	--	--	--	--
Utility	0.2	0.1	--	--	--	--
School	2.0	0.8	--	--	--	--
Church	15.2	6.1	3.1	1.2	15.2	6.2
Total Existing Land Use Impact Area	576.6	233.3	55.0	22.2	75.5	30.6

Source: Zambrana Engineering, Inc., 2004

By comparison, no land use impacts would occur with the No-Build Alternative as it does not entail the conversion of land uses. Ongoing changes in land uses may be expected to occur within the study area (in particular near the interchanges) in response to ongoing land development trends.

4. Consistency with Land Use Plans

The recommended preferred alternative is not expected to cause substantial amounts of growth in the region or study area. Existing development in the area is scattered and concentrated at interchanges near Boonville. The availability of services and infrastructure outside of the incorporated areas would increase the potential for future commercial, industrial and higher density uses compared to the existing character of development. An objective contained in Boonville's comprehensive plan is to "…plan and implement annexation for residential, commercial and industrial development. In anticipation of annexation, the city should make plans to extend public infrastructure to serve growth areas, especially along Highway 87 and across I-70." It is anticipated that any growth that occurs along I-70 will be in conformance with the city's comprehensive plan.

C. Cultural Resources

Cultural resource investigations within SIU 3 entailed a consideration of both historic architecture and archaeological resources. The assessment of potential effects of the proposed I-70 improvements on cultural resources entailed the following elements:

- literature and archival research to identify previously listed National Register of Historic Places (NRHP) sites, to develop a thorough understanding of the historical setting and context of the project area;
- historic architectural assessment to inventory all architectural resources and bridge resources and evaluate their NRHP eligibility;
- performance of a geomorphology investigation of the Missouri River floodplain to identify the presence of buried soils and evaluate their potential for supporting archaeologically significant cultural resources; and
- performance of an archaeological survey to identify eligible cultural resources.

Along the mainline (between interchanges), the architectural survey was conducted within an Area of Potential Effects (APE) the same as that used for other SIUs measuring 250 feet (76.2 meters) from the current right of way on the expansion side. At interchanges, the APE was within the outside limit of all alternatives for interchange reconstruction plus a buffer of 50 feet (15.2 meters).

More thorough literature and archival researches than those conducted for the First Tier Environmental Impact Statement (EIS) study have been undertaken for SIU 3. In addition to an array of internet searches, literature and records studies have been undertaken at the Historic Preservation Office, the MDNR, Jefferson City, Missouri; the Cultural Resources Section of MoDOT, also in Jefferson City; the State Historical Society Library on the University of Missouri campus in Columbia; and the Meyer Library, Southwest Missouri State University, Springfield.

From a county-wide basis, the focus of the background sections in this report is on the significantly larger portion of SIU 3 within Cooper County. Boone County will be considered in detail in the report on SIU 4.

Detailed results of literature and archival research, the assessment of historic architecture and geomorphic studies (available on request) are presented in the following two reports:

- Interstate 70 Tier II Cultural Resource Investigations Volume 7: SIU 3 Architectural Survey, MoDOT Job No. J4HI1341F (Lopinot et al., 2003) (available upon request); and

- Geomorphic Investigation and Geoarchaeological Evaluation of Large and Intermediate River Valley Crossings, Interstate 70, Kansas City to St. Louis (Hajic, 2003).

Within the former report, baseline information is presented for evaluation of architectural resources within relevant thematic historical contexts. The report included a narrative of the historical background of the project area, a listing of NRHP properties, a review of previous architectural surveys and the results of the present architectural survey within SIU 3. For the purposes of this Environmental Assessment, the following sub-chapters represent summaries of the cultural resources and the assessment of the potential impacts from the proposed SIU 3 improvements. Each of these reports is incorporated by reference as part of this Environmental Assessment. Additionally, a Draft Programmatic Agreement between FHWA and the Missouri State Historic Preservation Office, on cultural resources, is included in Appendix F.

1. Historic Setting

The historic overview is described in Lopinot et al. (2003) and is summarized below. The historic setting is divided into four time periods (Table III-14). Native Americans were living in west-central Missouri during the period of Contact and Colonialism (A.D. 1673-1803), one of considerable social turmoil and transition. Unfortunately, little is known about this period for the study area due to the absence of pertinent documents dating prior to the nineteenth century.

Table III-14: Historic Cultural Traditions

Period	Timespan
Economic Renewal and Suburbanization	A.D. 1930-Present
Industrialization and Urbanization	A.D. 1865-1930
European-American Settlement; Agricultural Expansion	A.D. 1803-1865
Contact and Colonialism	A.D. 1673-1803
Source: Lopinot et al., 2003	

The present research emphasized the consequences of European-American Settlement and Agricultural Expansion (A.D. 1803-1865) and the subsequent period of Industrialization and Urbanization (A.D. 1865-1930). It was during this time that Americans from eastern states and European immigrants moved into the region in large numbers and established the political and economic infrastructure of Central Missouri. The era of Economic Renewal and Suburbanization (1930-present) witnessed additional changes to the cities and countryside, affected to a great extent by expanding development of paved roads and eventually an interstate transportation system. Historical and historic architectural research has served to identify a number of themes applicable to the SIU 3 study corridor. These pertain to ethnic settlement, agriculture and transportation.

a. Contact and Colonialism (A.D. 1673-1803)

The year 1673 has been described as “the beginning of Missouri’s recorded history.” Father Jacques Marquette and Louis Jolliet traveled down the Mississippi River and reached the mouth of the Arkansas River that year, inaugurating a period of French colonization of the upper Mississippi Valley.

The entire expanse of midcontinental North America drained by the Mississippi River, including all of the present-day state of Missouri, was claimed by both Spain and France during the seventeenth century. Productive agricultural lands, minerals such as salt and lead and access to other plentiful resources were major incentives for settlement in present-day Missouri. The fur trade had expanded into the Great Plains and as far west as the Rocky Mountains, with the Missouri River serving as a principal trade route and means of transportation.

b. European-American Settlement, Agricultural Expansion (A.D. 1803-1865)

Missouri entered the Union in 1821. During the early part of this period, remaining Native Americans were removed from the area and resettled to reservations. During the process of pushing and ultimately intentionally removing the native population, European Americans quickly settled the area.

During the 1810s and 1820s, the major areas of settlement were concentrated along the Mississippi and Missouri rivers. The interior uplands, through which SIU 3 traverses, were largely settled from the 1830s through the 1850s by people of English, Scottish and Irish descent.

As a result of the slave trade, the size of the African-American population increased dramatically between 1820-1860. Cooper County was part of an area referred to as Little Dixie due to its relatively large slave population and an early emphasis on plantation agriculture. Immigrants from Germany and to a lesser extent Ireland and Great Britain, also settled in the area.

c. Industrialization and Urbanization (A.D. 1865-1930)

Following the Civil War, the project area continued to experience an influx of immigrants from Western Europe, but especially Germany. Railroad construction during the first half of this period provided considerable impetus for local economic development in Central Missouri. However, the economic expense of building and operating railroads was associated with an economic recession during the 1890s. The Pacific Railroad of Missouri was the first rail line to be constructed through the central part of Missouri. After the completion of a bridge over the Missouri River, the Missouri, Kansas and Texas (or the Katy line) was constructed through Boonville in 1873. Toward the end of this period, the seeds of an eventual interstate highway system were planted in this area in the form of U.S. 40, although this highway had little direct impact on SIU 3 since it was routed through Rocheport, New Franklin and Boonville, thereby largely bypassing the SIU 3 corridor.

d. Economic Renewal and Suburbanization (A.D. 1930-present)

By 1930, more than half of Missouri's population lived in cities and the number of farms had declined. In the late 1940s and 1950s there began a continual movement of rural African-Americans and other minority populations to cities and a corresponding movement of middle-class residents to surrounding suburbs. While the rural landscape of SIU 3 was somewhat depopulated, agriculture has continued to be the primary economic pursuit in the area.

Settlement patterns were further affected by the Federal-Aid Highway Act, which was signed into law on June 29, 1956 which authorized construction of the National System of Interstate and Defense Highways. Interstate 70 was one of the first interstates built. In Missouri, I-70 extends 251 miles (403.9 kilometers) from St. Louis to Kansas City. Construction began in 1956 and was completed in 1965. While the SIU 3 corridor still remains largely rural, the past 30 years has witnessed growing commercial development within SIU 3 at all of the interchanges.

2. National Register Properties

As part of the background investigations, all current NRHP properties within 500 feet (152 meters) of the APE were identified. Cooper and Boone counties both contain a large number of National Register properties and districts. Cooper County contains 47 National Register Districts and other individual properties. Of these, 43 districts and individual properties are architectural in character. Over two-thirds of these occur within the older parts of Boonville (i.e., seven districts and 22 other properties). None of the 43 architectural properties are close to the SIU 3 study area.

Boone County contains 35 National Register Districts and individual properties. Of these, 24, or more than two-thirds, occur within the older parts of Columbia well to the east of the SIU 3 study area. One National Register architectural property does occur within 500 feet (152.4 meters) of the APE. This is the Moses U. Payne house, a large central hall I-house that was built in 1856-1857. It is situated on the Missouri River bluffs near the southwest quadrant of the interchange for I-70 and Route BB; though within the 500-foot (152.4-meter) limit, it is 250 feet (76.2 meters) outside the APE.

The Moses U. Payne house is the only NRHP-listed property in the vicinity of the study area. It is located outside of the APE in Boone County in the southwest corner of the Route BB interchange. There would be no impacts to the Moses U. Payne house as a result of planned improvements to I-70.

There are no other NRHP-listed resources in the APE.

3. Archaeological Resources

A preliminary assessment of archaeological resources was conducted as part of the First Tier EIS. A records search was conducted and a list of NRHP-listed archaeological resources and historic cemeteries located within each county of the study area was compiled. Specifically, this study included an area approximately five miles (eight kilometers) to either side of the existing interstate. No previously recorded NRHP listed archaeological sites were identified within the SIU 3 study area.

Pursuant to 36 Code of Federal Regulations (CFR) 800.4, MoDOT has taken steps to identify archaeological sites that may be affected by the proposed project. A Phase I archaeological

survey was conducted and it was determined that four sites have potential for intact subsurface deposits. These sites are AS3CP1 – a Paleoindian site, AS3CP59 – a Late Archaic and Woodland site and AS3CP132 and AS3CP136 – Mississippian sites.

Further investigation and coordination regarding these sites is on-going.

Geomorphology
Interstate 70 crosses three distinct floodplain surfaces in the Missouri River valley. All three surfaces exhibit sandy ridges and swales representing lateral channel migration. Prior to 1993, ridges would have been expected to have good potential for the occurrence of archaeological sites. However, all surfaces were subject to the extreme floods of 1993. Scouring and deposition of sand and silt were extensive in the area of the I-70 crossing. The abundant geomorphic evidence of widespread traction and erosive currents suggests that any primary archaeological deposits, even on sand ridges, were destroyed in 1993. As such, the existence of intact archaeological sites in this portion of the Missouri River valley is very low (Hajic, 2003).

4. Historic Architectural Survey

An architectural survey was performed within SIU 3 that resulted in documentation of 45 building properties and 10 bridges. Of the 45 building properties, 28 dating between 1945 and 1970 did not require inventory forms under the methodology designed for the project. Inventory forms were prepared for the remaining properties. An overview of the building properties and the results and discussions of properties by historic period and context are discussed in detail in the I-70 Tier II Cultural Resource Investigations Draft Report (Lopinot et al., 2003) (available upon request).

Only two properties in the APE were initially recommended to be NRHP-eligible and are listed in Table III-15. Property 3CO5 comprises a farmstead with a Queen Anne house, a German barn and other outbuildings, whereas 3CO29 is a Greek Revival I-house that dates between 1850 and the 1870s. A site visit took place on Oct. 20, 2003 to review their NRHP eligibility with representatives from the Missouri State Historic Preservation Office and MoDOT Cultural Resources staff. It was determined that due to significant changes to the property (i.e., the addition of siding or other building alterations), neither of these two properties was eligible for the NRHP. Prior to the assessment of their eligibility, the location of these properties was taken into account with regard to selecting the preferred interchange alignment and neither property would be directly impacted by the proposed interchange improvements.

Table III-15: Properties Initially Recommended as Eligible for the NRHP

Property	Significance Criteria	Areas of Significance	Period of Significance	Nature of Impact
3CO5	A,C	Agriculture, Ethnic Heritage, Architecture	1900-1950	No impacts
3CO29	C	Architecture	1850-1900	No impacts
Source: Lopinot et al., 2003				

As a result of the survey, 10 bridges were documented. Only one bridge is greater than 50 years old and, with the exception of the existing I-70 bridge over the Missouri River, none of the bridges were recommended as eligible for the NRHP. Based on correspondence from the State Historic Preservation Office (June 22, 2004, Appendix D), the Missouri River bridge is eligible for listing to the NRHP because it was built in the early history of the interstate, was one of the first interstate bridges across the Missouri River and is one of the longest I-70 bridges. Structurally the bridge will remain unchanged with both the North and South Missouri River alternatives. Consequently

no adverse effects would occur with either alternative. Therefore, a Section 4(f) evaluation is not required for this proposed action.

The No-Build Alternative would not impact any historic architectural resources as it does not require the alteration or demolition of any historic properties or sites.

Additionally, no impacts to any historic architectural resources would occur with either the North Alternative or South Alternative to crossing the Missouri River.

5. Missouri Interstate 70 and History

a. Background

As early as 1938, the federal government began to consider designing an interstate highway network. A report resulting from the Federal Highway Act of that year recommended construction of a 26,000-mile (41,843-kilometer) inter-regional system consisting of two- or four-lane highways, some with controlled access. The plan remained dormant until the Federal Highway Act of 1944 authorized the designation of select existing highways as part of an interstate system. The Act called for improvement of these designated roads, but made no provision for increased federal funding. Lack of money and lack of uniform design standards slowed progress on the project over the following years. Although funding increased with the Federal Highway Act of 1952, only 6,000 miles (9,656 kilometers) of highway had been completed by 1953.

In an address prepared for a governors' conference in 1954, President Dwight Eisenhower declared that the highway system then in place was totally inadequate, causing needless death and injury, creating delay in the transportation of goods and placing the nation at risk in the event of major disaster or war. He called for federal and state cooperation in the creation of a modern interstate network, paid for by a revamped system of financing that would avoid debt.

The Federal Highway Act of 1956 substantially enacted Eisenhower's proposal and initiated the current interstate highway system. The Act instituted construction on a network 39,000 miles (63,730 kilometers) in extent and authorized $25 billion for the project, to be spent over the period 1957 to 1969. Existing toll roads meeting system standards could be integrated into the interstate system. Inherent in the terms of the Act was the idea that the interstate system should evolve and improve over time and that initial construction would be altered or replaced in the future as need arose. The original Act permitted two-lane interstate segments with at-grade intersections in low traffic rural areas, but called for the adoption of minimum standards aimed at the eventual elimination of these segments. Legislation passed in 1966 ultimately did require all interstates to be at least four lanes and have no at-grade intersections. According to the Federal Highway Act of 1956, interstates were to be constructed according to standards accommodating traffic forecasted for 1975. Subsequent legislation amended this requirement so that highway design would tolerate traffic estimates for a maximum of 20 years.

The 1956 Act started a public works project that was the most expensive and wide-scale in United States history, surpassing any program undertaken during the New Deal era, with approximately 75 percent of the new interstate system constructed on new right of way. Initial construction of the interstate system was greeted with wide-ranging support. It was not until the 1960s that significant opposition to the program mounted, with criticisms centering on the displacement of residents and the destruction of urban neighborhoods caused by highway construction.

When finished, I-70 extended from Baltimore, Maryland, through the Alleghenies of Pennsylvania and across the Ohio River at Wheeling, West Virginia. From there it passed through Indianapolis, St. Louis and Kansas City, toward its original western terminus at Denver. In 1957 it was decided to extend I-70 west from Denver to a junction of I-15 in south central Utah.

As one of the interstates built in the immediate aftermath of the Federal Highway Act of 1956, I-70 was designated by federal legislation in 1990 as part of the Dwight D. Eisenhower System of Interstate and Defense Highways. In February 1994, this system was named by the American Society of Civil Engineers as one of the Seven Wonders of the United States, along with other notable engineering accomplishments including the Golden Gate Bridge, the Panama Canal and Hoover Dam.

b. Missouri Interstate 70 Memorandum of Understanding

Missouri is sometimes credited as the first state to initiate interstate highway construction, breaking ground on a 2.6-mile (4.2-kilometer) section of I-70 in St. Charles County, after the state signed the first contracts under the new interstate program on August 2, 1956. Beginning in 1956, construction of I-70 across Missouri took nine years to complete. Work on the last sections, in Jackson and Lafayette counties, was completed in August 1965. Extending 251 miles (404 kilometers), the Missouri section of I-70 was designed to meet the 20-year tolerance standard established by federal legislation.

During the First Tier Study, discussions began with the Historic Preservation Program office, which houses the State Historic Preservation Office, within the MDNR and the FHWA. These discussions were regarding the potential historic significance of I-70 in view of the National Historic Preservation Act of 1966 and its possible eligibility for the NRHP. The interstate system is approaching the 50-year old threshold for consideration of eligibility and as a result, the national interstate system is currently being studied by a national task force including representatives of the National Conference of State Historic Preservation Officers, the FHWA, select state Departments of Transportation, the Advisory Council on Historic Preservation, the National Register and other interested parties. The discussions within Missouri led to the development of a Memorandum of Understanding that outlines a course of action to be followed with regard to I-70. The agreed action is the following:

A formal assessment of the eligibility of the section of I-70 addressed in the First Tier EIS and in the Second Tier environmental documents will be prepared by the FHWA at such time that the interstate has reached 50 years of age, or the national task force has reached an opinion regarding the eligibility of the interstate system.

In the interim, the FHWA and MoDOT will proceed in good faith to gather documentation on the history and development of this important interstate highway (I-70) in Missouri.

Should I-70 or any part thereof be determined eligible at a later date, the FHWA and MoDOT shall enter into consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation pursuant to 36 CFR 800.

The Memorandum of Understanding has been signed by the FHWA, MoDOT and MDNR. It is included in Appendix G of this document.

D. Agricultural Resources

1. Affected Environment

According to the Missouri Agriculture Statistics Service (MASS), approximately 67 percent of the land in Missouri is used for agricultural purposes (MASS, 1997). The average farm size in Missouri is 275 acres (111.3 hectares). Dominant crops in Missouri are soybeans and corn (MASS, 2000). Missouri is the second leading state in the number of farms, beef cows and hay production (excluding alfalfa) (MASS, 2000).

The U.S. Department of Agriculture (USDA) defines prime farmland as soils that have the best combination of physical and chemical characteristics for producing food, forage, fiber and oilseed crops and is available for these uses. In 1997, Missouri had a total of 14,310,200 acres (5,795,631 hectares) of prime farmland within the state (National Resource Inventory, revised 2000). Prime farmland within the study area is illustrated in Figure III-1.

Table III-16: Agricultural Statistics

Statistics	Missouri[1]	Cooper[2,3]	Boone[2,4]
Number of Farms	109,000	879	1,227
Average Farm Size, acres (hectares)	275 (111.3)	343 (138.9)	204 (82.6)
Percent Agricultural Land	67	83	60
Market Value of Agricultural Products Sold (millions)	4,570	53	40
Value of Land and Buildings ($/acre)		941	1,599
Prime Farmland, acres (hectares)	14,310,200 (5,795,631)	159,437 (64,522)	179,834 (72,776)

NA = not applicable.

Sources: (1) MASS, 2000
(2) MASS, 1997
(3) USDA, 1998
(4) USDA, 2003

Cooper County

Farming is the main enterprise in Cooper County. A high percentage of land in Cooper County (approximately 83 percent) is used for agricultural purposes (MASS, 1997). Soybean, corn and wheat are the primary crops and beef cattle and hogs are the principal livestock. The floodplain along the Missouri River and relatively flat areas in the uplands are used for cultivated crops. The steeper areas are used mostly for pasture, hay, woodland or orchards. There are 879 farms in Cooper County with a total of 301,692 acres (122,091 hectares) of agricultural land. The average size is 343 acres (138.9 hectares) with an average value of approximately $941 per acre (MASS, 1997). In 1997, total crop cash receipts were $23,945,000 and livestock was valued at $28,882,000 (MASS, 1997).

Boone County

Columbia, the county seat, is located in Boone County and represents the largest city in central Missouri. Neither Conservation Reserve Program (CRP) nor Wetland Reserve Program (WRP) lands are present within the corridor in Boone County. Approximately 60 percent of the land in Boone County is used for agricultural purposes (MASS, 1997). There are 1,227 farms in Boone County that account for a total of 249,849 acres (101,113 hectares) of agricultural land. The average size is 204 acres (82.6 hectares) with an average value of approximately $1,599 per acre (MASS, 1997). In 1997, total crop cash receipts were $16,824,000 and livestock was valued at $23,279,000 (MASS, 1997). Within Boone County SIU 3 extends only a short distance from the Missouri River to a point near mile marker 115. This area of Boone County is characterized by karst topography with numerous sinkholes that overlie a network of caves and springs.

2. Impacts to Agricultural Resources

Interagency coordination and cooperation regarding potential impacts to agricultural lands is set forth in a cooperative agreement between FHWA, MoDOT, Natural Resources Conservation Service (NRCS) and the Farm Service Agency (see Appendix G).

The recommended preferred alternative would result in impacts to approximately 514 acres (208.0 hectares) of lands that are used for agriculture (i.e., pasture, row crops, etc.). However, impacts to farm operations as a result of the creation of point rows, severances, or remnant parcels is expected to be minimal as the proposed roadway improvements will occur immediately adjacent to existing I-70.

Coordination with the NRCS was conducted throughout the course of the environmental documentation and the planning process for the purposes of identifying impacts to farmlands and identifying wetlands subject to NRCS jurisdiction. NRCS is the primary agency responsible for coordination pursuant to the Farmland Protection Policy Act. For federally funded projects potentially affecting prime or unique farmlands, coordination with NRCS requires completion of the Farmland Conversion Impact Rating for Corridor Type Projects (Form SCS-CPA-106), which specifically evaluates the conversion of prime and unique farmland and statewide and locally important farmland to nonagricultural uses. Prime farmland impacted in Cooper County by the recommended preferred alternative would be 76.8 acres (31.1 hectares). Prime farmland impacted in Boone County by the recommended preferred alternative would be 3.2 acres (1.3 hectares). As a result of the completion of the coordination with NRCS in both Boone and Cooper counties (see Appendix G), the total Impact Rating has been determined to be 139 points in Cooper County and 80 points in Boone County (MoDOT Memorandum, Appendix D). Since this value is less than 160, no significant impacts to prime farmland would occur and no additional consideration of alternatives or mitigative measures is required. Additionally, the project will not result in the creation of non-farmable remnants, nor will it interrupt or interfere with farm support services.

The No-Build Alternative would not result in impacts to lands currently in agricultural use or to prime farmland.

Based upon data supplied by the NRCS/USDA office in Columbia, Missouri, there are no CRP or WRP lands located within Boone County. Coordination with NRCS offices in Boonville, however, resulted in the identification of several CRP parcels within Cooper County. The distribution of these lands is similar along both the north and south sides of existing I-70. Consequently, no notable difference in impact would occur with widening of I-70 to either the north or south. In total, the recommended preferred alternative would impact approximately 20.7 acres (8.4 hectares) of CRP land. No WRP lands were identified within the study area from Cooper County.

Alternatives for crossing the Missouri River and its floodplain would not result in notable impacts to agricultural resources as much of the land consists of wildlife refuge and conservation lands. However, each alternative would result in the conversion of similar amounts of lands designated as prime and unique farmland. For example, the North Alternative would convert approximately 39.0 acres (15.8 hectares) as compared to 38.0 acres (15.2 hectares) with the South Alternative.

E. Air Quality

The federal Clean Air Act of 1970 required the adoption of air quality standards. These were established in order to protect public health, safety and welfare from known or anticipated effects of sulfur dioxide, particulate matter, carbon monoxide, nitrogen dioxide, ozone and lead. In addition to these pollutants, the state of Missouri has established additional criteria for hydrogen sulfide. The Missouri and National Ambient Air Quality Standards (NAAQS) for these pollutants are listed in Table III-17.

