5.20 Agricultural Impacts

5.20.1 Introduction

Since early settlement, agricultural land in Indiana has been, and continues to be, one of the most valuable natural resources within the state. There is a continued loss of farmland, specifically prime farmland, as cities expand and rural development for industry and housing becomes more attractive. Data from the 1997 census of agriculture indicated that just over 15.1 million acres, or 66% of Indiana's 22.9 million acres was farmland (Indiana Agricultural Statistics Service, 1999). The state's cropland and pastureland accounted for 12.8 million (56%) and 1.3 million (5%) acres, respectively. The remaining 1.0 million acres exists as miscellaneous agricultural property including woodland.

In 1997, 12.9 million acres of Indiana was considered rural prime farmland, placing it eighth in the country in total acreage of this resource. Only three states have more than 50% of their land area classified as prime farmland: Indiana, Illinois, and Iowa (Indiana Land Resources Council, 1999). In fact, at 58%, Indiana ranks second only to Illinois in the percent of its land that is considered prime farmland. However, with 124,200 acres of prime farmland converted to developed land from 1992 to 1997, Indiana ranks second in the highest percent of prime farmland conversion in the nation and seventh in the average annual rate (24,800 acres/year) of prime farmland converted to developed land (United States Department of Agriculture, 1997). Eighty-four percent of Indiana's prime farmland in 1997 was utilized for cropland, 6% was devoted to pastureland, and the remaining 10% was in the form of forestland, Conservation Reserve Program (CRP) land or miscellaneous rural land.

Farmland preservation and the conversion of prime and unique farmland to urban development are serious issues in Indiana. Continued population growth, increases in transportation systems and efficiency, and communication flexibility are some of the factors which make it increasingly easier to live and work in widely-dispersed communities today. The Hoosier Farmland Preservation Task Force indicates that from 1978 to 1992, an average of 88,714 acres of farmland per year have been lost to other uses (Indiana Land Resources Council, 1999). The Natural Resource Conservation Service (NRCS) estimates that prime and important agricultural soils are being converted at a rate three to four times that of less productive non-prime farmland (United States Department of Agriculture, 2002). In light of this trend, one of the goals of the Farmland Protection Program is to protect and slow the loss of farmland. The concern is not so much the overall acreage of cropland converted to urban development, but the quality and pattern of cropland conversion. Preservation strategies are not intended to be anti-development or anti-growth, but instead concentrate efforts to direct industrial, residential and commercial growth to areas less suitable for farming, thus preserving more valuable prime farmland, and ultimately achieve a balanced utilization of rural, suburban and urban land resources (Indiana Land Resources Council, 1999). Figure 5.20-1 shows a family farm located outside the City of Washington in Daviess County, Indiana.

Figure 5.20-1 – Family farm outside Washington, Daviess County

Total land area for the 26-county I-69 Tier 1 Study Area accounts for approximately 28.9% of the total land area in Indiana; the total land in farms for these 26 counties represents 24.0% of that reported for the

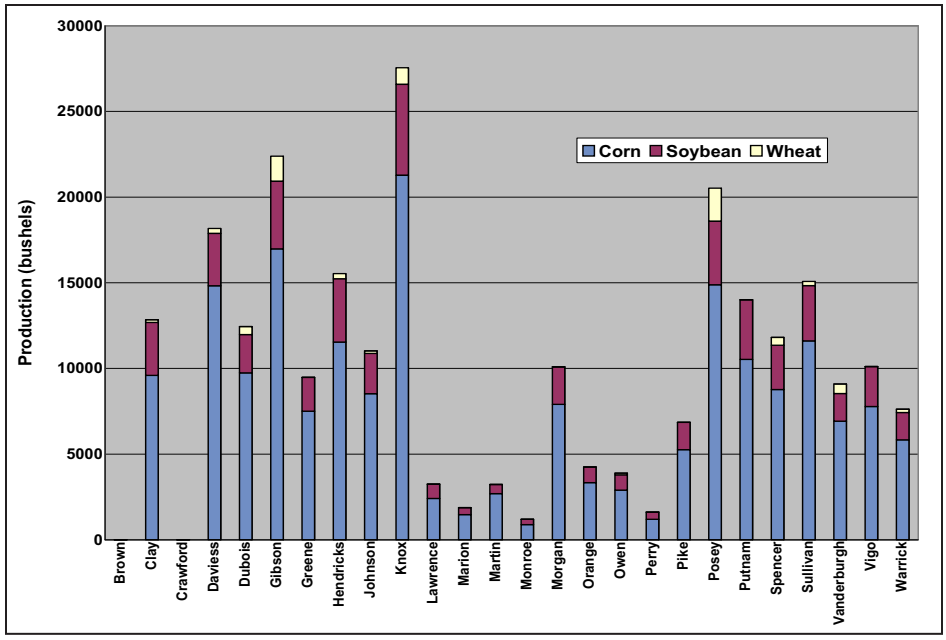

Figure5.20-2: 2001 Crop Production for Study Area Counties

state in the 1997 census of agriculture. Figure 5.20-2 illustrates corn, soybean and wheat production in 2001 for the 26-county southwestern Indiana Study Area and shows that Knox, Gibson, Posey, Daviess, and Hendricks counties are the most productive within this region based on the total number of bushels produced. Collective corn production (194.4 million bushels) and soybean production (52.3 million bushels) for the 26-county Study Area accounted for 22.0% and 19.1% of the states total production, respectively. Although the combined production of these 26 counties is 7-10% less than their total land area percentage within the state, three of the Study Area counties within the Lower Wabash basin (Knox, Gibson and Posey) rank among the top 20 for combined corn and soybean production in the state. Knox County was in fact ranked second for combined production for Indiana in 2001. Individually, Knox ranked second for corn production and eighth for soybean production, but did not rank within the top ten counties for yield (bushels per acre) in either crop. At 172 bushels/acre and 168 bushels/acre, respectively, Daviess County (ranked fourth) and Vanderburgh County (ranked tenth) were the only Study Area counties to rank among the top ten in the state for corn yield. None of the Study Area counties ranked among the top ten for soybean yield. Posey, Gibson, Knox and Vanderburgh counties ranked first, third, fourth, and tenth, respectively for winter wheat production for the state in 2001. However, at 77 bushels/acre Hendricks County was the only Study Area county to rank in the top ten for yield.

Although the efficiency and productivity experienced in today's farming community continues to increase, the returns to farmers for their investment in dollars is less than 20 years ago (Indiana Land Resources Council, 1999). Cash receipts for crops in 1997 in the 26 counties comprising the I-69 EIS Study Area ranged from $1.4 million for Brown County to $90.0 million for Knox County. The $661.5 million total cash receipts for crops generated by the Study Area counties in 1997 represents 18.7% of the total crop cash receipts ($3.51 billion) reported for the state during that census year. An even better indicator of the return on farmland within each county is the crop cash receipts per harvested acre (Figure 5.20-3). The statewide average of $291.42/acre harvested was exceeded by nine of the 26 Study Area counties: Marion, Morgan, Knox, Vanderburgh, Johnson, Hendricks, Gibson, Posey, and Vigo (Figure 5.20-4). The average value of farmland per acre for the 26-county Study Area in southwestern Indiana ranged from $1,288/acre to $4,369/acre. Eighteen, or 70%, of the 26-county Study Area counties are reported below the state average of $2,064/acre (Figure 5.20-3).

Since the publication of the DEIS, the following changes have been made to this section:

- Impact calculations have been updated to reflect the selection of variations, route shifts and other changes, as described in Section 5.1.3.

- Added 160 acres of farmland impacts for each alternative for rest areas, as discussed in Section 5.1.3.

- Added mitigation measures involving participation in the Farm and Rangeland Protection Program and the incorporation of farmland protection strategies in the I-69 Community Planning Program.

5.20.2 Farmland Protection Policy Act

The U.S. Department of Agriculture oversees the Farmland Protection Policy Act (FPPA). The Act's ultimate goal is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. The FPPA establishes the protocol and criteria to be used by federal agencies to (a) identify and take into account the adverse effects of their programs on the preservation of farmland, (b) consider alternative actions, as appropriate, that could lessen adverse effects, and (c) ensure that their programs are compatible with state and units of local government and private programs and policies to protect farmland. The FPPA does not provide authority to withhold Federal assistance for projects that convert farmland to non-agricultural uses.

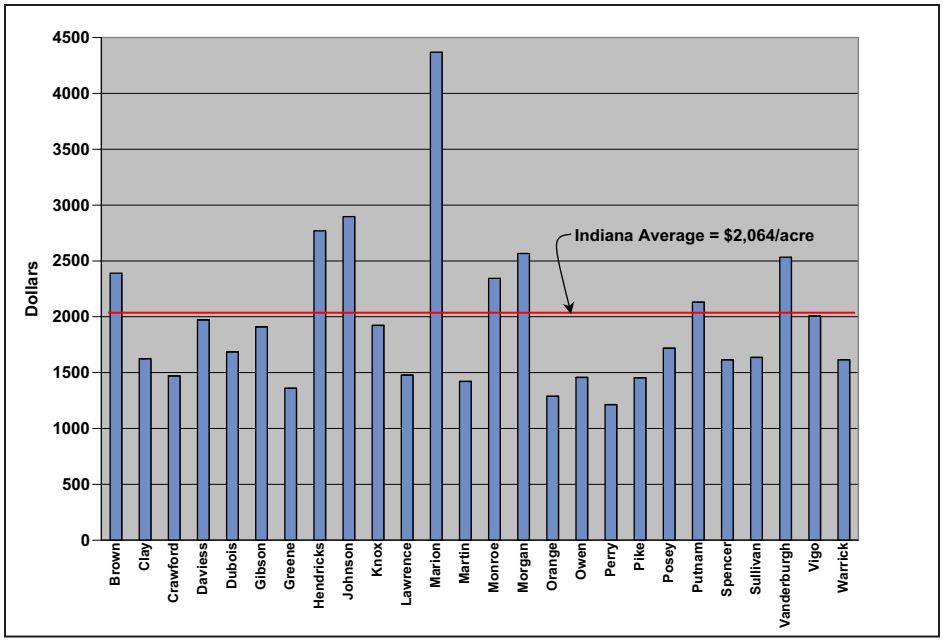

Figure 5.20-3: 1997 Crop Cash Receipts Per Acre Harvested for Study Area Counties

