3.0 Planning Area

## 3.1 – Introduction

Kansas Region K consists of the following participating counties, Tribes, and their participating jurisdictions:

- Atchison County
- Brown County
- Doniphan County
- Douglas County
- Iowa Tribe
- Jackson County
- Jefferson County
- Kickapoo Tribe
- Marshall County
- Nemaha County
- Washington County

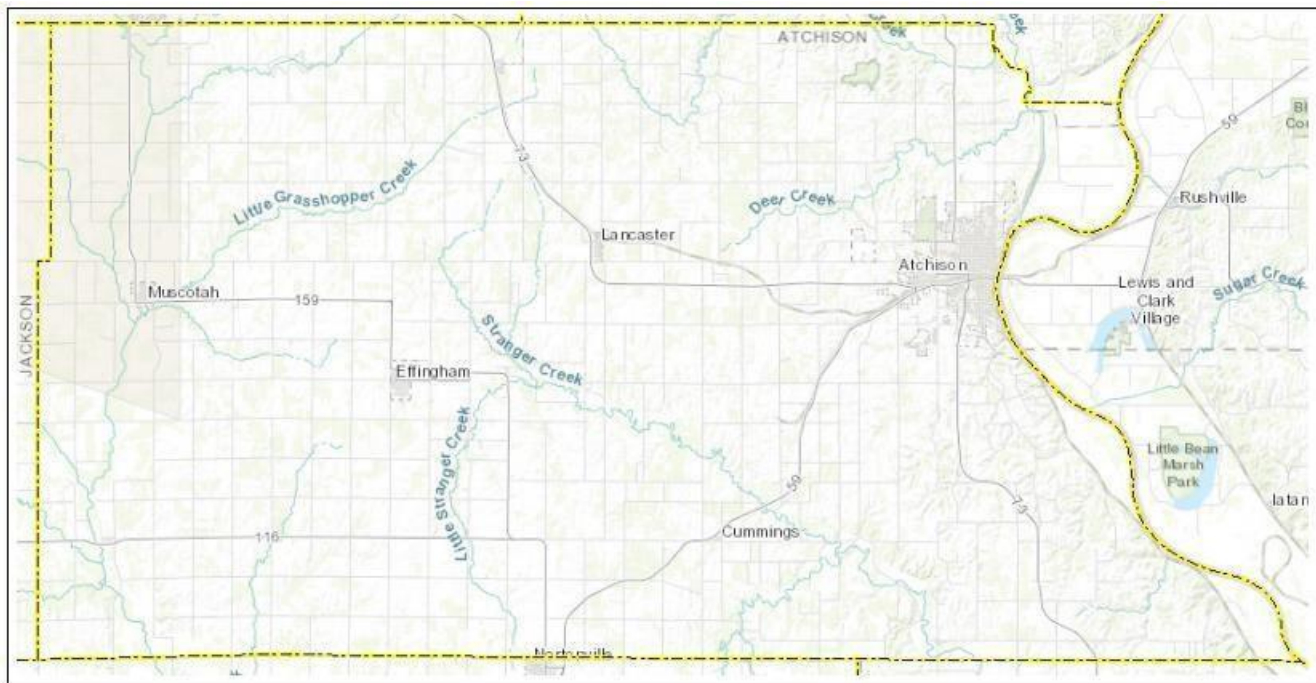The following map details the locations of these counties.
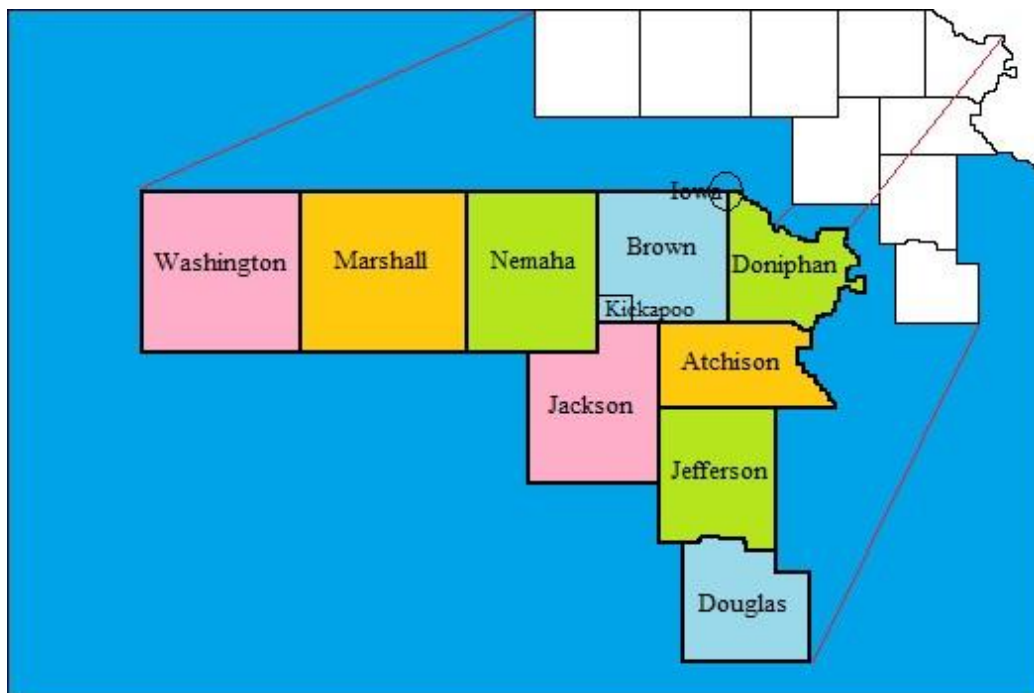
The following map, provided by the Kansas Department of Transportation (KDOT), detail the locations of participating jurisdictions for Atchison County:
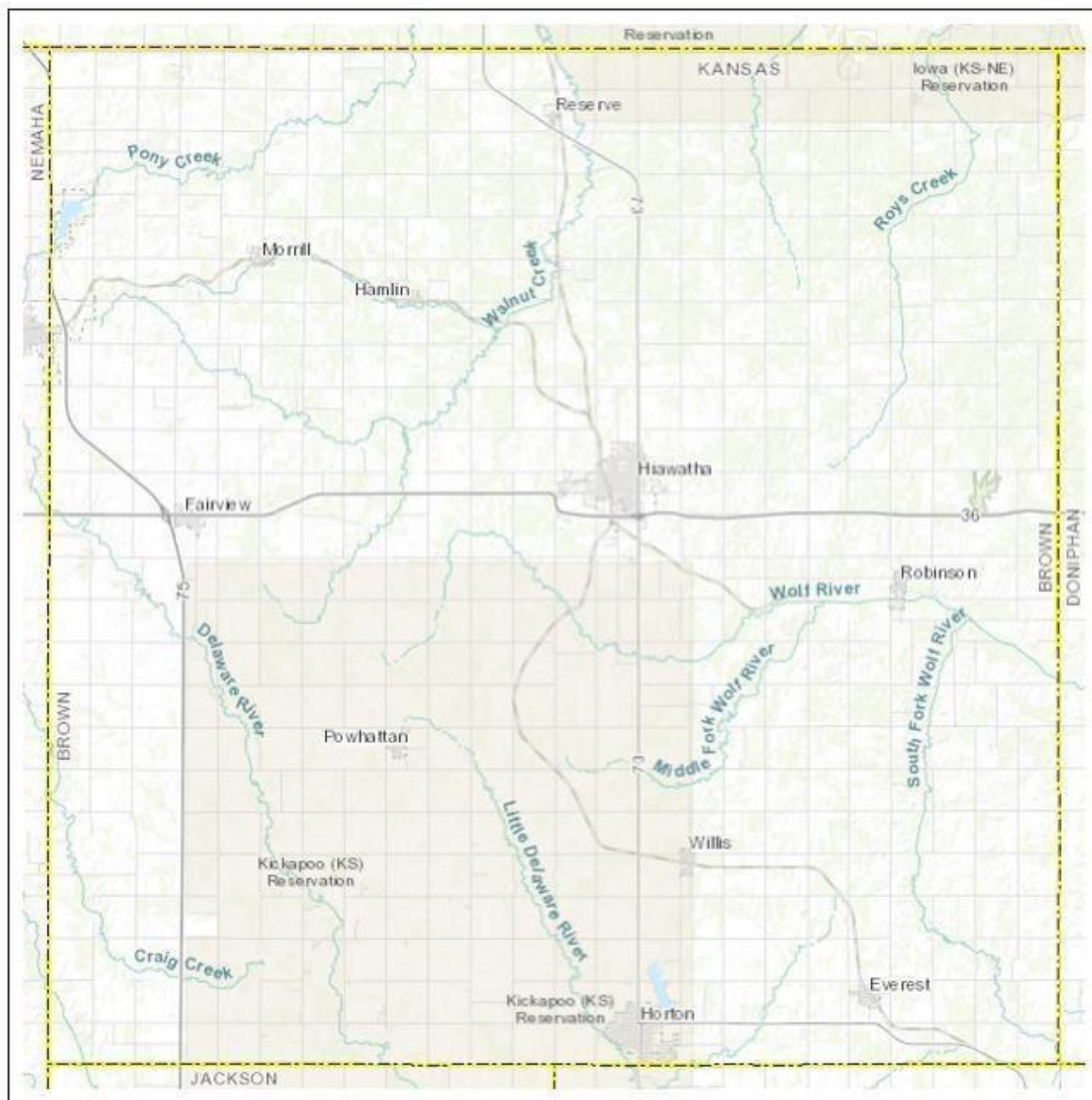
Atchison County

The following map, provided by KDOT, details the locations of participating jurisdictions for Brown County:

Brown County

The following map, provided by KDOT, details the locations of participating jurisdictions for Doniphan County:

Doniphan County

The following map, provided by KDOT, details the locations of participating jurisdictions for Douglas County:

Douglas County

The following map, provided by KDOT, details the location of the Iowa Tribal Reservation:
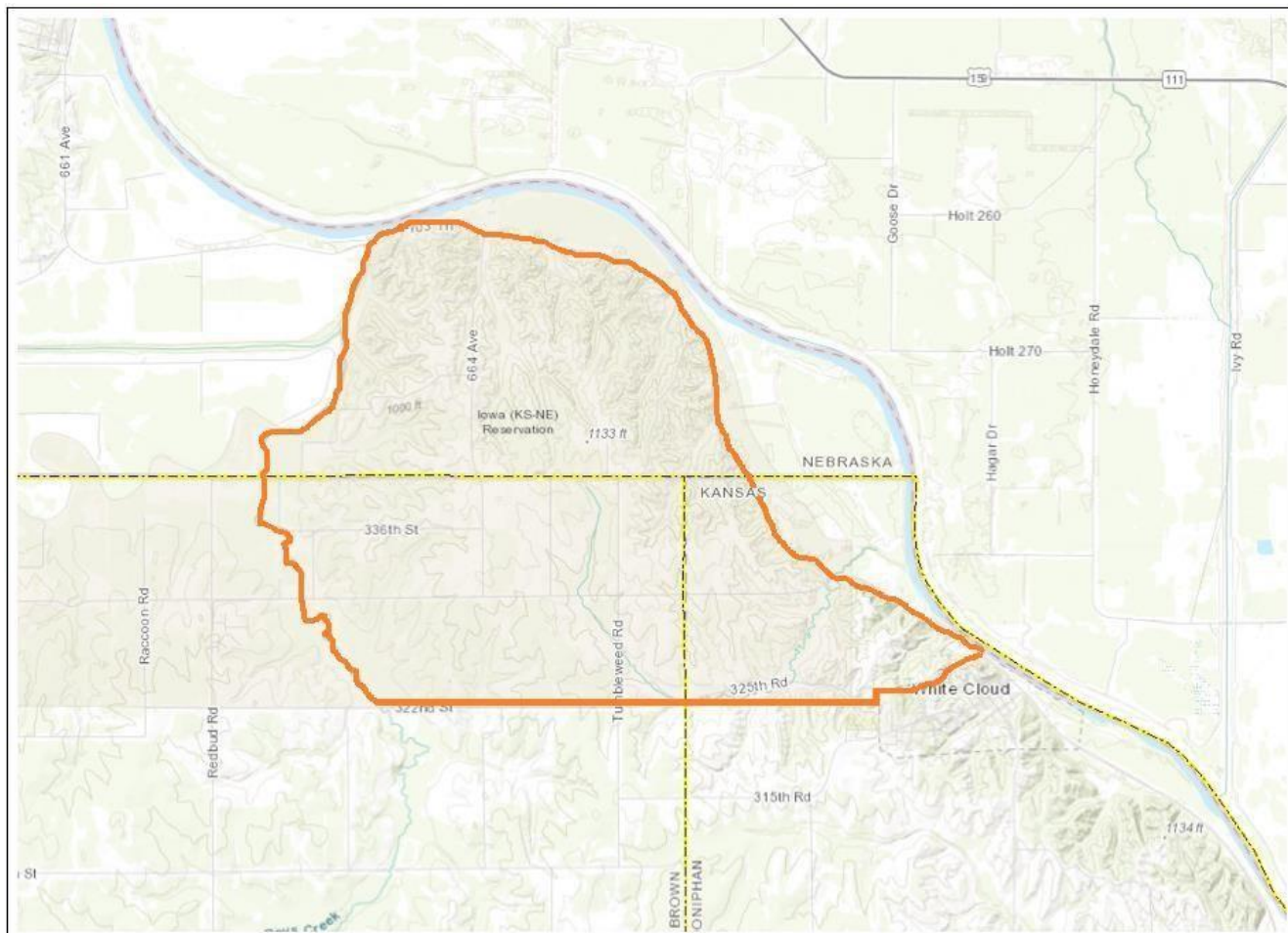
The following map, provided by KDOT, details the locations of participating jurisdictions for Jackson County:

Jackson County
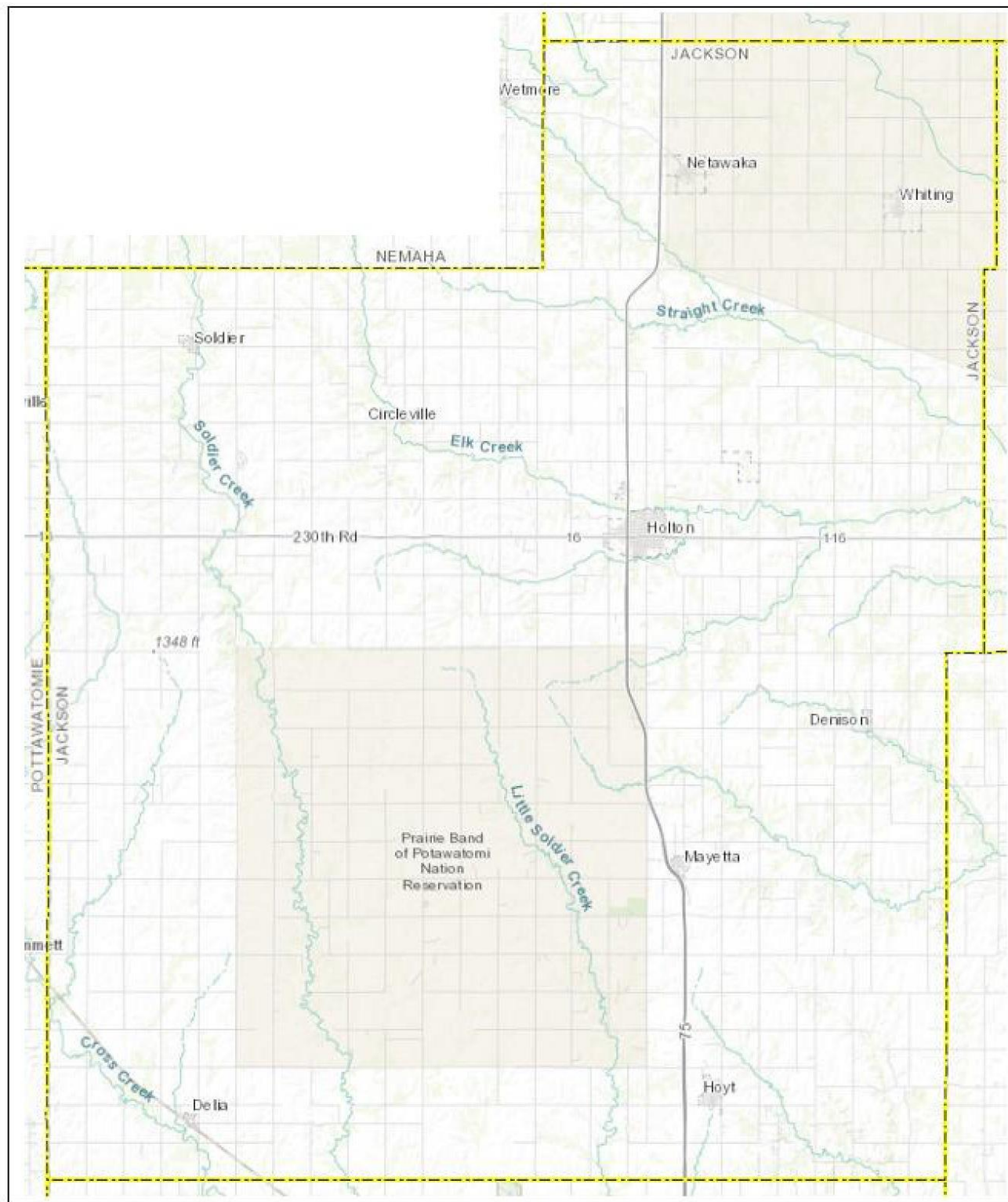
The following map, provided by KDOT, details the locations of participating jurisdictions for Jefferson County:

Jefferson County
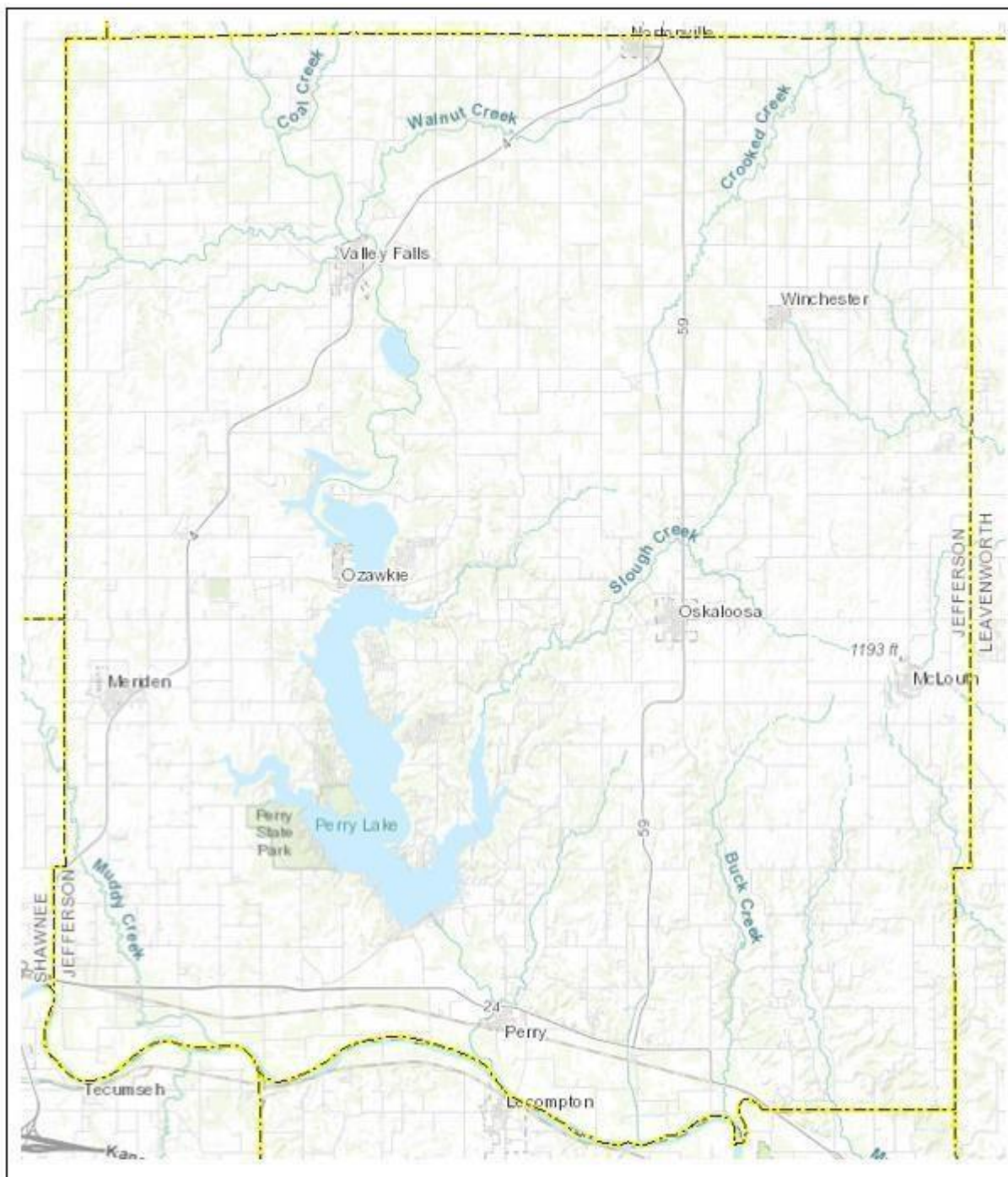
The following map, provided by KDOT, details the location of the Kickapoo Tribal Reservation:

Kickapoo Tribal Reservation

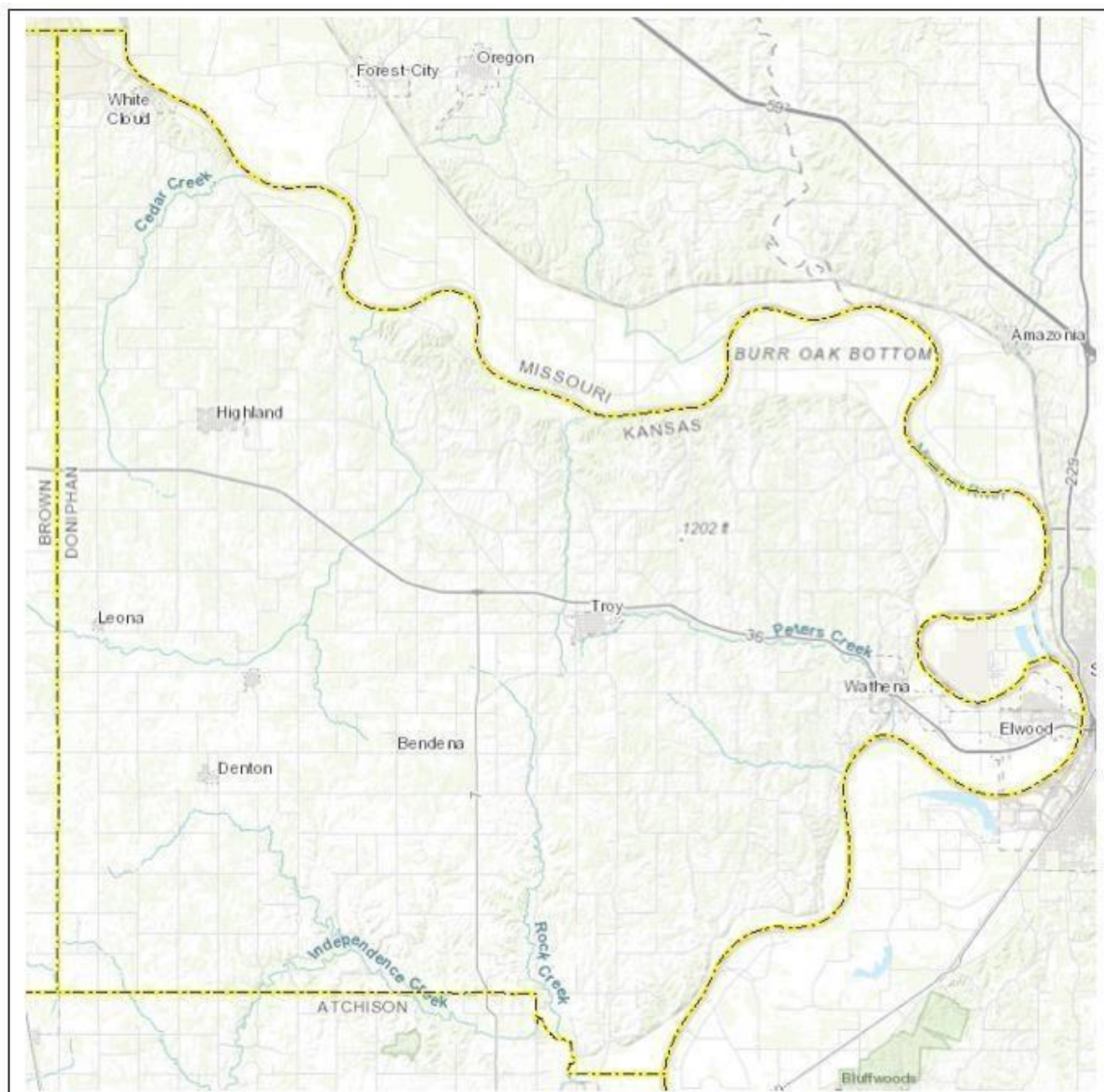The following map, provided by KDOT, details the locations of participating jurisdictions for Marshall County:
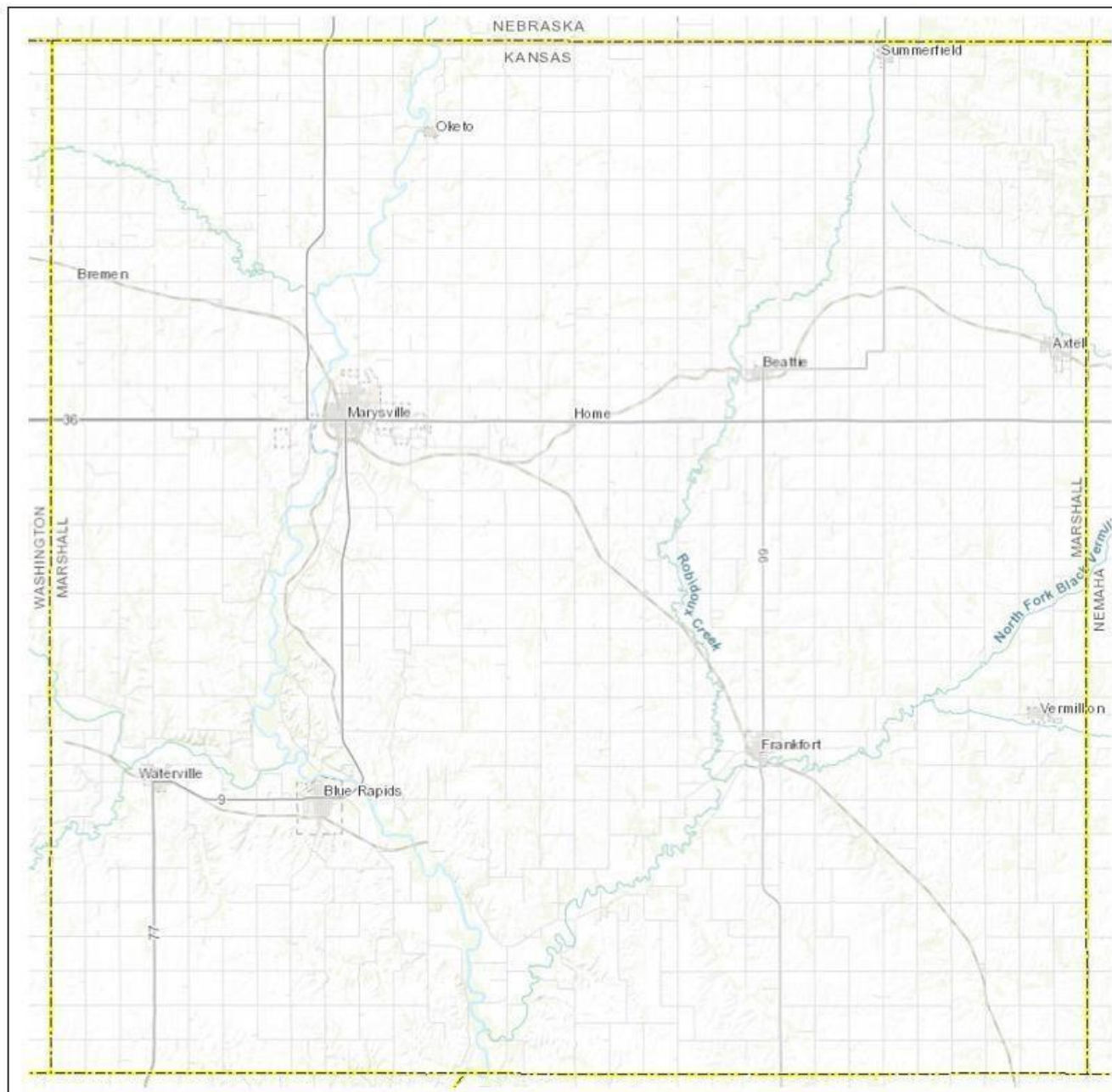
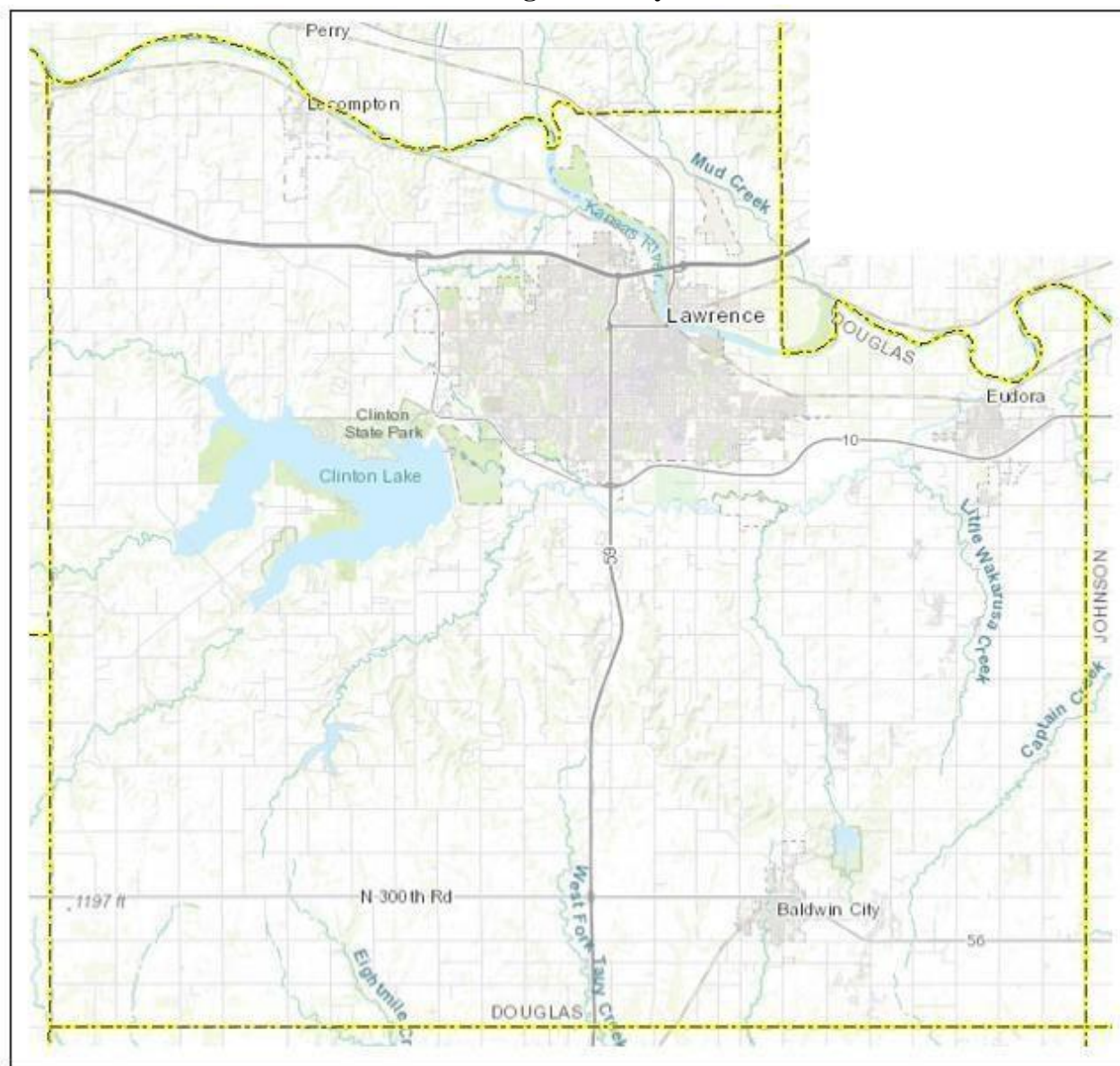The following map, provided by KDOT, details the locations of participating jurisdictions for Nemaha County:
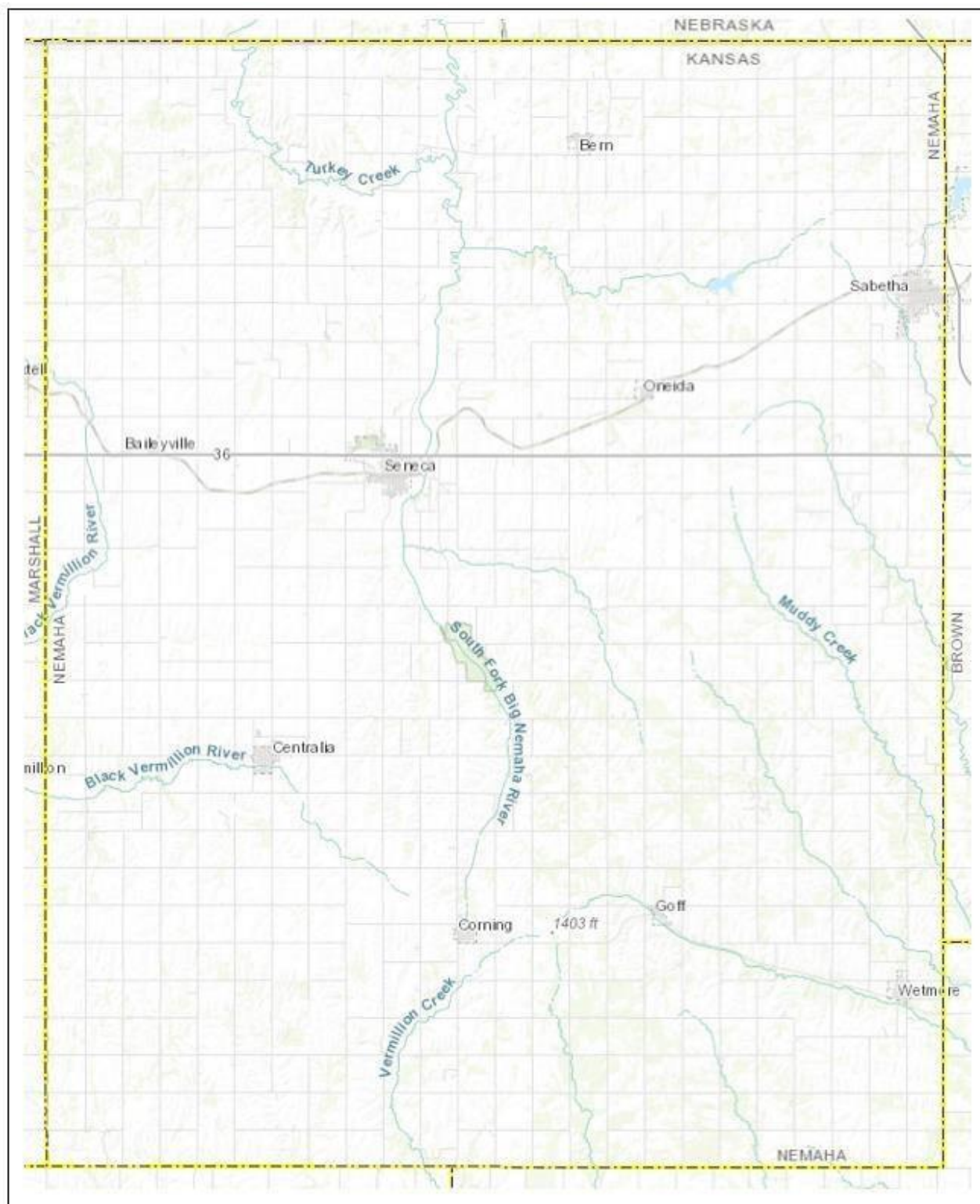
The following map, provided by KDOT, details the locations of participating jurisdictions for Washington County:

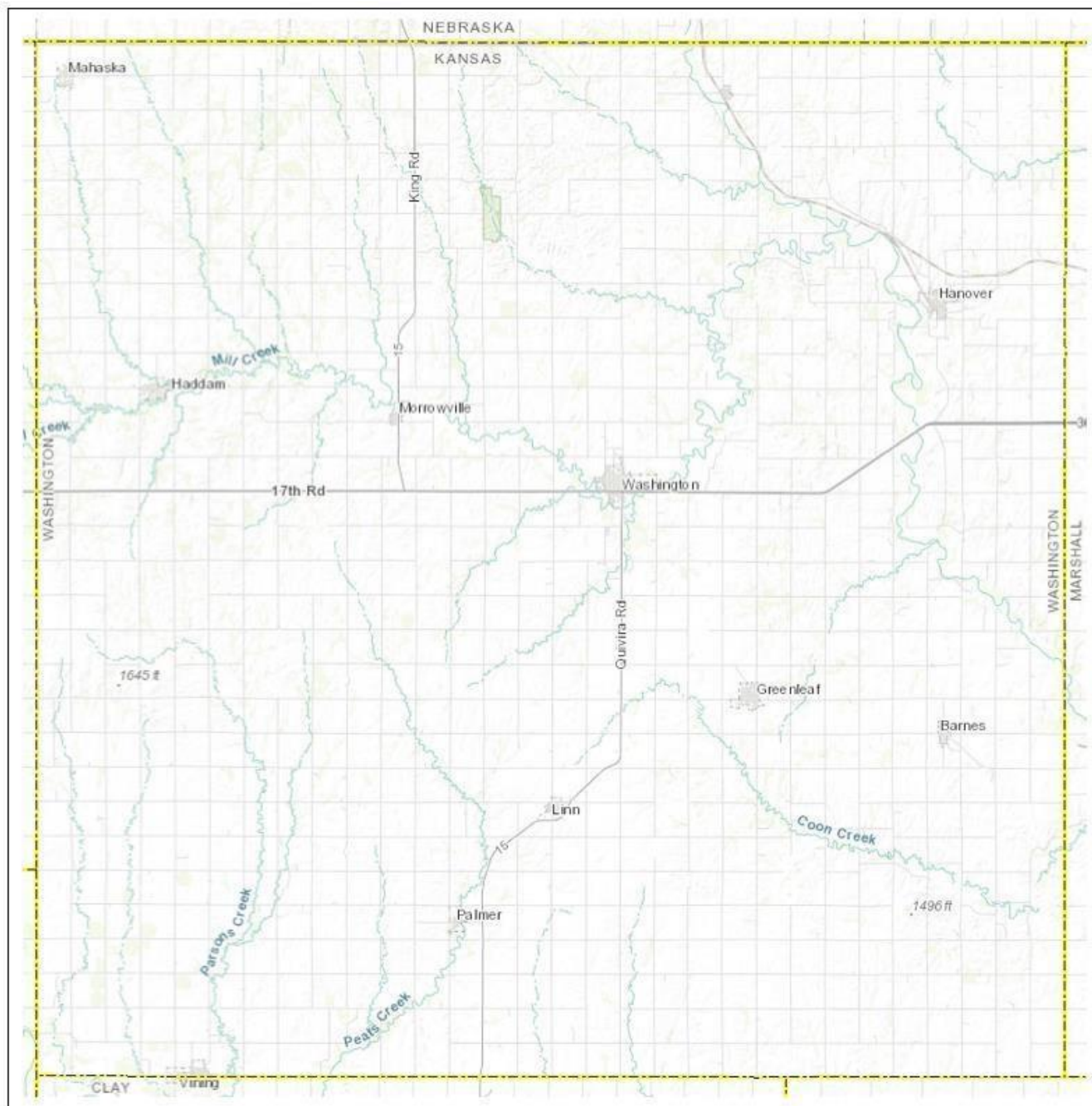## 3.2 – Regional Population Data

The following tables present population data for counties and participating city jurisdictions in Kansas Region K. In general, the higher a jurisdiction's population the greater the potential vulnerability of its citizens to identified hazards.

Table 3.1: Atchison County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Atchison County	**16,774**	**16,924**	**16,193**	**-581**	**-3.5%**	**37**
City of Atchison	10,232	11,021	10,727	495	4.8%	1,488
City of Effingham	588	546	587	-1	-0.2%	1,087
City of Huron	87	54	137	50	57.5%	161
City of Lancaster	291	298	250	-41	-14.1%	1,136
City of Muscotah	200	176	208	8	4.0%	612

Source: US Census Bureau

Of note for Atchison County and its participating jurisdictions for the period 2000 to 2017:

- A population decline was noted in Atchison County, -3.5% as a whole
- Population gains were noted in three participating cities
- Population declines were noted in two participating cities

Table 3.2: Brown County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Brown County	**10,724**	**9,984**	**9,736**	**-988**	**-9.2%**	**17**
City of Everest	314	284	323	9	2.9%	1,242
City of Fairview	271	260	340	69	25.5%	1,133
City of Hiawatha	3,417	3,172	3,176	-241	-7.1%	1,424
City of Horton	1967	1776	1773	-194	-9.9%	1,007
City of Morrill	277	230	297	20	7.2%	1,414
City of Reserve	100	84	70	-30	-30.0%	636
City of Robinson	216	234	201	-15	-6.9%	838
City of Willis	69	38	26	-43	-62.3%	153

Source: US Census Bureau

Of note for Brown County and its participating jurisdictions for the period 2000 to 2017:

- A population decline was noted in Brown County, -9.2% as a whole
- Population gains were noted in three participating cities
- Population declines were noted in five participating cities

Table 3.3: Doniphan County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017

Doniphan County	**8,249**	**7,945**	**7,790**	**-459**	**-5.6%**	**20**
City of Denton	186	148	177	-9	-4.8%	1,264
City of Elwood	1145	1224	1017	-128	-11.2%	499
City of Highland	976	1,012	1,043	67	6.9%	1,968
City of Troy	1054	1010	893	-161	-15.3%	1,240
City of Wathena	1,348	1,364	1,253	-95	-7.0%	643

Source: US Census Bureau

Of note for Doniphan County and its participating jurisdictions for the period 2000 to 2017:

- A population decline was noted in Doniphan County, -5.6% as a whole
- Population gains were noted in one participating city
- Population declines were noted in four participating cities

Table 3.4: Douglas County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Douglas County	**99,962**	**110,826**	**117,806**	**17,844**	**17.9%**	**248**
City of Baldwin City	3,400	4,515	4,627	1,227	36.1%	2,132
City of Eudora	4307	6136	6272	1,965	45.6%	3,120
City of Lawrence	80,098	87,643	93,954	13,856	17.3%	3,274
City of Lecompton	608	625	660	52	8.6%	673

Source: US Census Bureau

Of note for Douglas County and its participating jurisdictions for the period 2000 to 2017:

A population gain was noted in Douglas County, 17.9% as a whole
Population gains were noted in all participating cities

Table 3.5: Iowa Tribe Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Iowa Tribe	**129**	**162**	**191**	**62**	**48.1%**	**44**

Source: Iowa Tribe

Of note for the Iowa Tribe for the period 2000 to 2017:

A population gain was noted for the Iowa Tribal Reservation, 48.1% as a whole

Table 3.6: Jackson County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Jackson County	**12,657**	**13,462**	**13,322**	**665**	**5.3%**	**20**
City of Circleville	185	170	174	-11	-5.9%	967
City of Delia	179	169	147	-32	-17.9%	1,336
City of Denison	231	187	124	-107	-46.3%	1,033
City of Holton	3353	3329	3268	-85	-2.5%	1,287
City of Hoyt	571	669	663	92	16.1%	1,542
City of Mayetta	312	341	320	8	2.6%	1,882
City of Netawaka	170	143	176	6	3.5%	180
City of Soldier	122	136	94	-28	-23.0%	627
City of Whiting	206	187	205	-1	-0.5%	203

Source: US Census Bureau

Of note for Jackson County and its participating jurisdictions for the period 2000 to 2017:

- A population gain was noted in Jackson County, 5.3% as a whole
- Population gains were noted in three participating cities
- Population declines were noted in six participating cities

Table 3.7: Jefferson County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Jefferson County	**18,426**	**19,126**	**18,856**	**430**	**2.3%**	**34**
City of McLouth	868	880	1,012	144	16.6%	2,108
City of Meriden	706	813	904	198	28.0%	2,511
City of Nortonville	620	637	595	-25	-4.0%	1,384
City of Oskaloosa	1165	1113	1503	338	29.0%	1,652
City of Perry	901	929	909	8	0.9%	1,165
City of Ozawkie	552	645	623	-22	-3.5%	na
City of Valley Falls	1.254	1192	1071	-183	-14.6%	1,428
City of Winchester	579	551	552	-27	-4.7%	1,840

Source: US Census Bureau

Of note for Jefferson County and its participating jurisdictions for the period 2000 to 2017:

- A population gain was noted in Jefferson County, 2.3% as a whole
- Population gains were noted in four participating cities
- Population declines were noted in three participating cities

Table 3.8: Kickapoo Tribe Population Data

Jurisdiction	Population 2000	Population 2013	Population 2017	Numeric Population Change 2013 - 2017	Percent Population Change 2013 to 2017	Population Density, per Square Mile 2017
Kickapoo Tribe	**-**	**1,271**	**1,610**	**339**	**26.7%**	**54**

Source: Kickapoo Tribe

-: Data not available

Of note for the Kickapoo Tribe for the period 2013 to 2017:

 A population gain was noted for the Kickapoo Tribal Reservation, 26.7% as a whole

Table 3.9: Marshall County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Marshall County	**10,965**	**10,117**	**9,859**	**-1,106**	**-10.1%**	**11**
City of Axtell	445	406	374	-71	-16.0%	748
City of Beattie	277	200	193	-84	-30.3%	839
City of Blue Rapids	1,088	1,019	975	-113	-10.4%	469
City of Frankfort	855	726	678	-177	-20.7%	665
City of Marysville	3,271	3,294	3,288	17	0.5%	1,006
City of Oketo	87	66	50	-37	-42.5%	455
City of Summerfield	211	156	117	-94	-44.5%	344
City of Vermillion	107	112	99	-8	-7.5%	396
City of Waterville	681	680	745	64	9.4%	1,490

Source: US Census Bureau

Of note for Marshall County and its participating jurisdictions for the period 2000 to 2017:

- A population decline was noted in Marshall County, -10.1% as a whole
- Population gains were noted in two participating cities
- Population declines were noted in seven participating cities

Table 3.10: Nemaha County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Nemaha County	**10,717**	**10,178**	**10,095**	**-622**	**-5.8%**	**14**
City of Bern	204	166	165	-39	-19.1%	611
City of Centralia	534	512	623	89	16.7%	1,384
City of Corning	170	157	187	17	10.0%	668
City of Goff	181	126	125	-56	-30.9%	595

City of Oneida	70	75	60	-10	-14.3%	261
City of Sabetha	2589	2571	2544	-45	-1.7%	1,398

Table 3.10: Nemaha County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
City of Seneca	2,122	1,991	2,072	-50	-2.4%	1,345
City of Wetmore	362	368	357	-5	-1.4%	939

Source: US Census Bureau

Of note for Nemaha County and its participating jurisdictions for the period 2000 to 2017:

- A population decline was noted in Nemaha County, -5.8% as a whole☐
- Population gains were noted in two participating cities☐
- Population declines were noted in six participating cities☐

Table 3.11: Washington County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Washington County	**6,483**	**5,799**	**5,572**	**-911**	**-14.1%**	**6**
City of Clifton	557	554	566	9	1.6%	2,264
City of Greenleaf	357	331	424	67	18.8%	922
City of Haddam	169	104	80	-89	-52.7%	229
City of Hanover	653	682	715	62	9.5%	1,430
City of Hollenberg	31	21	20	-11	-35.5%	250
City of Linn	425	410	501	76	17.9%	1,518
City of Morrowville	168	155	156	-12	-7.1%	1,114
City of Palmer	108	111	144	36	33.3%	450
City of Vining	58	45	67	9	15.5%	479
City of Washington	1223	1131	1116	-107	-8.7%	1,255

Source: US Census Bureau

Of note for Washington County and its participating jurisdictions for the period 2000 to 2017:

- A population decline was noted in Washington County, -14.1% as a whole☐
- Population gains were noted in six participating cities☐
- Population declines were noted in four participating cities☐

3.3 – At-Risk Population Data

The National Response Framework defines at-risk populations as "populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care."

In general, at risk populations may have difficulty with medical issues, poverty, extremes in age, and communications due to language barriers. Several principles may be considered when discussing potentially at-risk populations, including:

- Not all people who are considered at risk are at risk☐
- Outward appearance does not necessarily mark a person as at risk☐
- The hazard event will, in many cases, affect at risk population in differing ways☐

The following tables present information on select potential at risk populations within each participating Region K jurisdiction, by county. This information, from the U.S. Census Bureau QuickFacts, was available for cities and towns with a population greater than 5,000 persons only. In general, the higher a jurisdiction's at-risk population the greater the potential vulnerability to identified hazards.

Table 3.12: Kansas Region K Potentially Vulnerable Population Data, Jurisdictions Over 5,000 Persons

Jurisdiction	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)	Percentage of Population Speaking Language Other Than English (2017)	Percentage of Population Living Below Poverty Level (2017)	Persons with a Disability, Under the Age of 65 (2017)
Atchison County	**6.0%**	**16.8%**	**1.4%**	**14.3%**	**11.3%**
City of Atchison	5.9%	13.9%	1.4%	24.0%	11.6%
Brown County	**6.6%**	**19.8%**	**1.8%**	**15.0%**	**10.9%**
Doniphan County	**5.9%**	**19.1%**	**1.3%**	**14.8%**	**10.4%**
Douglas County	**5.3%**	**11.7%**	**9.3%**	**15.9%**	**8.4%**
City of Eudora	6.8%	8.3%	6.5%	11.7%	9.8%
City of Lawrence	5.2%	9.9%	10.9%	21.8%	8.3%
Jackson County	**6.7%**	**18.6%**	**2.5%**	**11.0%**	**12.0%**
Jefferson County	**5.3%**	**18.1%**	**1.4%**	**8.5%**	**10.8%**
Marshall County	**6.8%**	**21.3%**	**2.3%**	**10.8%**	**9.4%**
Nemaha County	**7.6%**	**20.0%**	**1.7%**	**8.2%**	**7.4%**

Washington County	7.1%	23.8%	4.0%	10.0%	7.4%

Source: US Census Bureau

Of note for Kanas Region K and its participating jurisdictions:

- Regionally, 6.1% of the total population is under the age of 5, below the State of Kansas average of 6.6%.⬚
- Regionally, 18.9% of the total population is over the age of 65, above the State of Kansas average of 15.4%.⬚
- Regionally, 6.2% of the total population speak a language other than English at home, below the State of Kansas average of 11.5%.⬚
- Regionally, approximately 12.2% of the total population are living below the poverty line, above the State of Kansas average of 8.8%.⬚

- Regionally, 9.6% of persons under the age of 65 have an identified disability, below the State of Kansas average of 11.9%.⬚

3.4 – Regional Housing Data

Closely tracking population data, but tending to lag population changes, housing data is a good indicator of changing demographics and growth. Over the period 2000 to 2017 the majority of Kansas Region K has been experiencing a yearly increase in housing stock. In general, the higher a jurisdiction's housing stock, the higher the hazard vulnerability.