Table III-17: Missouri and National Ambient Air Quality Standards

Pollutant	Averaging Time	Concentration
Sulfur Dioxide	Annual Arithmetic Mean: Primary Twenty-Four Hour (1): Primary Three Hour(1): Secondary	80 µg/m(3) (0.03 ppm) 365 µg/m(3) (0.14 ppm) 1,300 µg/m(3) (0.50 ppm)
Particulate Matter 10*	Annual Arithmetic Mean: Primary and Secondary Twenty-Four Hour (2): Primary and Secondary	50 µg/m 150 µg/m
Particulate Matter 2.5†	Annual Arithmetic Mean: Primary and Secondary Twenty-Four Hour (2): Primary and Secondary	15 µg/m 65 µg/m
Carbon Monoxide	One Hour(1): Primary Eight Hour(1): Primary	40 mg/m(3) (35 ppm) 10 mg/m(3) (9 ppm)
Ozone	Eight Hour(1): Primary and Secondary	157 µg/m(3) (0.08 ppm)
Nitrogen Dioxide	Annual Arithmetic Mean: Primary and Secondary	100 µg/m(3) (0.053 ppm)
Lead	Calendar Quarter Arithmetic Mean: Primary and Secondary	1.5 µg/m(3)
Hydrogen Sulfide	One-half Hour(3) One-half Hour(4)	70 µg/m(3) (0.05 ppm)(8) 42 µg/m(3) (0.03 ppm)(8)
Sulfuric Acid)	Twenty-Four Hour(5) One Hour(6)	10 µg/m(3) 30 µg/m(3)

(1) Not to be exceeded more than once per year.
(2) Statistically estimated number of days with exceedances is not to be more than 1 per year.
(3) Not to be exceeded more than twice per year.
(4) Not to be exceeded more than twice in any consecutive days.
(5) Not to be exceeded more than once in any 90 consecutive days.
(6) Not to be exceeded more than once in any two consecutive days.
(7) Not more than one expected exceedance per year, on a 3-year average.
(8) Missouri Air Quality Standards.

** 10 microns or smaller*
† 2.5 microns or smaller

ppm = Parts of pollutant per million parts of air (by volume) at 25 degrees Celsius.
µg/m^3 = Micrograms of pollutant per cubic meter of air.

Source: MDNR Division 10 – Air Conservation Commission.

The Clean Air Act Amendments of 1977 required all states to submit to the U.S. Environmental Protection Agency (USEPA) a list identifying those air quality control regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions which are shown by monitored data or air quality modeling to exceed the NAAQS for any criteria pollutant are designated nonattainment areas for that pollutant.

The 1990 Clean Air Act Amendments established procedures for determining the conformity of state implementation plans with the requirements of the federal regulations. These procedures are published in 40 CFR Parts 51 and 93.

Section of Independent Utility 3 falls within the Northern Missouri Intrastate Air Quality Control Region (AQCR #137). This AQCR has a designation of better than national standards for total

suspended particulates and sulfur dioxide unclassifiable/attainment for carbon monoxide, cannot be classified or better than national standards for nitrogen dioxide and no designation for lead. The Missouri state implementation plan does not contain any transportation control measures for this AQCR.

An Air Quality Analysis Agreement executed in March 1988 by FHWA, MDNR and MoDOT states that a detailed air quality analysis for inclusion in an environmental document will only be prepared on federally funded highway projects when the present or predicted average daily traffic volume on the project exceeds 54,000 vehicles in the year of project construction or 72,700 vehicles in the 20th year following the project construction. However, as a result of more recent coordination between FHWA, MDNR and MoDOT regarding the I-70 corridor study, it was acknowledged that these average daily traffic values are too low and should be increased. The most likely occurrence for exceeding the NAAQS are at a controlled intersection which has the potential to create excessive traffic queues. There are controlled intersections at each interchange along this section of the corridor. However, the volumes at these locations are relatively low, so large traffic queues are not likely to occur. Therefore, it is exceedingly unlikely that in the presence of free flow I-70 traffic that a detailed air quality analysis would project a violation. This project is not located in an air quality non-attainment area. This air quality analysis approach for the non-urban sections of the I-70 corridor has been coordinated with the USEPA.

During construction of the project, construction methods and operations will be conducted in accordance with MDNR and MoDOT regulations, particularly concerning batch plant operations and clearing and grubbing functions. Standard construction specifications incorporate provisions for minimizing air quality impacts during construction.

Measures will be taken to reduce fugitive dust and other emissions generated during construction. Emissions from construction equipment would be controlled in accordance with emission standards prescribed under state and federal regulations. Materials resulting from clearing and grubbing, demolition or other operations (except materials to be retained) would be removed from the project, burned or otherwise disposed of by the contractor. Any burning, when permitted, would be conducted in accordance with applicable local laws and state regulations.

No differences in air quality impacts would occur with either the North Alternative or South Alternative to crossing the Missouri River, as each alternative would consist of mainline traffic of equal volume.

The No-Build Alternative does not entail any improvements to the transportation system within the study area. As a result, degradation of the level of service of the I-70 mainline and interchange crossroads will occur (see Chapter I.D.3). Consequently, the No-Build Alternative will also result in a localized degradation of air quality due to the effects of greater congestion. Conversely, because the No-Build Alternative does not entail construction activities, no construction-phase air quality impacts would occur.

F. Hydrogeology/Geology

1. Geologic Resources

Geologic resources of the study area were investigated by examining all appropriate geologic maps of the region and by conducting database searches to determine the presence of current or past mining activity, springs and reported seismic activity. As a result of this review, it was determined that no surface or subsurface mines or springs were reported from the immediate

study area. Mines in the general area (but outside the study area) were reported for limestone, coal and sand and gravel. Additionally, it was determined that the nearest seismic zone is New Madrid, located in Southeast Missouri. Due to the distance of the study area from the New Madrid seismic zone, seismicity does not represent a significant issue.

The geology and hydrogeology of the study area is divided into four sections:

- Boonville Area – bedrock consisting of sandstone, shale, coal, clay and limestone;
- Overton Area Uplands – bedrock consisting of cherty limestone;
- Overton Bottoms (Missouri River Floodplain)–underlain with sand, silt and clay; and
- Rocheport Karst Area – bedrock consisting of limestone with numerous sinkholes, springs and other karst features.

a. Boonville Area

This area extends from the western terminus of the study area to about the interchange at Route 87. The bedrock consists of the Pennsylvanian Age Cabaniss subgroup of the Cherokee Group (MDNR, 1979; Thompson, 1995). The Cabaniss subgroup consists of interbedded sandstone, siltstone, shale, underclay, limestone and coal. These beds are arranged in several successions or cyclic units, each of which may include a full sequence (in ascending order) of shale, sandstone, siltstone, underclay and coal. Individual beds are typically thin (two to eight feet) (0.6 to 2.4 meters) and discontinuous (not present in all areas).

In some cases, relatively thick channel (river) sandstones have developed in this sequence, which cut through the underlying beds. An excellent example of a Pennsylvanian channel sandstone is located on both sides of I-70 approximately 3,500 feet (1,066.8 meters) east of Route 5. The University of Missouri-Columbia uses this roadcut in their geology classes to show channel sand depositional features.

These alternating beds have very different hydraulic properties (e.g., the sandstone has a relatively high ability to transmit groundwater and the underclays are relatively impermeable to groundwater). These properties have resulted in the development of wetlands (i.e., North [N.] Wetland 1 and South [S.] Wetland 2 in Cooper County) and seeps in some areas, as the groundwater infiltrates the sandstone, but can not penetrate the underclay and, subsequently discharges to the surface.

b. Overton Area Uplands

A second geologically distinct area extends from near the Route 5 interchange to the Missouri River floodplain (Overton Bottoms). The bedrock is Mississippian Age Burlington-Keokuk limestone which consists of white-gray medium to coarsely crystalline limestone (MDNR, 1979; Thompson, 1995). The upper section (separated as the Keokuk Limestone in some areas) includes abundant chert. Although sinkholes were not observed, other karst features such as solution voids and gaining streams were observed in this area. Therefore, the bedrock in this area is classified as karst but is not as fully developed as Rocheport karst area. Groundwater was observed discharging in the tributary streams (Stream [STR] 28 and N. STR 28 East Tributary) that flow into S. Pond 15 (Siekman Lake), which is reportedly spring fed.

c. Overton Bottoms (Missouri River Floodplain)

The Missouri River floodplain is approximately 1.5 miles (2.4 kilometers) wide with the river on the east side, adjacent to the bluffs. This area is underlain with approximately 50 to 100 feet (15.2 to 30.5 meters) of alluvial sediments consisting of sand, gravel, silt and clay. Typically there is a confining upward sequence to these sediments, with predominantly sands and gravels towards the bottom and predominantly silt and clay towards the surface. The sands and gravels typically have high permeability and can produce useable quantities of water (alluvial aquifer). Most of the surface soils in the Overton Bottoms consist of low permeability clay. Sandy soils are present closer to the river and scour hole. In the proximity to the river, groundwater levels fluctuate in response to river levels. The scour hole (50+ feet [15.2+ meters] deep) is directly connected to the alluvial aquifer and quickly responds to changes in river levels. Therefore, groundwater is considered a primary hydrology source for wetlands in this area. The land surface elevation west of the new set-back levee, however, is above typical groundwater levels and the wetlands in this area receive hydrology from direct precipitation.

d. Rocheport Karst Area

The Rocheport karst area extends from the Manitou Bluffs on the east side of the Missouri River to the eastern terminus of the study area. This area is underlain by the Burlington-Keokuk Limestone (described above) and contains numerous sinkholes, several springs/seeps and solution voids (small cave). Therefore, this area is considered a fully mature open karst system. Information concerning the geology/hydrology of this area was obtained from Unklesbay (1952), Missouri Speleological Survey, Inc. (2003) and the MDNR Geological Survey and Resource Assessment Division (MDNR letter dated Aug. 27, 2003, Appendix D). A search of the Missouri Speleological Society database indicated that there were no reported caves within the study area. In addition, karst features such as sinkholes and springs were mapped with a ground penetrating system and information was obtained from local property owners.

The uplands in the Route BB and I-70 interchange area includes numerous sinkholes which are closed depressions formed by the solution of the underlying bedrock. Several of the sinkholes have visible drains or swallow holes which allow surface water to flow directly into the bedrock conduit system.

Many of the sinkholes, however, have become sealed with impermeable clay and, therefore, prevent water drainage, resulting in the formation of ponds or wetlands. A local landowner stated that the bottom of one sinkhole collapsed (drained), sending muddy water to nearby springs.

The unnamed tributary of Moniteau Creek (STR 2, Boone County) located just east of the Route BB interchange is mapped by the Geological Survey and Resource Assessment Division as a losing stream south of I-70 and a gaining stream north of I-70. Losing streams allow the direct infiltration of surface water into the bedrock and are typically dry, except during major precipitation events. A gaining stream, similar to a spring or seep, is an area of groundwater discharge, but along the length of stream channel, not at distinct points. Gaining streams typically contain flowing water for most of the year.

The stream (Boone County [BC] N. STR 1) located on the north side of I-70 between Route BB and the Missouri River contains two perennial springs which feed a perennial stream that flows to the Missouri River and was observed to provide habitat to salamanders and several species of macroinvertebrates.

A tributary to BC N. STR 1 (BC S. STR 1) flows under I-70 via a culvert. This stream contains two bedrock seeps which keep the exposed bedrock surface wet for most of the year, but does not discharge large quantities of groundwater. The west seep has a well-developed hydrophytic herbaceous plant community. The portion of BC S. STR 1 near I-70 appears to be perennial and likely receives groundwater discharge (gaining stream).

Two notable solution voids were observed in the project area. One void was located at the western bluff immediately south of existing I-70. This feature was investigated and determined to be relatively shallow (approximately 30 feet [9.1 meters]) deep and therefore not suitable for cave-dwelling biota. A second solution void is located approximately 100 feet (30.5 meters) south of existing I-70 on the Manitou Bluffs. The void is located at the approximate mid-point of the 150-foot (45.7-meter) tall bluff and, therefore, is very difficult to access. The Geological Survey and Resource Assessment Division provided information indicating that the entrance of the void was approximately eight feet (2.4 meters) tall by 10 feet (3.1 meters) wide and approximately 35 feet (10.7 meters) deep. A survey of the void was conducted by MoDOT on Oct. 23, 2003 (Alan Leary). The void could not be entered but was observed from the entrance. The back of the void could be seen and no water flows from the cave. Therefore, it is not likely that this void has potential to provide suitable bat or other cave-dwelling biota habitat.

e. Potential Impacts

Potential impacts to groundwater are expected to be extremely minor in most areas. Construction activities in mature karst systems have a high potential for indirect impacts. If a sinkhole which typically provides water to a spring is filled and sealed, the spring may dry up. Alternatively, if untreated roadway storm water is directed to a sinkhole opening or losing stream, the water quality of the groundwater or spring may be degraded. If the clay seal of a sink hole pond is broken during construction (without draining the pond), the water can directly enter the bedrock conduit system, impacting groundwater and spring water quality. In addition, losing and gaining streams that are culverted can either cut off surface water infiltrating to bedrock or cutoff groundwater discharging to the stream. Bottomless culverts would be considered in the design phase to minimize indirect impacts to the groundwater system. Detention basins or other engineering controls that treat (i.e., remove) sediment in surface water before it reaches the losing stream would also be considered in the design phase.

Given the irregular bedrock surface with numerous conduits, the roadbed may also be subject to subsidence if proper engineering controls are not in place. Therefore, sinkholes or conduit openings under or in proximity to the proposed roadway should be grouted to prevent subsidence. Changes in groundwater flow patterns and/or groundwater quality may occur in several areas along SIU 3. Potential indirect impacts to groundwater resources west of the Missouri River include the alterations of groundwater flow to wetlands/streams or ponds due to bedrock cut and fill activities. Individual, indirect groundwater impacts are difficult to predict.

In most cases, potential effects of the recommended preferred alternative on subsurface hydrologic features is expected to be relatively minor and localized it its effect. One potential effect may be to the hydrology of S. Wetland 1 which may be altered due to placement of fill within and adjacent to this wetland. Additionally, potential indirect impacts to S. Pond 15 may also occur as this pond is reportedly spring fed. Potential mitigative measures would be considered in the design phase (i.e., bottomless culverts may allow the continued discharge of groundwater to the lake) to avoid or offset potential impacts.

The Missouri River floodplain is underlain by an alluvial aquifer. This aquifer, however, is not used for water supply in proximity to I-70. The Missouri River and the scour hole would be bridged and

the area west of the new set-back levee would be filled. Given that the wetlands in this area do not receive hydrology from groundwater, indirect impacts to the remaining wetlands are not anticipated.

Potential effects of a North Alternative for crossing the Missouri River may be greater than those for a South Alternative, particularly in the vicinity of the Rocheport Bluffs. Expansion to the north will result in greater encroachment on a stream and its associated springs that may dramatically alter the groundwater discharge pattern to the stream. In contrast, a south alternative does not impact these springs and would only require a perpendicular crossing of a tributary to South Stream 1 (see Figure III-1, Sheet 5).

By comparison, the No-Build Alternative would not result in any impacts to geologic resources as it does not entail land alterations or disturbance activities.

2. Water Wells

A search for groundwater wells potentially affected by SIU 3 was conducted by contacting the MDNR Well Head Protection Section (Rolla, Missouri) and searching the Center for Agricultural, Resource and Environmental Systems web site database. The results provided by MDNR included 31 wells within a one-mile (1.6-kilometer) radius of each side of existing I-70 from Boonville to Rocheport. Latitude and longitude coordinate data are not available to precisely locate these wells along the corridor. Twenty-nine of the wells are used for water supply to single-family residences; one is used for irrigation and one supplies a public water system for a winery/restaurant. Both the irrigation well and restaurant well are located outside the study corridor.

The Center for Agricultural, Resource and Environmental Systems database identified six active public drinking water wells within the study area. All these public drinking water wells are located at I-70 interchanges and service gas stations, motels or a mobile home park. At the Route B interchange, one well serves the Bobber auto truck plaza and one well services the QT Inn Motel. At the Route 87 interchange, Texaco, Conoco and the Atlasta Motel each have a public well serving their water supply needs. At the Route BB interchange, one public well provides water to the Gygr mobile home park.

Although precise locations are not known for the single-family resident wells, impacts are not expected. No impacts would occur to the irrigation and restaurant wells at the winery located near Rocheport. Project design considerations would be incorporated to avoid or minimize any well impacts. However, in the event any well would be impacted, the well would be appropriately closed and sealed to prevent any contamination to the groundwater.

The No-Build Alternative would result in no impacts to water wells or water supplies.

G. Terrestrial Ecology

1. Land Cover

To provide an understanding of Missouri's ecosystems at regional and landscape scales, the MDC has divided the state into land type associations, based on geology, soils, topography and vegetation (MDC, 2002; Nelson, 1985).

The study corridor is located within the Outer Ozark Border Subsection of the Ozark Highland Section and is represented by three land type associations:

- **Petite Saline Oak Savanna/Woodland Dissected Plain** – This association is represented by the gently rolling upland drained mostly by Petite Saline Creek west of the Missouri River to the western terminus of SIU 3. Local relief varies from less than 50 feet to more than 150 feet (15.2 to 45.7 meters) in the Missouri River blufflands. Loess mantles the association. Geology is variable, with Pennsylvanian sandstone and shale around Boonville and Mississippian limestones elsewhere. Historically this association consisted of oak savanna and woodland with numerous prairie openings. However, today the association is dominated primarily by pasture and cropland in the bottoms and flatter uplands, with second-growth timber on steeper slopes.

- **Lower Missouri River Alluvial Plain** – This association consists of a river channel and an alluvial plain restricted by bluffs cut into Ozark bedrock materials. Bluff faces have been sharpened by quarrying and by railroad construction at their base. Soils consist of loamy, well-drained alluvium and poorly drained clay that was historically timbered. The Overton Bottoms area is dominated by old field, emergent wetlands, open water and early successional bottomland forest habitats.

- **Rock Bridge Oak Woodland/Forest Low Karst Hills** – This association consists of loess-covered upland divides dissected by deeply entrenched streams that cut through Mississippian limestones. Local relief is approximately 150 feet (45.7 meters). The association includes the Manitou Bluffs between Rocheport and McBaine. The landscape is characterized by oak savanna and woodland on the upland surface, while oak and mixed-hardwood forests on the valley slopes and bottoms.

The I-70 study corridor encompasses a variety of ecological cover types. Terrestrial cover types were determined by integrating aerial photography, topographic mapping (i.e., U.S. Geological Survey [USGS]) and literature reviews. This analysis was supplemented by performing select qualitative field surveys to confirm the general occurrence of cover types. As a result of coordination with NRCS, several areas within the study area were also determined to be enrolled in the Conservation Reserve Program. These lands are identified in Figure III-1.

The designation of a particular cover type was based on the dominant vegetative composition. All cover type information was incorporated into a geographical information system database for quantification. Cover types identified within SIU 3 are shown in Figure III-4 and included:

- Upland Deciduous Forest;
- Bottomland Deciduous Forest;
- Old Field;
- Early Successional Forest;
- Pasture;
- Row crops;
- Urban-Developed;
- Wetlands; and
- Open Water.

Upland Deciduous Forest – The majority of the forest in the study corridor consists of upland deciduous forest. These forests range from dry forests on ridgetops and south/west facing slopes, to mesic (moist) forests on north/east facing slopes and valley bottoms. Typical tree species within this cover type are white oak (*Quercus alba*), red oak (*Q. rubra*), shingle oak

(*Q. imbricaria*), chinkapin oak (*Q. meuhlenbergii*), basswood (*Tilia americana*), hickory (*Carya* spp.), slippery elm (*Ulmus rubra*), flowering dogwood (*Cornus florida*), hackberry (*Celtis occidentalis*), sugarberry (*C. laevigata*) and eastern redbud (*Cercis canadensis*). The moist (mesic) forests included sugar maple (*Acer saccharum)*, possum haw (*Ilex decidua*) and paw paw (*Asimina triloba*). The riparian system along upland streams typically included a few sycamores (*Platanus occidentalis*) and cottonwoods (*Populus deltoides*). Typical upland shrubs were buck brush (*Symphoricarpos orbiculatus*) and gooseberry (*Ribes missouriense*). The upland deciduous forest cover type constitutes approximately 13.6 percent of the study area.

Bottomland Deciduous Forest – Bottomland forest in the study corridor is restricted to a few major streams (e.g., Cooper County [CC] STR 13) and small portions of Overton Bottoms. Typical species in these areas were cottonwood, sycamore, box elder (*Acer negundo*) and sugarberry. Upland tree species, as discussed above, were also typically present. The bottomland forest in Overton Bottoms also included various willows (*Salix* spp.). The bottomland deciduous forest cover type constitutes less than two percent of the study area.

Old Field/Early Successional Forest – The old field designation is reserved for land that has been historically farmed, logged, or cleared and has since been abandoned. Vegetative composition within this cover type is variable and depends on the amount of time elapsed since the abandonment of the previous land use. Old fields are typically dominated by annual and perennial herbs, shrubs and early successional tree species. Species commonly encountered included goldenrod (*Solidago* spp.), blackberry (*Rubus* spp.), sumac (*Rhus* spp.), ragweed (*Ambrosia* spp.), fescue (*Festuca* spp.), aster (*Aster* spp.) and eastern redcedar (*Juniperus virginiana*). In some cases, the areas have been abandoned for sufficient time that pioneer tree species have become dominant. In the upland areas, the most common pioneer tree species is eastern redcedar. In the bottomlands, the typical pioneer species are willows and cottonwoods. The old field/early successional forest cover types constitute approximately eight percent of the study area.

Pasture – Pasture is dominated by fescue and other grasses with a minor component of herbs and forbs. Pasture is actively managed and dedicated to browse for livestock and hay production. Pastureland occupies approximately 33 percent of the study corridor and is typically located in the level to moderately level rolling upland areas.

Cropland – This cover type consists of actively cultivated field dominated by soybeans and corn. In addition to the cultivated species, weedy species that occur within these areas include fescue, foxtail (*Setaria* sp.), clover (*Trifolium* and *Melilotus* spp.) and ragweed. Cropland accounts for approximately 11 percent of the study area.

Urban-Developed – The urban cover type was used to define developed areas such buildings, parking lots, roads and lawns. This designation included the existing transportation network, commercial and retail services, industrial/manufacturing businesses and residential areas. Additional developed areas include relatively isolated homesteads and farms along the study corridor. The urban cover type collectively accounts for approximately 32 percent of the total study area.

Open Water – For the purposes of defining open water habitats within the study corridor, open water was considered to be large bodies of open water visible on the aerial photographs. This cover type accounts for approximately one percent of the study area.

Wetlands – The wetlands within the study corridor have been delineated in accordance with the USACE 1987 manual. The description of the wetlands is presented in Chapter III.L.

2. Wildlife

The variable habitat of terrestrial, wetland and aquatic ecosystems within the study area support a diverse mix of wildlife species. White-tailed deer are known to frequent forests, pastures and riparian corridors. Upland woodlands with sufficiently dense understory may support wildlife such as fox, deer, raccoon and opossum. Wetlands which are interspersed with old field or overgrown lots favor species such as skunk, woodchuck, rabbit, squirrel, red-tailed hawk, turkey vulture and variety of perching birds or songbirds such as robins, jays, thrushes, woodpeckers, vireos, warblers, sparrows and many other resident and migratory species.

Emergent and scrub-shrub wetlands such as those found within Overton Bottoms are utilized by a variety of reptiles and amphibians and are valuable foraging areas for wading birds such as green heron and great blue heron. Other species found in the Overton Bottoms area as recorded during recent surveys conducted by USFWS have included red-winged blackbird, song sparrow, cliff swallow, common yellowthroat and warbling vireo. Henslow's sparrow, a species listed by the state of Missouri as imperiled in the state (S2), was also found in surveys in May and June 2003 both north and south of I-70 within the Big Muddy Refuge and Overton Bottoms Conservation Area.

Reduced habitat diversity in developed areas (i.e., interchanges) limits the occurrence and variety of wildlife. Typical species associated with these habitats include birds such as robin, starling, house sparrow, house wren, cardinal and mockingbird and mammals such as eastern gray squirrel and other rodents that use these areas for feeding, roosting or nesting.

Primary impacts to wildlife of the project area are associated with direct avoidance and mortality during construction and habitat loss (see impacts to land cover—Chapter III.G.3). During construction of the recommended preferred alternative, wildlife displacement and mortality would result from excavation, vibration and soil compaction associated with the operation of heavy equipment. These impacts, however, would be of a limited duration and are thus not anticipated to be significant.

Operational mortality would increase with the recommended preferred alternative as increased traffic volumes and wider roadway would result in a greater incidence of vehicle-animal collisions. All terrestrial and avian species are subject to vehicle-induced mortality. Birds may become victims of highway traffic as they search for food and grit or as they cross the highway. Slower moving reptiles and amphibians also become victims of the fast moving traffic on this expanded highway. Mammals represent the largest number of vehicle-animal collisions with raccoons, opossum and rabbits being the most common. Vehicle collisions with the white-tailed deer are also common and can cause substantial damage to the vehicle and may injure the vehicle occupants. This impact, however, is not expected to be as great (as compared to an alternative in a new location) because improvements to I-70 entail widening of the existing roadway.

3. Terrestrial Impacts

The No-Build Alternative would result in no impacts to terrestrial ecology and cover types as it does not entail land disturbance or habitat alteration activities.

The discussion below addresses the potential impacts of the recommended preferred alternative to terrestrial communities. There are two prominent impact classes: (1) direct impact resulting from the conversion of habitats to developed land; and (2) indirect impacts that arise as a

consequence of habitat modification/conversion. Potential direct effects of the project on each terrestrial cover type correspond to the magnitude of habitat conversion as presented in Table III-18. Such impacts include the direct mortality of vegetation and less mobile faunal species locally reduced primary productivity, displacement of mobile faunal species and increased runoff from paved surfaces. Potential indirect impacts typically associated with highway development projects include:

- reduction in local floral and faunal species diversity due to the effects of habitat fragmentation;
- alteration of wildlife movement patterns; and
- increased incidence of road kills.