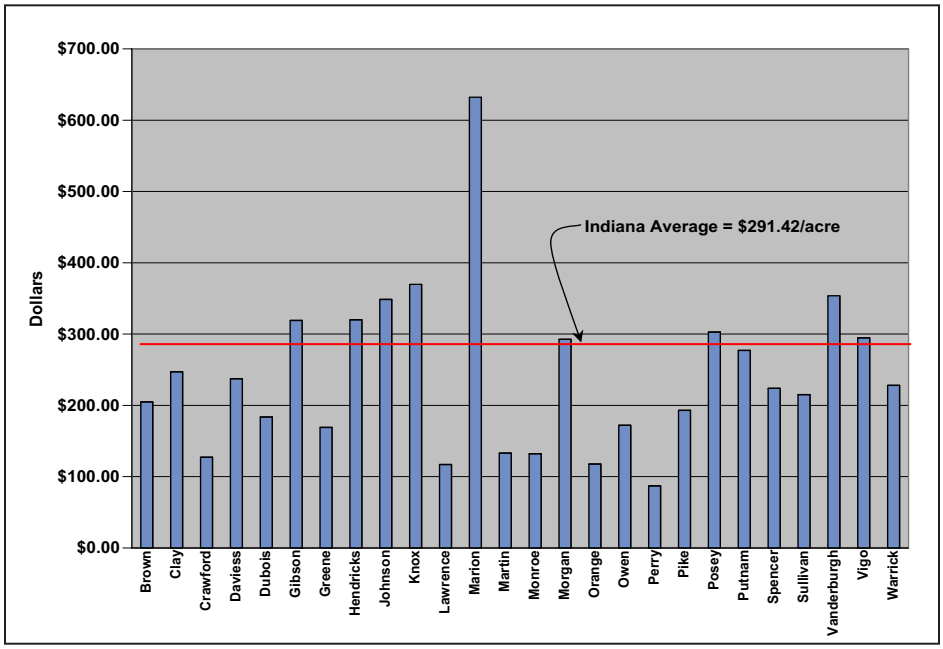

Figure 5.20-4: 1997 Average Value of Farmland Per Acre for Study Area Counties

For the purposes of implementing the FPPA, farmland is defined as prime or unique farmlands or farmland that is determined by the State or unit of local government agency to be farmland of statewide or local importance (7 CFR 658.2(a)). The NRCS defines prime farmland as:

> [l]and that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in

an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding. (SSM, USDA Handbook No. 18, October 1993)

Figure 5.20-5: Conditionally prime floodplain farmland along US 41 in Knox County

The NRCS generally identifies prime farmland in terms of the soil series and phase depicted as map units in each of the county soil surveys. In some instances, the series or a phase of the series is considered to be conditionally prime farmland only if it is drained, irrigated, or protected from frequent flooding. Figure 5.20-5 is an example of Haymond silt loam, frequently flooded farmland along US 41 within the West Fork White River floodplain in Knox County. This soil type is considered conditionally prime where protected or not frequently flooded.

Prime farmland does not include land already in or committed to urban development or water storage. Land utilized or designated for commercial, industrial or residential purposes is therefore, categorically excluded from consideration. For instance, the residential and commercial properties along SR 37 at Martinsville were developed on large expanses of Martinsville loam, Rensselaer clay loam, and Whitaker loam, each of which is classified as prime or conditionally prime soil types. However, since this land is not available for agricultural production, it is not regarded as prime farmland. In such cases, expansion of the existing right-of-way would not be considered an impact to prime farmland, regardless of the soil type.

5.20.3 Methodology

Impacts to agricultural lands resulting from direct conversion to transportation use were assessed using three different methodologies. The first assessment concerns the total number of farmland acres converted. The second addresses impacts specifically involving prime farmland. The third focuses on the potential annual loss in crop production.

The guidelines for evaluation of program or project compliance with the FPPA using the Farmland Conversion Impact Rating (Form AD 1006) system are outlined in 7 CFR 658.4. The NRCS is designated as the USDA agency responsible for providing assistance in the evaluation. 7 CFR 658.4(e) states that:

> "[I]t is advisable that evaluations and analyses of prospective farmland conversion impacts be made early in the planning process before a site or design is selected, and that, where possible, agencies make the FPPA evaluations part of the National Environmental Policy Act (NEPA) process."

Coordination with the NRCS Indiana headquarters on April 29, 2002 included a discussion of the Farmland Conversion Impact Rating system (Form AD 1006) and its suitability as a means to evaluate prime farmland impacts at the Tier 1 level for the I-69 study. This discussion concluded that due to the enormity of the project and the complexity of the alternatives, options and bypass variations contained within the study, that the Farmland Conversion Impact Rating system would not provide a clear and meaningful assessment of potential prime farmland impacts at this stage in the process. Additional consultation with the NRCS led to the development of an alternative methodology

to be used in the I-69 Tier 1 EIS. This methodology was designed to accurately assess expected prime farmland impacts using GIS data in a manner that would produce results allowing for comparisons between alternatives.

For the purposes of determining the total area of impact for each of the alternatives, a working alignment was utilized. The width characteristics of each working alignment segment were established by taking into consideration the location of the alignment (i.e. along an existing highway versus new alignment), type of terrain crossed (i.e. flat, gently rolling, hilly), as well as other factors. The estimation of farmland acreage to be directly converted within the working alignment of each alternative was based on the United States Geological Survey (USGS) Land Cover data layer in the GIS. This data layer is a subset of the National Land Cover Data (NLCD) developed by the USGS with the United States Environmental Protection Agency (USEPA) to produce a consistent, land-cover data layer for the continental U.S. The land-cover layer is based on 30 x 30 meter squares. For more information see Sections 4.1, *GIS Approach* and 5.1, *Methodology*, respectively.

In general, the land cover layer includes 21 categories of land use grouped into nine classes. The herbaceous planted/cultivated class is characterized as areas of herbaceous vegetation that have been planted or are intensively managed for the production of food, feed, or fiber, or are maintained in developed settings for specific purposes. This class includes the following five categories:

- Pasture/Hay - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops
- Row Crops - Areas used for the production of crops, such as corn, soybeans, vegetables, tobacco, and cotton
- Small Grains - Areas used for the production of small grain crops such as wheat, barley, oats, and rice
- Fallow - Areas used for the production of crops that are temporarily barren or with sparse vegetative cover as a result of being tilled in a management practice that incorporates prescribed alteration between cropping and tillage
- Urban/Recreational Grasses - Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.

For the purposes of determining direct farmland impact, the first three categories of the herbaceous planted/cultivated class were included in the analysis. The fallow category was excluded simply because it was not encountered within the working alignment for any of the alternatives. The urban/recreational grasses was excluded because, by definition, this category is not related to agriculture.

The working alignments were superimposed onto the GIS land cover layer representing the distribution and location of farmland (pasture/hay, row crops and small grains) within the 26-county Study Area to estimate the area of farmland to be converted by each of the five alternatives and their options. The data were also itemized by county for comparison purposes.

Methodology for the assessment of prime farmland impacts for this EIS was developed through coordination with the NRCS Indiana headquarters on April 29, 2002. The resulting methodology was based on the STATSGO (State Soil Geographic) dataset for Southwest Indiana. In general, this data set spatially represents a collection of map units or soil associations, each of which is defined and named in terms of their soil and/or nonsoil areas. Each soil association is comprised of up to 21 components or soil series phases. STATSGO data further indicates the relative

percent composition of a soil series phase within the association, and characterizes each series as prime farmland, conditional prime farmland or non-prime farmland. This makes it possible to determine what portion or percentage of a specific association is prime or conditional prime farmland.

Using the STATSGO spatial data and the GIS, estimates of prime farmland within each of the working alignments were determined through the following procedures.

1. Determine the total acreage of farmland within each working alignment.

2. Determine how much of this farmland exists within each soil association.

3. Using the percent of each soil series within each association, determine the acreage of each prime farmland soil series phase expected within the working alignment. This step assumes that each alignment will encounter each soil series phase within an association unit in proportions synonymous to the percent composition of each soil series phase within the association. To illustrate the potential worse case scenario, all conditional prime farmland soil series phases were included as prime farmland.

4. Because the NRCS does not regard each prime farmland series phase as equal with respect to its production potential and overall value to agriculture in the state, corn production yields for each prime farmland soil series phase were used to calculate a weighted production value, in bushels, which better assesses the varying value of each prime farmland soil series phase. This was accomplished by multiplying the estimated acreage for each prime farmland series phase by its corn yield (Indiana NRCS maximum = 155 bushels/acre) to calculate its potential annual production. The NRCS recognizes that in many cases a farmer may be capable of producing more yield per acre for a specific soil series than that used in this analysis; however, this annual potential "bushels of corn" produced by prime farmland within the working alignment can serve as an index for comparing relative prime farmland impacts between alternatives.

5. Total the annual "bushels of corn" produced by each individual soil series phase for each alignment to get an overall weighted estimate of prime farmland impacts.

The subsequent Tier 2 NEPA studies will assess prime farmland impacts via the USDA Farmland Conversion Impact Rating system (Form AD-1006).

The methodology employed to assess the impact of each alternative on agricultural production follows the general outline provided in INDOT's Procedural Manual for Preparing Environmental Studies (1996). This approach looks at each county as an agricultural unit for which statistical data for production, cultivation, and commodity sales price can be averaged and used to calculate an annual crop loss estimate for acreages of farmland within each working alignment. All raw data used in this analysis was taken directly from the most recent three issues of the Indiana Agricultural Statistics (1998-1999, 1999-2000 and 2000-2001). The latest three years of data available for acres of corn, soybean, wheat, and hay harvested in each of the 18 counties traversed by at least one of the study alternatives was averaged (Table 5.20-1). Next, the latest three years of production data for these four commodities was averaged for each of the 18 counties (Table 5.20-1). Using the average acreage harvested and the average production, the average yield for each commodity was calculated. Average sale prices (dollars/bushel or dollars/ton) were determined by averaging three years of statewide annual averages for each commodity (Table 5.20-2).