Table 3.13: Atchison County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Atchison County	**6,818**	**6,990**	**6,960**	**142**	**2.1%**	**16**	**4.5%**
City of Atchison	4,220	4,442	4,243	23	0.5%	588	0.4%
City of Effingham	255	252	283	28	11.0%	524	8.5%
City of Huron	32	25	52	20	62.5%	61	34.6%
City of Lancaster	117	117	121	4	3.4%	550	6.6%
City of Muscotah	90	90	104	14	15.6%	306	16.3%

Source: US Census Bureau

Of note for Atchison County and its participating jurisdictions for the period 2000 to 2017:

- A housing gain was noted in Atchison County, 2.1% as a whole⬚
- Housing gains were noted in all participating cities⬚

Table 3.14: Brown County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Brown County	**4,815**	**4,779**	**4,742**	**-73**	**-1.5%**	**8**	**4.0%**
City of Everest	156	155	186	30	19.2%	715	12.9%
City of Fairview	149	146	149	0	0.0%	497	8.7%
City of Hiawatha	1,646	1,588	1,621	-25	-1.5%	727	0.0%
City of Horton	906	904	1004	98	10.8%	570	6.2%
City of Morrill	113	105	134	21	18.6%	638	6.0%
City of Reserve	60	58	58	-2	-3.3%	527	3.4%
City of Robinson	111	109	111	0	0.0%	463	16.2%
City of Willis	29	27	29	0	0.0%	171	0.0%

Source: US Census Bureau

-: No Data

Of note for Brown County and its participating jurisdictions for the period 2000 to 2017:

- A housing decline was noted in Brown County, -1.5% as a whole
- Housing gains were noted in three out eight participating cities
- Housing declines were noted in two out of eight participating cities

Table 3.15: Doniphan County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Doniphan County	**3,588**	**3,576**	**3,588**	**0**	**0.0%**	**9**	**12.4%**
City of Denton	74	74	89	15	20.3%	636	5.6%
City of Elwood	494	533	560	66	13.4%	275	38.4%
City of Highland	344	372	295	-49	-14.2%	557	7.1%
City of Troy	474	467	448	-26	-5.5%	622	5.8%
City of Wathena	566	587	573	7	1.2%	294	6.1%

Source: US Census Bureau

Of note for Doniphan County and its participating jurisdictions for the period 2000 to 2017:

- Housing was static in Doniphan County, with a 0.0% change
- Housing gains were noted in three out five participating cities
- Housing declines were noted in two out of five participating cities

Table 3.16: Douglas County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Douglas County	**40,250**	**46,731**	**49,106**	**8,856**	**22.0%**	**103**	**2.3%**
City of Baldwin City	1,165	1,665	1,569	404	34.7%	723	0.0%
City of Eudora	1,664	2,306	2,241	577	34.7%	1,115	5.3%
City of Lawrence	32,761	37,502	39,928	7,167	21.9%	1,391	1.7%
City of Lecompton	233	254	231	-2	-0.9%	236	23.4%

Source: US Census Bureau

Of note for Douglas County and its participating jurisdictions for the period 2000 to 2017:

- A housing gain was noted in Douglas County, 22.0% as a whole
- Housing gains were noted in three out four participating cities
- Housing declines were noted in one out of four participating cities

Table 3.17: Iowa Tribe Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Iowa Tribe	**55**	**75**	**75**	20	36.4%	17	-

Source: Iowa Tribe

-: Data not available

Of note for the Iowa Tribe for the period 2000 to 2017:

 A housing gain was noted for the Iowa Tribal Reservation, 36.4% as a whole

Table 3.18: Jackson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Jackson County	**5,094**	**5,779**	**5,835**	**741**	**14.5%**	**9**	**7.4%**
City of Circleville	80	77	90	10	12.5%	500	6.7%
City of Delia	58	58	50	-8	-13.8%	455	10.0%
City of Denison	88	87	78	-10	-11.4%	650	6.4%
City of Holton	1522	1652	1662	140	9.2%	654	1.9%
City of Hoyt	219	269	277	58	26.5%	644	13.0%
City of Mayetta	121	131	163	42	34.7%	959	8.0%
City of Netawaka	66	62	77	11	16.7%	79	13.0%
City of Soldier	58	56	58	0	0.0%	387	22.4%
City of Whiting	109	95	104	-5	-4.6%	103	12.5%

Source: US Census Bureau

Of note for Jackson County and its participating jurisdictions for the period 2000 to 2017:

- A housing gain was noted in Jackson County, 14.5% as a whole
- Housing gains were noted in five out nine participating cities
- Housing declines were noted in three out of nine participating cities

Table 3.19: Jefferson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Jefferson County	**7,491**	**8,160**	**8,308**	**817**	**10.9%**	**15**	**9.4%**
City of McLouth	350	384	446	96	27.4%	929	11.7%
City of Meriden	279	336	346	67	24.0%	961	13.6%

City of Nortonville	255	261	261	6	2.4%	607	11.5%
City of Oskaloosa	478	480	639	161	33.7%	702	10.5%
City of Ozawkie	Na	Na	Na	Na	Na	Na	Na
City of Perry	395	392	426	31	7.8%	546	18.3%
City of Valley Falls	521	518	491	-30	-5.8%	655	4.9%

Table 3.19: Jefferson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
City of Winchester	221	261	325	104	47.1%	1,083	2.2%

Source: US Census Bureau

Of note for Jefferson County and its participating jurisdictions for the period 2000 to 2017:

- A housing gain was noted in Jefferson County, 10.9% as a whole
- Housing gains were noted in six out seven participating cities
- Housing declines were noted in one out of seven participating cities

Table 3.20: Kickapoo Tribe Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Kickapoo Tribe	**52**	**64**	**68**	**16**	**30.9%**	**2**	**-**

-: Data not available

Of note for the Kickapoo Tribe for the period 2000 to 2017:

 A housing gain was noted for the Kickapoo Tribal Reservation, 30.9% as a whole

Table 3.21: Marshall County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Marshall County	**4,999**	**4,866**	**4,890**	**-109**	**-2.2%**	**5**	**2.7%**
City of Axtell	204	194	189	-15	-7.4%	378	1.1%
City of Beattie	115	104	87	-28	-24.3%	378	5.7%
City of Blue Rapids	494	465	451	-43	-8.7%	217	2.9%
City of Frankfort	411	363	347	-64	-15.6%	340	4.6%
City of Marysville	1,614	1,646	1,763	149	9.2%	539	1.4%
City of Oketo	47	38	30	-17	-36.2%	273	0.0%
City of Summerfield	92	107	83	-9	-9.8%	244	13.3%

City of Vermillion	82	74	74	-8	-9.8%	296	5.4%
City of Waterville	328	331	362	34	10.4%	724	2.2%

Source: US Census Bureau

Of note for Marshall County and its participating jurisdictions for the period 2000 to 2017:

- A housing decline was noted in Marshall County, -2.2% as a whole
- Housing gains were noted in two out nine participating cities
- Housing declines were noted in seven out of nine participating cities

Table 3.22: Nemaha County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Nemaha County	**4,340**	**4,562**	**4,589**	**249**	**5.7%**	**6**	**4.4%**
City of Bern	102	95	97	-5	-4.9%	359	5.2%
City of Centralia	235	238	281	46	19.6%	624	7.5%
City of Corning	70	67	76	6	8.6%	271	11.8%
City of Goff	72	62	57	-15	-20.8%	271	1.8%
City of Oneida	36	34	32	-4	-11.1%	139	18.8%
City of Sabetha	1049	1227	1229	180	17.2%	675	0.2%
City of Seneca	978	982	1,124	146	14.9%	730	5.2%
City of Wetmore	156	152	161	5	3.2%	424	24.2%

Source: US Census Bureau

Of note for Nemaha County and its participating jurisdictions for the period 2000 to 2017:

- A housing gain was noted in Nemaha County, 5.7% as a whole
- Housing gains were noted in five out eight participating cities
- Housing declines were noted in three out of eight participating cities

Table 3.23: Washington County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Washington County	**3,142**	**2,955**	**2,943**	**-199**	**-6.3%**	**3**	**3.5%**
City of Clifton	278	151	237	-41	-14.7%	948	0.4%
City of Greenleaf	202	199	193	-9	-4.5%	420	0.0%
City of Haddam	96	88	64	-32	-33.3%	183	3.1%
City of Hanover	332	314	330	-2	-0.6%	660	3.9%
City of Hollenberg	28	23	22	-6	-21.4%	275	0.0%
City of Linn	186	165	203	17	9.1%	615	2.0%

City of Morrowville	93	90	97	4	4.3%	693	13.4%
City of Palmer	55	62	73	18	32.7%	228	0.0%
City of Vining	29	27	31	2	6.9%	221	0.0%
City of Washington	644	582	566	-78	-12.1%	637	1.4%

Source: US Census Bureau

Of note for Washington County and its participating jurisdictions for the period 2000 to 2017:

- A housing decline was noted in Washington County, -6.3% as a whole
- Housing gains were noted in four out ten participating cities
- Housing declines were noted in six out of ten participating cities

3.5 – Regional Property Valuations

This section quantifies the built environment exposed to potential hazards in Kansas Region K. The following tables provide monetary value of structures, by category and where available, for each county in Kansas Region K. In addition to the population information presented above, this information forms the basis of the vulnerability and risk assessment presented in this plan. This information was derived from inventory data associated with FEMA's loss estimation software HAZUS and from Tribal participants.

Table 3.24: Kansas Region K Property Valuations, Residential, Commercial and Industrial

County	Residential	Commercial	Industrial
Atchison	$1,473,238,000	$318,870,000	$174,307,000
Brown	$830,487,000	$181,994,000	$44,433,000
Doniphan	$698,298,000	$104,303,000	$33,291,000
Douglas	$9,914,359,000	$1,613,351,000	$445,073,000
Jackson	$1,231,822,000	$128,354,000	$36,066,000
Jefferson	$1,896,855,000	$169,452,000	$59,327,000
Marshall	$869,634,000	$163,819,000	$89,198,000
Nemaha	$964,612,000	$160,681,000	$54,897,000
Washington	$462,844,000	$95,510,000	$12,748,000

Source: FEMA HAZUS

Table 3.25: Kansas Region K Property Valuations, Agriculture, Government and Education

County	Agriculture	Government	Education
Atchison	$26,752,000	$10,264,000	$29,569,000
Brown	$24,713,000	$10,492,000	$19,259,000
Doniphan	$26,761,000	$7,603,000	$70,489,000
Douglas	$53,829,000	$59,265,000	$220,151,000
Jackson	$21,085,000	$15,745,000	$20,289,000
Jefferson	$23,789,000	$19,224,000	$34,136,000
Marshall	$43,033,000	$9,618,000	$24,404,000
Nemaha	$45,398,000	$9,104,000	$25,797,000
Washington	$38,074,000	$6,002,000	$16,225,000

Table 3.26: Kansas Region K Total Property Valuations

County	Total
Atchison	$2,077,340,000
Brown	$1,135,773,000
Doniphan	$953,610,000
Douglas	$12,489,840,000
Iowa Tribal Reservation*	$7,712,800
Jackson	$1,477,185,000
Jefferson	$2,239,834,000
Kickapoo Tribal Reservation*	$6,000,000
Marshall	$1,231,049,000
Nemaha	$1,282,096,000

Table 3.26: Kansas Region K Total Property Valuations

County	Total
Washington	$650,841,000

Source: FEMA HAZUS *
Source: Tribal Government

3.6 – Critical Facility Data

A critical facility is essential in providing utility or direction either during the response to an emergency or during the recovery operation, with facilities determined from jurisdictional feedback. The following are examples of critical facilities and assets:

- Communications facilities
- Emergency operations centers
- Fire stations
- Government buildings
- Hospitals and other medical facilities
- Police stations

Details concerning critical facilities have been deemed as sensitive information, and as such their specific information is not contained in the body of this HMP, but in restricted Appendix D.

3.7 – Cultural and Sacred Sites

44 CFR 201.7 (c)(2)(ii)(D): Cultural and sacred sites that are significant, even if they cannot be valued in monetary terms.

Native American sacred sites are defined differently depending on the tribe. For this plan, sacred sites are defined as sites that have an important historical, tribal or spiritual resonance. Details concerning these sacred sites have been deemed as sensitive information, and as such their specific information is not contained in the body of this HMP, but in restricted Appendix D.

3.8 – Unified School Districts

Each participating county is served by multiple Unified School Districts (USDs), with these USDs providing educational coverage for each participating jurisdiction. The following table presents participating USD enrollment information, the number of school structures, and the insured valuation of these structures and contents within (if information is available).

Table 3.27: Participating USD Information

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
Atchison County			
USD #377 - Atchison County	500	5	$34,000,000
USD #409 - Atchison	1,691	4	$104,694,277
Brown County			
USD #415 - Hiawatha	925	11	-
USD #430 - Horton	570	9	-
Doniphan County			
USD #111- Doniphan West	323	-	-
USD #114 - Riverside	642	10	-
USD #429 - Troy	337	7	-
Douglas County			
USD #343 - Perry / Lecompton	743	8	-
USD #348 - Baldwin City	1,450	6	$120,000,000
USD #491 - Eudora	1,768	8	-
USD #497 - Lawrence	11,970	9	-
Jackson County			
USD #335 - North Jackson	404	3	$17,000,000
USD #336 - Holton	1,133	5	$54,853,393
USD #337 - Royal Valley	850	5	$31,000,000
Jefferson County			
USD #338 - Valley Falls	372	8	-
USD #339 - Jefferson County North	471	9	$21,141,025
USD #340 - Jefferson West	845	8	$39,927,135
USD #341 - Okaloosa	511	1	$23,269,742
USD #342 - McLouth	492	8	-

USD #343 - Perry / Lecompton	743	8	-
Marshall County			
USD #113 - Prairie Hills	1,093	12	-
USD #364 - Marysville	777	9	-
USD #380 - Vermillion	300	2	$15,000,000
USD #498 - Valley Heights	407	10	-
Nemaha County			
USD #113 - Prairie Hills	511	4	-
USD #115 - Nemaha Central	680	3	-
Washington County			
USD #108 - Washington County	334	10	$7,665,876
USD #223 - Barnes / Hanover / Linn	444	4	$17,033,885
USD #224 – Clifton/Clyde		-	-

Source: Kansas State Department of Education and Participating USDs
-: Information unavailable

The following table presents participating college and university enrollment information, the number of school structures, and the insured valuation of these structures and contents within (if information is available).

Table 3.28: Participating College and University Information

College or University	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
Atchison County			
Highland Community College	3,260	38	-
Doniphan County			
Highland Community College	3,260	38	-
Douglas County			
Baker University	2,879	42	-
University of Kansas	28,447	147	-

Source: Kansas State Department of Education and Participating college or university -:
Information unavailable

3.9 – Regional Land Use

In general, land use is determined by three major types of regulation, zoning ordinances, floodplain ordinances and building code requirements.