Table III-18: Land Cover Impacts

Cover Type	North Alternative		South Alternative		Recommended Preferred Alternative	
	ac	ha	ac	ha	ac	ha
Upland Deciduous Forest	25.0	10.1	30.4	12.3	160.7	65.0
Bottomland Deciduous Forest	2.3	0.9	0.1	0.0	20.1	8.1
Old Field	36.9	12.5	32.5	13.2	43.2	17.5
Early Successional Forest	5.5	2.2	8.5	3.4	48.8	19.7
Pasture	38.4	14.6	38.9	15.7	387.4	156.8
Row Crops	0	0	0.4	0.2	126.2	51.1
Urban Developed*	53.6	21.7	30.4	12.3	377.4	152.7
Wetlands and Jurisdictional Ponds	5.4	2.2	5.0	2.1	12.1	4.9
Non-Jurisdictional Ponds					0.9	0.4
Total					1,176.8	476.2

** Includes the existing I-70 corridor.*
Source: MACTEC, 2004

However, such indirect impacts to terrestrial resources for the recommended preferred alternative (i.e., expansion of the existing transportation alignment) would be less than an alternative on a separate or new alignment that crosses land currently unbroken by roadways. An alternative at a new location would result in higher occurrences of roadkills and alterations of wildlife movement patterns as compared to the expansion of an existing roadway system (recommended preferred alternative).

The recommended preferred alternative would, however, result in some additional fragmentation of local terrestrial resources due to the direct conversion of habitat caused by the addition of lanes and frontage roads. In some cases, stream relocations may disrupt faunal movements. Additionally, slightly higher roadway mortality would be expected due to the increased number of lanes and frontage roads to be crossed. Furthermore, the frontage roads would allow for secondary development in areas previously not accessible, leading to additional habitat loss.

Additionally, a total of 20.7 acres (8.4 hectares) of CRP lands would be used for the recommended preferred alternative. Proper coordination with NRCS and local property owners will be conducted to coordinate land acquisition with CRP agreement expiration dates to minimize additional project cost.

Comparatively, the North Alternative and South Alternative result in similar impacts to land cover and terrestrial resources (see Table III-18). For example, old field habitats (primarily located

within the Overton Bottoms floodplain) account for 36.9 acres (12.5 hectares) along the North Alternative and 32.5 acres (13.2 hectares) along the South Alternative. Additionally, upland forest impacts along the North Alternative would be 25.0 acres (10.1 hectares), as compared to 30.4 acres (12.3 hectares) with the South Alternative.

No impacts to land cover or terrestrial resources would occur with the No-Build Alternative as it would not result in land clearing or habitat alteration.

H. Water Quality and Aquatic Ecology

1. Water Quality

There are two classified waterways that collect runoff and drain from this section of I-70: the Petite Saline Creek (watershed) and the Missouri River. In general, the drainage pattern in unnamed tributaries is from north to south through box culverts under the existing interstate. These unnamed tributaries flow south into Petite Saline Creek, which then discharges into the Missouri River approximately 7.5 river miles (12.1 kilometers) south of the existing I-70 bridge. The Missouri Clean Water Commission has established safe use designations for individual watercourses. Petite Saline Creek's designated uses include Livestock and Wildlife Watering, Protection of Warm Water Aquatic Life and Human Health – Fish Consumption, Whole Body Contact Recreation and Boating and Canoeing. The Missouri River's designated uses include Irrigation, Livestock and Wildlife Watering, Protection of Warm Water Aquatic Life and Human Health – Fish Consumption, Boating and Canoeing, Drinking Water Supply and Industrial (MDNR, 10 Code of State Regulations [CSR] 20-7, Stream Classifications and Use Designation).

The Petite Saline Creek is on a biocriteria reference list for Missouri streams (10 CSR 20 7). As such, the Petite Saline Creek is a high-quality creek with a low rate of pollutant loading and an aquatic invertebrate community of good quality.

Potential impacts to water quality resulting from roadway construction activities may be short-term or long-term in nature. Short-term impacts are primarily related to the construction phase, whereas long-term impacts could be associated with both the construction and operational and maintenance phases. Impacts to water quality during construction typically result from elevated turbidity levels and the deposition of sediment into neighboring surface waters. Increased sedimentation and turbidity can adversely affect aquatic primary production as well as feeding rates and reproductive success of aquatic organisms. However, fish and benthic macroinvertebrate communities may recover quickly after the cessation of construction activities. Water column turbidity and sedimentation rates associated with construction activities generally return to baseline levels upon the completion of project construction and the establishment of good vegetative cover. Long-term water quality will not be adversely affected by the proposed improvements.

The recommended preferred alternative would cross (impact) a total of 47 jurisdictional streams. Of these stream crossings, 22 are perennial streams and 25 are intermittent (Table III-19). (Note: An individual stream crossing may be represented by more than one entry in Table III-19 for both the north and south sides of I-70.)

Table III-19: River and Stream Crossings and Relocation Impacts

Stream Number	Location				Soil Mapping	Water of the U.S.	Impact Type	OHWM Width (feet)	Jurisdictional Impact Length		Impact Area (acres)	
	Approx. Station	Side	USGS*	Field					feet	meters	acres	hectares
Cooper County (CC)												
STR 1	14	South	I	I	NH	No	NA	NA	NA	NA	NA	NA
S. STR 2 West A	60-63	South	I	P	NH	Yes	Relocation	3	382	116.4	0.026	0.011
S. STR 2 West B	63	South	I	P	NS	Yes	Culvert	20	146	44.5	0.067	0.027
S. STR 2 East A	63	South	I	P	NH	Yes	Culvert	10	243	74.2	0.056	0.023
S. STR 2 East B	74	South	I	I	NH	Yes	Culvert	5	293	89.4	0.034	0.014
N. STR 2 West A	63	North	I	P	NH	Yes	Culvert	20	247	75.2	0.113	0.046
N. STR 2 East B	77-86	North	I	I	NH	Yes	Relocation	3	964	293.8	0.066	0.027
S. STR 3	124	South	I	P	NH	Yes	Culvert	13	331	100.9	0.099	0.040
N. STR 3A	124	North	I	I	NH	Yes	Culvert	10	186	56.6	0.043	0.017
N. STR 3B	118	North	I	I	NH	Yes	Culvert	3	160	48.9	0.011	0.004
S. STR 4	134	South	I	I	NH	Yes	Culvert	4	305	92.9	0.028	0.011
S. STR 5	141	South	I	I	NH	Yes	Culvert	2.5	323	98.5	0.019	0.008
N. STR 5.5	155	North	I	I	NH	Yes	Culvert	2	140	42.8	0.006	0.002
S. STR 6	176	South	I	P	NHI	Yes	Culvert	6.5	417	127.2	0.062	0.025
N. STR 6	174	North	I	P	NHI	Yes	Culvert	10	185	86.2	0.042	0.017
S. STR 7	185	South	I	P	NHI	Yes	Culvert	7	193	58.8	0.031	0.013
N. STR 7	185	North	I	P	NHI	Yes	Culvert	7	120	36.5	0.019	0.008
S. STR 8	209	South	I	I	NH	Yes	Culvert	4.5	268	81.8	0.028	0.011
S. STR 9	227	South	I	P	NH	Yes	Culvert	4.5	215	65.4	0.022	0.009
N. STR 9-A	225	North	I	P	NH	Yes	Culvert	4.5	135	41.2	0.014	0.006
N. STR 9-B	222-225	North	I	I	NH	Yes	Relocation	3	403	122.9	0.028	0.011
S. STR 10A	258	South	I	P	NH	Yes	Culvert	10	131	40.0	0.030	0.012
S. STR 10B	264	South	I	I	NH	Yes	Culvert	3	156	47.7	0.011	0.004
S. STR 10C	262	South	I	P	NH	Yes	Culvert	15	98	30.0	0.034	0.014
N. STR 10A	258	North	I	P	NH	Yes	Culvert	10	213	65.0	0.049	0.020
N. STR 10A Trib.	252-258	North	I	I	NH	Yes	Relocation	2	539	164.3	0.025	0.010
S. STR 10.5	299-306	South	I	P	NHI	Yes	Relocation	8	750	228.6	0.138	0.056
N. STR 10.5	297	North	I	P	NHI	Yes	Culvert	6	231	70.5	0.032	0.013
S. STR 11	306	South	P	P	NHI	Yes	Culvert	15	257	78.5	0.089	0.036
N. STR 11	306	North	P	P	NHI	Yes	Culvert	15	180	54.9	0.062	0.025

Table III-19: River and Stream Crossings and Relocation Impacts

Stream Number	Location				Soil Mapping	Water of the U.S.	Impact Type	OHWM Width (feet)	Jurisdictional Impact Length		Impact Area (acres)	
	Approx. Station	Side	USGS*	Field					feet	meters	acres	hectares
S. STR 12	318	South	I	I	NH	No	NA	NA	NA	NA	NA	NA
S. STR 13	331	South	P	P	NHI	Yes	Culvert	20	274	83.6	0.126	0.051
N. STR 13A	331	North	P	P	NHI	Yes	Culvert	20	79	24.1	0.036	0.015
N. STR 13B	350	North	I	P	NHI	Yes	Culvert	6	81	24.8	0.011	0.004
N. STR 13C	337	North	I	P	NHI	Yes	Culvert	10	204	62.1	0.047	0.019
N. STR 13D	336	North	I	I	NH	Yes	Culvert	2	44	13.3	0.002	0.001
S. STR 14	341-348	South	I	I	NHI	Yes	Relocation	8	1,011	308.2	0.186	0.075
S. STR 15	390	South	I	I	NHI	Yes	Culvert	15	267	81.4	0.092	0.037
N. STR 15	390	North	I	I	NHI	Yes	Culvert	15	115	35.2	0.040	0.016
S. STR 16	396	South	I	P	NH	Yes	Culvert	12.5	319	97.2	0.092	0.037
N. STR 16	396	North	I	P	NH	Yes	Culvert	12.5	175	53.5	0.050	0.020
S. STR 16.5	412	South	I	I	NH	No	NA	NA	NA	NA	NA	NA
S. STR 17	420	South	I	I	NH	Yes	Culvert	3	174	53.1	0.012	0.005
N. STR 17	420	North	I	I	NH	Yes	Culvert	3	160	48.8	0.011	0.004
S. STR 17.5	433	South	I	I	NH	Yes	Culvert	3	121	37.0	0.008	0.003
S. STR 18	445	South	I	I	NH	Yes	Culvert	4.5	210	64.0	0.022	0.009
N. STR 18	445	North	I	I	NH	No	NA	NA	NA	NA	NA	NA
S. STR 19	453	South	I	P	NH	Yes	Culvert	20	605	184.4	0.278	0.113
N. STR 19	453	North	I	I	NH	Yes	Culvert	4	228	69.4	0.021	0.008
S. STR 20	476	South	I	P	NH	Yes	Culvert	5	256	78.1	0.029	0.012
N. STR 20	474	North	I	P	NH	Yes	Culvert	5	194	59.2	0.022	0.009
S. STR 21	493	South	I	I	NH	Yes	Culvert	4	338	103.1	0.031	0.013
N. STR 21	493	North	I	I	NH	Yes	Culvert	4	175	53.2	0.016	0.006
S. STR 22	498	South	I	P	NH	Yes	Culvert	12.5	417	127.1	0.120	0.049
N. STR 22	500	North	I	P	NH	Yes	Culvert	12.5	202	61.5	0.058	0.023
S. STR 23	519	South	I	I	NH	Yes	Culvert	7	383	116.8	0.062	0.025
N. STR 23	520	North	I	I	NH	Yes	Culvert	7	148	45.2	0.024	0.010
S. STR 24	535	South	I	P	NHI	Yes	Culvert	6	169	51.6	0.023	0.009
N. STR 24	535	North	I	P	NHI	Yes	Culvert	4	179	54.5	0.016	0.006
S. STR 25	540	South	I	I	NH	Yes	Culvert	9	188	57.2	0.039	0.016
N. STR 25	540	North	I	I	NH	Yes	Culvert	6	114	34.6	0.016	0.006
S. STR 26	543	South	I	I	NH	No	NA	NA	NA	NA	NA	NA

Table III-19: River and Stream Crossings and Relocation Impacts

Stream Number	Location		USGS*	Field	Soil Mapping	Water of the U.S.	Impact Type	OHWM Width (feet)	Jurisdictional Impact Length		Impact Area (acres)	
	Approx. Station	Side							feet	meters	acres	hectares
S. STR 27	553	South	I	I	NH	Yes	Culvert	1.5	36	11.0	0.001	0.000
S. STR 28	567	South	I	P	NHI	Yes	Culvert	12	378	115.3	0.104	0.042
N. STR 28	567	North	I	P	NHI	Yes	Culvert	6	149	45.5	0.021	0.008
N. STR 28 E. Trib.	567-577	North	I	P	NHI	Yes	Relocation	7	1211	369.0	0.195	0.079
S. STR 29A	591	South	I	I	NH	Yes	Culvert	5	281	85.8	0.032	0.013
S. STR 29B	612	South	I	P	NH	Yes	Culvert	4	41	12.6	0.004	0.002
S. STR 30	640	South	I	I	NH	Yes	Culvert	5.5	242	73.9	0.031	0.013
N. STR 30A	637-640	North	I	I	NH	Yes	Relocation	2	284	86.5	0.013	0.005
N. STR 30B	628	North	I	I	NH	Yes	Culvert	4	33	10.0	0.003	0.001
S. STR 31	659	South	I	I	NH	Yes	Culvert	6	149	45.4	0.021	0.008
N. STR 31	659	North	I	I	NH	Yes	Culvert	6	45	13.7	0.006	0.002
S. STR 33	690	South	I	I	NH	Yes	Culvert	6	123	37.6	0.017	0.007
N. STR 33	690	North	I	I	NH	No	NA	NA	NA	NA	NA	NA
Missouri River(1,2)	795	North	P	P	H	Yes	Bridge	200	25	7.6	0.115	0.047
Subtotal Cooper County Jurisdictional Streams									**18,038**	**5,498.0**	**3.311**	**1.350**
Boone County												
Missouri River(1,2)	795	North	P	P	H	Yes	Bridge	100	25	7.6	0.057	0.023
S. STR 1	817	South	I	P	NH	Yes	Culvert	4	270	82.3	0.025	0.010
S. STR 1 E. Seep	820	South	I	I	NH	No	NA	NA	NA	NA	NA	NA
S. STR 2	848	South	I	P	NHI	Yes	Culvert	20	446	135.8	0.205	0.083
S. STR 3	852	South	I	I	NHI	No	NA	NA	NA	NA	NA	NA
Subtotal Boone County Jurisdictional Streams									**741**	**226**	**0.287**	**0.116**
Total Cooper County and Boone County Jurisdictional Streams									**18,779**	**5,724.0**	**3.598**	**1.467**

Notes:
NH = Non-hydric soil; H = Hydric Soil; NHI = Mapped Soil Series Contains Hydric Inclusions; NW = Non-wetland; OHWM = ordinary high water mark
** USGS classification based upon topographic map. Field modified based on field determinations.*
(1) Missouri River OHWM width is 1,218 feet (Cooper County 613 feet, Boone County 605 feet).
(2) The impacts to the Missouri River are based upon the placement of three 25-foot by 100-foot piers -- two in Cooper County and one in Boone County.

In many cases existing culverts will be extended to construct the additional highway lanes. In most situations, crossings will be designed at right-angles to minimize impacts. Culverts will be installed at grade and the discharge channel equipped with energy dissipation features to protect against bed degradation. Eight stream relocations are anticipated with the recommended preferred alternative. This will entail a relocation of approximately 5,544 feet (1,670 meters) (see Table III-19). Potential impacts associated with these relocations include direct mortality of aquatic biota, localized impacts to water quality and loss of riparian habitat. Any required stream relocations will be mitigated for by restoring a channel of similar length adjacent to the proposed limits of highway construction, where possible or through the use of grade control structures and/or stream mitigation at other locations.

To prevent contamination of streams, wetlands, ponds or other water impoundments adjacent to the project area, job construction specifications will require procedure be followed in accordance with the Missouri State Operating Permit, MO-R100007 (Appendix H) or subsequent operating permit.

Through MoDOT's approved plan, the control of water pollution is to be accomplished by the use of MoDOT's Pollution Prevention Plan, which specifies berms, slope drains, ditch checks, sediment basins, silt fences, rapid seeding and mulching and other erosion control devices or methods as needed. These temporary measures employed during construction are to be coordinated with planned erosion control features to ensure effective and continuous erosion control. In addition all construction and project activities will comply with all conditions of the USACE permit, MDNR water quality certification and other governmental agencies' rules and regulations with jurisdiction over waters of the United States.

Prior to the initiation of any construction, a water quality certification is required for any project that involves discharge of dredge material or the placement of fill into waters of the United States. This certification is a joint process through the state and the USACE Section 404 permit program of the Clean Water Act (CWA). During this process, the state of Missouri has the authority to issue Water Quality Certifications under Section 401 of the CWA verifying that the project will not violate water quality standards. Since this project involves the placement of fill into waters of the United States, a Section 404 CWA permit application will be submitted to the USACE and MDNR. Generally, a complete Section 404 permit application, as determined by the USACE, provides MDNR the needed information to issue the Section 401 certification. Water quality conditions included in the certification become conditions of the Section 404 permit. It is anticipated that this project will receive a Section 401 certification with conditions to protect the waters of the United States.

Roadway operation and maintenance activities are associated with long-term effects of increased motor vehicle traffic resulting in higher pollutant levels reaching surface water resources. Some anticipated pollutants associated with motor vehicle operations are toxic heavy metals, oil and grease, herbicides, deicing salt, rubber, asbestos, etc. ("Evaluation and Management of Highway Runoff Water Quality," FHWA-PD-96-032, 1996). These pollutants can move through the environment as runoff, splash and spray. Highway runoff on receiving streams can be minimized through design, construction, operational features such as the use of vegetated drainage ditches, preservation of riparian areas, wet detention basins, erosion control features and deicing control management.

Comparatively, the North Alternative and South Alternative crossing the Missouri River each result in three stream crossings. Each alternative crosses the Missouri River on a new bridge and would result in similar in-stream effects associated with pier construction. Potential water quality effects as discussed above are, therefore, similar with each alternative. Additionally, each

alternative results in similar effects to a tributary of Moniteau Creek located east of Route BB (S. Stream 2) as both alternatives would require a culverted crossing that is perpendicular to the stream channel. Differences, however, are apparent between the North Alternative and South Alternative in the crossing of S. Stream 1, located west of Route BB. Crossing of this stream with the North Alternative is more disruptive as it would require a longitudinal encroachment and stream relocation for a distance of 1,076 feet (353 meters) and would also disrupt springs associated with this stream. By comparison, the South Alternative would entail a perpendicular crossing of an intermittent tributary of S. Stream 1 and would result in minimal effects.

The No-Build Alternative would not result in any direct impacts to water quality attributable to roadway improvements (i.e., culvert extensions, fill placement, etc.). However, ongoing pollutant loading is expected to occur in conjunction with traffic operations and ongoing maintenance activities.

2. Aquatic Ecology

According to Pflieger (1997), four principal aquatic faunal regions have been established within the state of Missouri: Prairie, Ozark, Lowland and Big River. These aquatic faunal regions are based largely upon fish species presence, distribution and range. Fish were utilized because they exhibit patterns of distribution that are strongly correlated with environmental factors such as bedrock geology, topographic relief and stream size. These factors are generally thought to be important in controlling the distributions of aquatic organisms. Other watercourse-specific parameters affecting aquatic community composition include water chemistry, stream flow characteristics, channel structure, bank structure and composition, stream gradient, water clarity, adjacent land use practices and microhabitat availability.

All streams and drainages within the I-70 SIU 3 study area belong to the Prairie Faunal Region. Aquatic life in the Prairie Faunal Region is less varied than that of other faunal regions; however, near the border of the Prairie and Ozark regions there is a more complex mixing of species. Prairie species are generally more tolerant of fluctuating environmental conditions and can penetrate well into the other regions. Fishes typical of the Prairie Faunal Region are the common carp, river carpsucker, quillback, white sucker, black bullhead, channel catfish, flathead catfish, red shiner, suckermouth minnow, creek chub, green sunfish, bluegill, largemouth bass and white crappie (Pflieger, 1997).

There are two primary waterways in the study area: the Missouri River and the Petite Saline Creek. The recommended preferred alternative crosses the Missouri River at approximately River Mile (RM) 185 near Overton Bottoms and crosses several tributaries of the Petite Saline Creek. Although several studies have been conducted in association with the Missouri River and Overton Bottoms, there is little information available for the Petite Saline Creek.

Past fisheries collections near the study area in the Missouri River have included various minnows, bluegill, freshwater drum, channel catfish, shovelnose sturgeon, carp, gizzard shad, river carpsucker, smallmouth buffalo and sauger (Grady, 1998; MDC, 1985). The Missouri River near Overton Bottoms is also an important area for pallid sturgeon population and has been the subject of a number of habitat surveys (see Chapter III.I, Sensitive Species).

A macroinvertebrate study performed on the lower Missouri River contained high numbers of sensitive mayfly (Ephemeroptera), stonefly (Plecoptera) and caddisfly (Trichoptera) taxa reflecting moderately good water quality and habitat. In contrast, sites downstream from the study area contained lower numbers of caddisflies and greater numbers of pollution tolerant

oligochaetes. This survey indicates that urbanization continues to have an effect on the macroinvertebrate community in the Missouri River (Poulton et al., 2003).

Biological surveys of the scour hole just west of the Missouri River in Overton Bottoms have also documented its value as a fishery (colonized by Missouri River fishes) and as turtle habitat. Turtles found within this habitat have included the red eared slider, false map turtle, common snapping turtle, midland smooth softshell turtle, spiny softshell turtle and the western painted turtle. No threatened or endangered turtles are known to inhabit this scour hole (Maureen Gallagher, personal communication).

Additional information on aquatic federal threatened and endangered species as well as state listed species of concern that may occur within the study area is provided in Chapter III.I, Sensitive Species.

Aquatic biota could potentially be impacted by the construction, maintenance and operation of the recommended preferred alternative. Mechanisms of impact include direct mortality, siltation/ sedimentation, pollutant loading and habitat alteration. Each mechanism varies in the degree of impact and intensity depending on individual site characteristics. More pronounced local effects may be expected to occur at crossings of small perennial streams and impoundments. A total of eight impoundments representing 1.8 acre (0.7 hectare) of aquatic habitat are expected to be drained in their entirety, thus resulting in the direct mortality of all aquatic biota. In contrast, no impacts to the aquatic biota of the Missouri River are anticipated due to its size and turbulent flow. Potential impacts can be short term or long term in nature.

Within small streams, the composition of the local fish population may be altered by a decrease in the number of intolerant fish and increase in more tolerant species. Similarly, the benthic macroinvertebrate community composition may also be modified. Less tolerant taxa (Ephemeroptera and Trichoptera) may disperse downstream and more tolerant taxa (Oligocheates and Chironomids) may colonize the area. This shift in species composition is, however, expected to be minimized by strict adherence to MoDOT's Temporary Erosion and Sediment Control Procedures. Additionally, post-construction restoration efforts would result in the stabilization of exposed areas and promote the establishment of riparian vegetative cover.

Impacts to aquatic communities would be minimized by strict adherence to MoDOT's Temporary Erosion and Sediment Control Procedures. The distribution, seasonal movements and reproductive periods of fish species would be considered prior to the initiation of construction activities near streams and their tributaries.

Effects of the North Alternative and South Alternative on aquatic biota are related to the actions and effects given in the previous section. With the exception of the potential effects to S. Stream 1, the effects are similar with each Missouri River crossing alternative. Greater potential impacts, however, may occur to the aquatic biota of S. Stream 1 with the North alternative due to the longitudinal encroachment and associated channel relocation. Effects to aquatic biota would be greatly reduced with the South Alternative as the stream is intermittent and the crossing is perpendicular.

The No-Build Alternative would not result in impacts to aquatic biota as it does not entail habitat alteration activities.

I. Sensitive Species

The Endangered Species Act of 1973 (16 United States Code 1531-1543) provides for the protection of threatened and endangered species and the conservation of designated critical habitat. The potential occurrence of federal and state listed species in the vicinity of the study area was determined through literature review, field observation and agency consultation with USFWS and MDC. As summarized in Table III-20, several of these species have been reported to occur within the study area. Other species have a reported distribution that may encompass the study area, but have not been reported from the immediate study area.

The following discussion is given according to habitat association and distribution and is limited to the 20 federal and state listed species reported to occur within the vicinity of the study area (see Appendix D, MDC letter dated Nov. 12, 2002). No agency letter was received from the USFWS.

No species of conservation concern, including state and federal listed threatened and endangered species, were observed during field reconnaissance of the study area.

There is no designated critical habitat within the study area.

Federally Listed Species

As a result of coordination efforts with USFWS, four federally listed species require consideration as part of the I-70 Second Tier Studies. Discussion regarding each of these species is provided below.