Because a certain percentage of farmland in a county is harvested as corn, a certain percentage is harvested as soybean and so on for wheat and hay, these percentages for each county were applied to the farmland within the working alignment of each alternative to reflect a proportional impact to each of the four principal farmland commodities. The four prorated percentages were calculated by taking the three-year average harvest acreage for each

Table 5.20-1 - Agricultural Harvest and Production Statistics for I-69 Tier I Counties

County	Crop	Harvested Area (acres) x1000				Production (bushels or tons) x1000				Average Yield (bushels or tons/acre)
		1998	1999	2000	Average	1998	1999	2000	Average	
Daviess	corn	83.9	81.7	84.3	83.30	10936.0	12008.0	13978.1	12307.37	**147.7**
	soybeans	63.7	62.0	58.9	61.53	2319.9	2529.8	2933.1	2594.27	**42.2**
	wheat	13.5	4.9	6.9	8.43	602.0	316.9	415.4	444.77	**52.7**
	hay (tons)	11.3	9.8	12.4	11.17	33.6	26.6	38.4	32.87	**2.9**
Gibson	corn	96.2	101.6	103.0	100.27	13103.7	13017.6	16497.8	14206.37	**141.7**
	soybeans	97.3	87.4	88.4	91.03	3629.0	2937.7	3842.2	3469.63	**38.1**
	wheat	33.7	32.2	28.6	31.50	1712.3	2016.3	1984.9	1904.50	**60.5**
	hay (tons)	5.6	5.3	5.4	5.43	21.0	17.0	20.2	19.40	**3.6**
Greene	corn	44.0	46.0	45.5	45.17	5050.5	5682.5	7035.4	5922.80	**131.1**
	soybeans	42.2	46.0	49.8	46.00	1462.7	1754.2	2184.0	1800.30	**39.1**
	wheat	3.8	3.4	3.1	3.43	168.4	201.1	162.2	177.23	**51.6**
	hay (tons)	22.1	19.2	20.2	20.50	64.9	55.7	62.8	61.13	**3.0**
Hendricks	corn	65.5	72.8	69.6	69.30	9204.8	10183.0	10140.2	9842.67	**142.0**
	soybeans	75.6	70.8	76.7	74.37	3254.3	2895.5	3700.8	3283.53	**44.2**
	wheat	5.5	3.6	4.7	4.60	329.9	268.3	328.7	308.97	**67.2**
	hay (tons)	6.7	6.1	6.2	6.33	20.5	21.1	26.4	22.67	**3.6**
Johnson	corn	62.1	59.3	56.4	59.27	7799.4	8115.5	8668.7	8194.53	**138.3**
	soybeans	54.2	46.5	45.6	48.77	2215.4	2009.3	2273.1	2165.93	**44.4**
	wheat	5.6	4.2	3.8	4.53	348.2	280.9	271.9	300.33	**66.3**
	hay (tons)	5.3	6.2	6.2	5.90	19.9	19.6	22.9	20.80	**3.5**
Knox	corn	100.3	121.0	126.8	116.03	13241.0	16915.7	20980.9	17045.87	**146.9**
	soybeans	111.8	112.0	113.7	112.50	4173.2	4144.4	4871.0	4396.20	**39.1**
	wheat	40.3	32.2	5.9	26.13	1934.7	1973.3	1629.4	1845.80	**70.6**
	hay (tons)	5.8	6.1	5.9	5.93	17.9	16.4	19.1	17.80	**3.0**
Lawrence	corn	18.6	18.0	17.0	17.87	2013.5	1799.1	2403.2	2071.93	**116.0**
	soybeans	18.5	22.3	21.4	20.73	641.9	612.6	902.2	718.90	**34.7**
	wheat	3.4	2.3	0.0	1.90	175.4	148.0	0.0	107.80	**56.7**
	hay (tons)	24.7	22.4	25.2	24.10	75.6	60.0	78.0	71.20	**3.0**
Marion	corn	9.9	9.6	8.6	9.37	1245.2	1242.4	1335.0	1274.20	**136.0**
	soybeans	12.7	11.3	12.3	12.10	482.2	406.2	602.2	496.87	**41.1**
	wheat	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.00	**0.0**
	hay (tons)	1.5	1.4	1.3	1.40	5.1	4.6	4.7	4.80	**3.4**
Martin	corn	15.4	14.5	14.5	14.80	1656.1	1646.7	2261.3	1854.70	**125.3**
	soybeans	16.4	11.7	12.7	13.60	569.9	350.5	687.8	536.07	**39.4**
	wheat	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.00	**0.0**
	hay (tons)	7.4	7.5	8.2	7.70	23.6	18.9	26.0	22.83	**3.0**
Monroe	corn	6.2	5.7	5.0	5.63	769.8	628.3	743.1	713.73	**126.7**
	soybeans	6.0	6.6	7.1	6.57	205.6	207.2	340.6	251.13	**38.2**
	wheat	0.7	0.6	0.0	0.43	28.6	30.8	0.0	19.80	**45.7**
	hay (tons)	12.6	14.0	15.3	13.97	40.5	39.5	47.0	42.33	**3.0**
Morgan	corn	48.9	50.9	48.9	49.57	6098.2	6930.1	7760.0	6929.43	**139.8**
	soybeans	50.3	46.5	43.7	46.83	1982.4	1857.8	2195.3	2011.83	**43.0**
	wheat	0.0	3.7	0.0	1.23	0.0	231.1	0.0	77.03	**62.5**
	hay (tons)	8.6	8.8	8.4	8.60	31.8	29.8	32.0	31.20	**3.6**

Table 5.20-1 - Agricultural Harvest and Production Statistics for I-69 Tier I Counties continued

County	Crop	Harvested Area (acres) x1000				Production (bushels or tons) x1000				Average Yield (bushels or tons/acre)
		1998	1999	2000	Average	1998	1999	2000	Average	
Owen	corn	19.1	17.6	17.7	18.13	1949.4	2088.1	2604.7	2214.07	**122.1**
	soybeans	18.8	16.8	18.8	18.13	620.1	613.9	876.1	703.37	**38.8**
	wheat	0.0	2.4	2.5	1.63	0.0	122.0	146.3	89.43	**54.8**
	hay (tons)	13.0	11.6	11.8	12.13	40.4	33.4	38.1	37.30	**3.1**
Pike	corn	25.9	31.4	33.6	30.30	3194.0	3667.5	5272.2	4044.57	**133.5**
	soybeans	34.1	36.7	34.2	35.00	1184.8	1116.6	1641.3	1314.23	**37.5**
	wheat	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.00	**0.0**
	hay (tons)	3.4	3.5	3.5	3.47	11.2	9.0	9.3	9.83	**2.8**
Putnam	corn	66.7	63.4	65.8	65.30	9346.3	9380.3	9929.8	9552.13	**146.3**
	soybeans	70.6	65.2	65.2	67.00	3143.7	2942.1	3232.7	3106.17	**46.4**
	wheat	5.6	4.7	4.9	5.07	337.9	297.0	334.0	322.97	**63.7**
	hay (tons)	11.7	12.3	12.9	12.30	32.2	39.5	43.6	38.43	**3.1**
Sullivan	corn	71.4	71.1	71.1	71.20	9665.2	9499.7	11432.1	10199.00	**143.2**
	soybeans	71.6	71.8	70.2	71.20	2611.8	2775.7	3261.7	2883.07	**40.5**
	wheat	0.0	9.8	6.3	5.37	0.0	517.4	417.0	311.47	**58.0**
	hay (tons)	5.5	6.0	6.8	6.10	15.0	18.7	19.0	17.57	**2.9**
Vanderburgh	corn	33.1	40.3	39.6	37.67	4126.2	5114.1	6318.8	5186.37	**137.7**
	soybeans	33.2	33.9	36.0	34.37	1178.9	1105.4	1570.6	1284.97	**37.4**
	wheat	11.4	no data	9.5	10.45	549.3	no data	632.0	590.65	**56.5**
	hay (tons)	1.7	1.5	1.5	1.57	6.7	4.7	5.3	5.57	**3.6**
Vigo	corn	38.2	50.7	51.9	46.93	4106.2	6612.7	7702.6	6140.50	**130.8**
	soybeans	46.0	52.8	53.9	50.90	1625.2	1839.3	2346.1	1936.87	**38.1**
	wheat	4.9	5.8	5.8	5.50	245.5	336.5	333.7	305.23	**55.5**
	hay (tons)	3.5	3.3	3.5	3.43	10.2	10.2	13.1	11.17	**3.3**
Warrick	corn	35.4	37.6	37.2	36.73	3390.2	4195.5	5738.7	4441.47	**120.9**
	soybeans	37.7	35.8	37.7	37.07	1191.9	1065.5	1581.9	1279.77	**34.5**
	wheat	8.1	6.2	6.3	6.87	325.1	292.3	389.0	335.47	**48.9**
	hay (tons)	59.0	5.8	5.8	23.53	17.1	13.3	16.0	15.47	**0.7**

Table 5.20-2: Average Crop Sales Prices for Indiana

Crop Type	1998-1999	1999-2000	2000-2001	Average
Corn	$2.11/bushel	$1.88/bushel	$1.85/bushel	$1.95/bushel
Soybean	$5.05/bushel	$4.71/bushel	$4.75/bushel	$4.84/bushel
Wheat	$2.36/bushel	$2.13/bushel	$2.10/bushel	$2.20/bushel
Hay	$88.00/ton	$91.00/ton	$86.00/ton	$88.33/ton

crop commodity and dividing it by the total three-year average harvest acreage for all four crops. Added together, the four prorated percentages for these crops within each county equal 100%. Calculating the dollar loss for each commodity within an individual county based on a specific farmland acreage purchase can then be achieved through the following equation:

$$CCL_{com} = CFA \times CPF_{com} \times CYR_{com} \times SAP_{com}$$

where:

CCL_{com} is the county crop loss for a specific commodity (dollars)

CFA is the county farmland area within the right-of-way (acres)

CPF_{com} is the county prorate factor for a specific commodity

CYR_{com} is the county yield rate for a specific commodity (bushels/acre of tons/acre)

SAP_{com} is the state average price for a specific commodity (dollars/bushel or dollars/ton)

Finally, the total production loss in dollars for each alternative was achieved by adding the appropriate commodity subtotals for each county and then adding the county subtotals. Tables 5.20-6 through 5.20-10 for Alternatives 1 through 5, respectively, can be found in the following Analysis section. Since Alternatives 1 and 2 include bypass variations around Fort Branch, Vincennes, and Farmersburg, the data is presented in the form of a range.