- 2017 Kansas Statutes, KS Stat § 12-741 (2017): This act is enabling legislation for the enactment of planning and zoning laws and regulations by cities and counties for the protection of the public health, safety and welfare, and is not intended to prevent the enactment or enforcement of additional laws and regulations on the same subject which are not in conflict with the provisions of this act.▯
- 2012 Kansas Statutes, Chapter 19 Counties and County Officers, Article 33 Flood Control: Allows cities and counties to develop stormwater management and flood control projects and programs, provide local funding, and enter into agreements with other agencies to develop and use flood control works.▯
- The Kansas State Legislature has not implemented a statewide building code, nor does it require comprehensive planning by local governments.▯

These three types of regulations can assist in preventing the following:

- Unrestricted residential growth which can increase a population's exposure to identified hazard prone areas▯
- Rapid, unchecked development that can put a strain on a community's vulnerable resources such as its energy infrastructure▯
- Residential development constructed quickly and inexpensively to meet consumer demand that often lacks long term mitigation measures and resiliency▯
- Rapid development under pressure to meet consumer demand can alter the landscape in ways affecting urban runoff, drainage, or other environmental considerations which have drastic effects on floodplains▯

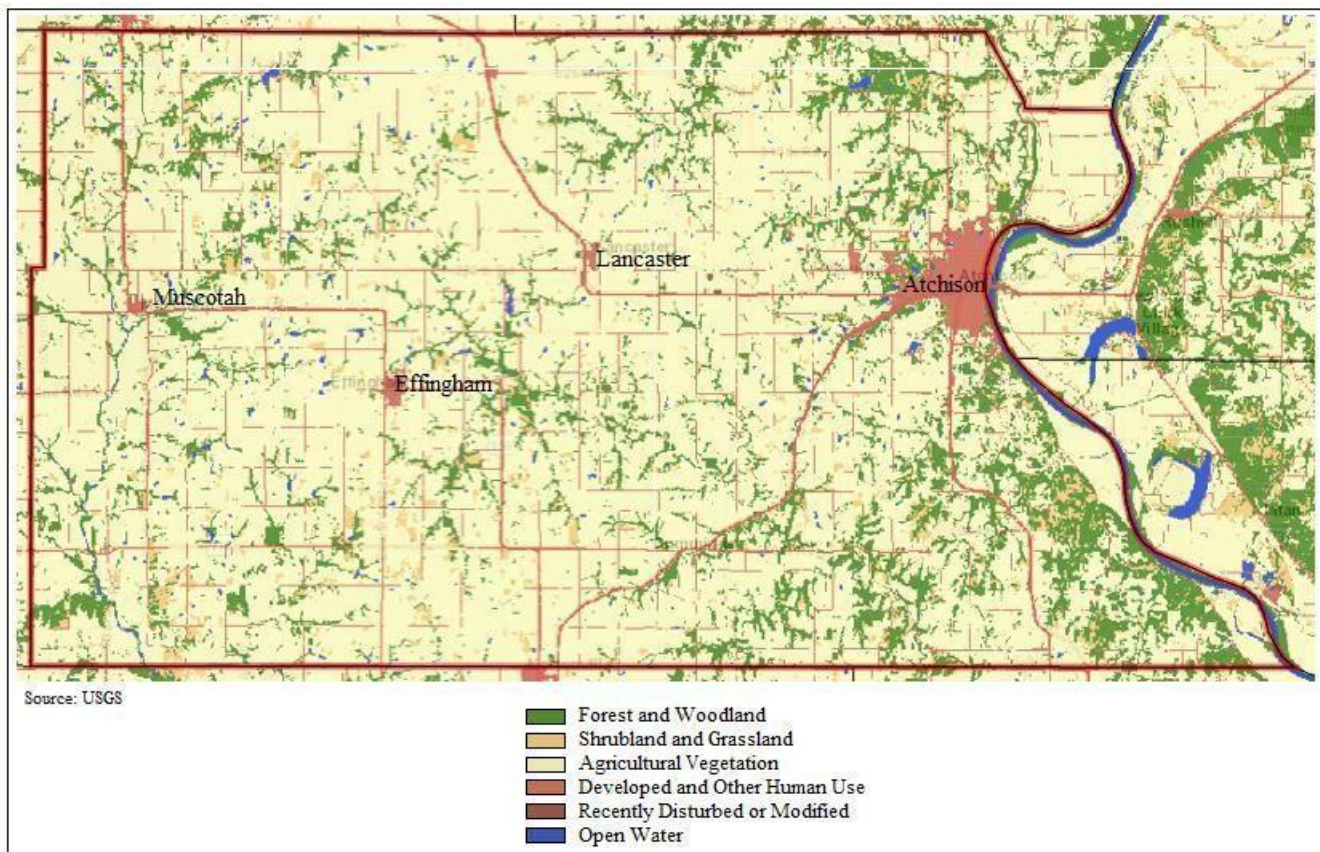Information on relevant codes and ordinances may be found in Section 5 of this HMP.

3.10 – Regional Land Cover

The 2016 USGS land cover map illustrates land usage. As indicated by the following maps, areas of the region are grasslands and cultivated crops. Additionally, each county has at least one area of low to high intensity development corresponding with larger cities.
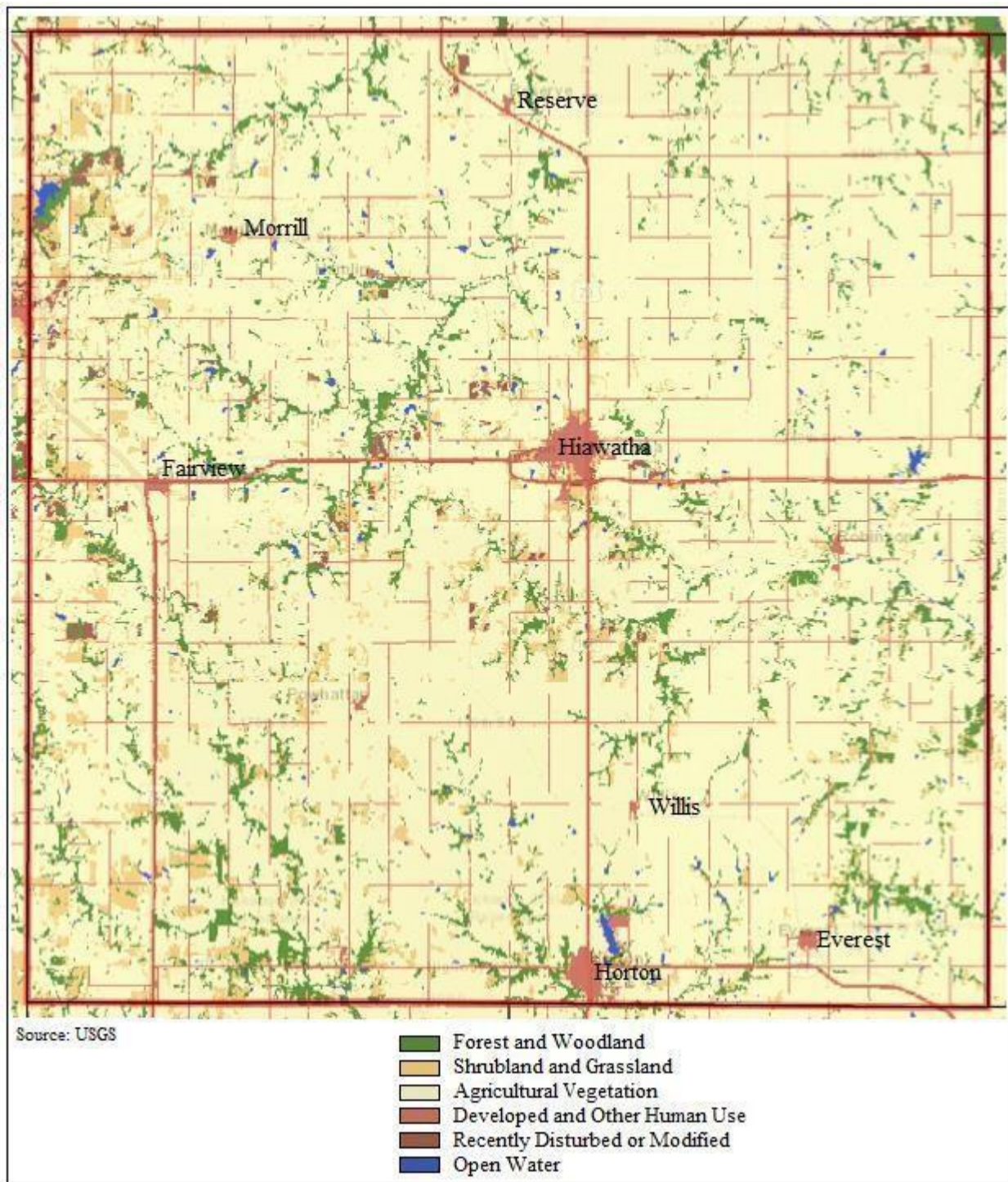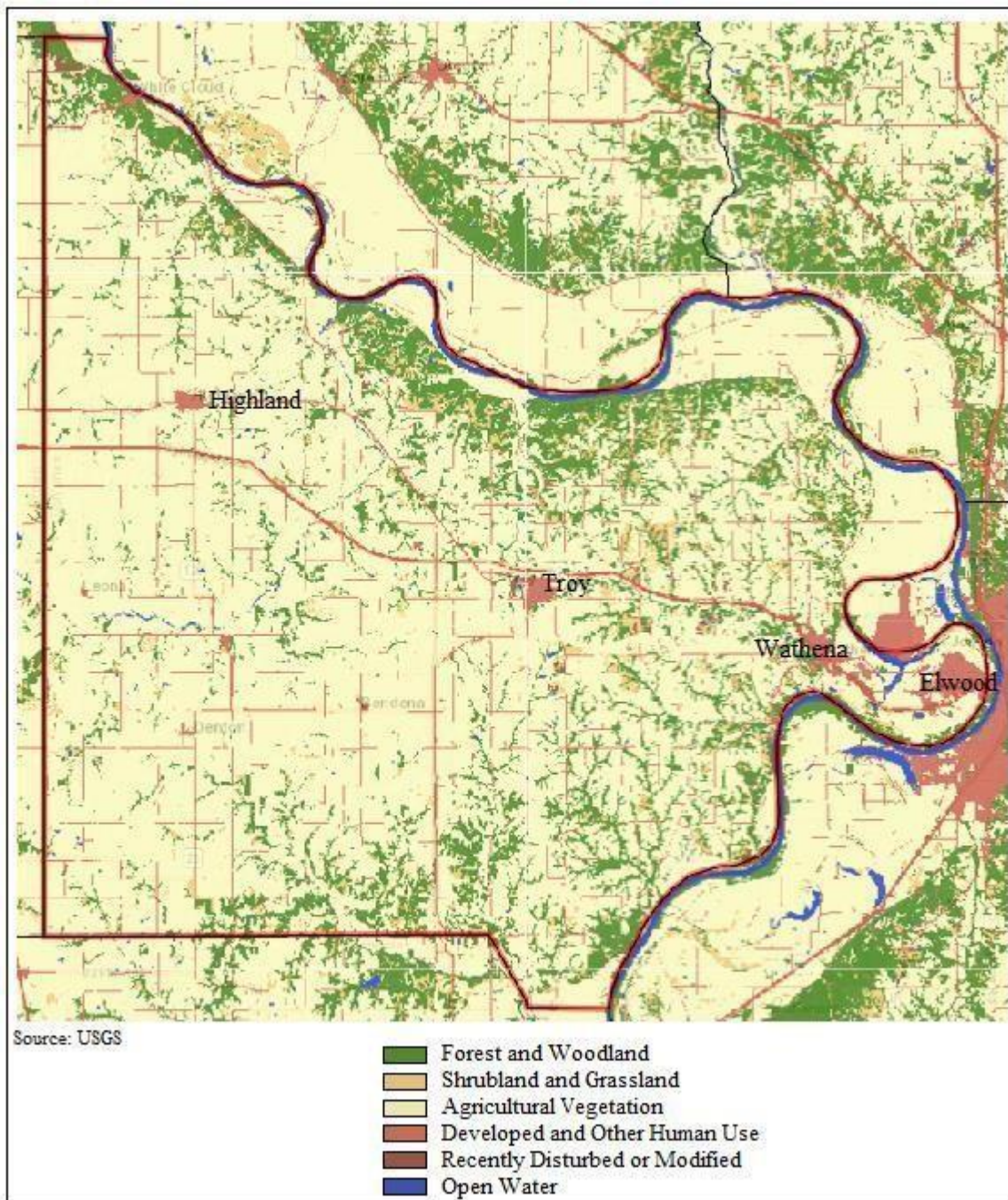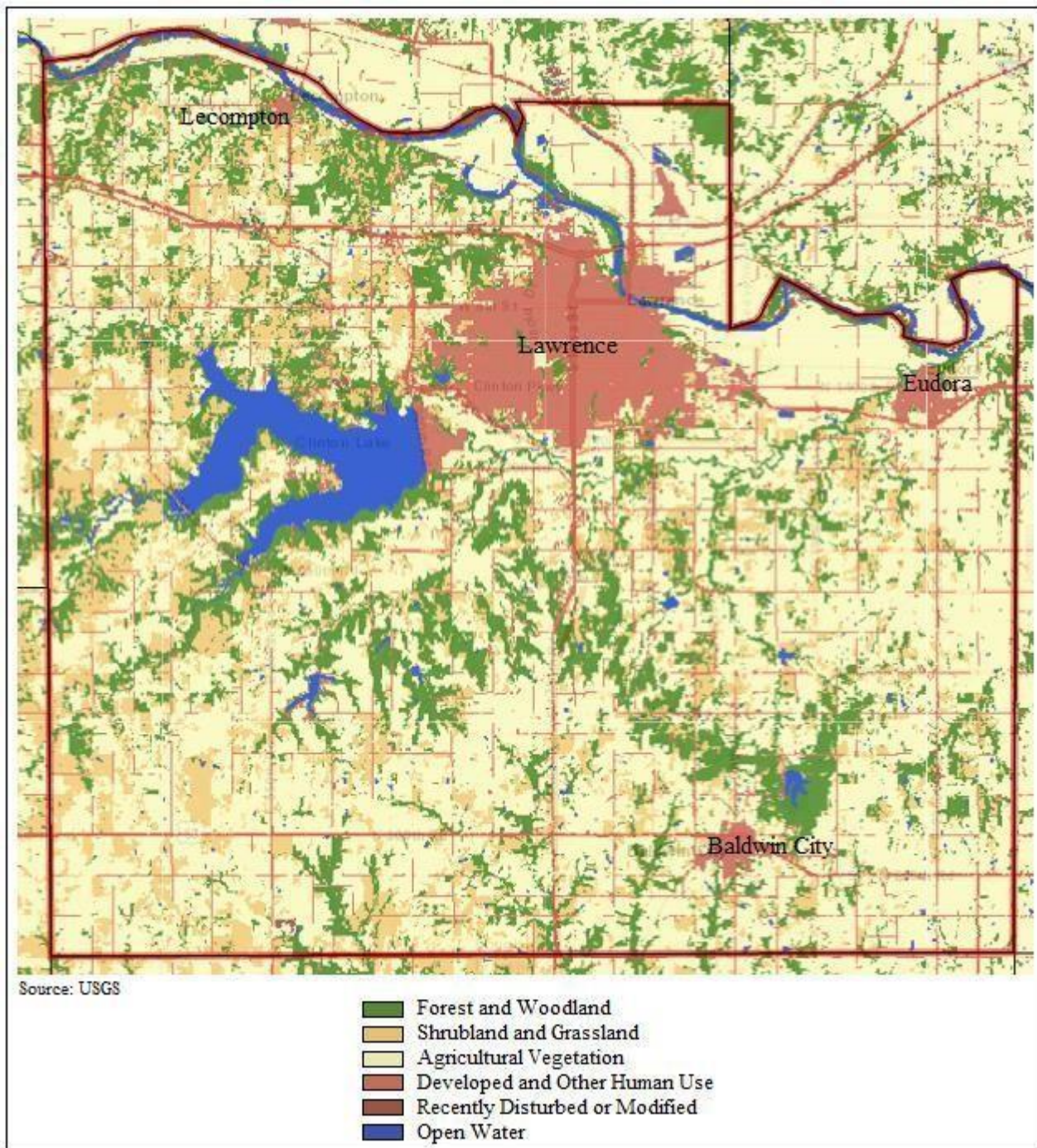
Atchison County Land Cover Map

Source: USGS

Forest and Woodland
Shrubland and Grassland
Agricultural Vegetation
Developed and Other Human Use
Recently Disturbed or Modified
Open Water

Brown County Land Cover Map

Source: USGS

- Forest and Woodland
- Shrubland and Grassland
- Agricultural Vegetation
- Developed and Other Human Use
- Recently Disturbed or Modified
- Open Water

Doniphan County Land Cover Map

Source: USGS

Legend:
- Forest and Woodland
- Shrubland and Grassland
- Agricultural Vegetation
- Developed and Other Human Use
- Recently Disturbed or Modified
- Open Water

Douglas County Land Cover Map

Source: USGS

- Forest and Woodland
- Shrubland and Grassland
- Agricultural Vegetation
- Developed and Other Human Use
- Recently Disturbed or Modified
- Open Water

Iowa Tribal Reservation Land Cover Map

Source: USGS

Forest and Woodland
Shrubland and Grassland
Agricultural Vegetation
Developed and Other Human Use
Recently Disturbed or Modified
Open Water

Jackson County Land Cover Map

Source: USGS

Legend:
- Forest and Woodland
- Shrubland and Grassland
- Agricultural Vegetation
- Developed and Other Human Use
- Recently Disturbed or Modified
- Open Water

Jefferson County Land Cover Map

Source: USGS

Legend:
- 🟩 Forest and Woodland
- 🟧 Shrubland and Grassland
- 🟨 Agricultural Vegetation
- 🟥 Developed and Other Human Use
- 🟫 Recently Disturbed or Modified
- 🟦 Open Water