Pallid Sturgeon

Pallid sturgeon (*Scaphirhynchus albus*) is present in the Missouri River through its entire length of the state. The pallid sturgeon is a benthic (bottom-dwelling) fish that prefers turbid, swift-flowing water of various depths. Earlier studies indicated that the pallid sturgeon does not have a restricted home range and may move long distances. Side channels, wing dams and other channel training structures provide important foraging, over-wintering and nursery habitat for riverine fish species including the pallid sturgeon (Atwood, 2000; Pitlo, 1998; USACE, 1999; Dunn and Johnson, 2000; Jacobson and Laustrup, 2000). Dike systems contribute to habitat diversity because they are comprised of a mosaic of steep banks, sandbars, deep channel habitat types and a variety of microhabitats (USACE, 1999).

The Missouri River at Overton Bottoms is one area with several documented captures of pallid sturgeon and it is the location of several ongoing monitoring and telemetry studies (Delonay, personal communication; Doyle and Starostka, 2003; Grady, personal communication). Past studies have documented the movement of pallid sturgeon in the area of the existing I-70 bridge crossing at Rocheport, Missouri. For example, a female tagged with a radio transmitter had recently remained in a two-mile (3.2-kilometer) reach of the Missouri River in the proximity of the bridge since March 2003 (Delonay, personal communication). In 2002, six live pallids were captured using gill nets on the Missouri River between RM 180-190. Of these, four were previously tagged, stocked pallids and two were presumed of wild origin.

Table III-20: Federal and State Listed Species Reported to Occur within the Vicinity of the I-70 Study Area

Common Name	Scientific Name	Federal or State Status	State Rank	Recently Reported in Study Area	Location in Study Area
Aquatic Species					
Lake Sturgeon	*Acipenser fulvescens*	E†	S1	[2]Y	Missouri RM 180-190
Alabama Shad	*Alosa alabamae*	--	S2	[4]N	--
Highfin Carpsucker	*Carpiodes velifer*	--	S2	[4]N	--
Blue Sucker	*Cycleptus elongatus*	--	S3	[2]Y	Missouri RM 180-190
Plains Killifish	*Fundulus zebrinus*	--	S2	[4]N	--
Brassy Minnow	*Hybognathus hankinsoni*	--	S3	[4]N	--
Plains Minnow	*Hybognathus placitus*	--	S2	[2]Y	Missouri RM 180-190
Sturgeon Chub	*Macrhybopsis gelida*	--	S3	[2]Y	Missouri RM 180-190
Sicklefin Chub	*Macrhybopsis meeki*	--	S3	[2]Y	Missouri RM 180-190
Silver Chub	*Macrhybopsis storeriana*	--	S3	[2]Y	Missouri RM 180-190
Ghost Shiner	*Notropis buchanani*	--	S2	[2]Y	Missouri RM 180-190
Trout-perch	*Percopsis omiscomaycus*	--	S1?	[4]N	--
Flathead Chub	*Platygobio gracilis*	E†	S1	[4]N	Missouri RM 143
Paddlefish	*Polyodon spathula*	--	S3	[2]Y	Missouri RM 180-190
Pallid Sturgeon	*Scaphirhynchus albus*	E*,†	S1	[1,2]Y	Missouri RM 180-190
Aquatic Macroinvertebrates					
Perlid Stonefly	*Attaneuria ruralis*	--	S3	[3]N	--
Spring Stonefly	*Hydroperla fugitans*	--	S3	[3]N	--
Terrestrial Species					
Indiana bat	*Myotis sodalis*	E	E	Y	Riparian areas
Gray bat	*Myotis griscesens*	E	E	Y	Boone County
Henslow's sparrow	*Ammodamus henslowii*	--	S2	[3]Y	Overton Bottoms
Plants					
Bergia	*Bergia texana*	--	S2	[5]N	--
Buffalo Grass	*Buchloe dactyloides*	--	S1	[5]Y	Eastbound right of way
Slender Ladies' Tresses	*Spiranthes lacera* var. *gracilis*	--	S3	[5]‡	--

Federal or State Status:

**Federal Status*
†State Status
E – Endangered

State Rank:

S1 – Critically imperiled in the state
S2 – Imperiled in the state
S3 – Rare and uncommon in the state
? – Denotes inexact or uncertain ranks

Reported in Study Area:

[1, 2, 3, 4]Suitable habitat is present within the study area.
‡This species variation is no longer tracked by MDC.

Sources: *[1]Delonay, A.J. (personal communication). [2]Doyle and Starostka, 2003. [3]Poulton, B.C. (personal communication), [4]Grady, J. (personal communication). [5]Smith, T. (personal communication)*

The presence of pallid sturgeon within this reach of the Missouri River has been attributed to habitat modifications conducted by the USACE to assist with the reintroduction of the pallid sturgeon. A dike field consisting of deep notched L-dikes has allowed higher flows which have created shallow sand bar habitat on the inside of the L-dikes (Doyle and Starostka, 2003; Grady, personal communication; MDC agency letter dated Nov. 12, 2002). In addition to existing available habitat and habitat modifications in the Overton Bottoms area of the Missouri River, pallid sturgeon reintroduction efforts have included stocking 2,696 hatchery-produced pallids at Boonville (RM 195) in 2002 (Doyle and Starostka, 2003).

The USFWS pallid sturgeon sampling program along the Missouri River in vicinity of Overton Bottoms has resulted in the collection of pallid sturgeons at several locations. A review of Missouri River hydrograph maps from 1994 and 2001 shows both sandbars and localized scour holes located in the river both upstream and downstream of the bridge.

Discussions with the USFWS indicate that deep scour holes, often behind the bridge piers and at wing dam tips can provide overwintering habitat for the pallid sturgeon. One such localized scour hole is downstream of the I-70 bridge pier at Rocheport. In recent samplings, they were found along a sandbar upstream of the bridge, near the Taylor's Landing boat ramp as well as downstream at the left bank wing dikes.

The fishery sampling program has also indicated that pallid sturgeon is often found along with the shovelnose sturgeon (*Scaphirhynchus platorhynchus*), which is not endangered, indicating some overlap in habitat requirements.

The combination of scour holes, deeply notched L dikes, and sandbars provides an appropriate habitat complex for the endangered pallid sturgeon. While this habitat complex is present just north of the I-70 Rocheport bridge near Taylor's Landing, it is not as prevalent downstream of the bridge. Indeed, in a recent meeting on March 4, 2004, USFWS representatives indicated that the areas upstream of the existing bridge were more valuable to pallid sturgeon due to habitat variability (chute/side channel habitat, wing dams, sand bars, scour holes, etc.) and the presence of a stable substrate that may be suitable for pallid sturgeon spawning. Additionally, USFWS representatives expressed a preference for the I-70 improvements on the south side (i.e., downstream) of the existing bridge. Such habitat complexity is not as well represented within the I-70 Improvement Corridor downstream of the bridge (as compared to upstream).

Based on available fishery data and habitat complex requirements, it appears that the downstream corridor, located just south of the existing bridge, would have no impact on the pallid sturgeon. Future design and location of bridge piers would, however, be coordinated with USFWS and MDC during the design phase to consider seasonal patterns of habitat use, to avoid potential habitat and to enhance existing habitat.

Indiana Bat

Indiana bat (*Myotis sodalis*) is a state and federally listed endangered species that may be found throughout the state. The wintering range is generally south of the Missouri River and the summer range generally north of the Missouri River. Caves are used for the hibernaculum during the winter, while trees are preferred for females and their young in the summer months. According to the MDC, there are fewer than 30 caves or mines which are known to have sizable Indiana bat colonies (Elliot, personal communication). The bats have very specific habitat requirements for their winter hibernation sites.

The Indiana bat is known to use the Rocheport (also known as Boone) Cave during the winter months and Lewis and Clark Cave. These caves are located between one and three miles (1.6 and 4.8 kilometers) south of I-70 in the Overton Bottoms area of the Missouri River. The Indiana bats come into the cave shortly after the gray bats have left, (generally in October) and stay until March. According to a recent MDC census, approximately 200 Indiana bats are present over the winter months. However, not all the bats will leave the cave's vicinity during the summer months. Some of the Indiana bats, typically males, will stay near the cave and continue foraging nearby. There are probably no additional important hibernaculum in the I-70 corridor.

The MDC indicated that both of the caves described above are structurally sound and likely have limited vulnerability to the effects of the construction activity that will be of limited scope and duration and occur over one mile (1.6 kilometer) away. There would be no anticipated impact on the Indiana bat as a result of the I-70 Improvement Project at these locations.

The females and their young spend the summer months in maternity colonies in both riparian and upland woodlands where suitable roost trees are present. The preferred roost trees have exfoliating, loose or platy bark, or scars from fire or lighting strikes or other damage that allow the bats entry in a hollow or cavity in the tree. The tree could also be dead or declining in vigor and have bark that is in the process of sloughing off. Female maternity colonies prefer to roost under the sloughing bark.

Trees that provide Indiana bat roosts are considered ephemeral. Roost longevity can vary depending on the condition of the tree. Some roosts may be habitable for only one or two years, while others with good bark retention may provide roosting habitat for four to eight-years (USFWS, 1999).

While it is generally accepted that Indiana bats use floodplain and riparian forests as their primary habitat during the summer, research has also indicated the importance of upland forest in the Indiana bat's natural history. Upland forests have been found to be important areas for roost locations (Clark et al., 1987; Gardner et al., 1991; Callahan et al., 1997; MacGregor, 1996).

Birth occurs in late June and early July (Easterla and Watkins, 1969; Humphrey et al., 1977). The young become capable of flight between mid-July and early August (Mumford and Cope, 1958; Cope et al., 1974; Humphrey et al., 1977; Clark et al., 1987; Gardner et al., 1991; Kurta et al., 1996).

Indiana bats feed at night on flying aquatic and terrestrial insects, including moths, mosquitoes and flies. The foraging areas of Indiana bats include floodplain, riparian and upland forests, particularly areas in and around the tree canopies. In riparian areas, Indiana bats forage along stream corridors and associated bottomland forests. Streams, impounded bodies of water such as ponds and their associated forests are considered preferred foraging areas for pregnant and lactating female Indiana bats (USFWS, 1999). These bats may fly up to 1.5 mile (2.4 kilometers) from upland roosts to preferred foraging areas (USFWS, 1999). In upland areas, Indiana bats forage among the canopies of upland forests, upland ponds and waterholes and often times along the borders of agricultural fields and pastures (USFWS, 1999).

There are likely additional areas within the I-70 corridor that provide seasonal habitat to the Indiana bat. MoDOT recognizes the importance of minimizing the effects of habitat loss, especially with respect to habitats that could be used by threatened and endangered species. As stated above, the Indiana bat frequently utilizes riparian woodlands as foraging areas. In order to assess potential effects of the proposed improvement on the Indiana bat, the relative magnitude of habitat loss was investigated. Within the context of SIU 3, approximately 1,816 acres

(735 hectares) of floodplain forested habitat occurs within five miles (eight kilometers) north or south of existing I-70 that may be used by Indiana bat for foraging. In comparison, the proposed improvements (including the North Alternative and South Alternative) would affect approximately 1.7 acres (0.7 hectare) or less than 0.1 percent of this habitat. Based on this relatively minimal impact, the proposed improvements are not expected to impact the Indiana bat foraging habitat.

The USFWS previously used a guidance that focused on not cutting suitable roost trees during the breeding season (April 1 through September 30) to avoid negative impacts on the species. The USFWS now advocates reviewing projects on a case-by-case basis focusing on the following criteria: the projects proximity to known hibernacula; maternity, male roosts and/or important foraging areas; the composition of the woodland; the land use of the area after the project is complete; location in Knox, Macon and Shelby counties; and consideration of the magnitude, scope, frequency and duration of the proposed action with regard to the importance of the area to the Indiana bat.

To address USFWS and MDC concerns, MoDOT would review the Natural Heritage Data Base periodically during the project development process to identify any new locations of Indiana bat activity. The Missouri Department of Transportation would continue consultation with the USFWS to avoid or minimize potential impacts to this species.

Gray Bat

The gray bat (*Myotis grisescens*) was listed by the USFWS as endangered in 1976. The gray bat has a limited geographic range and requires caves or mine shafts year around for its habitat. The species' habitat requirements are very specific and only a fraction of the caves within the geographic range will meet the species' habitat parameters. The winter and summer caves will have slightly different characteristics for the bat's specific habitat requirements. They do not generally occupy the same cave on a year around basis unless the cave is sufficiently large to have a variety of habitats available.

The gray bat is particularly vulnerable to habitat disturbance during their winter hibernation periods in caves. Many of the caves where these bats are known to occur have had access limited by the construction of gates which allow for free movement of the bats but minimize human intrusion. A single disturbance could have the bats utilize enough energy reserves that their survival could be in jeopardy. The hibernation period, during winter months, is when the bats are most susceptible to human disturbances. Other caves are used in summer months for the rearing of their young. These summer caves are located near rivers or lakes almost always within one-half mile (0.8 kilometer).

Gray bats are known to inhabit Rocheport Cave (also known as Boone Cave) and Lewis and Clark Cave. These caves are located between one and three miles (1.6 and 4.8 kilometers) south of I-70 in the Overton Bottoms area of the Missouri River. These sites are the only known colonies within five miles (eight kilometers) of I-70. Rocheport Cave is generally known as one of the most important gray bat maternity caves in the state of Missouri. Generally, gray bats begin arriving at the caves in June and stay until August. A recent MDC census places the number of gray bats present in the estimated range of 34,000 to 36,000 individuals.

Rocheport Cave is less than one-half mile (0.8 kilometer) long and is relatively narrow, ranging from 35 to 75 feet (10.7 to 22.9 meters) in width. It has a commercially developed trail within the southern half of the cave. The cave is generally oriented in a north-south direction with a single secondary cave extending to the east of the primary cave.

There was some concern on the part of the USFWS that there could be construction impacts on Rocheport Cave and disturbance of the gray bats. However, according to MDC cave and endangered species representatives, the Rocheport Cave is located in karst topography and the limestone structure effectively dampens the potential impacts of sound and vibration.

The MDC indicated that both of the caves in question are structurally sound and likely have limited vulnerability to the effects of construction activity that will be of limited scope and duration and occur over one mile (1.6 kilometer) away. There would be no anticipated impact on the gray bat as a result of the I-70 Improvement Project.

MoDOT is committed to working with the USFWS and MDC to avoid, minimize and mitigate, as appropriate, for impacts of their projects. MoDOT would continue to consult with the USFWS and MDC during the I-70 Improvement Project. MoDOT would periodically review the Natural Heritage Database for updated information on the locations of gray bats in the I-70 project area and coordinate with USFWS and MDC on the gray bat issues prior to construction.

Running Buffalo Clover

Running buffalo clover (*Trifolium stoloniferum*) is a native clover of Missouri and was thought to have been extirpated from the state until 1989, when it was rediscovered growing on an unattended dirt pile in St. Louis. A natural site was discovered in Madison County in 1994 and a second followed in Maries County in 1998. It is a perennial that grows from 4 to 20 inches (10.6 to 51 centimeters) tall, blooming generally from mid-May through June. Its appearance is very similar to other clovers found in the state.

Running buffalo clover was recently discovered along the Loutre River, near the existing I-70 crossing. The sites where the plants were found appear to be in or adjacent to disturbed areas as well as in riverine settings, along the first wooded terrace or bench above the river. It has been thought that disturbance, such as that formerly provided by the herds of buffalo in Missouri, is instrumental in the species propagation and distribution. Running buffalo clover does not appear to compete well with other species of clover. Currently mowing and grazing can provide that disturbance which appears to be necessary for the plant's distribution.

The I-70 Improvement Corridor crosses the Loutre River, near the site of the most recent discovery of running buffalo clover. The I-70 Improvement corridor's proposed right of way along the Loutre River crossing was surveyed by a local botanist consultant hired by MoDOT and no plants were located in the area of direct effect (i.e., anticipated right of way and construction easement area). Running buffalo clover is not known to occur within SIU 3.

Since it will likely be a number of years before the I-70 Improvement is constructed, the distribution of this endangered plant could change over time. MoDOT would review the Natural Heritage Database periodically for new locations of the running buffalo clover and would conduct a survey for the running buffalo clover at least one year prior to construction and clearing activities at the locations noted below and any new areas identified from the Natural Heritage Data Base. The Missouri Department of Transportation would commit to conducting running buffalo clover surveys at the Loutre River crossing, the Auxvasse Creek crossing in SIU 6, the Cedar Creek crossing in SIU 5 and the Lamine River crossing in SIU 2 prior to construction.

The Missouri Department of Transportation would also continue consulting with the USFWS and MDC on this plant species and would develop or improve habitat for the plant when feasible to do so as part of the construction activities.

The Missouri Department of Transportation recognizes the importance of riverine corridors for a variety of benefits, including habitats suitable for endangered species such the Indiana bat and running buffalo clover. The Missouri Department of Transportation has developed a stream mitigation and enhancement plan for the major river crossings, including those noted above.

Aquatic Species of Concern
Several aquatic species of concern were identified as a result of the natural heritage database search. As indicated by Table III-20, several of these species such as Alabama shad, highfin carpsucker, trout-perch and flathead chub (state-endangered) are incidental or uncommon inhabitants of the Missouri River. These species are infrequently found within the study area and are not likely to be impacted by the proposed project. Similarly, the two stonefly species are big river species that have been collected from other reaches of the Missouri River (Poulton, personal communication) and in spite of the extensive biological studies conducted in the vicinity of Overton they have not been documented within the study area. Given that the area of disturbance within the river is expected to be minimal (i.e., that area associated with pier construction), no major impacts to these species are anticipated.

Two other species, the plains killifish and the brassy minnow, are more frequently inhabitants of smaller sized streams (less frequently the Missouri River mainstem). These species have not been documented from the study area and are, therefore, not likely to be impacted by the proposed project.

Several species observed within the study area are state ranked S2 (imperiled) or S3 (rare and uncommon). These species have all been collected from the Missouri River near Overton Bottoms and include blue sucker (S3), plains minnow (S2), sturgeon chub (S3), sicklefin chub (S3), silver chub (S3), ghost shiner (S2) and paddlefish (S3). Because the proposed improvements would not result in significant water quality degradation or alteration of the Missouri River habitat, no significant impacts to these species are anticipated.

Lake sturgeon (state endangered) has also been reported from the Missouri River at Overton Bottoms. The lake sturgeon is a benthic (bottom-dwelling) fish that prefers turbid, swift-flowing water of various depths. This fish occurs primarily over firm, silt-free bottoms of sand, gravel and rock (Pflieger, 1997). In 2002, 17 lake sturgeons were captured in gill nets and three were captured in trawls in the vicinity of Overton Bottoms between RM 180-190 (Doyle and Starostka, 2003).

Although lake sturgeon has been reported from the project area, they are not abundant. Potential impacts to this species are associated with any proposed crossing of the Missouri River. Individual specimens potentially occurring in the vicinity of the proposed crossing during bridge construction would either be unaffected or may demonstrate some short-term avoidance of the construction area.

State Listed Terrestrial Faunal Species – Henslow's sparrow, a species listed by the state of Missouri as imperiled (S2), was also found in surveys conducted by USFWS in May and June 2003 both north and south of I-70 (Gallagher, personal communication, 2003). This secretive grassland species was found associated with early successional habitats within the Big Muddy Refuge and the Overton Bottoms Conservation Area. While only a few specimens were observed during the surveys, it is likely that the habitats at Overton Bottoms are used by Henlsow's sparrow for nesting. Potential impacts to this species include the loss of this habitat of approximately 10 acres (4.1 hectares) for foraging and nesting (estimated to be 50 percent of the area affected

within the Big Muddy Refuge and Overton Bottoms Conservation Area). However, given the abundance of such habitats within the Overton Bottoms area (see Chapter III.A.2.a), no notable impacts are expected to occur.

State Listed Terrestrial Floral Species – Three state-ranked plant species reported to occur within the vicinity of the study area include *Bergia texana*, buffalo grass (*Buchloe dactyloides*) and slender ladies' tresses (*Spiranthes lacera* var. *gracilis*).

Bergia texana is an emergent aquatic species state-ranked S2 that inhabits mud flats, pond fringes and sandy lake beds (Mohlenbrock, 1992). An existing population of this species is located in Boone County about 0.6 mile (0.96 kilometer) north of existing I-70.

Buffalo grass is a range grass state-ranked S1 with existing populations in Boone and Cooper counties. This species has been sporadically introduced in Missouri and inhabits loess hill prairies, roadsides, railroads and open, disturbed areas (Yatskievych, 1999). Buffalo grass was observed south of the east bound rest area in 1993 (Smith, personal communication). No specimens of buffalo grass were observed during field reconnaissance of the study area.

Slender ladies' tresses can be observed in a variety of habitats including dry, upland forests and prairies and disturbed areas such as old fields, powerline corridors, cemeteries and lawns (Yatskievych, 1999). This variation is distinguished from *Spiranthes lacera* by having tightly spaced flowers in condensed spirals (Yatskievych, 1999). Although this species variation retains the state rank of S3, its locations are no longer recorded by MDC due to the increased number of existing sites reported within the last 20 years (Smith, personal communication). The three historical Boone County records for this species within the vicinity of the study area are from the 1930s and 1940s and the reported location data for these sites is vague (Smith, personal communication).

Based on available information, buffalo grass is the only state-listed floral species known to occur within the study area of SIU 3. Consequently, impacts to state-listed plant species would be limited to potential impacts (i.e., removal due to construction activities) to the buffalo grass community located near the eastbound rest area (should the population still exist).

The No-Build Alternative would not impact sensitive species as it does not entail any habitat alteration activities.

J. Special Waste/Hazardous Materials

A hazardous material reconnaissance and assessment was conducted for the I-70 SIU 3 project area. The purpose of the reconnaissance was to (1) identify and assess significant sites within the study area that were identified within the I-70 First Tier EIS and (2) identify sites that potentially represent health and safety concerns to workers or that would result in high remediation and clean-up costs.

For the purpose of this report, hazardous wastes and materials are defined as products or wastes regulated by the USEPA or MDNR. These include substances and sites regulated under the Comprehensive Emergency Response, Compensation and Liability Act.

The hazardous waste assessment for the I-70 corridor involved data collection efforts, including review of numerous government agencies' lists and files, as well as a limited field reconnaissance

of the corridor. A review of regulatory databases was conducted by Environmental Data Resources (EDR) of Southport, Connecticut. The database findings were provided in a report titled "EDR Environmental Atlas™" dated Aug. 12, 2003, Inquiry Number 11019359.1p. The EDR report is not included as a part of this document.

The databases searched by EDR included the following with additional supplemental federal, state and/or local databases:

Federal Databases

- National Priority List;
- Comprehensive Environmental Response, Compensation and Liability Information System;
- Comprehensive Environmental Response, Compensation and Liability Information System – No Further Remedial Action Planned;
- Corrective Action Report;
- Emergency Response Notification System; and
- Resource Conservation and Recovery Information System Databases (Treatment, Storage and Disposal, Large Quantity Generator, Small Quantity Generator):
  - Registered Hazardous Waste Transport, Storage and Disposal Facilities
  - Registered Hazardous Waste Generators.

Missouri State Databases

- Hazardous Waste Sites;
- Landfill and/or Solid Waste Disposal Sites;
- Leaking Underground Storage Tank (LUST) Site;
- Registered Underground Storage Tank (UST) and Aboveground Storage Tank (AST) Sites; and
- Voluntary Cleanup Program.

Potential Sites

No landfills or Comprehensive Emergency Response, Compensation and Liability Act type (Superfund) sites that would be impacted by the I-70 corridor expansion were identified in the review process. Sites such as service stations, active and abandoned, with AST, UST and LUST tanks and generators of designated regulated material were included in the reconnaissance and assessment.

In all, 24 sites were identified within the study area as having the high potential to be affected by the location of a transportation facility. Several of the sites are large, working commercial facilities which are in the study area and are included for regulatory reasons, but assumed to be avoided for other reasons.

In general, these sites can be characterized from the EDR report as follows: three Resource Conservation and Recovery Information System-Small Quantity Generator, three LUST, 14 USTs, two ASTs and two spills. Based on a review of the EDR database findings and the results of the field reconnaissance, 16 sites, as identified in Table III-21, have been identified within the study area as having a potential need to remediate contaminated soil and/or groundwater. In many cases, detailed information regarding these sites is either incomplete or lacking. For example, prior to 1988, USTs could be closed in-place without confirming if contamination had taken place. As a result, all USTs removed, closed in-place, or abandoned prior to 1988 must be considered as representing a potential source of contamination. Consequently, a definitive assessment of the need to remediate at each location is not possible.