To determine the annual percent loss in crop cash receipts for each affected county, it was necessary to determine the average annual crop cash receipts for the 18 counties crossed by the alternatives, using three years of recent data (Table 5.20-3). Using this county average data, the loss of crop cash receipts resulting from the direct purchase of farmland by each alternative can be translated into a percent loss for each county (Table 5.20-4).

Table 5.20-3: Average Crop Cash Receipts for Counties Crossed by I-69 Tier 1 Alternatives

County	1998	1999	2000	Average
Daviess	$38,730,000	$43,955,000	$46,302,000	$42,996,000
Gibson	$59,963,000	$49,476,000	$55,692,000	$55,044,000
Greene	$18,480,000	$22,046,000	$24,570,000	$21,699,000
Hendricks	$35,435,000	$37,814,000	$38,389,000	$37,213,000
Johnson	$30,803,000	$32,481,000	$32,965,000	$32,083,000
Knox	$70,408,000	$81,364,000	$85,711,000	$79,161,000
Lawrence	$9,728,000	$9,253,000	$11,073,000	$10,018,000
Marion	$17,370,000	$18,674,000	$20,808,000	$18,951,000
Martin	$5,873,000	$5,222,000	$7,278,000	$6,124,000
Monroe	$4,704,000	$4,602,000	$5,370,000	$4,892,000
Morgan	$23,295,000	$25,884,000	$26,727,000	$25,302,000
Owen	$6,702,000	$7,287,000	$8,633,000	$7,541,000
Pike	$13,250,000	$14,616,000	$18,857,000	$15,574,000
Putnam	$32,746,000	$34,157,000	$33,487,000	$33,463,000
Sullivan	$39,193,000	$42,510,000	$45,109,000	$42,271,000
Vanderburgh	$15,934,000	$18,097,000	$21,427,000	$18,486,000
Vigo	$16,868,000	$24,010,000	$26,200,000	$22,359,000
Warrick	$14,668,000	$16,473,000	$20,537,000	$17,226,000

5.20.4 Analysis

The results of the assessment for the alternatives allow for general comparisons of potential total farmland impacted, estimated prime farmland area, prime farmland corn production index and loss of crop production. For a discussion on cumulative farmland impacts, refer to Section 5.26, *Cumulative Impacts.* Table 5.20-5 highlights the impacts for each of the alternatives studied. Figure 5.20-6 illustrates farmland acreage loss for each of the alternatives. Figure 5.20-7 illustrates prime farmland conversion acreages for the study alternatives. Figure 5.20-8 illustrates the assessment of prime farmland impacts as a function of corn production. Figure 5.20-9 illustrates esti-

Table 5.20-4: Percent of Annual Crop Cash Receipt Loss for I-69 Tier 1 Alternatives

County	Average (dollars x1000)	Percent of Crop Cash Receipt Loss Through Direct Right-of-Way Conversion											
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B
		Low High	Low High	Low High	Low High								
Daviess	$42,996					0.74	0.74	0.74	0.65	0.65	0.65	0.47	0.47
Gibson	$55,044	0.19 0.26	0.19 0.26	0.16 0.26	0.19 0.26	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Greene	$21,699		1.12	1.12	1.12	0.66	0.66	0.54	1.01	1.01	1.01		
Hendricks	$37,213											0.02	
Johnson	$32,083				0.11		0.11	0.11			0.11		0.11
Knox	$79,161	0.11 0.16	0.30 0.32	0.30 0.32	0.30 0.32								
Lawrence	$10,018											1.08	1.08
Marion	$18,951				0.12		0.12	0.12			0.12		0.12
Martin	$6,124											1.05	1.05
Monroe	$4,892					3.30	3.12	2.78				2.11	2.11
Morgan	$25,302			0.65	0.70	0.63	0.31	0.31		0.65	0.71	0.81	0.31
Owen	$7,541		2.28	2.48	2.48				2.28	2.48	2.48		
Pike	$15,574					0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Putnam	$33,363		0.21						0.21				
Sullivan	$42,271	0.10 0.19											
Vanderburgh	$18,486	0.0005	0.0005	0.0005	0.0005								
Vigo	$22,359	0.19 0.22											
Warrick	$17,226					0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07

0 – 0.5% | 0.5 – 1.0% | 1.0 – 2.0% | 2.0 – 3.0% | 3.0%

mated crop production loss in dollars per year. Table 5.20-5 includes an itemized list of farmland acreage that would be impacted within each county and a summary total of total estimated farmland, prime farmland, prime farmland production, and crop production loss for each alternative. Rest area acreages are assumed to be prime farmland but the specific locations of the rest areas will not be known until Tier 2. Therefore, the acreage is shown in a separate line in Table 5.20-5. This acreage is not reflected in Tables 5.20-6 through 5.20-10

Alternative 1

Alternative 1 would involve the loss of between 1,410 and 1,940 acres of farmland from Vanderburgh, Gibson, Knox, Sullivan, and Vigo counties, with 65% to 70% occurring in Gibson and Knox (Figure 5.20-6). The 500-plus acre difference in the range reported for farmland is attributed to the bypass variations at Fort Branch, Vincennes, and Farmersburg, where the working alignment involves new alignment away from existing US 41.

Table 5.20-5 - Summary of Farmland Impacts for I-69 Tier I Study Alternatives

Farmland Conversions by County (acres)												
Counties	Alternatives											
	1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B
	Low High	Low High	Low High	Low High								
Daviess					1289.8	1289.8	1289.8	1144.8	1144.8	1144.8	823.5	823.5
Gibson	483.9 657.8	483.9 657.8	483.9 657.8	483.9 657.8	664.7	664.7	664.7	664.7	664.7	664.7	664.7	664.7
Greene		1074.1	1074.1	1074.1	629.0	629.0	518.5	971.7	971.7	971.7		
Hendricks											25.4	
Johnson				146.2		146.2	146.2			146.2		146.2
Knox	381.5 532.4	1029.0 1105.0	1029.0 1105.0	1029.0 1105.0								
Lawrence											499.8	499.8
Marion				94.2		94.2	94.2			94.2		94.2
Martin											283.0	283.0
Monroe					672.2	636.1	566.9				429.2	429.2
Morgan			669.7	724.7	647.2	316.5	316.5		669.7	727.7	832.1	316.5
Owen		769.4	835.3	835.3				769.4	835.3	835.3		
Pike					617.7	617.7	617.7	617.7	617.7	617.7	617.7	617.7
Putnam		274.3						274.3				
Sullivan	186.6 357.7											
Vanderburgh	0.4	0.4	0.4	0.4								
Vigo	195.8 231.7											
Warrick					77.0	77.0	77.0	77.0	77.0	77.0	77.0	77.0
Rest Areas	160	160	160	160	160	160	160	160	160	160	160	160
Total Farmland Acreage Range (acres)	1408.2 1940.0	3791.1 4041.0	4252.4 4502.3	4547.8 4797.7	4757.6	4631.2	4451.5	4679.6	5140.9	5439.3	4412.4	4111.8
Total Prime Farmland Acreage Range (acres)	1014 1421	2738 2995	3174 3431	3488 3744	3088	2974	2902	3367	3802	4115	2866	2670
Total Prime Farmland Corn Prod. Index (bu.)	102,057 154,187	303,871 339,625	365,437 401,174	400,160 435,888	348,138	327,941	320,489	373,782	435,239	470,004	317,077	290,389
Annual Crop Production Loss Range (dollars)	279,647 399,708	828,323 884,195	938,776 994,648	1,009,874 1,065,746	1,074,461	1,041,956	1,000,352	1,037,031	1,147,483	1,219,320	984,103	908,557

NOTE: Due to different rounding methods, these numbers may vary slightly from those presented in Tables S-6 and 6-1.

With an estimated 1,010 to 1,420 acres of potential prime farmland directly affected (Figure 5.20-7) and a prime farmland corn production index ranging from 102,000 to 154,000 bushels (Figure 5.20-8), prime farmland impacts are also relatively low compared to the other four alternatives and their options. Collectively, it is estimated that