Kickapoo Tribal Reservation Land Cover Map

Source: USGS

Forest and Woodland
Shrubland and Grassland
Agricultural Vegetation
Developed and Other Human Use
Recently Disturbed or Modified
Open Water
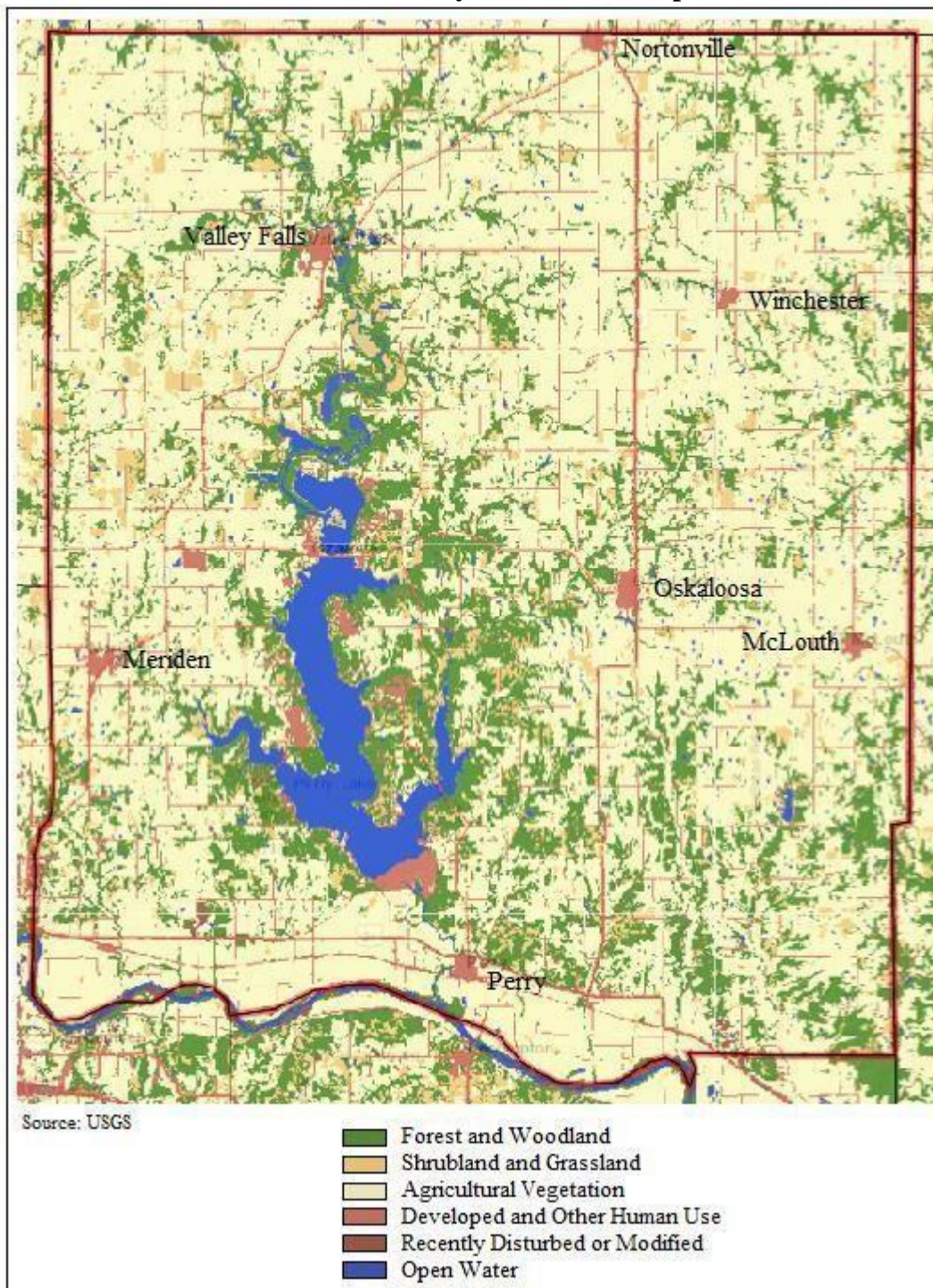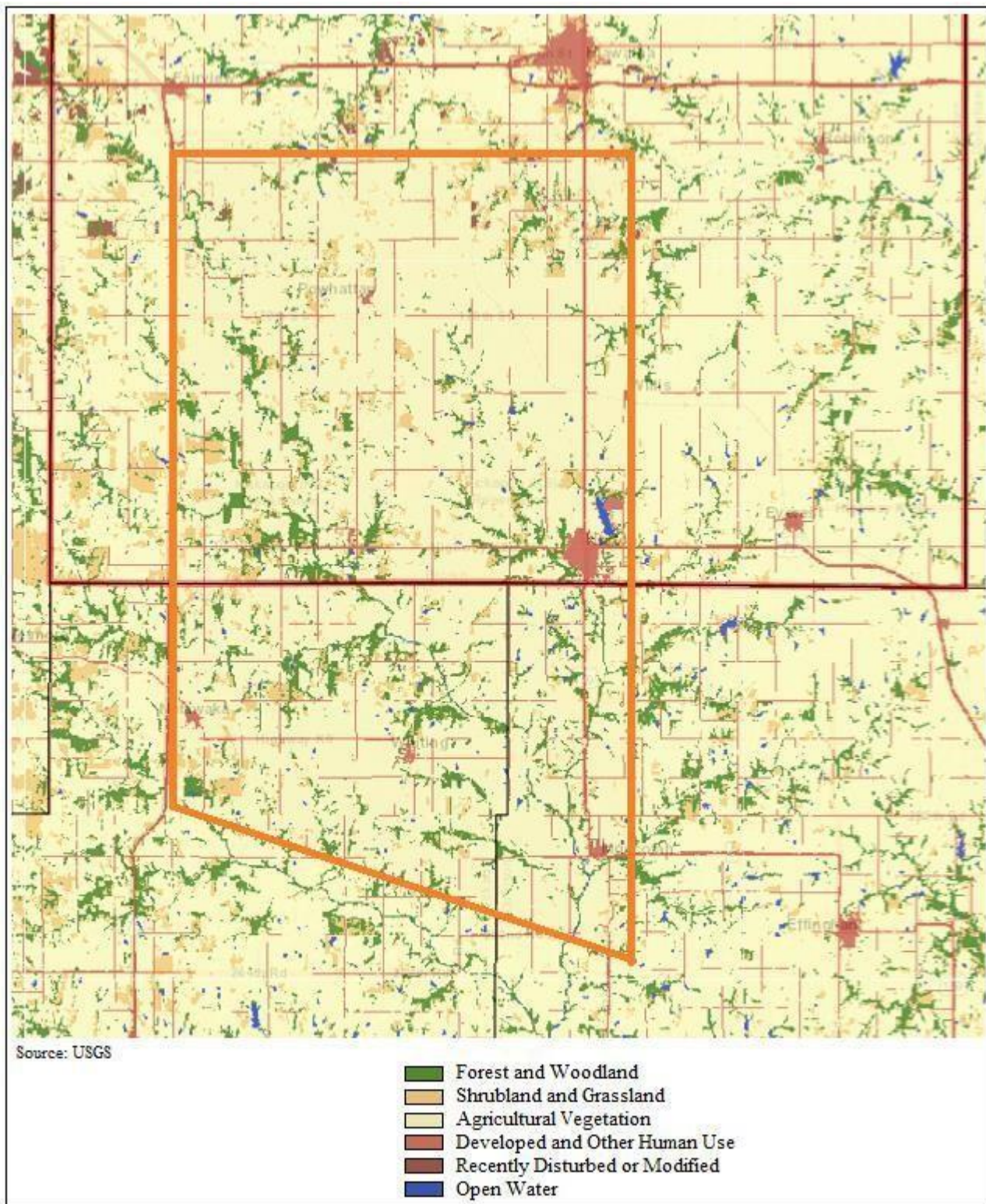
Marshall County Land Cover Map

Source: USGS

Forest and Woodland
Shrubland and Grassland
Agricultural Vegetation
Developed and Other Human Use
Recently Disturbed or Modified
Open Water
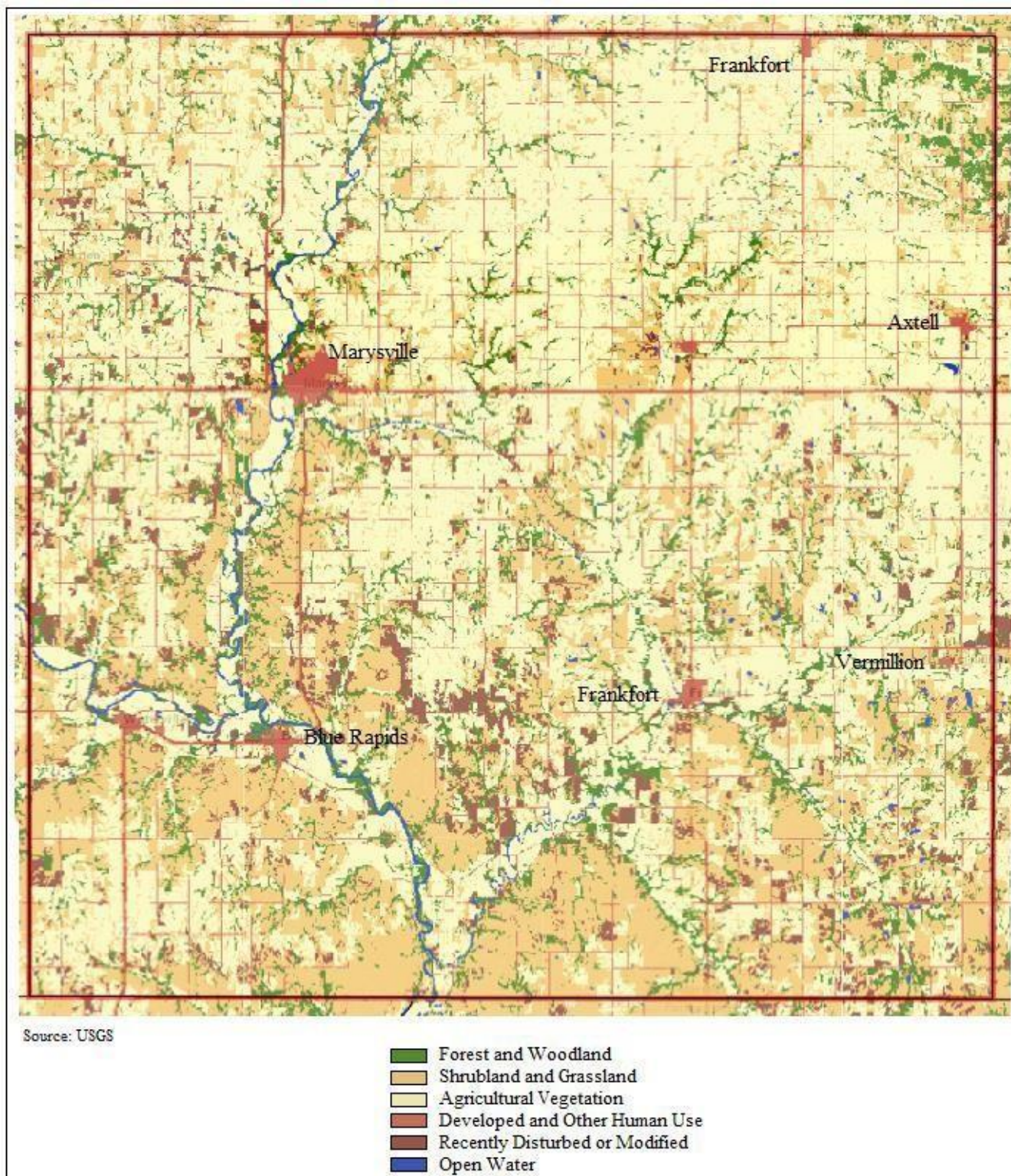
Nemaha County Land Cover Map

Source: USGS

- ■ Forest and Woodland
- ■ Shrubland and Grassland
- ■ Agricultural Vegetation
- ■ Developed and Other Human Use
- ■ Recently Disturbed or Modified
- ■ Open Water
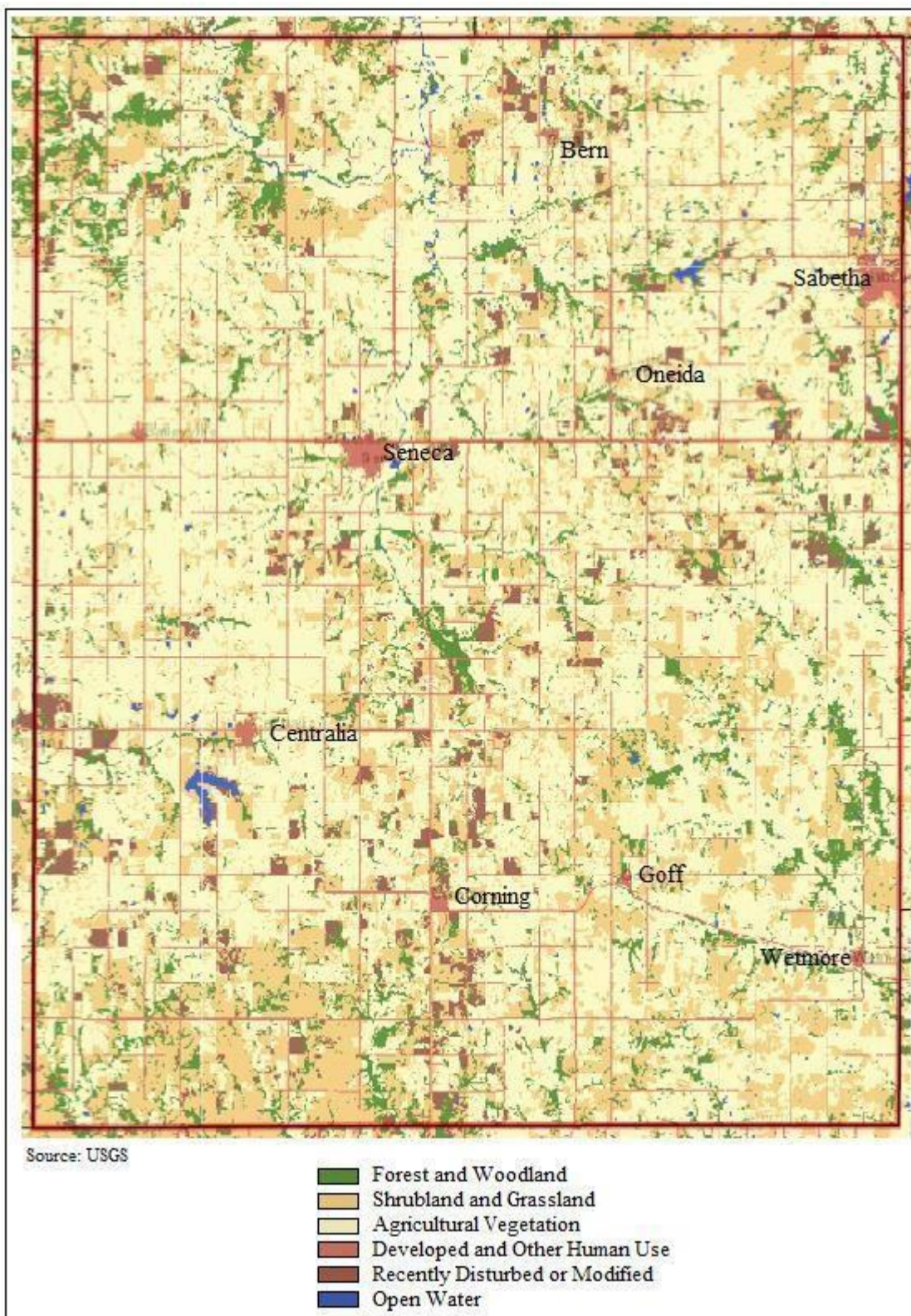
Washington County Land Cover Map