Table III-21: Potential Hazardous Waste Sites within the SIU 3 Project Area

Site ID	Site Location	Federal/State Program List	Comments	Potential for Impact
Interchange at Route BB				
Suspected Abandoned Gas Station	Route BB, approx. 900 feet (274.3 meters) north of westbound I-70 lanes	Not listed	Potential for abandoned USTs that would potentially require soil remediation.	No impact
Suspected Abandoned Gas Station	Route BB, approx. 600 feet (182.9 meters) north of westbound I-70 lanes	Not listed	Potential for abandoned USTs that would potentially require soil remediation.	No impact
Abandoned Gas Station	Route BB, approx. 600 feet (182.9 meters) south of eastbound I-70 lanes	Not listed	May be listed as Phillips 66 UST (two) removed with groundwater monitoring. Potential for soil contamination and/or groundwater contamination is medium risk	No impact
Suspected Abandoned Gas Station	Route BB, approx. 100 feet (30.5 meters) from westbound off-ramp	Not listed	Potential for abandoned USTs that would potentially require soil remediation.	Displaced. Potential for soil remediation.
Interchange at Route 179				
Phillips 66 Station (Missouri River Tire Company/ Convenience Store)	Southeast quadrant of interchange	ASTs (three)	Relocate ASTs and containment bay. Unregulated wastewater lagoon east of property used for sanitary waste may require remediation. Risk for sanitary waste is high.	Facility within Interchange area, high potential for relocation. Sanitary waste lagoon to be displaced by westbound I-70 exit ramp.
Interchange at Route 87				
Conoco Food Store	Northeast quadrant of interchange	USTs (six), LUST (closed)	Potential UST closure and removal and potential soil remediation. Potential for remediation is medium risk.	Displaced, may require remediation
Phillips 66	Northwest quadrant of interchange	USTs (three), AST (one)	UST closure and removal, AST relocation and potential for soil remediation. Potential for remediation is medium risk.	No direct impact.
Suspected Abandoned Gas Station	Route 87, approx. 850 feet (259.1 meters) north of westbound I-70 lanes	Not listed	Potential for abandoned USTs that would potentially require soil remediation.	Displaced by north outer road
Interchange at Route B				
Jump Stop #29	2450 South Main, Boonville	USTs (three)	UST closure and removal and potential soil remediation. Potential for remediation is medium risk.	No impact
Amoco Oil SS #354	I-70 and Route B, Boonville	Not listed – Multiple ASTs in rear of property, southwest quadrant	Potential closure, relocation and rearrangement of AST cluster. Potential for soil remediation is low.	AST area will be displaced by south outer road

Table III-21: Potential Hazardous Waste Sites within the SIU 3 Project Area

Site ID	Site Location	Federal/State Program List	Comments	Potential for Impact
Break Time	I-70 and Route B, Pioneer and Americana STS	USTs (three)	UST closure and removal and potential soil remediation. Potential for remediation is medium risk.	Displaced by westbound I-70 off-ramp
Bobber Auto Truck Plaza	Southeast quadrant of interchange	USTs (seven)	UST closure and removal and potential soil remediation. Potential for remediation is medium risk.	No impact
Jim's Auto Body	16278 Old 5 Drive	Not listed	Small Quantity Waste Generator – identification not listed on EDR. May be conditionally exempt.	Displaced, low potential for remediation.
Interchange at Route 5				
Pilot Travel Center	North of interchange along west side of Route 5	USTs (seven)		No impact
Zeller Marine Boat Shop	Southwest quadrant of interchange along Route 5	LUST, SPILLS, UST (removed)	Remediation could be required if soils are disturbed during construction phases. Potential for additional remedial action is low to medium risk.	No impact. Facility may be relocated due to site position. Excavation and land farming for LUST
Suspected Abandoned Gas Station	Route 5, approx. 350 ft south of westbound I-70 lanes	Not listed	Potential for abandoned USTs that would potentially require soil remediation.	No impact or displacement with current design. Facility may be relocated due to site position.

Additionally, speculation as to the remedial methods or their associated costs is not practical. Special or hazardous wastes encountered during construction shall be handled and disposed of in accordance with all applicable state and federal regulations. Similarly, should any wells be located in close proximity to such sites, all appropriate control measures shall be employed to avoid the potential for groundwater contamination. The following presents a discussion of those sites potentially affected by the recommended preferred alternative.

Route BB Interchange

Four sites were identified at the Route BB interchange, all of which are suspected or confirmed as abandoned gasoline stations. Two sites are located north of I-70 and two sites are located south of I-70. Three UST sites were identified in the EDR database at the I-70 and Route BB interchange: Rocheport Junction 66, Rocheport FINA and Phillips 66. Each of these sites were identified within the UST database as having all of the USTs removed, with the exception of Rocheport Junction 66, which had one UST permanently closed in-place. One site, most recently used as an antique store, located on the west side of Route BB south of I-70, will be displaced.

Based on a review of site conditions and information contained in the database searches, the potential need to remediate contaminated soil within this interchange is moderate to high.

Route 179 Interchange

One site, Missouri River Tire Company and Convenience Store, identified as an unmappable orphan site on the EDR report, has three active ASTs in-place and a lagoon that will be displaced by the new facility. The ASTs are located in a concrete containment basin, so potential for petroleum soil contamination is low at this site. There is a lagoon to the east of the property that is used for sanitary waste and wastewater. Remediation, restoration and/or relocation of the lagoon will be required.

Route 87 Interchange

Two sites, Conoco Food Store and I-70 Phillips 66 are identified in the EDR database and were visually inspected. Conoco Food Store will be displaced by the recommended preferred alternative. The Conoco station currently has six USTs and one closed, excavated LUST. There is also a suspected abandoned gasoline station approximately 850 feet (259.1 meters) north of I-70 on Route 87 which will be displaced by the proposed north outer road. Based on a review of site conditions and information contained in the database searches, the potential need to remediate soil within this interchange area is moderate to high.

Route B Interchange

Three sites were identified on the EDR database and correlate with the information gathered from field reconnaissance. The Amoco Oil SS #354 did not appear on the EDR database search. Two sites will be displaced by Option A. Jump Stop #29 has three USTs which will be displaced by the proposed eastbound I-70 on-ramp and Amoco Oil SS #354 has multiple ASTs in the southwest quadrant of the property which will be displaced by the south outer road. Break Time, with three USTs, will be displaced by Option B, the proposed westbound on-ramp to I-70. Bobber Auto Truck Plaza with seven USTS would not be impacted. Jim's Auto Body did not appear on the EDR database search and is located on the south outer road (Old 5 Drive).

Jim's Auto Body produces minimal waste each year (less than 1,000 kilograms) and should not constitute a potential risk to remediate. Based on a review of site conditions and information

contained in the database searches, the potential need to remediate soil within this interchange area is moderate to high for all other sites.

Route 5 Interchange
Two sites were identified on the EDR database: Pilot Travel Center and Zeller Marine Boat Shop. Pilot Travel Center has seven active USTs and Zeller Marine Boat Shop was identified as a remediated LUST site. There is a suspected abandoned gasoline station on Route 5 approximately 350 feet (106.7 meters) south of I-70. None of the sites are anticipated to be impacted or displaced by the proposed improvements. Based on a review of site conditions and information contained in the database searches, the potential need to remediate is low to moderate within this interchange area.

Potential involvement of the North Alternative and South Alternative with hazardous or special waste issues would be similar, as each alternative would disrupt such potential sites in the vicinity of the interchange at Route BB in Rocheport. No other special or hazardous waste sites were identified along the length of these alternatives to crossing the Missouri River.

No land or site disturbance activities would be conducted for the No-Build Alternative. Consequently, the No-Build Alternative would not entail any involvement in hazardous or special waste issues.

K. Floodplains/Floodways

Floodplains
Executive Order 11988, Floodplain Management (1977) requires that federal agencies consider alternatives to avoid adverse impacts and incompatible development in floodplains. When available, flood hazard boundary maps (National Flood Insurance Program) and flood insurance studies for the project area are used to determine the limits of the base (100-year) floodplain and the extent of encroachment. The Federal Emergency Management Agency (FEMA) and FHWA guidelines 23 CFR 650 define the base (100-year) flood as the flood having a one percent probability of being equaled or exceeded in any given year. The base floodplain is the area of 100-year flood hazard within a county or community.

FEMA maps were reviewed as part of the identification of mapped floodplains within the study area. The floodplain of the Missouri River is the most expansive floodplain within the project area (see Figure III-1). The 100-year FEMA floodplain extends from the eastern bluff near Rocheport to the western river bluff for a distance of approximately 9,560 feet (2,914 meters). West of the Missouri River, four tributaries of Petite Saline Creek have designated floodplains. Floodplains associated with these tributaries follow the tributary from the south and extend north of I-70 in the vicinity of the interchanges with Routes B and 179.

Floodplains are important natural resources that provide numerous benefits. One primary function is to provide temporary floodwater storage, thereby diminishing flooding impacts to downstream areas by dissipating excess water over larger areas. As a result, floodplains decrease soil erosion by reducing flow velocity and retaining water-borne silt and sediment. Floodplains also act as natural filtration systems by trapping sediments, pollutants and excess nutrients, thereby improving water quality. Undisturbed floodplains typically support diverse floral and faunal habitats that provide a number of fish and amphibian species with spawning areas and migratory birds with resting, feeding and nesting habitats.

The Missouri River floodplain experienced extensive flooding as a result of the flood events in 1993 and 1995. The peak flood level in the 1993 flood was just short of overtopping I-70. This was an unusually large flood in terms of flow volume, duration and maximum flow rate. As a result of the high-flow velocity, a large scour hole was created at the west abutment of the I-70 bridge that is nearly 600 feet (182.9 meters) wide and nearly 2,000 feet (609.6 meters) long. After the flood events, many area farmers began to sell their agricultural land adjacent to the Missouri River to the USACE. As a result, over 5,000 acres (2,025 hectares) have been converted to refuge or conservation areas managed by the USFWS (the Big Muddy Refuge) and MDC (the Overton Bottoms Conservation Area). No FEMA/State Emergency Management Agency buyout lands are present within the study area.

An agricultural flood protection levee system was initially constructed along the west (right) descending bank of the river. In conjunction with the Missouri River Mitigation Property, the USACE constructed a new set-back levee approximately 2,000 feet (609.6 meters) west of the primary levee. Subsequent to the completion of this new levee, the USACE intermittently breached the old agricultural levee, thereby allowing the expansion of flood waters.

Floodplain encroachment would occur at each of the mapped floodplain crossings along tributaries of the Petite Saline Creek and south of I-70 in the Overton Bottoms Wildlife Conservation Area. As summarized in Table III-22, each of these crossings would require the placement of fill material within the 100-year floodplain.

Table III-22: Impacts to Floodplains

	Floodplain Impacts	
Stream Number*	**Acres**	**Hectares**
Stream 10	5.3	2.2
Stream 10.5 and 11	8.5	3.4
N. Stream 13	0.9	0.4
S. Stream 13	0.1	<0.1
Stream 19	2.5	1.0
Stream 24	4.5	1.8
Missouri River Floodplain – North Alternative	50.8	20.6
Missouri River Floodplain – South Alternative (Preferred)	50.0	20.2
Total*	71.8	29.0

* Includes the recommended preferred alternative only.
Source: MACTEC, 2003

In total, the impacts to floodplains would consist of approximately 72 acres (29.0 hectares). Impacts to floodplains have been minimized to the extent practical by avoiding and minimizing encroachment. For example, at all floodplains, I-70 crosses at nearly perpendicular angles, thereby minimizing the effects of longitudinal encroachments.

Potential impacts to floodplains involving loss of floodplain storage area shall be mitigated for by providing appropriately sized compensatory storage areas. Within Overton Bottoms, the location and design of such compensatory storage facilities shall be determined in consultation with USFWS, USACE and MDC. Using this coordinated approach, such facilities may also be designed to incorporate and accommodate agency plans for wildlife and wetland habitat development.

Potential encroachment on floodplains would be similar with both the North Alternative and the South Alternative. Respective impacts of each of these alternatives on the floodplain of the Missouri River are 50.8 acres (20.6 hectares) and 50.0 acres (20.2 hectares).

No encroachment on designated floodplains would occur with the No-Build Alternative as it does not entail any construction activities.

Floodways

The regulatory floodway comprises the channel of a river plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood discharge can be conveyed without increasing the base flood elevation more than an established surcharge depth (maximum of one foot [0.3 meter] under federal and state standards). A floodway boundary is a regulatory line used to restrict development within the channel and, generally, a portion of the adjacent floodplain of a river. FEMA has mandated that projects can cause no rise in the regulatory floodway (i.e., no increase in the flood elevation). For projects that involve the state of Missouri, the State Emergency Management Agency issues floodplain development permits. In the case of projects proposed within regulatory floodways, a no-rise certificate, if applicable, should be obtained prior to issuance of a permit.

Within Boone County, on the left descending (east) bank of the Missouri River, a FEMA regulatory floodway boundary exists. Cooper County, on the right descending (west) bank of the river, also participates in the Flood insurance Program. However, a regulatory floodway boundary for the west bank of the Missouri River has not been adopted within Cooper County. The hydraulic model developed by FEMA for the Boone County Flood Insurance Study defines a full floodway, west bank as well as east bank, but that floodway was not adopted by Cooper County for inclusion in the Cooper County Flood Insurance Study.

Backwater

Backwater is defined as the maximum increase in flood elevation that a bridge creates over that which would have existed in the absence of the bridge. Based on observed high-water marks and hydraulic modeling, the backwater created by the existing I-70 bridge during the 1993 flood was approximately 2.63 feet (0.8 meter) at a point 1.3 mile (2.1 kilometers) upstream of the bridge. A backwater of one foot (0.3 meter) or larger existed, based on hydraulic modeling, for a distance of nearly 10 miles (16.1 kilometers) upstream of I-70.

For the 50- and 100-year frequency flood flow rates (USACE, 2003), the maximum backwater that would be created by the existing bridge and road embankment would be 1.21 foot (0.4 meter) and 1.6 foot (0.5 meter), respectively. The 50-year backwater would exceed one foot (0.3 meter) for a distance of more than three miles (4.8 meters) upstream of I-70 and the 100-year backwater would exceed one foot (0.3 meter) for a distance of approximately six miles (9.7 kilometers). It should be noted here that the existing bridge and road approaches were designed and constructed prior to the establishment of a floodway on the Missouri River. These backwater data constitute an existing condition and are not the result of the proposed action.

Under MoDOT's current design criteria, new bridges must have a backwater for the design flood of not greater than one foot (0.3 meter). For the proposed project (North Alternative or South Alternative), the improvements within Overton Bottoms shall be designed and constructed so as to result in no additional increase in upstream backwater. In situations where the proposed new bridge will be in the vicinity of an existing bridge that has an existing backwater and other regulations (e.g., FEMA) or criteria do not control, MoDOT makes a case-by-case decision as to

whether design of the new bridge should consider the existing bridge backwater or only the backwater associated with the new bridge (Personal communication, Brian Haeffner, MoDOT, 2003). Factors in that decision include ownership and proximity of the existing bridge. It would appear that for the proposed additional I-70 bridge, the combined backwater of the two bridges would be considered. However, as discussed under the Floodway section, a floodway exists at this location and consequently, the new bridge design would need to demonstrate a no-rise condition, resulting in a no additional backwater.

No impacts to regulatory floodways would occur with the No-Build Alternative as it does not entail any construction activities.

L. Wetlands and Waters of the United States

1. Regulatory Overview

The USACE has authority to administer a permit program to regulate the discharge of dredged or fill material into waters of the United States and obstructions to navigation under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. These federal statutes prohibit the discharge of dredge material or placement of fill into waters and the obstruction of navigation without a Department of the Army permit. In accordance with these laws, the USACE will review and evaluate project plans and issue permits as defined by 33 CFR Parts 320-331 and the Rivers and Harbors Act. The USACE, Kansas City District has jurisdiction over the water resources in the area in which the SIU 3 project area is located. In accordance with the Missouri I-70 Corridor Interagency Partnering Agreement (see Appendix G), it was the intent of FHWA, USACE, USEPA and USFWS to complete the National Environmental Policy Act and Section 404 process in a cooperative process. However, because construction on the proposed improvement is not imminent and a 404 permit will not be needed for several years, the merged National Environmental Policy Act/404 process will not be used for SIU 3. USACE permits are issued contingent on water quality certification issued under Section 401 of the CWA by the MDNR. In accordance with a Memorandum of Agreement dated Jan. 1994 with the USACE, the Natural Resources Conservation Service has regulatory authority over the delineation of farmed wetlands.

Other regulatory permits such as a U.S. Coast Guard Section 9 Bridge Permit (Rivers and Harbors Act), MDNR stormwater permit and FEMA/State Emergency Management Agency floodplain development permit (and if in a floodway a no-rise certificate) are also required.

In response to these regulatory mandates, a thorough water resource inventory (streams, wetlands and ponds) was conducted as part of the natural resource investigation within the study area. Potentially jurisdictional waters were identified during the alternate development stage in conjunction with natural resource constraints mapping. Detailed field delineations of water resources were performed within limits of construction for the recommended preferred alternative.

The Missouri Department of Transportation Environmental Methodologies, I-70 Second Tier Environmental Studies (Kansas City to St. Louis, Missouri), dated Jan. 2003 (available upon request) outlined the methodology used to identify streams and locations of jurisdictional wetlands and ponds. Rivers, streams, wetlands and ponds occurring within the project corridor were identified utilizing a variety of existing data sources including:

- National Wetland Inventory maps;
- USGS 7.5 minute topographic quadrangle maps;
- aerial photography (dated 2001);
- Cooper County and Boone County soil surveys ;
- Cooper County and Boone County NRCS hydric soils list;
- NRCS wetland inventory maps for Cooper and Boone counties; and
- FEMA Flood Insurance Rate Maps.

Windshield surveys were performed within 350 feet (106.7 meters) of each side of the I-70 center line with a review of the available mapping for use in the evaluation of the north/south mainline alternatives (see Chapter II.B). Rivers and streams were initially identified on USGS maps and wetlands were initially identified using National Wetland Inventory and NRCS maps. Subsequent field reconnaissance was conducted to confirm mapped resources and identify additional resources. Subsequent to the selection of the south mainline alternative and the development of limits of construction, a detailed field delineation of wetlands and other waters was conducted using the USACE 1987 Wetland Delineation Manual. The delineation effort was performed in Sept. and Oct. 2003 by MACTEC personnel.

2. Rivers and Streams

The field determination of streams as jurisdictional resources was based upon the presence of an ordinary high water mark, bed and bank and the presence of documented surface water connections to navigable waters of the United States. According to 33 CFR 328.3, the term ordinary high water mark means: “the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” In general, the ordinary high water mark (OHWM) for a stream is usually determined through an examination of the recent physical evidence of surface flow in the stream channel. Watercourses that contain bed and bank and exhibit an OHWM are classified as waters of the United States and regulated by the USACE.

Field investigations resulted in the identification of 37 jurisdictional stream crossings. (Note: An individual stream crossing may include both the north and south sides of I-70 or the same stream may be impacted at two or more locations.) The stream impact quantifications presented in Table III-19, however, separates the stream impacts for each side of I-70 and each impacted stream section. Most of the streams in Cooper County flow from north to south into the Petite Saline Creek and ultimately to the Missouri River. Most of the streams had an established stream bed and bank with an OHWM and were, therefore, considered jurisdictional waters of the United States. Tributary streams of Petite Saline Creek were typically small, with channel widths ranging from five to 20 feet (1.5 to 6 meters). Substrate and in-stream cover were found to be variable depending on overall stream gradient, bank stability and degree of riparian zone development.

Several intermittent and perennial streams were found to be fed (at least seasonally) by groundwater discharge. For example, an unnamed tributary of Moniteau Creek is a small

(five- to 20-foot [1.5- to 6.1-meter] wide) stream with a well developed riparian corridor near the eastern terminus of SIU 3. According to MDNR (Geological Survey and Resource Assessment Division), this stream is also designated as a losing stream south of I-70 and a gaining stream north of I-70. The close association that this stream has with groundwater is also evident for a number of streams identified west of Route BB and west of Overton Bottoms.

Photographs and pertinent information about each stream and the adjacent riparian area are presented on stream data forms in the I-70 SIU 3 Draft Wetland and Stream Delineation Report (MACTEC, 2004) (available upon request).

The Missouri River is a large, central aquatic feature of the SIU 3 study area. It is a navigable water of the United States and will be crossed by a new bridge. As such, the bridge will require a Section 10 Rivers and Harbors Act permit and any fill impacts below OHWM will require a CWA Section 404 permit. The bridge will be located south (downstream) of the existing bridge crossing. The new bridge will be placed parallel to the existing bridge and will meet U.S. Coast Guard requirements for vertical and horizontal clearance of the navigation channel.

3. Wetlands

The USACE and the USEPA jointly define wetlands as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands generally include swamps, marshes, bogs and similar areas.

The wetlands within the study area were delineated in accordance with the USACE 1987 Wetland Delineation Manual. The results of detailed wetland delineations are presented in detail in a separate Wetland and Stream Delineation Report (MACTEC, 2004) and are illustrated in overview in Figure III-1. Potential wetland areas are considered jurisdictional wetlands if they meet all three wetland criteria: hydrophytic vegetation, hydric soils and wetland hydrology (USACE, 1987). In addition, wetlands must be hydraulically connected or adjacent to jurisdictional waters in order to be classified as jurisdictional wetlands (U.S. Supreme Court ruling, Solid Waste Agency of Northern Cook County). Typically, this includes wetlands located within the floodplain of a jurisdictional river or stream.

The wetlands within the study area consist of palustrine and farmed wetlands. Palustrine wetlands are further divided based on hydrology, landscape position and vegetation (USFWS, 1979). Palustrine wetlands are classified according to dominant vegetation as palustrine unconsolidated bottom (PUB), palustrine emergent (PEM) wetlands, palustrine scrub-shrub (PSS) and palustrine forested (PFO) wetlands. All these palustrine types are present in the study area. Farmed wetlands (FW) consist of active row crop or pasture that meet the wetland soil and hydrology criteria but are currently used for agriculture.

Wetland communities represent transitional areas between aquatic and terrestrial habitats. Wetlands generally occur within a variety of landscapes including forest, pasture, cropland, old field and urban/suburban areas. As a result, wetlands reflect aspects of both aquatic and terrestrial communities. Wetland habitats are generally highly productive and maintain relatively diverse floral and faunal assemblages. While wetlands have long been recognized as providing habitat for fish and wildlife, these areas are also recognized as performing a variety of functions that are valuable to society at large. Wetland functions include groundwater recharge, flood storage, sediment retention, erosion control, nutrient removal and retention, maintenance of plant and animal communities and enhancement of water quality. While wetland communities are, in part, determined by the composition of the plant communities and certain soil characteristics,

hydrology is recognized as the driving force behind wetland development. Within the study corridor, it is apparent that position within the landscape and groundwater discharge are predominant determinants of hydrological characterization. Wetlands of the SIU 3 project area are described in more detail in the I-70 SIU 3 Draft Wetland and Stream Delineation Report (MACTEC, 2004).

a. Riparian Corridor Wetlands – West of Overton Bottoms

Several wetlands are associated with the intermittent and perennial streams and rivers within the study corridor. These palustrine wetlands are associated with the riparian corridors, most of which are tributaries to Petite Saline Creek. The following is a list of riparian corridor wetlands, in Cooper County west of Overton Bottoms:

- North Side of I-70 – N. Wetland 1 (PEM, Figure III-1, 1 of 5), 2 (PUB, Figure III-1, 2 of 5), 4 (PSS, Figure III-1, 3 of 5) and 6.5 (PEM Figure III-1, 3 of 5).
- South Side of I-70 – S. Wetland 1 (PFO Figure III-1, 1 of 5), 3 (PSS Figure III-1, 2 of 5), 4 (PEM Figure III-1, 2 of 5), 5 (PFO Figure III-1, 2 of 5), 6 (PFO Figure III-1, 2 of 5), 8 (PFO Figure III-1, 3 of 5), 9 (PFO) and Pond 15 (PFO).

Wetlands associated with these watercourses are primarily classified as palustrine forested and to a lesser extent, palustrine emergent and palustrine scrub-shrub wetlands. The dominant hydrology source for many of these wetlands is periodic overbank flooding and the ponding of direct precipitation. The dominant hydrology for a few of the wetlands is groundwater discharge.

Stream characteristics and land use practices have affected the development of riparian wetlands within some areas of the study corridor. Stream downcutting and stream bank erosion, particularly in pastures, may decrease the frequency of seasonal flooding and the hydrology required to sustain existing riparian areas.

b. Missouri River Floodplain (Overton Bottoms) Wetlands

The Overton Bottoms area is part of the Missouri River Mitigation Project managed by the USACE, Kansas City District. The Missouri River Mitigation Project is designed to mitigate, or compensate, for fish and wildlife habitat losses as the result from past channelization effects on the Missouri River. The purpose of this mitigation is to acquire, restore and preserve aquatic and terrestrial habitat on individual sites found along the project area from Sioux City, Iowa to the mouth of the Missouri River at St.. Louis, a length of 735 river miles (1,183 kilometers). Overton Bottoms is being developed by the USACE under this Missouri River Mitigation Project and leased to the MDC and USFWS. Overton Bottoms North – Big Muddy Refuge (Right Bank RM 189 – 185) and Overton Bottoms South (Right Bank RM 185 to 178) consist of approximately 5,318 acres (2,152 hectares) located in the Missouri River floodplain. This area is under development and management to create shallow water, wetland, prairies and bottomland hardwood habitats. The effects and alterations of the landscape as a result of the flood events of 1993 and 1995 are still evident today as illustrated by the scour hole located at the existing bridge. In addition, the USACE has constructed a new agricultural setback levee and plans on improving the Missouri River hydrologic connection to adjacent lands by breaching (notching) the old agricultural levee.