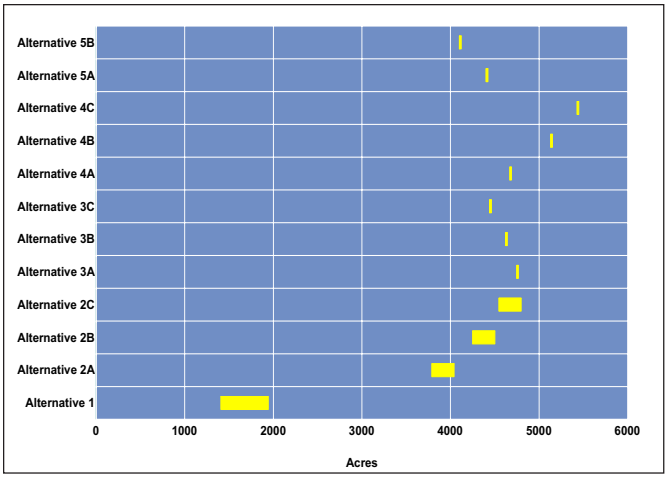

Figure 5.20-6: Total Farmland Area Ranges for I-69 Tier 1 Alternatives

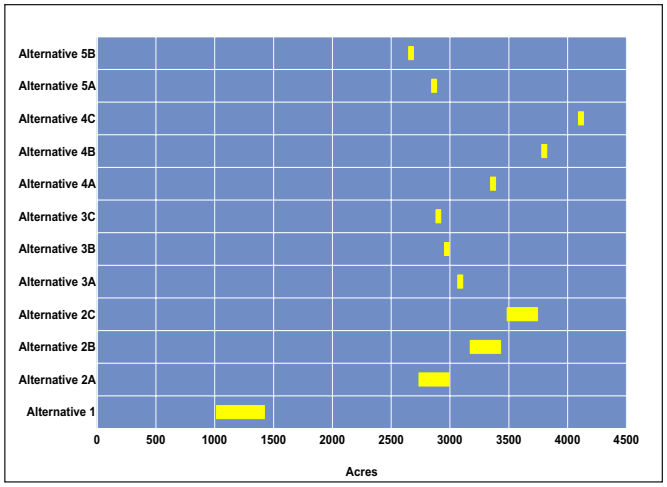

Figure 5.20-7: Total Prime Farmland Area Ranges for I-69 Tier 1 Alternatives

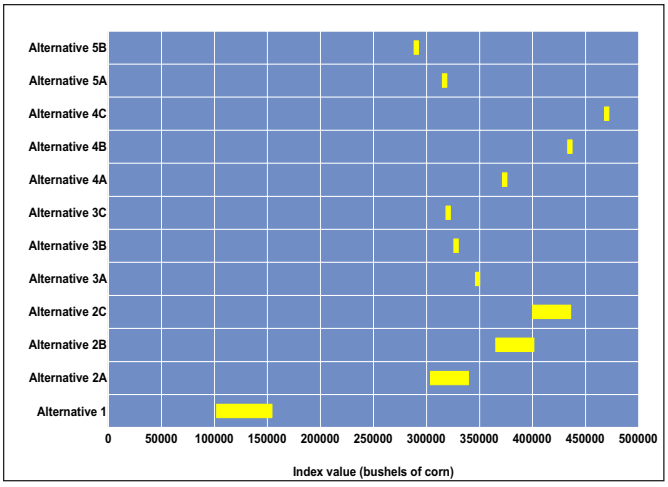

Figure 5.20-8: Prime Farmland Corn Production Index Ranges

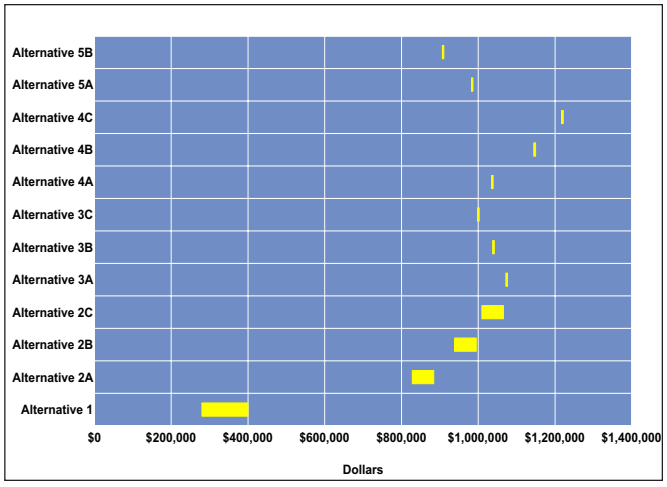

Figure 5.20-9: Annual Crop Production Loss Ranges

just over 983,000 acres of these five counties are considered prime farmland; therefore, the anticipated direct loss of prime farmland represents 0.16% of the collective total.

The estimated loss of farmland for Alternative 1 translates into an annual crop production loss of between $280,000 and $400,000 (Figure 5.20-9). At $107,000 to $145,000, Gibson County would sustain the greatest annual loss (Table 5.20-6), yet this represents 0.19% to 0.26% of the county's $55.0 million average annual cash receipts for crops in the late 1990s (Table 5.20-4). This alternative has the lowest relative impact to farmland, prime farmland and crop production of all the alternatives studied.

Alternatives 2A, 2B, and 2C

The differences in farmland impacts for the three Alternative 2 alignments are directly related to the length of new alignment between the split and I-70 or I-465. The estimated farmland acreage for Alternatives 2A and 2B range from 3,790 to 4,040 acres and 4,250 to 4,500 acres, respectively (Figure 5.20-6). The 460-acre average difference between these two alignments reflects the fact that Alternative 2A joins I-70 11 miles west of Alternative 2B and, therefore, entails fewer miles of new alignment. The 260-plus acre range for each of these alternatives is attributed

to bypass variations along US 41 at Fort Branch and Vincennes. Alternative 2C would result in farmland impacts ranging from 4,550 to 4,800 acres. The lower end of the range represents an alignment with no bypasses at Fort Branch and Vincennes, while the upper end of the range represents an alignment using both bypasses. Although Alternative 2C follows along SR 37, the expansion of the right-of-way for the Interstate typical section on one or both sides of the existing facility will still incur some farmland impacts. These impacts would be limited to relatively narrow strips along agricultural fields bordering existing SR 37. Relative to the other alternatives proposed in this EIS, farmland impacts for Alternatives 2A and 2B are considered moderate. In fact, excluding Alternative 1, Alternative 2A would cause the least farmland acreage impact of the remaining ten alignments. Because Alternative 2C has the potential to impact over 4,800 acres of farmland, its severity of impact is considered moderate to high relative to the other alternatives. Each of the Alternative 2 alignments would potentially require more than 500 acres from Gibson, Greene, Knox and Owen counties. Alternatives 2B and 2C would also impact more than 500 acres in Morgan County. Greene and Knox counties would sustain the greatest acre impacts.

Table 5.20-6 - Agricultural Crop Production Loss Estimates for Alternative 1

County	Crop	Yield	Sales Price	Prorate Factor	Alternative 1			
					Acreage		Crop Loss (in dollars)	
					Low	High	Low	High
Gibson	corn	141.7	1.95	0.4393	483.9	657.8	$58,632	$79,702
	soybeans	38.1	4.84	0.3989			$35,583	$48,371
	wheat	60.5	2.20	0.1380			$8,868	$12,056
	hay (tons)	3.6	88.33	0.0238			$3,632	$4,937
Knox	corn	146.9	1.95	0.4453	381.5	532.4	$48,581	$67,798
	soybeans	39.1	4.84	0.4317			$31,127	$43,440
	wheat	70.6	2.20	0.1003			$5,936	$8,285
	hay (tons)	3.0	88.33	0.0228			$2,305	$3,216
Sullivan	corn	143.2	1.95	0.4627	186.6	357.7	$24,075	$46,151
	soybeans	40.5	4.84	0.4627			$15,959	$30,593
	wheat	58.0	2.20	0.0349			$830	$1,591
	hay (tons)	2.9	88.33	0.0396			$1,879	$3,603
Vanderburgh	corn	137.7	1.95	0.4481	0.43		$51	
	soybeans	37.4	4.84	0.4089			$31	
	wheat	56.5	2.20	0.1243			$6	
	hay (tons)	3.6	88.33	0.0186			$2	
Vigo	corn	130.8	1.95	0.4396	195.8	231.7	$21,922	$25,941
	soybeans	38.1	4.84	0.4767			$17,178	$20,328
	wheat	55.5	2.20	0.0515			$1,229	$1,454
	hay (tons)	3.3	88.33	0.0322			$1,811	$2,143
Gibson							$106,716	$145,067
Knox							$87,951	$122,740
Sullivan							$42,745	$81,939
Vanderburgh							$92	
Vigo							$42,141	$49,868
Alternative Totals					**1248.2 – 1780.0***		**$279,647**	**$399,708**

* Alternative Totals do not include the 160 acres for rest areas because rest area locations will not be determined until Tier 2.

Prime farmland acreage impacts estimated for Alternatives 2A and 2B range from 2,740 to 3,000 acres and 3,170 to 3,430 acres, respectively. They are considered moderate in severity compared to the other alternatives (Figure 5.20-7). The prime farmland annual corn production index, which provides a better picture of the relative value of the prime farmland impacted, shows a similar relative range for these alignments, 304,000 to 340,000 bushels for Alternative 2A and 365,000 to 401,000 bushels for Alternative 2B (Figure 5.20-8). As with overall farmland, the potential for prime farmland impacts (acreage and/or corn production index) associated with Alternative 2C is considered moderate-to-high relative to the other study alternatives. Collectively, it is estimated that just over 1,086,000 acres of the six counties crossed by Alternative 2A, 1,037,000 acres of the six counties crossed by Alternative 2B and 1,384,000 acres of the eight counties crossed by Alternative 2C are considered prime farmland. Alternative 2 is therefore, estimated to convert approximately 0.24% to 0.32% of the prime farmland located within the counties it crosses.