Source: USGS

🟩	Forest and Woodland
🟧	Shrubland and Grassland
⬜	Agricultural Vegetation
🟥	Developed and Other Human Use
🟫	Recently Disturbed or Modified
🟦	Open Water
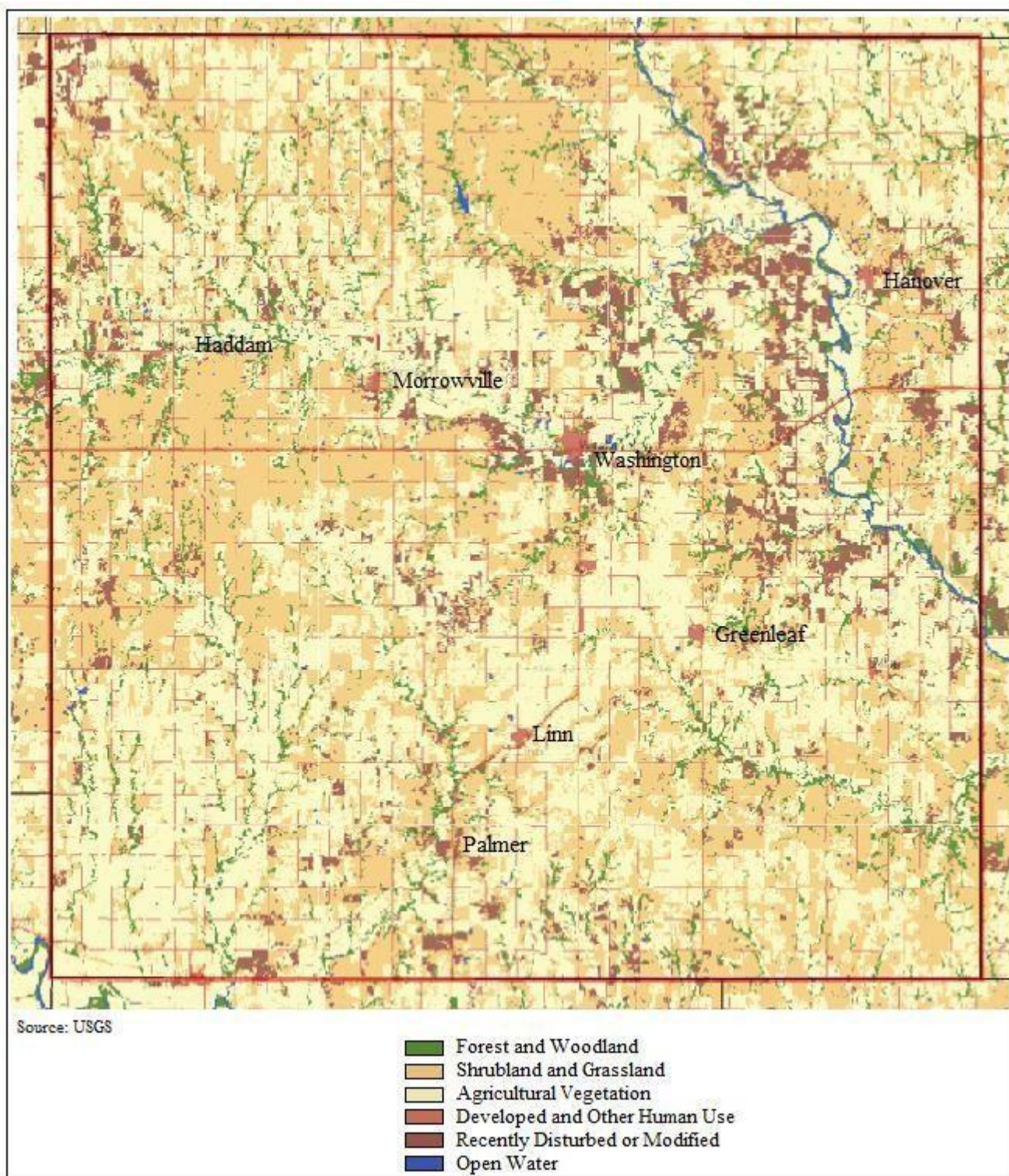
3.11 – Regional Agricultural Data

Agriculture is a major component of the economy of Kansas. According to the Kansas Department of Agriculture, Agriculture is the largest economic driver in Kansas, valued at nearly $67.5 billion and accounting for 44.5 percent of the state's total economy. In Kansas, there are 46,137,295 acres of farmland, which accounts for 88 percent of all Kansas land.

The following tables present information from the USDA National Agricultural Statistics Service 2017 Census of Agriculture (the latest available data) relating to farm totals and agricultural acreage, livestock (cattle, hogs and pigs), and agricultural market value for Kansas Region K.

Table 3.29: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Number of Farms	Farm Acreage	Cropland Acreage	Pasture and Other Usage Acreage
Atchison	642	232,748	171,068	61,680
Brown	593	317,352	253,664	63,688
Doniphan	516	210,383	164,084	46,299
Douglas	905	213,635	144,030	69,605
Jackson	1,109	305,431	177,522	127,909
Jefferson	1,097	258,703	168,315	90,388
Marshall	910	472,591	329,099	143,492
Nemaha	1,001	393,331	285,470	107,861
Washington	786	509,631	334,163	175,468

Source: United States Department of Agriculture National Agricultural Statistics Service

Table 3.30: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Cattle	Beef Cattle	Milk Cattle	Hogs	Sheep	Chicken Layers
Atchison	32,525	12,661	729	8,982	167	885
Brown	28,125	8,695	952	25,440	1,363	324
Doniphan	16,385	7,536	513	3,779	850	374
Douglas	26,964	9,585	1,129	6,277	782	979
Jackson	44,990	22,077	612	4,722	1,143	683
Jefferson	37,272	15,208	1,771	5,103	500	1,327
Marshall	39,908	15,596	1,687	24,515	1,084	668
Nemaha	59,170	15,750	5,076	101,834	1,009	(D)
Washington	58,788	21,841	1,468	111,471	585	1,043

Source: United States Department of Agriculture National Agricultural Statistics Service (D):
Data not reported due to privacy concerns

Table 3.31: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Total Agricultural Commodity Sales	Crop Sales	Animal Sales
Atchison	$34,484,000	$22,748,000	$11,736,000
Brown	$67,473,000	$44,878,000	$22,595,000
Doniphan	$44,177,000	$37,236,000	$6,941,000
Douglas	$38,198,000	$21,095,000	$17,103,000
Jackson	$27,486,000	$12,760,000	$14,727,000
Jefferson	$33,526,000	$18,359,000	$15,167,000
Marshall	$65,381,000	$40,989,000	$24,392,000

Table 3.31: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Total Agricultural Commodity Sales	Crop Sales	Animal Sales
Nemaha	$86,038,000	$31,268,000	$54,770,000
Washington	$82,073,000	$34,665,000	$47,408,000

Source: United States Department of Agriculture National Agricultural Statistics Service

3.12 – Regional Development Trends

44 CFR 201.6 (c)(2)(ii)(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas

Future development speaks to the potential impacts of land use and demographic changes in hazard prone areas. Data in this section is based on the best available data but is speculative as future conditions are subject to numerous unpredictable factors. While past trends are used to inform the discussion, previous historical trends are no guarantee of future conditions.

The University of Kansas Institute for Policy and Social Research developed population projections for the region using historical and trend data. Indications are that most counties and tribes in the region will experience a steady decline in the population through the year 2044.

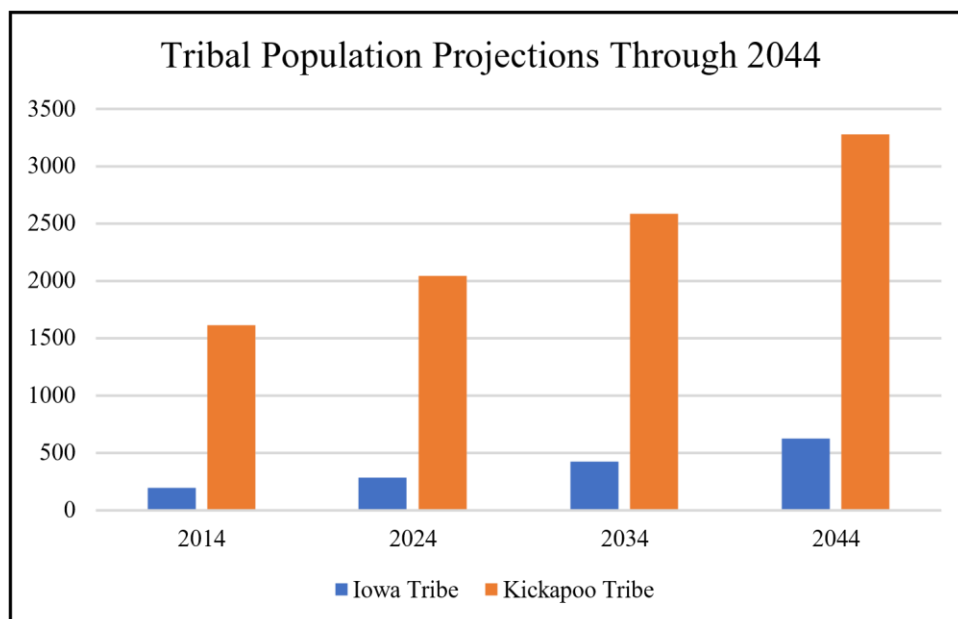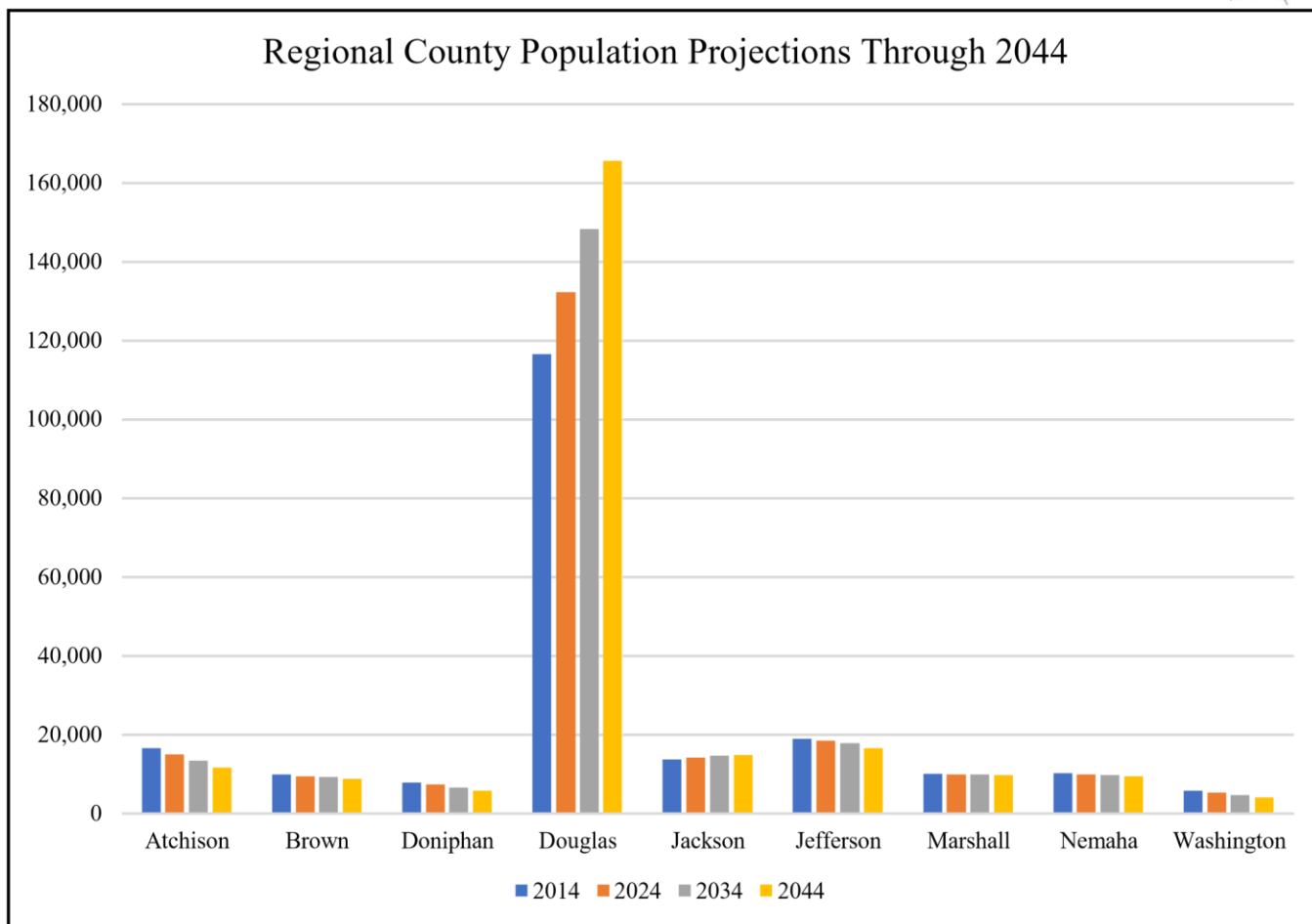**Table 3.32: Kansas Region K Population Projections Through 2044**

County	2014	2024	2034	2044	Projected Growth Percentage Through 2044
Atchison	16,513	14,946	13,331	11,493	-30.4%
Brown	9,815	9,465	9,117	8,706	-11.3%
Doniphan	7,847	7,180	6,459	5,611	-28.7%
Douglas	116,585	132,148	148,208	165,504	42.0%
Iowa Tribe*	191	283	419	620	48.10%
Jackson	13,539	14,024	14,499	14,767	9.1%
Jefferson	18,855	18,291	17,677	16,596	12.0%
Kickapoo Tribe*	1,610	2,040	2,585	3,275	26.7%
Marshall	10,006	9,837	9,746	9,643	-3.6%
Nemaha	10,148	9,830	9,640	9,390	-7.5%
Washington	5,598	5,134	4,605	4,035	-27.9%

Source: University of Kansas Institute for Policy and Social Research

*: Tribal data

The following charts illustrates the above data.

Regional County Population Projections Through 2044

Tribal Population Projections Through 2044

US Census Bureau and tribal data was used to develop housing projections for the region using historical and trend data. Indications are that most counties and tribes in the region will experience a steady increase in housing through the year 2051.

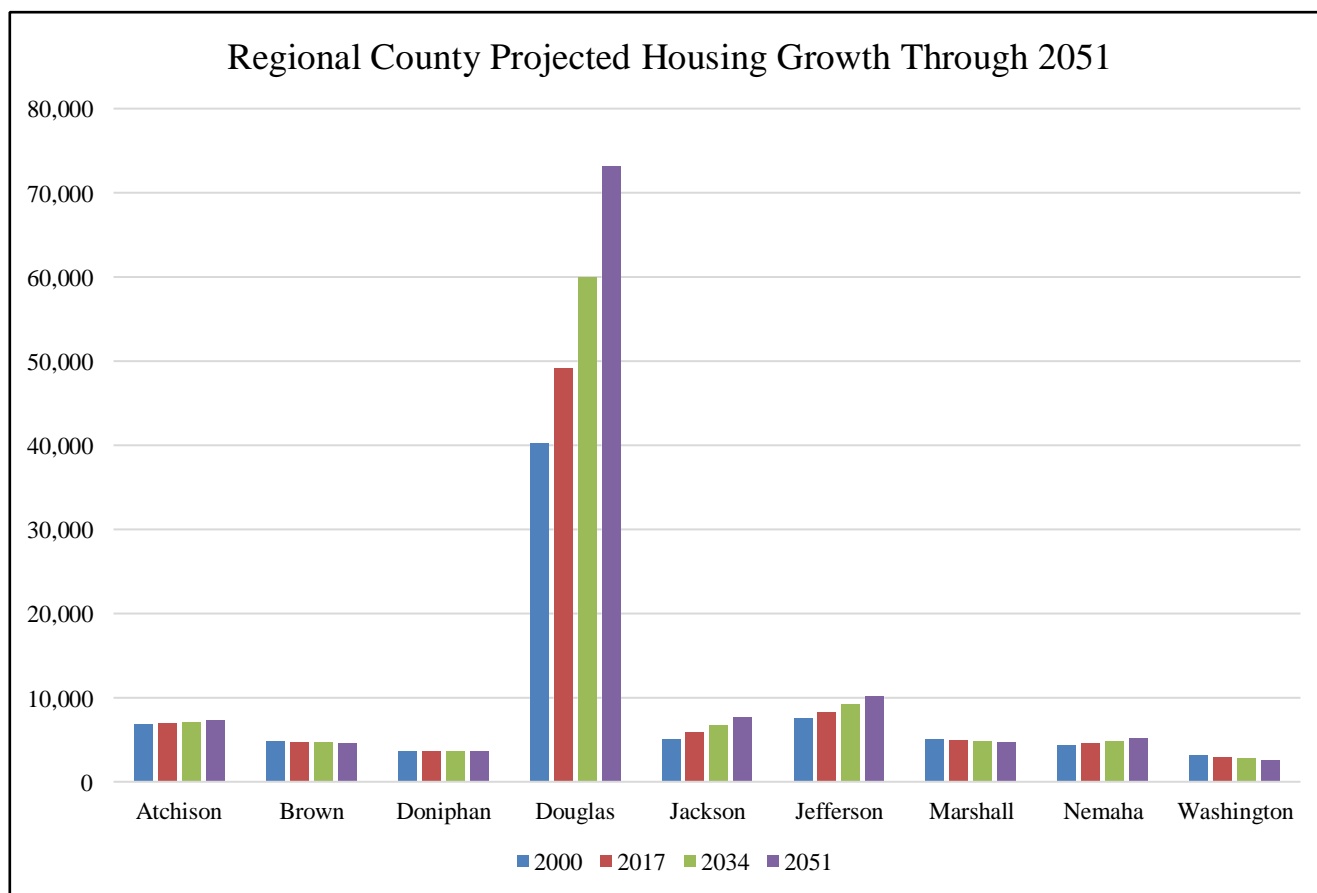**Table 3.33: Kansas Region K Housing Projections Through 2051**

County	2000	2017	2034	2051	Projected Growth Percentage Through 2051
Atchison	6,818	6,960	7,106	7,255	2.1%
Brown	4,815	4,742	4,671	4,601	-1.5%
Doniphan	3,588	3,588	3,588	3,588	0.0%
Douglas	40,250	49,106	59,909	73,089	22.0%
Iowa Tribe*	55	75	102	140	36.4%
Jackson	5,094	5,835	6,681	7,650	14.5%
Jefferson	7,491	8,308	9,214	10,218	10.9%
Kickapoo Tribe*	52	68	89	117	30.9%
Marshall	4,999	4,890	4,782	4,677	-2.2%
Nemaha	4,340	4,589	4,851	5,127	5.7%
Washington	3,142	2,943	2,758	2,584	-6.3%

Source: US Census Bureau

*: Tribal data

-Data not available

The following charts illustrates the above data.