Wetlands within the Overton Bottoms floodplain consist predominantly of palustrine emergent communities with minor components of palustrine forested and scrub-shrub communities that varied in terms of landscape position and vegetative character.

The Overton Bottoms wetlands in proximity to the recommended preferred alternative are divided into three areas: (1) riverside of the old agricultural levee, (2) the scour hole area and (3) land-side of the new set-back levee (see Figure III-1, 5 of 5).

The river side wetlands consist of a narrow band of mature forested wetlands located adjacent to the bank of the Missouri River and bounded on the upland side by the old agricultural levee. This area receives primary hydrology from the Missouri River. This area has cottonwood, black willow and sycamore trees as its dominant species.

The scour hole area is defined as the area between the old agricultural levee (adjacent to the river) and the new set-back levee, recently constructed west of the scour hole. The scour hole is a deep (50+ foot [15.2+ meter]) erosional feature that is directly connected to the Missouri River alluvial aquifer. Therefore, the scour hole surface water elevation reflects the groundwater elevation which, in turn, responds relatively quickly to changes in the Missouri River water elevation. As a result, the scour hole allows river water (during periods of high water) to bypass the old agricultural levee and provide hydrology to the wetlands between the two levees. In some areas, the land surface elevations are at or below the 15-day inundation level (574.4 feet [175 meters] mean sea level). Therefore, the primary hydrology source for the scour hole area is (indirectly) the Missouri River. Ponding of direct precipitation and runoff may also be a factor in some areas. The dominant wetland community type in this area is PSS (*Salix* spp.) intermixed with emergent wetland communities. An early successional forested (cottonwoods) wetland is located west of the scour hole. The scour hole has an extensive mud flat developed along its southern edge, which is seasonally inundated (depending on the river level) and has limited herbaceous vegetation development.

The wetlands located on the land side (west) of the new set-back levee are protected from flooding by the new levee. The land surface elevations are above the 15-day inundation level (574.4 feet [175 meters] mean sea level). Therefore, the hydrology for these wetlands is not the Missouri River. These wetlands have developed in depressional areas, such as relict scars or shallow drainageways. The hydrology source for these wetlands is ponding of direct precipitation or local runoff on the dense clay soils. The topography has been, in part, modified to facilitate drainage for the former farm field. The majority of these wetlands are classified as emergent wetlands with minor scrub-shrub communities. These wetlands are seasonal, with ponding water present only during periods of heavy rains. During the majority of the year, these wetlands are not inundated and the vegetation communities are more indicative of old fields than wetlands.

c. Rocheport Wetlands

The jurisdictional wetlands in the Rocheport area are limited to a single riparian corridor wetland. This wetland, S. Wetland 1, is a 0.07-acre (0.03-hectare) farmed wetland that is associated with Stream 2 (unnamed tributary of Moniteau Creek, Boone County). The vegetative condition of this wetland is poor as it consists primarily of early successional weedy species.

Other areas characterized by wetland vegetation were observed in association with several isolated water bodies. These areas, however, are not considered to be jurisdictional and are therefore discussed in the following sub-chapter.

4. Ponds

Excavated ponds and impoundments with open water are located throughout the study corridor. In general these areas were created primarily for recreation or livestock watering purposes and were generally classified as palustrine, unconsolidated bottom, diked/impounded wetlands (PUB) if they were hydrologically connected to jurisdictional waters and met wetland criteria. The majority of ponds and impoundments in the study corridor were not connected to jurisdictional waters (isolated) and therefore, did not meet jurisdictional criteria. These are designated as non-jurisdictional ponds in accordance with the U.S. Supreme Court ruling, Solid Waste Agency of Northern Cook County.

In addition to excavation of ponds, ponds also form as a result of sinkholes. These sinkholes/wetlands are developed in naturally occurring depressions (sinkholes) in which the subsurface drain (swallow hole) has become sealed, preventing the water from directly entering the bedrock conduit system. In one of the sinkhole wetlands, two swallow holes were present but were not positioned to completely drain the bottom of the sinkhole. Several of the sinkholes have been modified (i.e., bermed) to increase water retention. The characteristic of these sinkholes/wetlands varied with some consisting entirely of open water, some having extensive wetland vegetated fringes and some consisting entirely of emergent wetland community with little or no open water. The sinkholes/wetlands are not considered jurisdictional resources because they are not hydrologically connected to water of the United States (U.S. Supreme Court ruling, Solid Waste Agency of Northern Cook County).

Many potential PUB wetlands or upland ponds are located in a variety of positions within the landscape. Thus, these features exhibit a wide range of characteristics (i.e., extent and composition of vegetation, water depth and clarity, etc.). Pond age and current use (i.e., recreation, livestock watering, etc.) often determines the extent and composition of vegetation. Ponds that have been recently constructed typically have steep banks and no established shoreline vegetative communities. Ponds used frequently for livestock are usually characterized by degraded banks and littoral zones, with a limited vegetative fringe.

Established PUB wetlands and ponds generally contain more extensive emergent vegetation zones and support a more diverse floral assemblage. Some impoundments appeared abandoned and were characterized by limited open water, large diverse communities of emergent vegetation and aquatic macrophytes and bank communities of herb, shrub and tree species. Fringe vegetation around PUBs typically includes cattails, sedges, smartweed and spikerush.

5. Impacts

No impacts to jurisdictional wetlands or other waters of the United States would occur with the No-Build Alternative as it does not entail any construction activities.

Potential impacts of the recommended preferred alternative to jurisdictional waters are illustrated in detail in the Wetland and Stream Delineation Report (MACTEC, 2004) and are summarized in Tables III-19, III-23 and III-24. Table III-19 presents potential impacts to each stream within the recommended preferred alternative including type of impact, stream length within the impact area, channel width at the OHWM, surface area within the OHWM and project totals. Other information in the table includes the location, the USGS/National Wetland Inventory (perennial or intermittent) designation and hydric soil designation. Data are presented west to east for each county and then combined together for the project.

Table III-23: Wetland and Jurisdictional Pond Impacts

Wetland Number	Location		NWI/ NRCS	Soil Mapping	Impact Type	Wetland Type or Open Water	Open Water Impacts		Total Open Water		Wetland Impacts		Total Wetland Area		Water of the U.S.?
	Station (approx.)	Side					ac	ha	ac	ha	ac	ha	ac	ha	
Cooper County South															
S. Pond 3 Wetland	51	South	PUBgh	NH	Fill TL	PEM					0.08	0.03	0.08	0.03	Yes
S. Pond 3	51	South	PUBgh	NH	Fill TL	OW	1.87	0.77	1.87	0.77					Yes
S. Wetland 1	60	South	None	NH	Fill	PFO					0.12	0.05	0.38	0.15	Yes
S. Wetland 1.5	153	South	None	NH	Fill TL	PEM					0.29	0.12	0.29	0.12	Yes
S. Pond 6	153	South	PUBgh	NH	Fill TL	OW	2.08	0.84	2.08	0.84					Yes
S. Wetland 2	168	South	None	NH	Fill TL	PSS					0.22	0.09	0.22	0.09	No
S. Wetland 3	184	South	None	NHI	Fill	PFO					0.06	0.02	0.1	0.04	Yes
S. Wetland 4	210	South	None	NH	Fill	PEM					0.45	0.18	0.84	0.34	Yes
S. Wetland 4.5	285	South	None	NH	Fill TL	PEM					0.08	0.03	0.08	0.03	No
S. Wetland 5	307	South	None	NHI	Fill TL	PFO					0.08	0.03	0.08	0.03	Yes
S. Wetland 6	330	South	None	NH	Fill TL	PFO					0.03	0.01	0.03	0.01	Yes
S. Wetland 8	394	South	None	NHI	Fill TL	PFO					0.11	0.05	0.11	0.05	Yes
S. Wetland 9	420	South	PUB	NH	Fill TL	PFO					0.08	0.03	0.08	0.03	Yes
S. Pond 14	505	South	None	NH	Fill	OW	0.09	0.04	1.49	0.6					Yes
S. Pond 14 Wetland	505	South	None	NH	Fill	PFO					0.07	0.03	1.49	0.6	Yes
S. Pond 15 Wetland	565	South	PUB	NHI	Fill	PFO					0.01	0	0.26	0.1	Yes
Cooper County North															
N. Wetland 1	88	North	None	NH	Fill	PEM					0.42	0.17	1.07	0.43	Yes
N. Wetland 2	301	North	PUBgh	NHI	Fill TL	PEM					0.14	0.06	0.14	0.06	Yes
N. Wetland 3	420	North	None	NH	Fill	PSS					0.11	0.04	0.87	0.35	Yes
N. Wetland 4	421	North	None	NHI	Fill	PSS					0.07	0.03	0.45	0.18	Yes
N. Wetland 5	440	North	None	NH	Fill TL	PEM					0.05	0.02	0.05	0.02	No
N. Wetland 6.5	454	North	None	NH	Fill TL	PEM					0.05	0.02	0.05	0.02	Yes
N. Wetland 7	602	North	None	NH	Fill TL	PEM					0.03	0.01	0.04	0.02	No
Cooper County Overton Bottoms															
OS. Wetland 3	709	South	None	H	Fill	PSS					0.07	0.03	1.38	0.56	Yes
OS. Wetland 4	713	South	None	H	Fill	PEM					0.26	0.11	1.16	0.66	Yes

Table III-23: Wetland and Jurisdictional Pond Impacts

Wetland Number	Location		NWI/ NRCS	Soil Mapping	Impact Type	Wetland Type or Open Water	Open Water Impacts		Total Open Water		Wetland Impacts		Total Wetland Area		Water of the U.S.?
	Station (approx.)	Side					ac	ha	ac	ha	ac	ha	ac	ha	
OS. Wetland 5	720	South	None	H	Fill	PSS					0.44	0.18	1.01	0.41	Yes
OS. Wetland 7	725	South	None	H	Fill	PEM					0.2	0.08	0.96	0.39	Yes
OS. Wetland 8	733	South	None	H	Fill	PEM					0.27	0.11	1.21	0.49	Yes
OS. Wetland 9	744	South	PEM	H	Fill	PEM					1.19	0.48	5.58	2.26	Yes
OS. Wetland 10	768	South	PEMAx	H	Fill	PFO					1.48	0.6	1.75	0.71	Yes
Scour Hole	775	South	None	NHI	Bridge/ Rock Fill	OW	1.78	0.72	30.63	12.40					Yes
OS. Wetland 12	785	South	PEMAx	NH	Bridge(1)	PSS					0.11	0.04	8.97	3.63	Yes
OS. Wetland 13	787	South	PFO1A	NH	Bridge(2)	PFO					0.06	0.02	39.29	15.9	Yes
Cooper County Subtotal Jurisdictional Impacts							**5.82**	**2.37**	**36.07**	**14.61**	**6.25**	**2.52**	**67.63**	**27.55**	
Cooper County Subtotal Non-Jurisdictional Impacts							**0**	**0**	**0**	**0**	**0.38**	**0.15**	**0.39**	**0.16**	
Boone County															
S. Wetland 1	852	South	None	NH	Fill	FW					0.07	0.03	0.07	0.03	Yes
S. Pond 8 Wetland	864	South	None	NH	Fill TL	PEM					0.19	0.08	0.19	0.08	No
S. Pond 8	864	South	None	NH	Fill	OW	0.12	0.05	0.19	0.08					No
N. Wetland 2	832	North	PEMC	NH	Fill	PEM					0.17	0.07	0.17	0.07	No
Boone County Subtotal Jurisdictional Impacts							**0**	**0**	**0**	**0**	**0.07**	**0.03**	**0.07**	**0.03**	
Boone County Subtotal Non-Jurisdictional Impacts							**0.12**	**0.05**	**0.19**	**0.08**	**0.36**	**0.15**	**0.36**	**0.15**	
Cooper County and Boone County Total Jurisdictional Impacts							**5.82**	**2.37**	**36.07**	**14.61**	**6.32**	**2.55**	**67.7**	**27.58**	
Cooper County and Boone County Total Non-Jurisdictional Impacts							**0.12**	**0.05**	**0.19**	**0.08**	**0.74**	**0.30**	**0.75**	**0.31**	

Notes:
NH = Non-hydric soil; H = Hydric Soil; NHI = Mapped Soil Series Contains Hydric Inclusions; NW = Non-wetland; NWI = National Wetland Inventory.
PUB = Palustrine Unconsolidated Bottom; PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested; FW = Farmed Wetland; OW = Open Water; TL = Total Loss.
The open water (OW) designation was used for sections of jurisdictional ponds that lack vegetation. If the pond contained vegetated areas large enough to map, these areas were classified separately as PFO, PSS or PEM wetlands.
(1) Impacts to Wetland OS12 based upon two 25-foot by 100-foot piers.
(2) Impacts to Wetland OS13 based upon one 25-foot by 100-foot pier.

MACTEC, 2004

Table III-24: Upland Pond* Impacts

Pond #	Location		National Wetland Inventory	Soil Mapping	Type	Impact Type	Area Impacted		Water of the U.S.
	Station (approx.)	Side					Ac	Ha	
Cooper County South									
1	12	South	PUBgh	NH	Excavated	Fill TL	0.51	0.21	No
5	110	South	NA	NH	Wildlife	Fill TL	0.10	0.04	No
8	223	South	PUBgh	NH	Recreation	Fill TL	0.80	0.32	No
9	376	South	PUBgh	NH	Livestock	Fill TL	0.18	0.07	No
11	418	South	PUBgh	NH	Wildlife	Fill	0.01	0.00	No
13	488	South	PUBgh	NH	Wildlife	Fill TL	0.18	0.07	No
Cooper County North									
2	181	North	PUBgh	NH	Livestock	Fill TL	0.24	0.10	No
5	380	North	None	NH	Wildlife	Fill TL	0.04	0.02	No
Cooper County Subtotal Non-Jurisdictional Impacts							**2.06**	**0.83**	
Boone County									
1**	828	North	PUBgh	NH	Sinkhole	Fill	0.02	0.01	No
5**	839	South	PUBgh	NH	Sinkhole	Fill TL	0.26	0.11	No
6**	842	South	PUBgh	NH	Sinkhole	Fill	0.04	0.02	No
7**	844	South	PUBgh	NH	Sinkhole	Fill TL	0.17	0.07	No
Boone County Subtotal Non-Jurisdictional Impacts							**0.49**	**0.21**	
Cooper County and Boone County Total Non-Jurisdictional Impacts							**2.55**	**1.04**	

NH = Non-hydric soil; H = Hydric Soil; NHI = Hydric Inclusions; TL = Total Loss of pond

** These ponds are isolated and therefore not considered jurisdictional waters of the U.S.*

*** Naturally occurring sinkhole ponds. Only current use is for wildlife.*

Table III-24 presents potential impacts to non-jurisdictional upland ponds within the recommended preferred alternative including type of impact, pond type and area of impact and jurisdictional determination. In total 2.55 acres (1.04 hectare) of upland ponds would be impacted by the recommended preferred alternative (impacts include direct fill actions and loss due to drainage of the impoundment).

Indirect wetland and pond impacts could occur where a wetland or pond is split by the fill footprint (limits of construction fill) and a portion of the wetland or pond remains outside the fill line. Potential effects of such indirect impacts include the alteration of wetland hydrology (changes in flow patterns, watershed area, etc.) and isolation or fragmentation of wetlands and ponds. Degradation of water quality may also occur due to the effects of erosion and sedimentation, increased nutrient loading and reduced shading by riparian vegetation.

a. River and Stream Impacts

Streams will be either bridged, culverted or relocated. Most streams currently flow in culverts under I-70. With the widening of I-70 to the south, these pipes/box culverts will be extended to a

new discharge location. A total of 37 streams including the Missouri River will be affected. The only bridged impact is the Missouri River. The Missouri River bridge impacts are based on the placement of three 25-foot by 75-foot (7.6-meter by 22.9-meter) piers, or a total area of 0.172 acre (0.07 hectare). Streams meandering parallel to I-70 will most likely be relocated further from the highway. Eight streams will be relocated for a total length of 5,544 feet (1,670 meters). The total length of stream channel that will be culverted (not including relocations) in Cooper County is 12,494 feet (3,808 meters). The total length of stream channel that will be culverted or bridged (not including relocations) in Boone County is 741 feet (226 meters). Therefore, the total jurisdictional stream impacts (relocations, culverted, bridged) for the recommended preferred alternative is 18,779 feet (5,724 meters).

In addition, construction methods such as cofferdams, sand islands/causeway and false work, etc. may induce temporary fill impacts to the Missouri River. Barges used to unload materials and equipment with temporary ramps adjacent to the construction site may also cause further local river impacts. These impacts, however, are not expected to be significant and would be minimized further during bridge design to reduce disruption to river substrates, the river bank and aquatic biota.

b. Wetland Impacts

Study alternates were refined and evaluated with a goal of avoiding and minimizing impacts to wetland resources to the extent practicable. Numerous environmental and transportation/ engineering variables were considered during alternate development and evaluation. The avoidance and minimization of impacts to wetlands was a major consideration during the process of locating the recommended preferred alternative. The No-Build Alternative would result in no impacts to wetlands.

The assessment of potential impacts to wetlands was based upon direct wetland losses relating to the placement of fill material or bridging the wetland as well as potential indirect effects related to changes in vegetation and hydrologic characteristics.

Within the recommended preferred alternative alignment, field investigations were performed at all potential wetland sites. Table III-23 presents potential impacts to each wetland for the recommended preferred alternative including type of impact, wetland type and area of impact. Other information in the table includes the location and hydric soil designation. The data are presented west to east for SIU 3 in total as well as by county. Tables III-23 and III-24 identify direct wetland and pond impacts resulting from the placement of fill material within the limits of construction for the project. In total, approximately 12.07 acres (4.88 hectares) of wetlands would be impacted within Cooper County and 0.07 acres (0.03 hectares) within Boone County. Most PUBs, however, were not considered jurisdictional wetlands and have been identified separately as ponds in Table III-25 and are discussed in the following section.

Potential wetland impacts are similar, but slightly greater with the North Alternative (5.4 acres [2.18 hectares]) as compared to the South Alternative (5.04 acres [2.03 hectares]).

c. Pond Impacts

Table III-24 presents potential impacts to each pond potentially affected by the recommended preferred alternative including type of impact, pond type and area of impact and jurisdictional determination. In total 2.55 acres (1.04 hectares) of upland ponds would be impacted by the recommended preferred alternative.

Table III-25: Summary of Estimated Impacts to Wetlands and Jurisdictional Ponds

Wetland Type	Recommended Preferred Alternative		North Alternative		South Alternative	
	Acres	Hectares	Acres	Hectares	Acres	Hectares
FW	0.07	0.03	0.07	0.03	0.07	0.03
PEM	3.35	1.36	3.63	1.46	2.41	0.98
PSS	0.80	0.32	0.13	0.05	0.52	0.21
PFO	2.10	0.85	0.22	0.09	1.43	0.56
OW*	5.82	2.36	1.35	0.55	0.61	0.25
Total	12.14	4.91	5.40	2.18	5.04	2.03

** Includes area of scour hole crossed.*

FW = farmed wetland, PEM = palustrine emergent wetland, PSS = palustrine scrub shrub wetland, PFO = palustrine forested wetland, OW = open water.

Source: MACTEC, 2003

6. Mitigation

Project applicants requesting a Section 404 permit must demonstrate that they have taken all appropriate measures to avoid and minimize effects to wetlands, prior to the USACE giving consideration to mitigation of impacts. The alternative analysis presented in Chapter II.B, implements avoidance and minimization strategies for this project. Detailed future designs may further reduce impacts. However, unavoidable adverse impacts as identified in Tables III-19, III-23 and III-24 will require mitigation. Such mitigation will be prescribed by the USACE in accordance with the following general national policy and agency guidance:

- Presidential policy and USACE Headquarters policy as to no net loss of wetlands.
- RG -02-02, Dec. 24, 2002 directing USACE mitigation policy to
  - use functional assessment tools,
  - improve mitigation performance standards, and
  - impose stronger requirements for monitoring of wetland mitigation sites.

A one to one replacement ratio is typically used for farmed wetlands because these areas are generally considered of fairly low quality and their functions can be replaced quickly. Consequently higher mitigation ratios are proposed for emergent and forested wetlands (ranging from one to one, to four to one) because they typically have higher functional values. The replacement ratios are also higher for forested wetlands due to the relatively longer time to develop mature wetland systems. Actual mitigation requirements shall be determined through the permitting process with the USACE and the MDNR.

It is anticipated that a stream mitigation ratio of one to one would be used. Consequently, the total stream mitigation based upon relocations is approximately 5,544 feet (1,690 meters)

Corridor-wide mitigation planning is currently being addressed by the Study Management Group. A meeting was held with MODOT, MDNR, NRCS, MDC, USACE, FHWA, and HNTB on June 24, 2004 to discuss possible wetland mitigation options for the I-70 corridor. The corridor-wide wetland and stream impacts were also discussed. The General Engineering Consultant presented the I-70 Corridor Potential Wetland Mitigation Sites Report, which highlighted the following possible mitigation sites: Davis Creek floodplain, Blackwater River floodplain, Loutre River floodplain, Sni-A-Bar Creek and the Lamine River.

A memorandum that outlined a conceptual wetland and stream mitigation program for the I-70 corridor was discussed. The following basic concepts were presented:

- On-site mitigation would occur within the corridor at one or several of the above listed sites.
- Off-site mitigation would occur at one or several public or private wetland banks.
- Off-system mitigation would use MoDOT funds to develop wetland(s) identified by another agency.

There was a concensus that the Loutre River valley site was an excellent potential location for wetland mitigation. The Missouri Department of Transportation would explore the Stream Stewardship Trust Fund for potential mitigation of stream impacts.

The I-70 Corridor Conceptual Wetland Mitigation Plan will be forthcoming.

M. Noise

The Federal Aid Highway Act of 1970 established the requirements contained in 23 CFR Part 772 that traffic noise control be a part of the planning and design of all federally aided highway projects (Table III-26).

Table III-26: Federal Highway Administration Noise Abatement Criteria (NAC) for Applicable Land Use Activity Categories

Activity Category	Abatement Criteria [Leq(h)]*	Description of Activity Category
A	57 exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of these qualities are essential if the areas are to continue to serve their intended purpose.
B	67 exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 exterior	Developed lands, properties, or activities not included in Categories A or B.
D	--	Undeveloped lands.
E	52 interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

* *Hourly A-weighted noise levels in decibels (dBA).*

$L_{eq}(h)$ = the equivalent steady state sound level which in a 1-hour period of time contains the same acoustic energy as the time varying sound level during the same period.

Source: CFR, Title 23 Part 772, Revised October 1997.

Noise impacts, as defined by MoDOT's noise policy as approved by FHWA, occur when the predicted noise levels approach or exceed the FHWA Noise Abatement Criteria (NAC) (i.e., 66 dBA), or when the predicted traffic noise levels substantially exceed the existing noise levels [i.e., an increase of 15 dBA $L_{eq}(h)$ or more above existing noise levels]. A Traffic Noise Model 2.1® analysis was conducted to gauge the noise impacts associated with SIU 3 improvements under the recommended preferred alternative. The studies were done using traffic data supplied by MoDOT. This analysis was performed for a total of 29 noise sensitive receptors as illustrated in Figure III-5. Results of this analysis are shown in Table III-27 and consider such factors as traffic volume (existing and projected for the design year 2030), vehicle mix, speed and roadway geometry.

Table III-27: Design Hour Noise Levels, dBA L_{eq}(h), SIU 3

Receiver Number	Receiver Location	Number of Dwelling Units Represented	NAC Category	NAC Level	Noise Level (L_{eq}) (Design Hour)			Distance from Proposed Roadway to Noise Receptor (feet)	Decibel Increase over Existing	Impact*
					Existing	Build 2030	No-Build 2030			
1	046-10-03-08-05.15	8	B	67	64	66	68	338	2	Yes
2	046-10-03-08-05.05	9	B	67	65	67	69	305	2	Yes
3	Clyde and Mary Stewart	2	B	67	70	72	74	120	2	Yes
4	Dixie J. Bennett	3	B	67	71	73	74	104	2	Yes
5	John and Judy Crowley	3	B	67	71	74	75	92	3	Yes
6	Edward and Anita Helmreich	1	B	67	58	62	62	624	4	No
7	John and Carry Eichelberger	1	B	67	60	62	64	545	2	No
8	Rick and Kathy Lee	1	B	67	59	63	63	543	4	No
9	George and Carolyn Tedrow	1	B	67	62	67	66	304	5	Yes
10	Wayne Klein	1	B	67	60	65	64	417	5	No
11	Holiday Construction Company	8	B	67	58	59	61	809	1	No
12	046-09-03-08-04-003-20.10	3	B	67	58	60	62	736	2	No
13	046-09-03-08-04-003-20.15	3	B	67	59	60	63	617	1	No
14	046-09-03-08-04-003-20.22	3	B	67	67	67	70	225	0	Yes
15	John and Orpha Rapp	1	B	67	66	65	69	149	-1	No
16	Citizens Bank and Trust	1	C	72	68	71	72	180	3	Yes
17	Phillip and Carol Woods	1	B	67	64	67	68	340	3	Yes
18	Larry and Peggy Frederick	1	B	67	59	62	63	607	3	No
19	Missouri River Valley Stream	1	B	67	58	62	62	565	4	No
20	DeWayne and Julie Murray	1	B	67	66	68	69	270	2	Yes
21	Larry and Becky Sieckmann	1	B	67	58	61	60	661	3	No
22	Fred Delius Jr.	1	B	67	61	63	64	537	2	No
23	Earl and Patricia Gent	1	B	67	63	69	67	267	6	Yes
24	Edwin and Amy Waters	1	B	67	59	61	62	666	3	No
25	Yahweh's Assembly in Messiah	1	B	67	53	58	56	1070	5	No
26	Yahweh's Assembly in Messiah	1	B	67	59	64	62.7	487	5	No
27	Lighthouse Mission of Rocheport	1	B	67	53	58	56.1	1090	5	No
28	William and Patsy Wyatt	1	B	67	63	65	66.6	389	2	No
29	Vernetta C. Wehmeyer	2	B	67	61	64	64.6	449	3	No

* *Impact is defined as approaching, meeting or exceeding the FHWA NAC or causing a substantial increase in noise levels. The noise level which approaches the FHWA NAC is 66 dBA and a substantial increase is defined as 15 dBA over existing noise levels.*

Source: MACTEC, 2003.