The estimated annual crop production loss range of $828,000 to $884,000 for Alternative 2A, $939,000 to $995,000 for Alternative 2B are regarded as moderate relative to the other Tier 1 study alternatives (Figure 5.20-9). The

Table 5.20-7 - Agricultural Crop Production Loss Estimates Alternatives 2A, 2B, and 2C

County	Crop	Yield	Sales Price	Prorate Fact	Alternative 2A				Alternative 2B				Alternative 2C			
					Acreage		Crop Loss (in dollars)		Acreage		Crop Loss (in dollars)		Acreage		Crop Loss (in dollars)	
					Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Gibson	corn	141.7	1.95	0.4393	483.9	657.8	$58,632	$79,702	483.9	657.8	$58,632	$79,702	483.9	657.8	$58,632	$79,702
	soybeans	38.1	4.84	0.3989			$35,583	$48,371			$35,583	$48,371			$35,583	$48,371
	wheat	60.5	2.20	0.1380			$8,868	$12,056			$8,868	$12,056			$8,868	$12,056
	hay (tons)	3.6	88.33	0.0238			$3,632	$4,937			$3,632	$4,937			$3,632	$4,937
Greene	corn	131.1	1.95	0.3924	1074.1		$107,590		1074.1		$107,590		1074.1		$107,590	
	soybeans	39.1	4.84	0.3997			$81,266				$81,266				$81,266	
	wheat	51.6	2.20	0.0298			$3,629				$3,629				$3,629	
	hay (tons)	3.0	88.33	0.1781			$50,391				$50,391				$50,391	
Johnson	corn	138.3	1.95	0.5003									146.2		$19,687	
	soybeans	44.4	4.84	0.4116											$12,926	
	wheat	66.3	2.20	0.0383											$814	
	hay (tons)	3.5	88.33	0.0498											$2,267	
Knox	corn	146.9	1.95	0.4453	1029.0	1105.0	$131,037	$140,715	1029.0	1105.0	$131,037	$140,715	1029.0	1105.0	$131,037	$140,715
	soybeans	39.1	4.84	0.4317			$83,959	$90,160			$83,959	$90,160			$83,959	$90,160
	wheat	70.6	2.20	0.1003			$16,012	$17,195			$16,012	$17,195			$16,012	$17,195
	hay (tons)	3.0	88.33	0.0228			$6,217	$6,676			$6,217	$6,676			$6,217	$6,676
Marion	corn	136.0	1.95	0.4096									94.2		$10,217	
	soybeans	41.1	4.84	0.5292											$9,900	
	wheat	0.0	2.20	0.0000											$0	
	hay (tons)	3.4	88.33	0.0612											$1,745	
Morgan	corn	139.8	1.95	0.4666					669.7		$85,040		724.7		$92,024	
	soybeans	43.0	4.84	0.4409							$61,348				$66,386	
	wheat	62.5	2.20	0.0116							$1,065				$1,153	
	hay (tons)	3.6	88.33	0.0810							$17,383				$18,811	
Owen	corn	122.1	1.95	0.3624	769.4		$66,274		835.3		$71,950		835.3		$71,950	
	soybeans	38.8	4.84	0.3624			$52,310				$56,791				$56,791	
	wheat	54.8	2.20	0.0326			$3,016				$3,275				$3,275	
	hay (tons)	3.1	88.33	0.2425			$50,666				$55,005				$55,005	
Putnam	corn	146.3	1.95	0.4363	274.3		$34,079									
	soybeans	46.4	4.84	0.4477			$27,536									
	wheat	63.7	2.20	0.0339			$1,302									
	hay (tons)	3.1	88.33	0.0822			$6,223									
Vander-burgh	corn	137.7	1.95	0.4481	0.4		$51		0.4		$51		0.4		$51	
	soybeans	37.4	4.84	0.4089			$31				$31				$31	
	wheat	56.5	2.20	0.1243			$6				$6				$6	
	hay (tons)	3.6	88.33	0.0186			$2				$2				$2	
County Subtotals	Gibson						$106,716	$145,067			$106,716	$145,067			$106,716	$145,067
	Greene						$242,878				$242,878				$242,878	
	Johnson														$35,696	
	Knox						$237,226	$254,748			$237,226	$254,748			$237,226	$254,748
	Marion														$21,864	
	Morgan										$164,838				$178,375	
	Owen						$172,267				$187,022				$187,022	
	Putnam						$69,141									
	Vanderburgh						$92				$92				$92	
Alternative Totals					**3631.1 – 3881.0***		**$828,323**	**$884,195**	**4092.4 – 4342.3***		**$938,772**	**$994,648**	**4387.8 – 4637.7***		**$1,009,874**	**$1,065,746**

* Alternative Totals do not include the 160 acres for rest areas because rest area locations will not be determined until Tier 2.

Alternative 2C range of $1.009 to $1.065 million is considered moderate-to-high relative to other alternatives. The potential exists for at least four or five of the counties directly impacted by the Alternative 2 alignments to experience a production loss in excess of $100,000 annually (Table 5.20-7). Greene and Knox, would each conceivably sustain losses in excess of $200,000 annually. For Gibson, Johnson, Knox, Marion, Morgan, Putnam, and Vanderburgh counties, this represents a reduction of less than one percent in their average annual cash receipts for crops in the late 1990s (Table 5.20-4). However, for Greene County, the reduction would be approximately 1.1 percent, and as much as 2.5% for Owen County (Table 5.20-4).

Alternatives 3A, 3B, and 3C

Estimated farmland acreage for the Alternative 3 alignments is 4,760 acres for 3A, 4,630 for 3B and 4,450 for 3C Perferred Alternative (Figure 5.20-6). The relative reduction in farmland encroachment experienced by Alternative 3A using a portion of I-70 compared to Alternatives 3B and 3C is offset by the fact that all of this alternative is on new alignment from Monroe County north to I-70. Portions of Alternatives 3B and 3C utilize varying lengths of SR 37, which also reduces farmland acreage impacts. Among the Alternative 3 alignments, Preferred Alternative 3C represents the relative low end of the potential farmland impact because it utilizes a longer stretch of existing SR 37 than Alternative 3B. Alternative 3A represents the relative high end of this group. Alternative 3B is more indicative of the overall mean anticipated farmland impact of the group. In comparison to the other four study alternatives, the Alternative 3 group is considered relatively moderate with respect to overall farmland impact, although 3A is regarded as relatively moderate-to-high. On the average, Alternative 3 acreage impacts are slightly higher than those estimated for Alternatives 2A and 5B. They are comparable to Alternatives 2B, 2C, 4A, and 5A, yet appreciably lower than those estimated for Alternatives 4B and 4C. Although the Alternative 3 alignments have the potential to impact 500 plus acres of farmland in Daviess, Gibson, Greene, Monroe, Morgan, and Pike counties, roughly 30% of the farmland for these alignments is located in Daviess County.

Prime farmland acreage impacts are estimated to range from 2,900 acres for Preferred Alternative 3C to 3,090 for Alternative 3A (Figure 5.20-7). The prime farmland annual corn production index for Alternatives 3C and 3A range from 320,000 to 348,000 bushels (Figure 5.20-8). The corn production index for the Alternative 3 alignments is considered moderate for prime farmland impacts relative to the other study alternatives. Collectively, it is estimated that just over 1,063,000 acres of the seven counties crossed by Alternative 3A and 1,411,000 acres of the nine counties crossed by Alternatives 3B and 3C are considered prime farmland. Alternative 3A prime farmland conversion therefore, represents 0.27% of the seven county total. On the other hand, Alternatives 3B and 3C would convert approximately 0.19% to 0.20% of the prime farmland located within the nine counties it crosses.

The estimated annual crop production loss of $1,074,000 for Alternative 3A, $1,042,000 for Alternative 3B, and $1,000,000 for Preferred Alternative C are regarded as moderate-to-high relative to the other Tier 1 study alternatives (Figure 5.20-9). The potential exists for five to six of the counties directly impacted by the Alternative 3 alignments to experience a production loss in excess of $100,000 annually. However, at $317,000 Daviess County accounts for roughly 30% of the total annual loss expected for these alternatives and would sustain nearly twice the loss of any other county affected (Table 5.20-8). For Daviess County, this represents approximately 0.7% of its average annual cash receipts for crops in the late 1990s (Table 5.20-4). In contrast, the estimated $161,000 and $153,000 loss in annual cash receipts for Alternatives 3A and 3B in Monroe County represents 3.3% and 3.1%, respectively, of the counties average annual production (Table 5.20-4).

Alternatives 4A, 4B, and 4C

Alternative 4A, with an estimated farmland acreage of 4,680 acres, represents the lower end of the Alternative 4 spectrum. It is for the most part, comparable to estimates for Alternative 2C, the Alternative 3 group, and Alternative 5A, and is therefore considered relatively moderate in severity of impact to this resource (Figure 5.20-6). On the other hand, Alternative 4B (5,140 acres) and Alternative 4C (5,440 acres) are the two alternatives with the highest potential to impact farmland. Potential farmland impacts of 500-plus acres are expected in Daviess, Gibson, Greene, Owen, and Pike counties for each of the Alternative 4 options. In addition, Morgan County is estimated to sustain a direct farmland conversion loss in excess of 500 acres for Alternatives 4B and 4C. As with Alternatives 3 and 5, Daviess County would incur the greatest overall farmland loss.

Prime farmland acreage impacts estimated for Alternative 4 range from 3,370 to as much as 4,120 acres. Alternative 4A has the lowest acreage in the group and is considered to have a moderate relative impact comparable to that of Alternative 2B, but higher than that of the Alternative 3 alignments (Figure 5.20-7). At an estimated 4,120 acres, Alternative 4C represents the greatest overall impact to prime farmland acreage of all the Tier 1 study alignments. The conversion of prime farmland assessed for Alternative 4A and 4C represents as much as 0.27% of the prime farmland within the counties crossed by each alignment. For Alternative 4B, this represents 0.32% of the seven

Table 5.20-8 - Agricultural Crop Production Loss Estimates for Alternatives 3A, 3B, 3C

County	Crop	Yield	Sales Price	Prorate Factor	Alternative 3A		Alternative 3B		Alternative 3C	
					Acreage	Crop Loss (in dollars)	Acreage	Crop Loss (in dollars)	Acreage	Crop Loss (in dollars)
Daviess	corn	147.7	1.95	0.5066	1289.8	$187,931	1289.8	$187,931	1289.8	$187,931
	soybeans	42.2	4.84	0.3742		$98,418		$98,418		$98,418
	wheat	52.7	2.20	0.0513		$7,665		$7,665		$7,665
	hay (tons)	2.9	88.33	0.0679		$22,769		$22,769		$22,769
Gibson	corn	141.7	1.95	0.4393	664.7	$80,538	664.7	$80,538	664.7	$80,538
	soybeans	38.1	4.84	0.3989		$48,878		$48,878		$48,878
	wheat	60.5	2.20	0.1380		$12,182		$12,182		$12,182
	hay (tons)	3.6	88.33	0.0238		$4,989		$4,989		$4,989
Greene	corn	131.1	1.95	0.3924	629.0	$63,005	629.0	$63,005	518.5	$51,937
	soybeans	39.1	4.84	0.3997		$47,590		$47,590		$39,229
	wheat	51.6	2.20	0.0298		$2,125		$2,125		$1,752
	hay (tons)	3.0	88.33	0.1781		$29,509		$29,509		$24,325
Johnson	corn	138.3	1.95	0.5003			146.2	$19,687	146.2	$19,687
	soybeans	44.4	4.84	0.4116				$12,926		$12,926
	wheat	66.3	2.20	0.0383				$814		$814
	hay (tons)	3.5	88.33	0.0498				$2,267		$2,267
Marion	corn	136.0	1.95	0.4096			94.2	$10,217	94.2	$10,217
	soybeans	41.1	4.84	0.5292				$9,900		$9,900
	wheat	0.0	2.20	0.0000				$0		$0
	hay (tons)	3.4	88.33	0.0612				$1,745		$1,745
Monroe	corn	126.7	1.95	0.2118	672.2	$35,114	636.1	$33,228	566.9	$29,613
	soybeans	38.2	4.84	0.2469		$30,699		$29,050		$25,890
	wheat	45.7	2.20	0.0163		$1,099		$1,040		$927
	hay (tons)	3.0	88.33	0.5251		$94,505		$89,429		$79,700
Morgan	corn	139.8	1.95	0.4666	647.2	$82,183	316.5	$40,190	316.5	$40,190
	soybeans	43.0	4.84	0.4409		$59,287		$28,993		$28,993
	wheat	62.5	2.20	0.0116		$1,030		$503		$503
	hay (tons)	3.6	88.33	0.0810		$16,799		$8,215		$8,215
Pike	corn	133.5	1.95	0.4406	617.7	$70,720	617.7	$70,720	617.7	$70,720
	soybeans	37.5	4.84	0.5090		$57,101		$57,101		$57,101
	wheat	0.0	2.20	0.0000		$0		$0		$0
	hay (tons)	2.8	88.33	0.0504		$7,800		$7,800		$7,800
Warrick	corn	120.9	1.95	0.3525	77.0	$6,388	77.0	$6,388	77.0	$6,388
	soybeans	34.5	4.84	0.3557		$4,573		$4,573		$4,573
	wheat	48.9	2.20	0.0659		$544		$544		$544
	hay (tons)	0.7	88.33	0.2258		$1,009		$1,009		$1,009
County Subtotals	Daviess					$316,784		$316,784		$316,784
	Gibson					$146,589		$146,589		$146,589
	Greene					$142,231		$142,231		$117,244
	Johnson							$35,696		$35,696
	Marion							$21,864		$21,864
	Monroe					$161,418		$152,749		$136,132
	Morgan					$159,300		$77,902		$77,902
	Pike					$135,621		$135,621		$135,621
	Warrick					$12,516		$12,516		$12,516
Alternative Totals					4597.6*	$1,074,461	4471.2*	$1,041,956	4291.5*	$1,000,352

* Alternative Totals do not include the 160 acres for rest areas because rest area locations will not be determined until Tier 2.

counties encountered. The annual prime farmland corn production index shows similar relative comparisons as prime farmland acreage. Annual bushel estimates of 374,000 bushels for Alternative 4A are comparable to those of Alternative 2B. Bushel estimates for Alternative 4A are less than that expected for Alternatives 2C, 4B, and 4C, but more than that of Alternatives 1, 2A, and all of the Alternative 3 and 5 alignments (Figure 5.20-8). Annual bushel estimates of 435,000 for Alternative 4B are comparable to the upper range of Alternative 2C and are considered high, but not as high as the potential for Alternative 4C (470,000 bushels).

The estimated annual crop production loss of $1,037,000 for Alternative 4A is regarded as moderate relative to the other Tier 1 study alternatives (Figure 5.20-9). The Alternative 4B estimate of $1,147,000 and the $1,219,000 for Alternative 4C are considered relatively high. The potential exists for at least five of the counties directly impacted by Alternative 4A and six counties affected by Alternatives 4B and 4C to experience a production loss in excess of $100,000 annually (Table 5.20-9). While production loss for Morgan and Greene counties could exceed $200,000, Daviess County could approach $300,000 for each of the Alternative 4 alignments. Approximately 23% to 27% of the production loss would be in Daviess County. This however, represents less than one percent of Daviess Counties average annual cash receipts. As with Alternative 2, the estimated reduction in crop cash receipts for Alternative 4 in Greene County is 1.0% of the average annual, and as much as 2.5% for Owen County (Table 5.20-4).

Alternatives 5A and 5B

Estimated total farmland impacts for Alternatives 5A and 5B are 4,410 and 4,110 acres within nine or ten counties, respectively (Figure 5.20-6). Relative to the other study alternatives, this is considered moderate in severity. Anticipated farmland conversion totaling 500 acres or more is expected from each of the following counties: Gibson, Pike, Daviess, Lawrence, and Morgan (Table 5.20-5). On average, farmland impacts based on acreage estimates for Alternative 5 are comparable to those expected for Alternative 2B, slightly greater than those estimated for Alternative 2A, slightly less than those expected for Alternatives 2C, 3A, 3B, 3C, and 4A, and much less than those predicted for Alternatives 4B and 4C.

With a prime farmland acreage loss estimate of 2,870 to 2,670 acres (Figure 5.20-7), and a prime farmland corn production index ranging from 290,000 to 317,000 bushels (Figure 5.20-8), the impacts of these alternatives are moderate in comparison to the other four alternatives. Collectively, it is estimated that just over 1,245,000 acres of the nine Alternative 5A counties and 1,355,000 acres of the ten Alternative 5B counties are considered prime farmland. Therefore, the anticipated direct loss of prime farmland would be 0.22% of the nine county total for Alternative 5A and about 0.18% of the ten county total for Alternative 5B.

An estimated annual crop production loss of $984,000 is expected for Alternative 5A and $908,000 for Alternative 5B (Figure 5.20-9). Daviess County (5A and 5B) and Morgan County (5A only) would incur the greatest annual cash receipt loss, each in excess of $200,000 (Table 5.20-10). This represents 0.5% of the receipts for Daviess County and 0.8% of that for Morgan County (Table 5.20-4). In contrast, the estimated $103,000 loss in annual cash receipts for Monroe County represents approximately 2.1% of its average annual production (Table 5.20-4).

Based on data from the previous four agricultural censuses, farmland in southwestern Indiana is currently being lost at a rate of approximately 20,800 acres/year. Assuming this trend continues, it is estimated that over the next 20 years (2002 to 2022) approximately 415,300 acres of farmland will have been converted to non-farmland uses. For Alternative 1, this regional trend translates into expected farmland conversions that represent 6% to 9% of the annual loss in farmland for southwestern Indiana, or 0.3% to 0.4% of the loss projected over the next 20 years (Figure 5.20-10). For the 11 other alternatives that involve varying lengths of new alignment, direct farmland conversion is estimated to account for 17% to 25% of that expected to occur in southwestern Indiana in a single year, or 0.9% to 1.3% of that projected for southwestern Indiana over the next 20 years (Figure 5.20-10).

Table 5.20-9 - Agricultural Crop Production Loss Estimates for Alternatives 4A, 4B, 4C

County	Crop	Yield	Sales Price	Prorate Factor	Alternative 4A		Alternative 4B		Alternative 4C	
					Acreage	Crop Loss (in dollars)	Acreage	Crop Loss (in dollars)	Acreage	Crop Loss (in dollars)
Daviess	corn	147.7	1.95	0.5066	1144.8	$166,804	1144.8	$166,804	1144.8	$166,804
	soybeans	42.2	4.84	0.3742		$87,354		$87,354		$87,354
	wheat	52.7	2.20	0.0513		$6,803		$6,80		$6,803
	hay (tons)	2.9	88.33	0.0679		$20,209		$20,209		$20,209
Gibson	corn	141.7	1.95	0.4393	664.7	$80,538	664.7	$80,538	664.7	$80,538
	soybeans	38.1	4.84	0.3989		$48,878		$48,878		$48,878
	wheat	60.5	2.20	0.1380		$12,182		$12,182		$12,182
	hay (tons)	3.6	88.33	0.0238		$4,989		$4,989		$4,989
Greene	corn	131.1	1.95	0.3924	971.7	$97,333	971.7	$97,333	971.7	$97,333
	soybeans	39.1	4.84	0.3997		$73,518		$73,518		$73,518
	wheat	51.6	2.20	0.0298		$3,283		$3,283		$3,283
	hay (tons)	3.0	88.33	0.1781		$45,587		$45,587		$45,587
Johnson	corn	138.3	1.95	0.5003					146.2	$19,687
	soybeans	44.4	4.84	0.4116						$12,926
	wheat	66.3	2.20	0.0383						$814
	hay (tons)	3.5	88.33	0.0498						$2,267
Marion	corn	136.0	1.95	0.4096					94.2	$10,217
	soybeans	41.1	4.84	0.5292						$9,900
	wheat	0.0	2.20	0.0000						$0
	hay (tons)	3.4	88.33	0.0612						$1,745
Morgan	corn	139.8	1.95	0.4666			669.7	$85,040	727.7	$92,405
	soybeans	43.0	4.84	0.4409				$61,348		$66,661
	wheat	62.5	2.20	0.0116				$1,065		$1,158
	hay (tons)	3.6	88.33	0.0810				$17,383		$18,889
Owen	corn	122.1	1.95	0.3624	769.4	$66,274	835.3	$71,950	835.3	$71,950
	soybeans	38.8	4.84	0.3624		$52,310		$56,791		$56,791
	wheat	54.8	2.20	0.0326		$3,016		$3,275		$3,275
	hay (tons)	3.1	88.33	0.2425		$50,666		$55,005		$55,005
Pike	corn	133.5	1.95	0.4406	617.7	$70,720	617.7	$70,720	617.7	$70,720
	soybeans	37.5	4.84	0.5090		$57,101		$57,101		$57,101
	wheat	0.0	2.20	0.0000		$0		$0		$0
	hay (tons)	2.8	88.33	0.0504		$7,800		$7,800		$7,800
Putnam	corn	146.3	1.95	0.4363	274.3	$34,079				
	soybeans	46.4	4.84	0.4477		$27,536				
	wheat	63.7	2.20	0.0339		$1,302				
	hay (tons)	3.1	88.33	0.0822		$6,223				
Warrick	corn	120.9	1.95	0.3525	77.0	$6,388	77.0	$6,388	77.0	$6,388
	soybeans	34.5	4.84	0.3557		$4,573		$4,573		$4,573
	wheat	48.9	2.20	0.0659		$54		$544		$544
	hay (tons)	0.7	88.33	0.2258		$1,009		$1,009		$1,009
County Subtotals	Daviess					$281,171		$281,171		$281,171
	Gibson					$146,589		$146,589		$146,589
	Greene					$219,723		$219,723		$219,723
	Johnson									$35,696
	Marion									$21,864
	Morgan							$164,838		$179,114
	Owen					$172,267		$187,022		$187,022
	Pike					$135,621		$135,621		$135,621
	Putnam					$69,141				
	Warrick					$12,516				$12,516
Alternative Totals					**4519.6***	**$1,037,031**	**4980.9***	**$1,147,483**	**5279.3***	**$1,219,320**

* Alternative Totals do not include the 160 acres for rest areas because rest area locations will not be determined until Tier 2.