The lowest existing noise levels for SIU 3 are represented by a value of 53 dBA L_{eq}(h) at the Lighthouse Mission Baptist church (Receptor 27) located along Route BB south of I-70 approximately 1,090 feet (332.2 meters) from the proposed improvements. In contrast, the highest existing level is estimated at 71 dBA L_{eq}(h)at the Crowley residence (Receptor #5) at 13803 Pecan Court located 92 feet (28 meters) from the proposed improvements. However, existing noise levels for much of the project range between 53 dBA L_{eq}(h)and 70 dBA L_{eq}(h). In total, 11 noise receptors presently are exposed to noise levels that approach or exceed the NAC (see Table III-27).

The No-Build 2030 Scenario A Traffic Noise Model 2.1® analysis was performed utilizing the same 29 noise sensitive receptors as the Build 2030 analysis. In comparison, the No-Build 2030 shows 14 noise receptors that are exposed to noise levels that approach or exceed the NAC (see Table III-27). In the No-Build 2030, the increase in traffic is in closer proximity to the sensitive noise receptors in question resulting in a higher dBA at the receptor.

Feasibility of providing mitigation for noise impacts relates to the overall effectiveness of such measures. Considerations that affect noise mitigation feasibility include engineering factors such as topography, access, drainage, safety, maintenance and other possible noise sources. Factors to determine reasonableness of noise mitigation are shown in Table III-28.

Table III-28: Factors to Determine Reasonableness of Noise Mitigation

Noise walls must provide noise reduction of at least 5 dBA L_{eq} (h) for all primary receptors. Primary receptors are those, which are closest to the highway.
Noise walls must provide attenuation for more than one receptor.
Noise walls must be 18 feet (5.5 meters) or less in height above normal grade.
Noise walls must not interfere with normal access to the property.
Noise walls must not pose a traffic safety hazard.
Noise walls must not exceed a cost of $30,000 per benefited receptor. A benefited receptor is defined as a receptor, which receives a noise reduction of 5 dBA L_{eq} (h) or more.
The majority of the affected residents (primary and benefited receptors) must concur that a noise wall is desired.

Receivers One through Five on the northwest end of SIU 3 approach or exceed FHWA's NAC [i.e., 66 dBA L_{eq} (h)] for the design year 2030 (see Table III-28). Two noise walls were modeled for these areas. Noise wall Number One was modeled at 12 feet (3.7 meters) high for a length of 3,378 feet (1,029.6 meters). This noise wall would benefit 19 receptors and result in noise reductions ranging from three dBA to seven dBA. Based on a cost of $18.00 per square foot, the wall would cost approximately $729,648.00 or $38,403.00 per receptor. This cost exceeds the cost factor value of $30,000.00 per benefited receptor, therefore, the wall does not meet MoDOT's definition for reasonableness.

Noise wall Number Two was modeled at 12 feet (3.7 meters) high for a length of 1,565 feet (477 meters). This wall would benefit six receptors and would result in noise reductions of 7 dBA. At a cost of $18.00 per square foot, this wall would cost $338,040.00 or $56,340.00 per benefited receptor. This wall does not meet MoDOT's definition for reasonableness.

Several isolated properties also show a design year noise level in excess of 66 dBA L_{eq} (h). It would not prove reasonable or feasible to build a noise wall for single receptors.

Based on the study completed, mitigation of noise impacts for the proposed project does not meet all of MoDOT's definitions for reasonableness. Therefore, no noise mitigation measures are being considered for the proposed improvement. If substantial changes in horizontal or vertical alignment occur during the remaining stages of design and construction, noise abatement measures will be reviewed.

Based on the 2030 design hour volumes the setback distances to 66 dBA Leq is 338 feet measured perpendicular to the edge of pavement to I-70. Any developments constructed closer to I-70 than the 338-foot distance would be exposed to noise levels that approach or exceed the NAC in Table 3-26. This setback distance was developed to assist local planning authorities in developing land use control over the remaining undeveloped lands along the proposed route in order to prevent further development of incompatible land use.

MoDOT has special provisions for construction which require that all contractors comply with all applicable local, state and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site. Construction equipment is required to have mufflers constructed in accordance with the equipment manufacturer's specifications.

N. Visual Environment

Within the SIU 3 study area, the visual environment is comprised of three distinct landscapes or viewsheds: rolling rural landscapes, developed interchange areas and the Overton Bottoms/Missouri River landscape.

Rolling rural landscapes are characterized by undulating uplands with predominantly agricultural land dissected by wooded stream valleys. Few small, noncontiguous developed areas such as residences and farmsteads, are scattered throughout the landscape that provide intermittent noteworthy features of visual interest within the landscape.

Developed interchange areas are characterized by a variety of uses such as truck stops, gas stations, churches, residences, retail facilities and light industrial facilities. The visual environment of interchange areas is not distinctive and is typical of many such areas along the I-70 corridor.

The Overton Bottoms/Missouri River area is a scenic resource characterized by the presence of steep bluffs on the east side of the river and Overton Bottoms Conservation Area and the Big Muddy Refuge west of the river. On the eastern side of the river, the Manitou Bluffs rise abruptly from the river's edge to a height of more than 150 feet (45.7 meters). The steep bluffs are comprised of undeveloped wooded areas, dissected by deep forested stream valleys. The Katy Trail is situated just east of the river at the base of the bluffs. West of the river, the wildlife refuge and conservation areas are comprised of primarily herbaceous and scrub/shrub vegetation with some sparsely wooded areas.

The proposed changes to I-70 would not have a major impact on the visual environment in the study area. The proposed improvements involve widening an existing roadway that has previously altered the visual environment. For much of SIU 3, the proposed improvements consist of widening the existing facility in a landscape that is either a low quality visual resource (i.e., interchanges) or relatively common undulating rural uplands. No notable effects on these visual features are, therefore, anticipated with the proposed action. Construction of a second Missouri River bridge would, however, be located in a relatively sensitive visual environment. Potential visual impacts associated with this crossing include the creation of an additional structure across

the river and the Overton Bottoms floodplain and the creation of a wider cut within the Manitou Bluffs. While the proposed action would alter the environment, the addition of a second bridge would utilize a compatible design that would not represent a major alteration of the visual environment. Similarly, the creation of a wider cut within the Manitou Bluffs would alter the viewshed of the bluffs from the west, but would allow for the preservation of the bluff (with the exception of that portion removed) as an aesthetic resource that can be enjoyed by viewers. Improvements to I-70 would, therefore, provide travelers with continued opportunities to view the scenic resources presented by the Missouri River and the Overton Bottoms floodplain as well as the generally pleasing rolling rural landscapes. Additionally, consideration for preservation and enhancement of the visual and aesthetic resources along I-70 has also been undertaken by the Corridor Enhancement Subcommittee of the Study Management Group. The enhancement plan (available upon request), developed by the Subcommittee, entailed improvements to aesthetics (e.g., landscape enhancements) and sensitivities to the visual resources within each SIU and includes:

- visual design treatments;
- overall design themes and context sensitive design;
- corridor landscape enhancements; and
- riparian and wildlife habitat enhancements.

Consideration would be given to incorporating these elements during the detailed design phase.

Comparatively, the North Alternative and South Alternative represent similar impacts to the visual landscape. While the South Alternative would remove somewhat greater amounts of rock at the bluff, the proposed improvement with each Missouri River crossing are otherwise similar in that each would entail a new Missouri River companion bridge and the construction of a parallel roadway facility within the Overton Bottoms floodplain.

The No-Build Alternative would not entail any construction activities and will, therefore, not result in impacts to the visual environment.

O. Construction Impacts

There will be some short-term, temporary impacts in the vicinity of the proposed project in conjunction with the recommended preferred alternative including noise, dust and machine pollutants discharged by construction equipment. To minimize impacts associated with the construction of the recommended preferred alternative, pollution control measures outlined in the Missouri Standard Specifications for Highway Construction would be used; these measures pertain to air, noise and water pollution as well as traffic control (e.g., detours) and safety measures. All practicable measures would be employed to minimize or mitigate any potential impacts. Implementing these measures would ensure as little impact as can be realistically achieved with a highway construction project of this magnitude.

Emissions from construction equipment would be controlled in accordance with emission standards prescribed under state and federal regulations. Materials resulting from clearing and grubbing, demolition, or other operations (except materials to be retained) would be removed from the project area, burned, or otherwise disposed of by the contractor. Any burning, when permitted, would be conducted in accordance with applicable local laws and state regulations.

To reduce the impacts of construction noise, MoDOT has special provisions in the construction contract which require that all contractors comply with all applicable local, state and federal laws

and regulations relating to noise levels permissible within and adjacent to the project construction site. Construction equipment would be required to have mufflers constructed in accordance with the equipment manufacturer's specifications.

As discussed in detail in the earlier section on water quality, MoDOT's Pollution Prevention Plan provides for temporary erosion and sediment control measures that would be included within construction contract specifications. Erosion would be reduced by limiting the surface area of erodible material exposed during clearing and grubbing, excavation and borrow and fill operations. Careful refueling practices would limit spills of gasoline and diesel fuels. Oil spills can be minimized by frequent checks of construction equipment.

During construction, removal of vegetation upslope from wetland areas can cause erosion and result in sedimentation in wetlands downslope and downstream from the construction site. Steps to prevent sedimentation in wetlands adjacent to construction sites shall be taken in accordance with MoDOT's Best Management Practices for roadway construction.

Traffic would be handled during construction by maintaining two lanes of through-traffic flow in each direction on mainline I-70 at all times. Some temporary paving may be needed to maintain two lanes. Temporary lane closures (several hours at a time) may be necessary to handle traffic lane shifts or to allow for a construction procedure that is best done without traffic present (e.g., the removal of a bridge). A detailed traffic control plan would be included as part of the detailed design plans. The recommended preferred alternative is not expected to result in any adverse impacts to traffic during construction.

P. Secondary and Cumulative Impacts

1. Introduction

The assessment of secondary and cumulative impacts in National Environmental Policy Act documents is required by Council on Environmental Quality regulations. Secondary and cumulative impacts result when the effects of an action or project are added to or interact with other effects in a particular place and within a particular time. The cumulative impacts of an action or project can be viewed as the total effects on a resource, ecosystem, or human community of that action or project and all other activities affecting that resource no matter what entity is taking the actions. By comparison, secondary impacts are considered to be those impacts that are associated with activities or developments that are induced by the primary action. Secondary and cumulative impacts may occur outside the highway right of way and are generated as a result of changes in development patterns. Secondary or cumulative impacts may be the unintended consequences of roadway improvements. These impacts may include increases in traffic volumes outside the study corridor; or changes in population, housing, employment, tax base or other land use changes.

Determining the boundaries and time period depends on the characteristics of the resources affected, the magnitude and scale of the projects' impacts and the environmental setting. To avoid extending data and analytical requirements beyond those relevant to decision-making, a practical delineation of the spatial and temporal factors is needed. For this project, the existing spatial factor is the I-70 corridor from Kansas City to St. Louis and the time period will cover from approximately the 1950s up to and through the year 2030. For the purpose of the overall secondary and cumulative impacts evaluation, the length of the I-70 corridor is approximately 200 miles (322 kilometers), the width for evaluation is resource dependent and the time period will cover approximately 75 years. The secondary and cumulative impacts evaluation for each

SIU will cover the same time period. This secondary and cumulative impact analysis will consider impacts that are due to past, present and reasonably foreseeable actions.

2. Existing I-70 Overall Corridor

a. Land Use

Beginning in the 1910s and 1920s, Missouri improved and paved its first major cross-state highway. The route was designated Highway 40 and by the 1930s, the road was carrying cross-state and national traffic. A number of small communities arose along the highway to provide basic services for travelers such as fuel, food and lodging. When the original I-70 corridor was located and constructed during the 1950s and 1960s, the direct and secondary impacts included noticeable changes to land use.

Although today the primary land use within the corridor is rural in character (see Figure III-3), the change from forest and agricultural lands to the location of development was highly related to the selection of the new corridor, as well as the locations of the current interchanges. Economic development generated new jobs, which, in turn increased the demand for housing, commercial and retail services and fundamental community infrastructure such as schools, libraries, police and fire protection and sewer and water service. The economic growth and the secondary growth that follows is a cumulative impact. The I-70 transportation corridor, past, now and in the future, will continue the economic development trend and hence, impacts to land use. Transportation contributes to and is one of several factors that helps facilitate economic development.

The existence or the creation of adequate utilities and other infrastructure was an attraction for development. Communities or areas with these types of facilities were and are able to attract development. Development generated tax revenues that contribute to the initial investment in the utilities and infrastructure. Over time, the expansion of the population, households and employment took place with the accompanying increase in the tax base. The cumulative impacts of the corridor have continued with these development trends until the present and it is expected that these trends will continue with the reconstruction and widening of the existing I-70 corridor.

Agricultural uses, scattered residential and retail development, mining, forested and natural areas distinguish the rural areas. More dense and urbanized land uses occur within the cities located along the I-70 corridor. These include Columbia, Warrenton, Wright City and Wentzville. Smaller urbanized areas are found at Oak Grove, Grain Valley, Higginsville, Odessa, Concordia, Boonville, Kingdom City and High Hill. Eastern Jackson County and western St. Charles County are generally characterized by low density, suburban development and represent the outermost reaches of the Kansas City and St. Louis metropolitan areas, respectively. The development trend is especially expected to continue on the fringe or edges of the urban areas of Kansas City, Columbia and St. Louis. The basic infrastructure is already in place, the typical level of traffic is high and the non-interstate roadways usually have unrestricted access. These three features are important factors to attract development. With the ultimate improvement of I-70, there will be some residential and business displacements along the existing roadway. It is likely that these displacees would relocate close to or within the I-70 corridor area, especially the transportation dependent businesses. This, in turn, would cause an additional change in land use, from non-developed to developed use.

b. Parklands

Section 4(f) of the U.S. Department of Transportation Act of 1966, as codified and amended, has afforded publicly owned parkland protection from being converted to uses other than park and recreation. Consequently and over time, Federal-aid highway projects have avoided or mitigated any impacts to the taking of parkland. Most often, parkland has been avoided and if impacted, the impact has been minor and appropriately mitigated.

Reconstructing and widening the existing I-70 corridor could result in secondary and cumulative impacts resulting from improved transportation access. As ensuing development expands around existing parkland facilities, particularly in urban areas, some encroachment could take place because of street widening or changes in land use/zoning. Increased development could also result in increased noise levels and visual impacts in some parklands that were previously somewhat isolated.

An additional secondary impact could occur in urban areas in the form of park system expansion. A trend of expanding development in an area can trigger cities to purchase more property to be preserved as part of a parkland plan or open space corridors. This land use determination may have otherwise been at the discretion of private developers and individual property owners. Also, with the reconstruction of existing interchanges, there will be the opportunity to provide increased trails plus bicycle and pedestrian infrastructure. Additionally, these areas could provide the opportunity for community initiated enhancement features.

c. Prime Farmland

The proposed reconstruction and widening of I-70 may result in secondary impacts to prime farmland due to farmland conversion along the new required right of way. It is estimated that approximately 1,300 acres (526.5 hectares) of farmland would be directly impacted along the entire length of the I-70 corridor. Farmers affected by the conversion of all or part of their land to the development of the roadway may choose to no longer farm or cultivate their land. As a result, more farmland soils could be taken out of production if farmers choose to sell their land for non-farm uses. If the farmland is sold, it may be subdivided and converted to commercial and residential land use.

The improved roadway may, at some time in the future, act as a catalyst for increased growth, relocated development and expansion in the region. Historically, this has taken place in the I-70 corridor. New development would depend on the location and such development would be expected to occur in areas already near the main population centers. However, with the proposed reconstruction and widening of existing I-70, overall secondary and cumulative impacts to the prime farmland resource are expected to be minimal.

d. Terrestrial and Aquatic Communities

Although the direct loss of forest acreage can eliminate or reduce the size of habitats, secondary and cumulative impacts can also occur as a result of habitat fragmentation, which can have an adverse effect on species diversity and connectivity. It is estimated that approximately 230 acres (93.2 hectares) of forest land would be directly impacted along the length of the corridor. Habitat fragmentation in both terrestrial and aquatic areas can create variable-sized parcels or islands of viable habitats that become isolated. Secondary and cumulative impacts could also result by inducing more development within the corridor. Forested areas and watersheds across the I-70 corridor are resources that have been impacted by the initial location and construction of I-70.

With the reconstruction and widening of I-70 and, as more land is encroached upon by private development, the potential for additional disturbance of terrestrial and aquatic areas increases.

e. Threatened and Endangered Species

Much of the land near and adjacent to the I-70 corridor already exhibits appreciable amounts of disturbance and/or development. Therefore, most of these areas are unlikely to harbor listed species that could be impacted by secondary development. Most of the recorded habitat locations are remote and are far enough removed from the I-70 corridor to avoid secondary impacts from reconstructing and widening existing I-70. Because of this, the potential for cumulative impacts to listed threatened and endangered species is considered to be low.

f. Wetlands and Waters of the United States

There is the potential for the proposed reconstruction and widening of the I-70 corridor to contribute to secondary and cumulative impacts to wetlands and other waters of the United States. During the construction phase, activities that impact these sites through sedimentation, changes in the nature of stream hydraulics, or clearing of vegetation in riparian habitat are likely to have impacts on wetland functions and values of downstream or downslope waters of the United States, including wetlands. It is estimated that approximately 80 acres (32.4 hectares) of wetlands would be directly impacted along the I-70 corridor. It should be noted however, that there will be wetland mitigation planned within the corridor to ensure, at a minimum, no net loss of wetlands as a resource. Major floodplain and floodplain complexes across the 200-mile (322-kilometer) corridor include the: Blackwater, Lamine, Missouri and Loutre rivers. The Missouri River floodplain and Overton Bottoms wetlands complex is a special area within the I-70 corridor.

g. Air Quality

The proposed reconstruction and widening of the 200-mile (322-kilometer) long I-70 corridor falls within the Metropolitan Kansas City Interstate Air Quality Control Region, the Southwest Missouri Intrastate Air Quality Control Region, the Northern Missouri Intrastate Air Quality Control Region and the Metropolitan St. Louis Interstate Air Quality Control Region. The Metropolitan Kansas City Interstate Control Region and the Metropolitan St. Louis Interstate Air Quality Control Region are classified as maintenance for Ozone. Corridor-wide, emissions are projected to decrease in the next 20 to 30 years. These reductions in emission will offset the increase in free-flow traffic volumes along the study corridor. It is recognized that development trends are expected to continue throughout the foreseeable future. With the improved mobility and the access management policy implemented with the ultimately reconstructed I-70 corridor, this project is not anticipated to cause a violation of the NAAQS. At the western and eastern termini, conformity statements may be required from the Metropolitan Planning Organizations.

h. The Land and Visual Quality

The Interstate 70 corridor travels through several physiographic regions of North-Central Missouri. The western portion of the study corridor is located in the Western Glaciated Plains, consisting of gentle to moderate slopes with rolling hills. Much of this area has been cleared for use as agricultural cropland and pastureland.

The middle portion of the corridor includes the Lower Missouri River and the adjacent Ozark Border. The Lower Missouri River region consists of level river bottoms in a wide floodplain area,

most of which has been cleared and is used for agricultural cropland. Some areas remain as wetlands and riparian forests. The Ozark Border is characteristically rugged with forested hilly terrain of steep to moderately steep slopes and narrow valleys. Some of this area has remained forested.

The eastern portion of the study corridor is located in both the Eastern Glaciated Plains and the Ozark Border adjacent to the Missouri River. The Eastern Glaciated Plains consist of gentle to moderate slopes with rolling hills, most of which has been cleared for agricultural use over time. The Ozark Border is characterized by hilly terrain similar to that of the middle portion of the corridor, however, there is much more remaining forested land in Callaway, Montgomery and Warren Counties, between Kingdom City and Wright City, especially in the area south of I-70.

In addition to the Missouri River valley, the study corridor includes several other perennial and intermittent stream valleys. Each of these provides a unique visual environment, which is composed of water, trees and rocks or bluffs.

The majority of the built environment is concentrated within the larger towns and cities such as the east side of the Kansas City metropolitan area, the west side of the St. Louis metropolitan area and the city of Columbia. In these areas, there is a sharp contrast between the built environment and the natural environment. In most cases, the edges of these urbanized or built-up areas tend to include highway corridors with adjacent commercial and industrial uses that lack harmonious or cohesive aesthetic relationships. In contrast, the smaller towns within the study corridor are less intrusive and can be more aesthetically pleasing, depending upon architectural styles and maintenance practices.

The proposed reconstruction and widening of existing I-70 would secondarily and cumulatively impact the visual quality of the environment as increases in growth, development and traffic volumes occur as a result of the proposed improvement. However, the visual quality of the corridor would be enhanced in accord with the appropriate elements of an I-70 Corridor Enhancement Plan.

3. Mitigation and Enhancement of I-70 Overall Corridor Cumulative Impacts

The First Tier EIS documented the commitments of MoDOT and FHWA to provide corridor-wide impact coordination, impact mitigation and considerations of corridor enhancements. The document (available upon request) provided assurances to agencies and communities through the development of an enhancement master plan, that corridor-based considerations would be fulfilled and appropriate special considerations would be provided for each of the second tier studies.

A Corridor Enhancement Subcommittee, one of three subcommittees for the I-70 corridor, is a consortium of the project team and local, state and federal agency technical staff. This committee developed a proposed mitigation and an enhancement plan for the overall I-70 corridor. The goals of the corridor mitigation and enhancement plan include creating an approximately 200-mile (322-kilometer) I-70 transportation corridor that:

- complements the existing natural environment;
- maintains sensitivity to the existing context of the corridor;
- provides a sense of consistency along the entire route;

- showcases Missouri through enhancements which highlight Missouri history, cultural resources and economy; and
- establishes baseline enhancements for the entire corridor and identifies opportunities for additional enhancements by local communities and other partnering agencies.

As referenced in Chapter III.N of this document, the plan included a program for aesthetic enhancements for the existing natural features in the corridor; visual design treatments to built elements that reduce their sense of scale; an overall design theme for enhancements to complement the visual context of the corridor (context sensitive design); corridor landscape enhancements for both the mainline and interchanges; and, riparian habitat enhancement and wildlife corridors treatment. Applicable parts of the mitigation and enhancement plan will be incorporated and committed to in the second tier environmental decision documents.

4. Section of Independent Utility 3 Secondary and Cumulative Impacts

a. Natural

Potential secondary and cumulative impacts to natural resources within SIU 3 are similar to those discussed in previous sections for the I-70 corridor. Within the temporal context of the cumulative impact analysis (i.e., the period from the 1950s to 2030), natural habitats have been encroached upon primarily by development at interchanges within Boonville. The pre-I-70 landscape undoubtedly consisted of a mosaic of agricultural areas (cultivated fields, pastures) interspersed by forested areas (primarily associated with more rugged steeply sloping terrain). Within the historical context (i.e., 1950s to present) secondary development associated with the interchanges of I-70 has resulted in the disturbance of undeveloped lands for primarily traffic dependent business and residential development. This has resulted in a corresponding reduction of natural and agricultural habitats such as forested lands, pasture, cultivated fields, prime farmland and to a lesser extent, wetlands. Potential impact to rare, threatened or endangered species is unlikely, as such species are restricted to the Missouri River and other unique habitats (e.g., subterranean cave systems). Much of the development, for example, has occurred within agricultural or other previously disturbed habitats within upland areas. Consequently, sensitive species are not likely to have been adversely impacted by development activities within this historical context. With respect to the future context (present to 2030), development associated with a reconstructed I-70 will likely follow similar patterns as that exhibited historically (i.e., concentrated in the vicinity of interchanges). Such developments would likely result in additional conversion of natural and open lands to developed uses.

b. Social and Economic

Although today the primary land use within SIU 3 is rural in character, the change from forested and agricultural lands to development has primarily been confined to interchange areas. Economic development has had the effect of generating new jobs, which increased the demand for housing, commercial and retail services and fundamental community infrastructure such as schools, libraries, police and fire protection and sewer and water service. The Interstate 70 transportation corridor, past, now and in the future, will continue the economic development trend and hence, impacts to land use. Due to the presence of utilities and other supporting infrastructure, however, it is likely that a greater amount of development and its associated impacts is likely to occur in the vicinity of Booneville as compared to Rocheport.