No Build Alternative

The No Build Alternative will have no impacts on agricultural resources.

5.20.5 Mitigation of Agricultural Impacts

Agricultural impacts in the form of permanent conversion of farmland to non-farmland use generally cannot be mitigated easily by the creation of new farmland elsewhere. For this reason, the mitigation of agricultural impacts tends to focus on those practices that assist in avoiding and/or minimizing conversion, or designing alignments to minimize disruption to existing agricultural patterns. A detailed discussion of specific farmland mitigation measures for each of the study alternatives will be conducted in the Tier 2 NEPA studies. The following lists a few general practices that can be taken into consideration to avoid, minimize or mitigate farmland impacts.

- Where reasonable, corridors should follow existing property lines and minimize dividing or splitting of large tracts of farmland.
- Follow agricultural property lines as much as possible or cross fields at perpendicular angles to reduce point rows and the creation of uneconomic remnants.
- Work with local officials to control access through interchange locations. In so doing, subsequent development can possibly be directed away from large expanses of prime farmland, thus preserving this resource.
- The NRCS will be contacted and appropriate analyses will be conducted in accordance with the Farmland Protection Policy Act during Tier 2. In addition, coordination will continue with the NRCS in Tier 2 to determine the feasibility of participating in the Farm and Ranch Lands Protection Program (formerly known as the Farmland Protection Program).
- Incorporate local and regional farmland protection strategies into the I-69 Community Planning Program.

In addition, FHWA and INDOT will provide financial and technical assistance for local land use planning through the I-69 Community Planning Pilot Program. This program will include grants to local governments to support land use and economic development planning. This program will assist local governments in developing plans that protect farmland.

5.20.6 Summary

The analysis of the overall direct farmland conversion, prime farmland impacts, and the potential crop production loss for the study alternatives reveals a few basic conclusions for the project. Alternative 1, utilizing the existing US 41 and I-70 alignments, is the alternative with the lowest impacts to farmland. The total estimated farmland acreage and crop production loss for Alternative 1 is less than half that of any other alternative studied. At the other end of the spectrum, Alternatives 4C and 4B exhibited the highest potential for farmland acreage impact and overall crop production loss. The potential for impacts to prime farmland were also considered high, at least 10% greater than other alternatives. Alternatives 2A and 4A, which use lengthy segments of I-70, had reduced impacts compared to other alternatives within the same group. The use of the existing SR 37 alignment for Preferred Alternative 3C would reduce farmland impacts below that expected for Alternatives 2C, 3A, 3B, 4A, 4B, and 4C. The No Build Alternative will have no impacts on agricultural resources. The I-69 project would impact approximately 1,410 (Alternative 1) to 5,460 (Alternative 4C) acres of farmland. For a discussion of cumulative farmland impacts refer to Section 5.26, *Cumulative Impacts.*

Table 5.20-10 - Agricultural Crop Production Loss Estimates Alternatives 5A and 5B

County	Crop	Yield	Sales Price	Prorate Factor	Alternative 5A		Alternative 5B	
					Acreage	Crop Loss (in dollars)	Acreage	Crop Loss (in dollars)
Daviess	corn	147.7	1.95	0.5066	823.5	$119,988	823.5	$119,988
	soybeans	42.2	4.84	0.3742		$62,837		$62,837
	wheat	52.7	2.20	0.0513		$4,894		$4,894
	hay (tons)	2.9	88.33	0.0679		$14,537		$14,537
Gibson	corn	141.7	1.95	0.4393	664.7	$80,538	664.7	$80,538
	soybeans	38.1	4.84	0.3989		$48,878		$48,878
	wheat	60.5	2.20	0.1380		$12,182		$12,182
	hay (tons)	3.6	88.33	0.0238		$4,989		$4,989
Hendricks	corn	142.0	1.95	0.4483	25.4	$3,148		
	soybeans	44.2	4.84	0.4810		$2,609		
	wheat	67.2	2.20	0.0298		$111		
	hay (tons)	3.6	88.33	0.0410		$329		
Johnson	corn	138.3	1.95	0.5003			146.2	$19,687
	soybeans	44.4	4.84	0.4116				$12,926
	wheat	66.3	2.20	0.0383				$814
	hay (tons)	3.5	88.33	0.0498				$2,267
Lawrence	corn	116.0	1.95	0.2766	499.8	$31,208	499.8	$31,208
	soybeans	34.7	4.84	0.3209		$26,897		$26,897
	wheat	56.7	2.20	0.0294		$1,831		$1,831
	hay (tons)	3.0	88.33	0.3731		$48,664		$48,664
Marion	corn	136.0	1.95	0.4096			94.2	$10,217
	soybeans	41.1	4.84	0.5292				$9,900
	wheat	0.0	2.20	0.0000				$0
	hay (tons)	3.4	88.33	0.0612				$1,745
Martin	corn	125.3	1.95	0.4100	283.0	$28,305	283.0	$28,305
	soybeans	39.4	4.84	0.3767		$20,323		$20,323
	wheat	0.0	2.20	0.0000		$0		$0
	hay (tons)	3.0	88.33	0.2133		$15,811		$15,811
Monroe	corn	126.7	1.95	0.2118	429.2	$22,420	429.2	$22,420
	soybeans	38.2	4.84	0.2469		$19,601		$19,601
	wheat	45.7	2.20	0.0163		$702		$702
	hay (tons)	3.0	88.33	0.5251		$60,341		$60,341
Morgan	corn	139.8	1.95	0.4666	832.1	$105,662	316.5	$40,190
	soybeans	43.0	4.84	0.4409		$76,225		$28,993
	wheat	62.5	2.20	0.0116		$1,324		$503
	hay (tons)	3.6	88.33	0.0810		$21,599		$8,215
Pike	corn	133.5	1.95	0.4406	617.7	$70,720	617.7	$70,720
	soybeans	37.5	4.84	0.5090		$57,101		$57,101
	wheat	0.0	2.20	0.0000		$0		$0
	hay (tons)	2.8	88.33	0.0504		$7,800		$7,800
Warrick	corn	120.9	1.95	0.3525	77.0	$6,388	77.0	$6,388
	soybeans	34.5	4.84	0.3557		$4,573		$4,573
	Wheat	48.9	2.20	0.0659		$544		$544
	hay (tons)	0.7	88.33	0.2258		$1,009		$1,009
County Subtotals	Daviess					$202,257		$202,257
	Gibson					$146,589		$146,589
	Hendricks					$6,198		
	Johnson							$35,696
	Lawrence					$108,601		$108,601
	Marion							$21,864
	Martin					$64,441		$64,441
	Monroe					$103,065		$103,065
	Morgan					$204,811		$77,902
	Pike					$135,621		$135,621
	Warrick					$12,516		$12,516
Alternative Totals					**4252.4***	**$984,103**	**3951.8***	**$908,557**

* Alternative Totals do not include the 160 acres for rest areas because rest area locations will not be determined until Tier 2

The Preferred Alternative 3C would result in the direct conversion of an estimated 4,450 acres of farmland. This represents approximately 1,000 acres less than Alternative 4C, the highest estimate, and 660 acres more than Alternative 2A which represents the lowest of the new alignment alternatives. Preferred Alternative 3C will convert between 2,510 and 3,040 acres more than Alternative 1. Prime farmland impact estimates for the Preferred Alternative 3C are 2,900 acres. Although much greater than Alternative 1, prime farmland impacts for the Preferred Alternative 3C are only slightly higher than that of Alternatives 2A, 5A, and 5B. Crop production loss resulting from the Preferred Alternative 3C is estimated at just over $1 million annually for the eight counties through which the alignment passes. Nearly, a third of this annual crop loss revenue would be in Daviess County. As with total farmland acreage, the crop production loss for Preferred Alternative 3C is roughly in the middle of the $828,000 to $1,219,000 range that represents the new alignment alternatives studied.

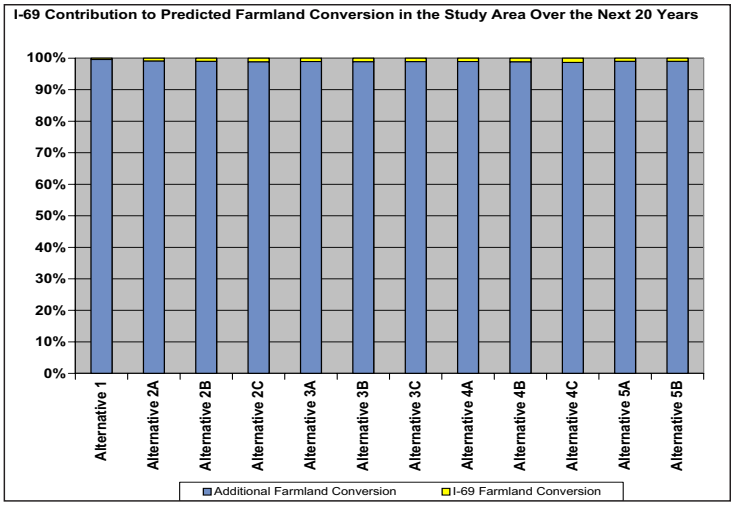

Figure 5.20-10: I-69 Contribution to Predicted Farmland Conversion in the Study Area Over the Next 20 Years

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