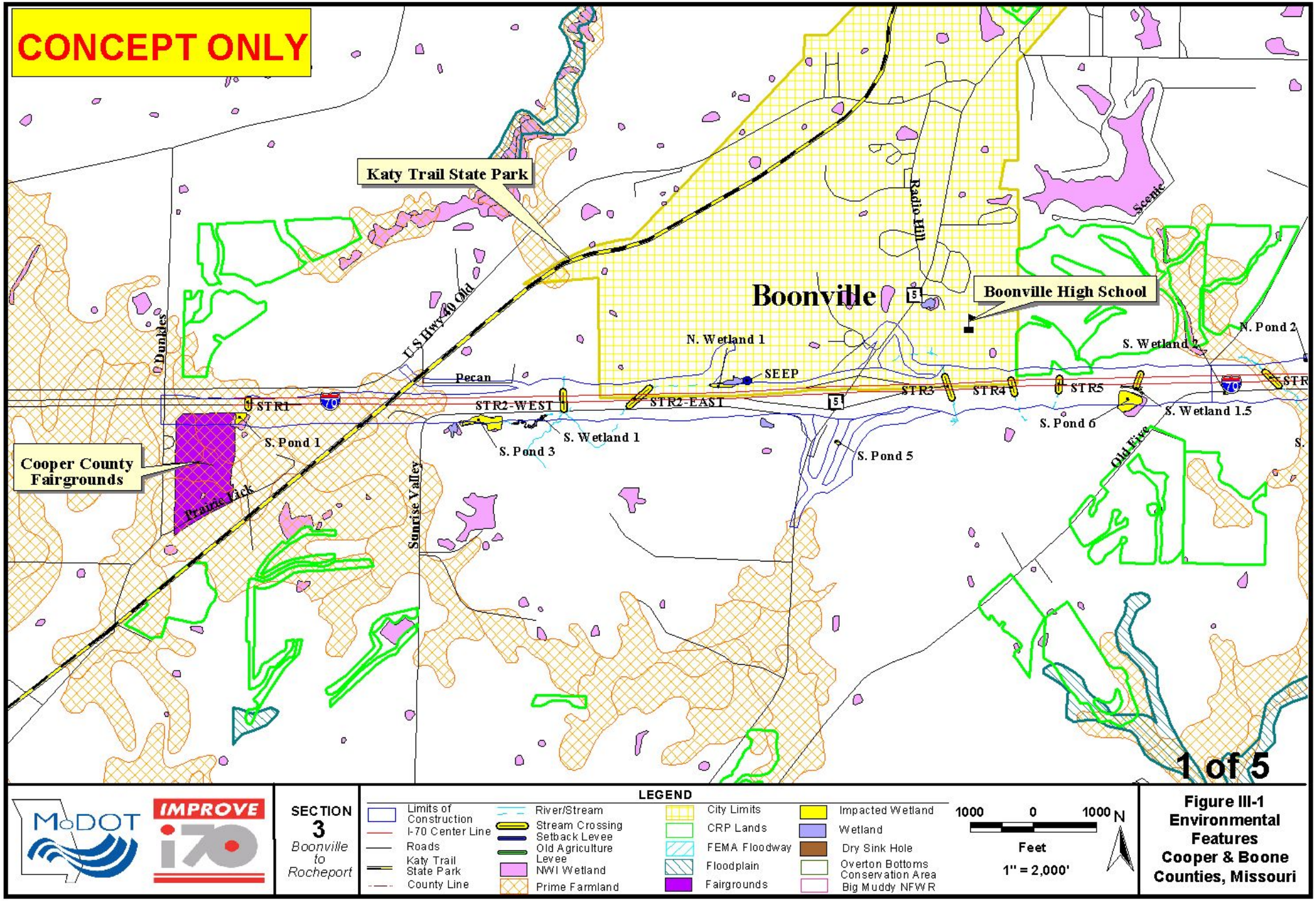
Past, present and future actions within SIU 3 have had the effect of increasing the number of parks and recreational areas available and improving access to these areas, both regionally and locally. Notable recreational features within SIU 3 include the Katy Trail State Park, the Big Muddy Refuge and the Overton Bottoms Conservation Area. With the reconstruction of existing interchanges, there would be the opportunity to provide increased trails plus bicycle and pedestrian infrastructure. Additionally, these areas could provide the opportunity for community initiated enhancement features.

c. Known and Anticipated Actions (Projects) By Others

No state, local or privately funded actions have been identified within SIU 3 that would represent a significant contribution to the assessment of cumulative impacts. However, several federal actions are under way within SIU 3 that represents a positive impact to the natural ecosystems of the area.

The establishment of the Big Muddy Refuge in 1994 is a major federal action that has had a pronounced positive effect on the natural environment within SIU 3. This area, described in more detail in Chapter III.A.2, has resulted in efforts to restore 8,145 acres (3,296 hectares) of the Missouri floodplain from a predominantly agricultural use to a mosaic of natural habitats (e.g., emergent and forested wetlands, floodplain forest, etc.). Similarly, federally acquired lands within Overton Bottoms south of I-70 are being managed by state of Missouri as the Overton Bottoms Conservation Area.

The USACE's Missouri River Mitigation Project and the USACE's review of its Missouri River Master Control Manual are other major federal actions that in part, are being undertaken within SIU 3. Changes in the USACE's Missouri River Master Control Manual would result in changes in the flow regime within the Missouri River. Such an action is designed to benefit fish and wildlife resources of the river, but would not have an effect on other areas of the study area. Efforts to improve aquatic ecosystem habitat are also in progress at numerous areas along the Missouri River in conjunction with the Missouri River Mitigation Project. Within SIU 3, however, these efforts have included the restoration of a Missouri River side channel located approximately one mile (1.6 kilometers) upstream of the I-70 bridge. Restored side channels such as this would provide valuable spawning and nursery habitat for a wide variety of Missouri River fishes. Such improvements, coupled with other management actions within the Big Muddy Refuge and the Overton Bottoms Conservation Area would be effective in enhancing water quality functions, improvement and expansion of wetlands and other jurisdictional waters of the United States, in providing improved wildlife habitat and overall habitat enhancement for rare, threatened and endangered species such as the pallid sturgeon, the sicklefin chub and the sturgeon chub.


CONCEPT ONLY
Katy Trail State Park
Boonville
Boonville High School
Radio Hill
Scenic
N. Wetland 1
SEEP
Pecan
STR1
STR2-WEST
STR2-EAST
STR3
STR4
STR5
S. Pond 1
S. Pond 3
S. Wetland 1
S. Pond 5
S. Pond 6
S. Wetland 1.5
S. Wetland 2
N. Pond 2
Old Five
Cooper County Fairgrounds
Prairie Dick
Sunrise Valley
Dunkles
US Hwy 40 Old
1 of 5
SECTION 3
Boonville to Rocheport
LEGEND
Limits of Construction
I-70 Center Line
Roads
Katy Trail State Park
County Line
River/Stream
Stream Crossing
Setback Levee
Old Agriculture Levee
NWI Wetland
Prime Farmland
City Limits
CRP Lands
FEMA Floodway
Floodplain
Fairgrounds
Impacted Wetland
Wetland
Dry Sink Hole
Overton Bottoms Conservation Area
Big Muddy NFWR
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Feet
1" = 2,000'
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Figure III-1
Environmental Features
Cooper & Boone Counties, Missouri

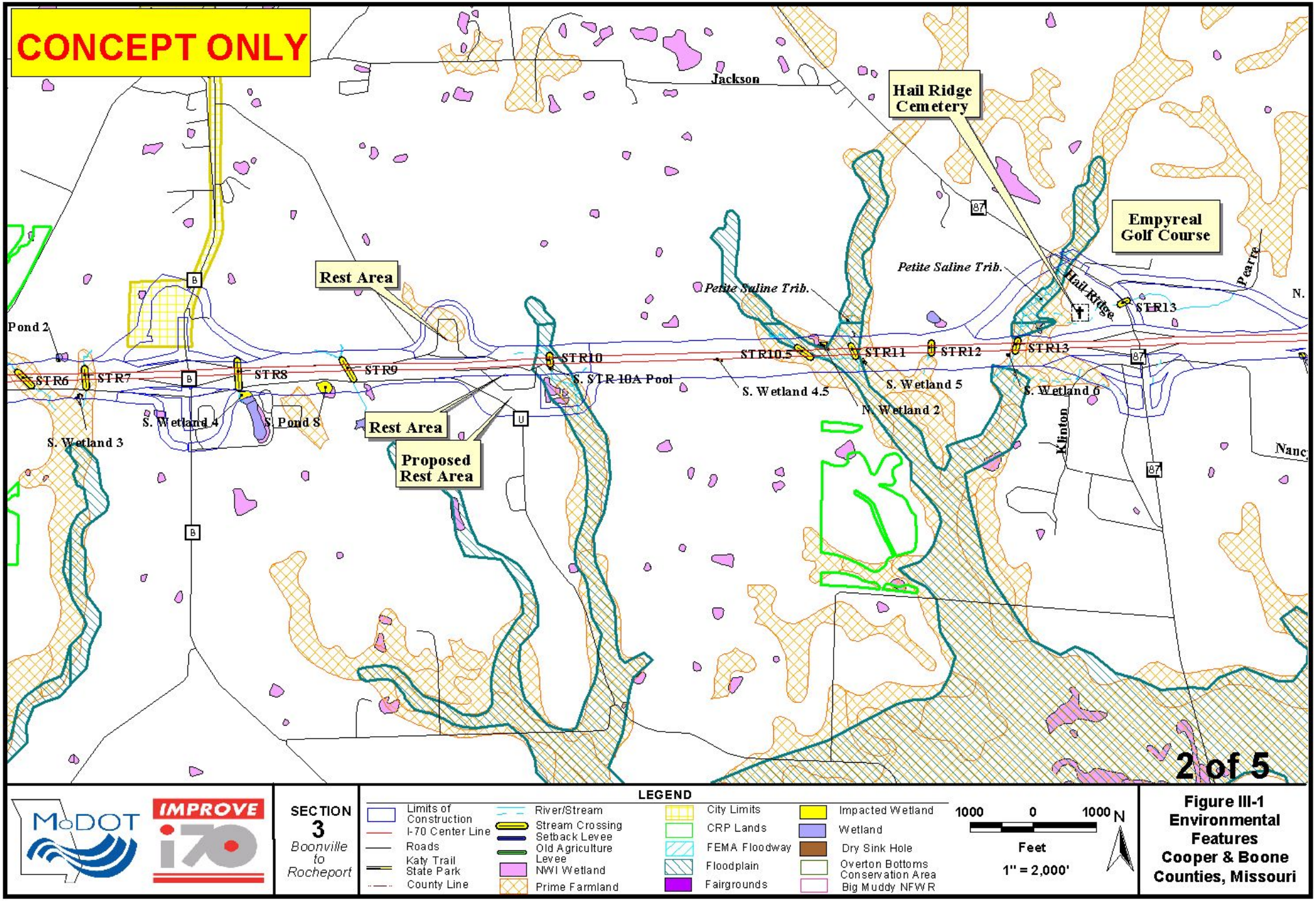

Figure III-1
Environmental Features
Cooper & Boone Counties, Missouri

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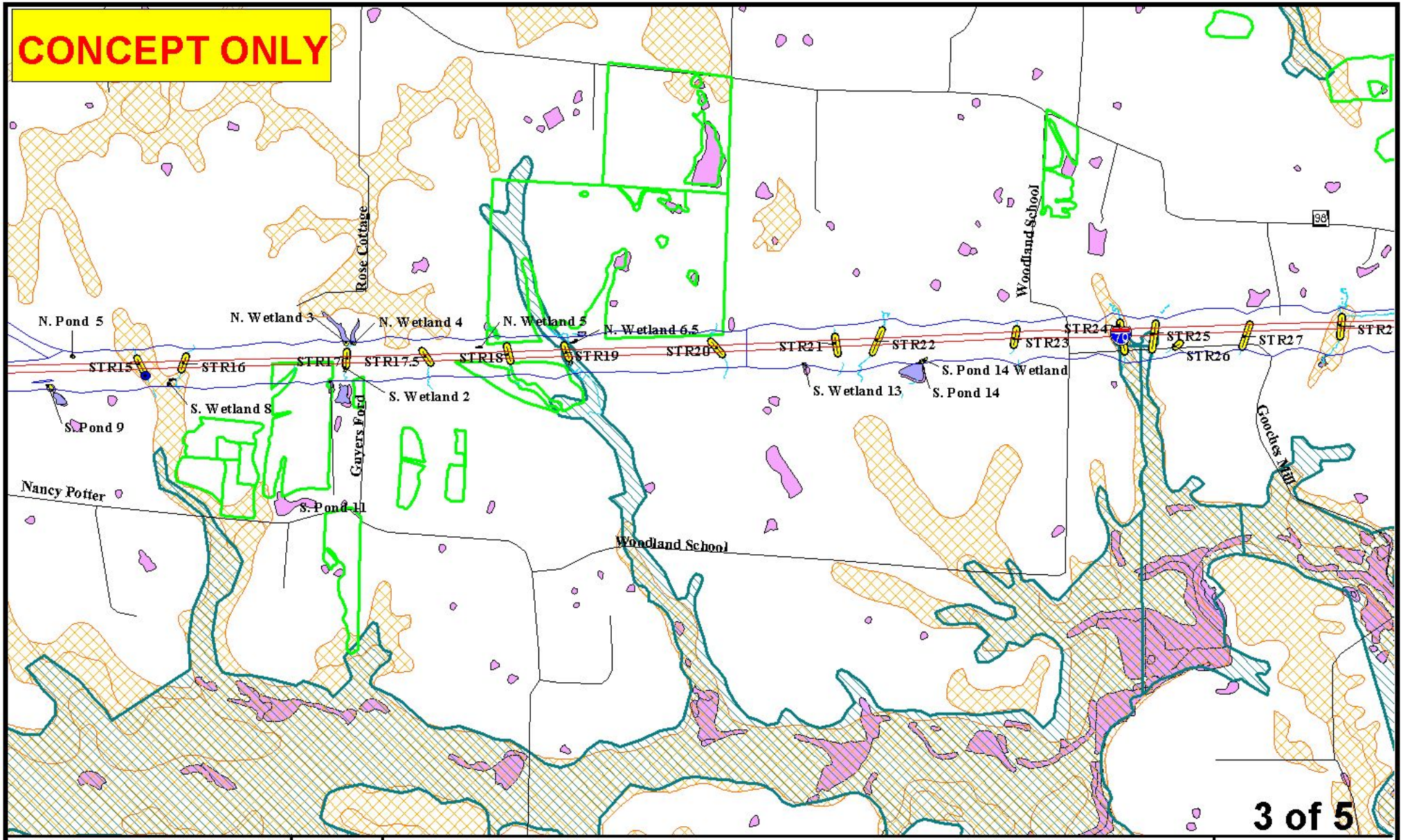
CONCEPT ONLY
N. Pond 5
N. Wetland 3
N. Wetland 4
N. Wetland 5
N. Wetland 6.5
Rose Cottage
Woodland School
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STR16
STR17
STR17.5
STR18
STR19
STR20
STR21
STR22
STR23
STR24
STR25
STR26
STR27
S. Pond 14 Wetland
S. Wetland 13
S. Pond 14
S. Wetland 2
S. Wetland 8
S. Pond 9
Guyers Ford
Goodies Mill
Nancy Potter
S. Pond 11
Woodland School
3 of 5
LEGEND
Limits of Construction
I-70 Center Line
Roads
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Feet
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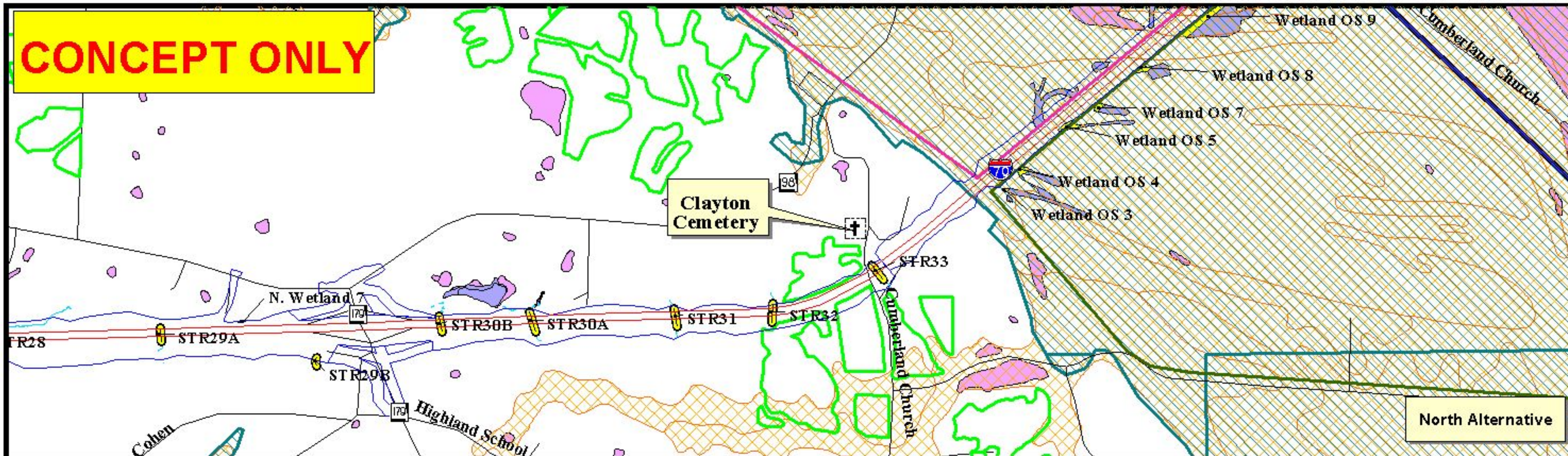
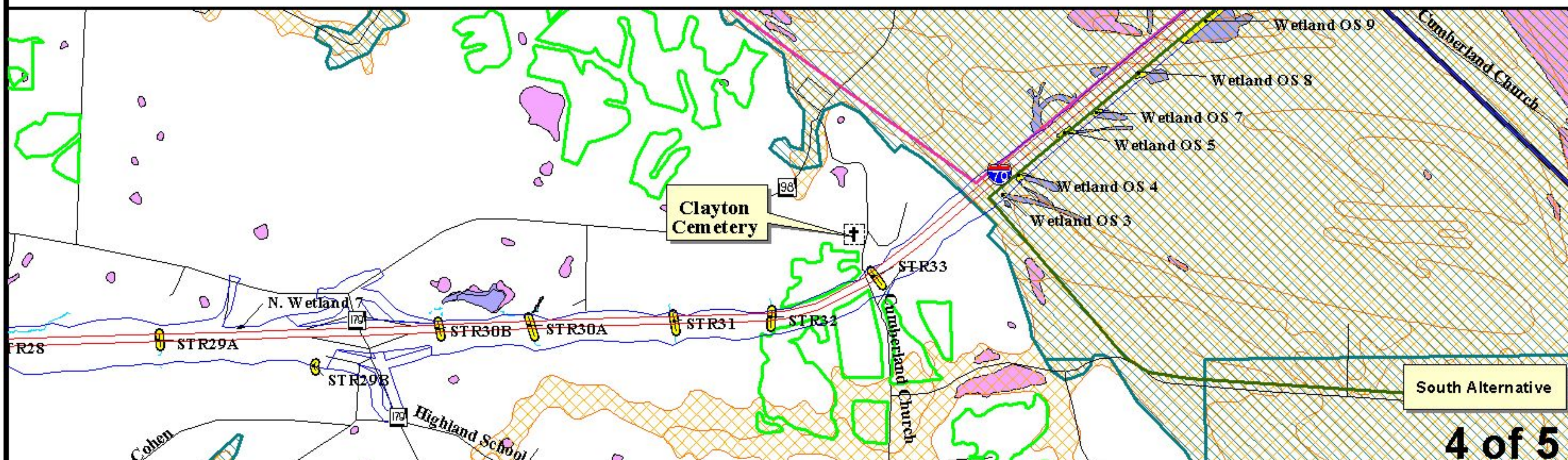
MoDOT
IMPROVE I70
SECTION 3
Boonville to Rocheport
Figure III-1
Environmental Features
Cooper & Boone Counties, Missouri





MoDOT IMPROVE i70

SECTION
3
Boonville to Rocheport

LEGEND

- Limits of Construction
- I-70 Center Line
- Roads
- Katy Trail State Park
- County Line
- River/Stream
- Stream Crossing
- USACE Setback Levee
- Old Agricultural Levee
- NWI Wetland
- Prime Farmland
- City Limits
- CRP Lands
- FEMA Floodway
- Floodplain
- Fairgrounds
- Impacted Wetland
- Wetland
- Dry Sink Hole
- Overton Bottoms Conservation Area
- Big Muddy NFWR

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Feet
1" = 2,000'
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Figure III-1
Environmental Features
Cooper & Boone Counties, Missouri

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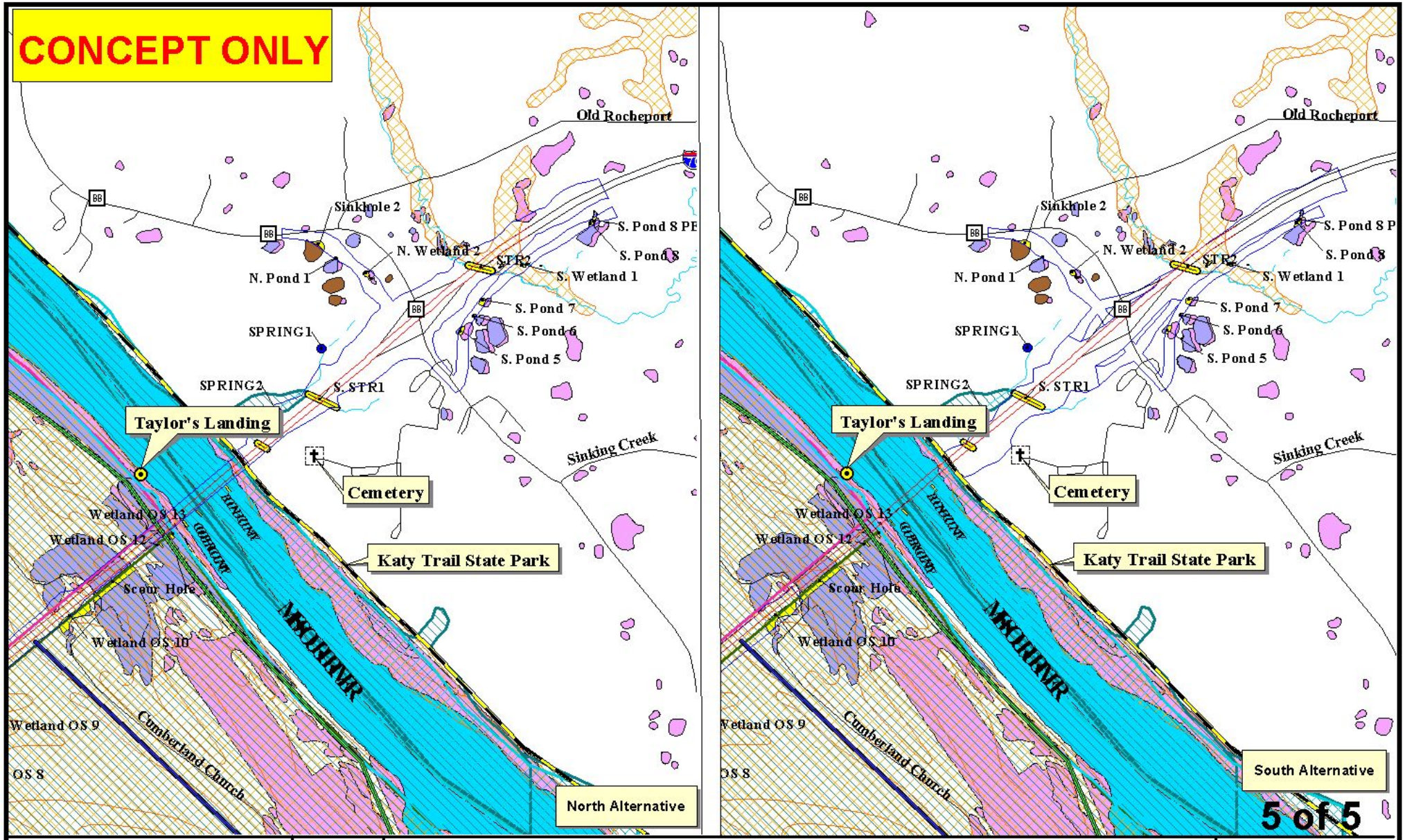

MoDOT IMPROVE i70

SECTION 3 Boonville to Rocheport

LEGEND

- Limits of Construction
- I-70 Center Line
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- Floodplain
- Fairgrounds
- Impacted Wetland
- Wetland
- Dry Sink Hole
- Overton Bottoms Conservation Area
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1" = 2,000'

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Figure III-1
Environmental Features
Cooper & Boone Counties, Missouri

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