Regional County Projected Housing Growth Through 2051

Tribal Projected Housing Growth Through 2051
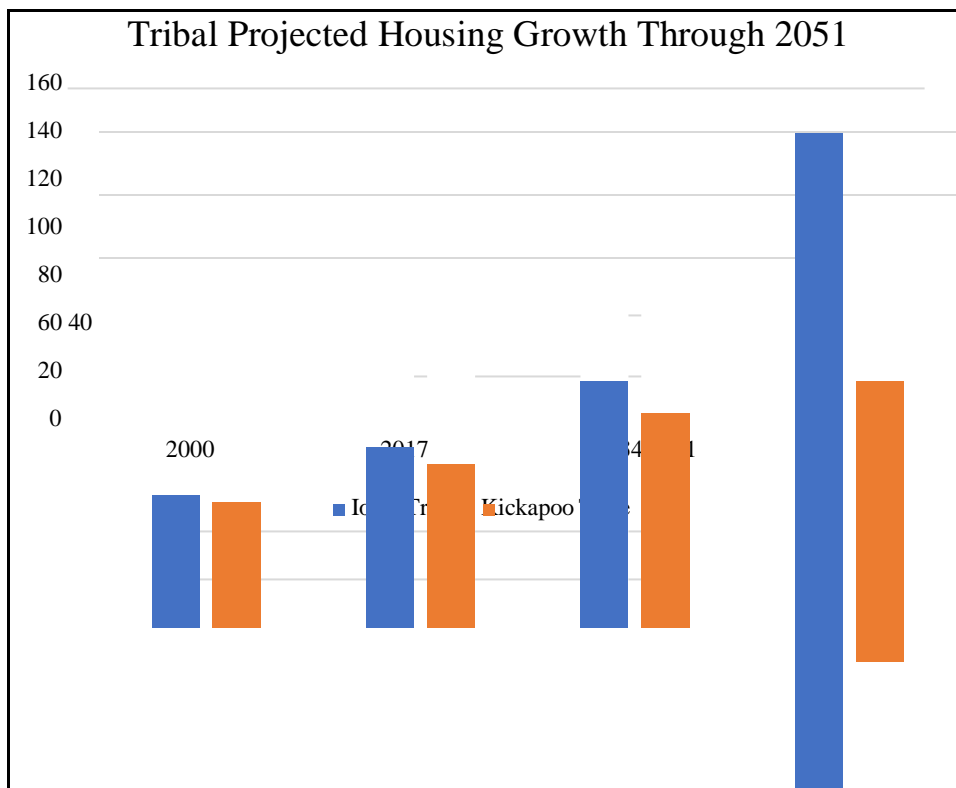
FEMA's loss estimation software HAZUS data was used to developed property valuation projections for the region using historical and trend data. Indications are that approximately half of the counties in the region will experience continued growth in the property valuation through the year 2030.

**Table 3.34: Kansas Region K Property Valuation Projections Through 2030**

County	2006	2012	2018	2024	2030	Projected Growth Percentage Through 2030
Atchison	$2,280,366,000	$2,077,340,000	$1,892,389,851	$1,723,906,221	$1,570,423,059	-8.9%
Brown	$1,205,618,000	$1,135,773,000	$1,069,974,326	$1,007,987,564	$949,591,877	-5.8%
Doniphan	$948,397,000	$953,610,000	$958,851,654	$964,122,120	$969,421,555	0.5%
Douglas	$10,959,548,000	$12,489,840,000	$14,233,808,112	$16,221,288,132	$18,486,281,858	14.0%
Jackson	$1,287,648,000	$1,477,185,000	$1,694,621,142	$1,944,063,076	$2,230,221,936	14.7%
Jefferson	$1,826,921,000	$2,239,834,000	$2,746,071,859	$3,366,727,471	$4,127,661,052	22.6%
Marshall	$1,303,504,000	$1,231,049,000	$1,162,621,396	$1,097,997,327	$1,036,965,372	-5.6%
Nemaha	$1,205,024,000	$1,282,096,000	$1,364,097,440	$1,451,343,601	$1,544,169,929	6.4%
Washington	$667,368,000	$650,841,000	$634,723,282	$619,004,710	$603,675,401	-2.5%

Source: HAZUS

The following chart illustrates the above data.

Regional County HAZUS Valuation Projections Through 2030
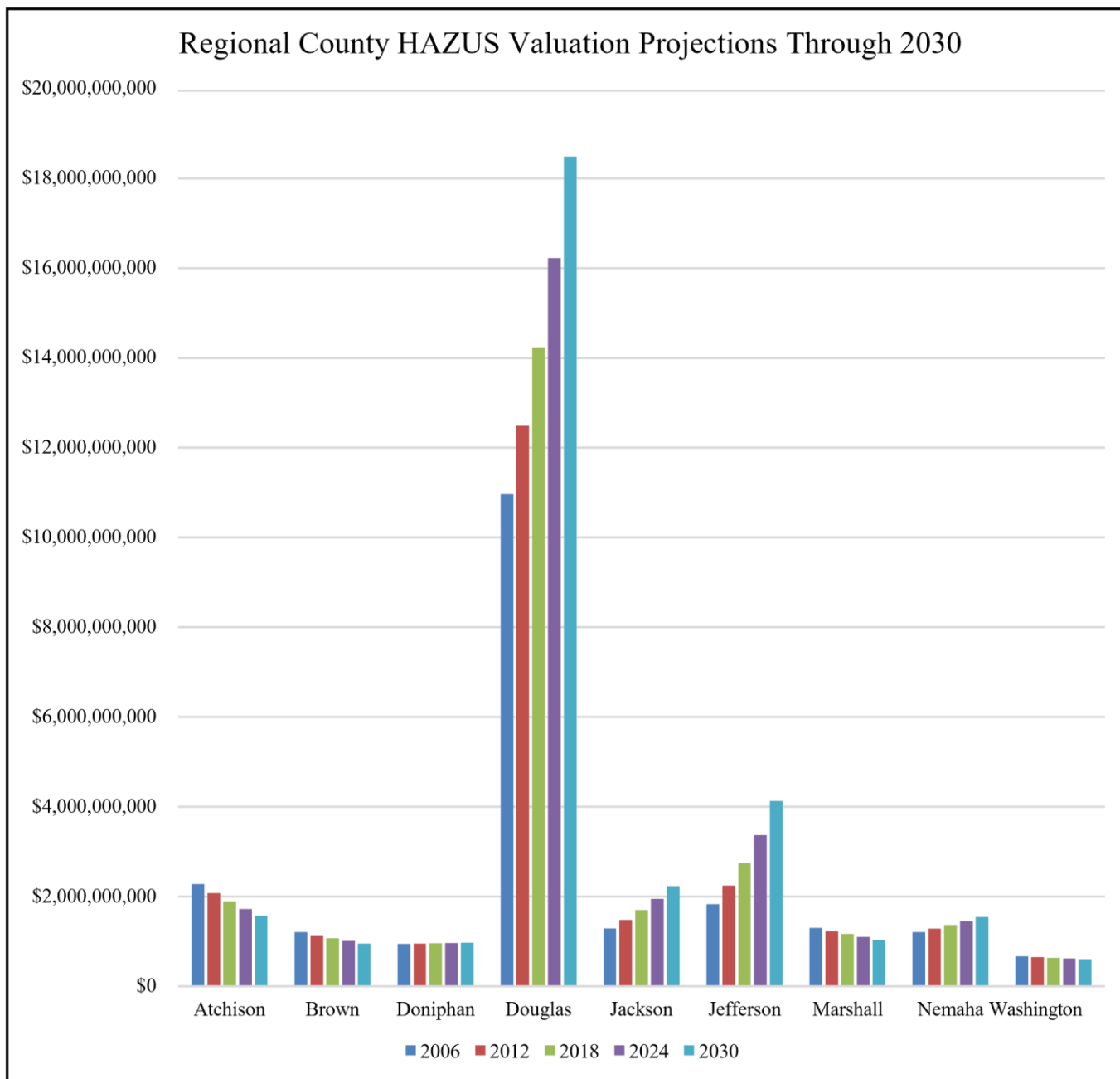
Individual tribal data was used to developed property valuation projections using historical and trend data. Growth projections were based on an average growth percentage from the Kansas counties each tribal reservation spans, using 2017 valuation data provide by each tribe. Indications are that the tribal reservations will see a steady decline in the property valuation through the year 2033.

**Table 3.34: Kansas Region K Tribal Property Valuation Projections Through 2033**

County	2017	2021	2027	2033	Projected Growth Percentage Through 2033
Iowa Tribe	$7,712,800	$7,504,554	$7,301,931	$7,104,779	-2.7%
Kickapoo Tribe	$6,000,000	$5,652,000	$5,324,184	$5,015,381	-5.8%

The following chart illustrates the above data.

Regional Tribal Reservation Valuation Projections Through 2033
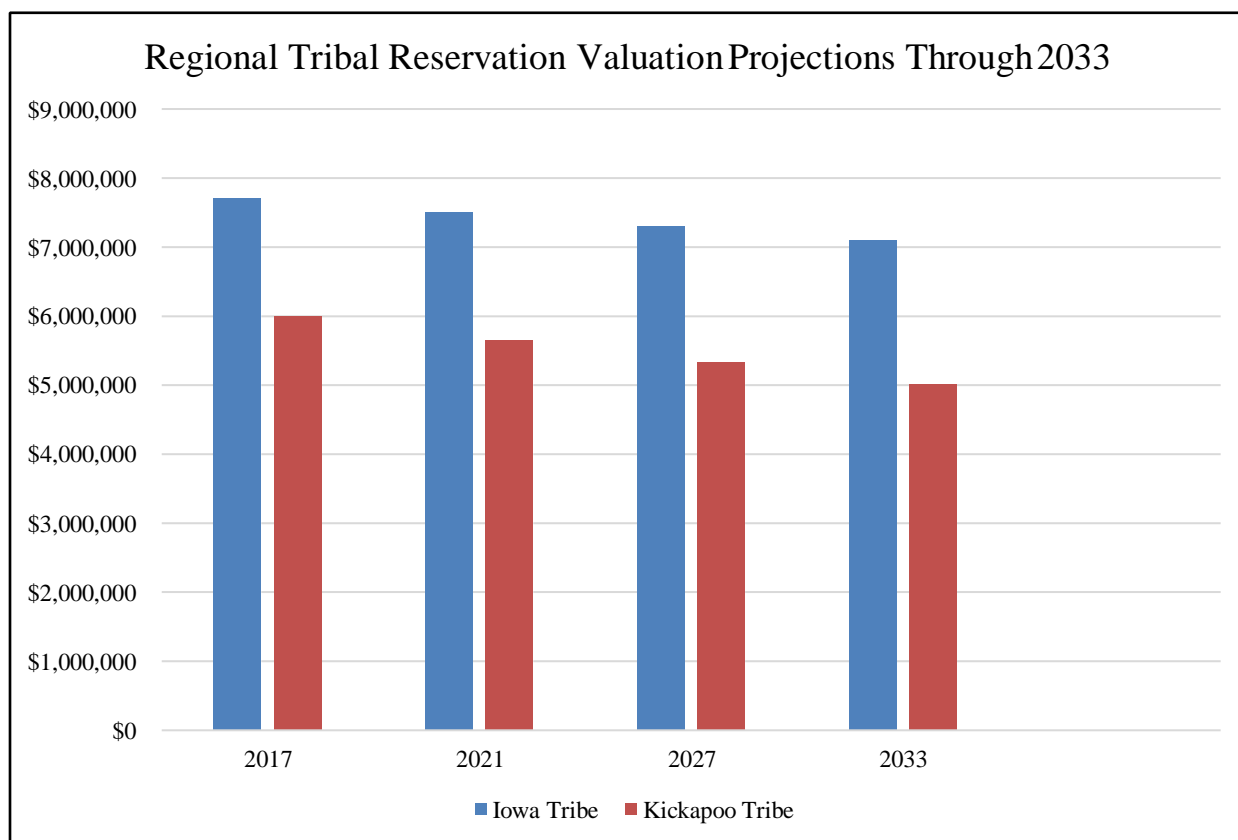
The United States Department of Agriculture (USDA) National Agricultural Statistics Service data was used to develop agricultural projections for the region using historical and trend data. Tribal data was not broken out by the USDA National Agricultural Statistics Service but is included in the counties the tribal reservations span. Indications are the region will experience a steady decrease in the number of farms through the year 2037.

**Table 3.35: Kansas Region K Number of Farms Data Projections Through 2037**

County	Number of Farms, 1997	Number of Farms, 2007	Number of Farms, 2017	Number of Farms, 2027	Number of Farms, 2037	Projected Growth Percentage Through 2037
Atchison	642	711	595	578	562	-2.8%

Table 3.35: Kansas Region K Number of Farms Data Projections Through 2037

County	Number of Farms, 1997	Number of Farms, 2007	Number of Farms, 2017	Number of Farms, 2027	Number of Farms, 2037	Projected Growth Percentage Through 2037
Brown	593	637	510	478	448	-6.3%
Doniphan	516	573	430	400	372	-7.0%
Douglas	905	1,040	998	1,052	1,110	5.4%
Jackson	1,109	1,127	972	913	858	-6.1%
Jefferson	1,097	1,137	1,012	975	939	-3.7%
Marshall	910	913	802	755	710	-5.9%
Nemaha	1,001	1,054	809	736	670	-9.0%
Washington	786	817	694	655	619	-5.6%

Source: United States Department of Agriculture National Agricultural Statistics Service
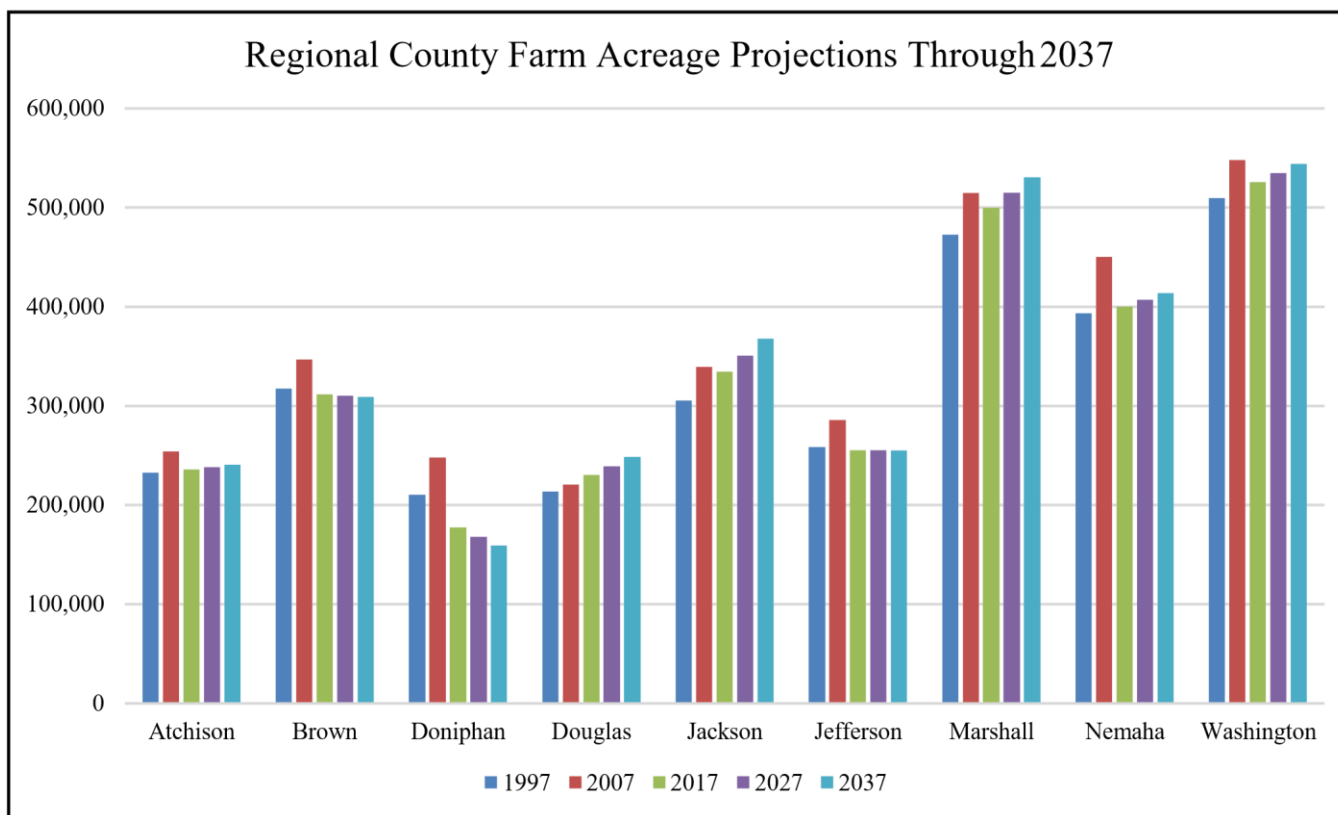
The following chart illustrates the above data.
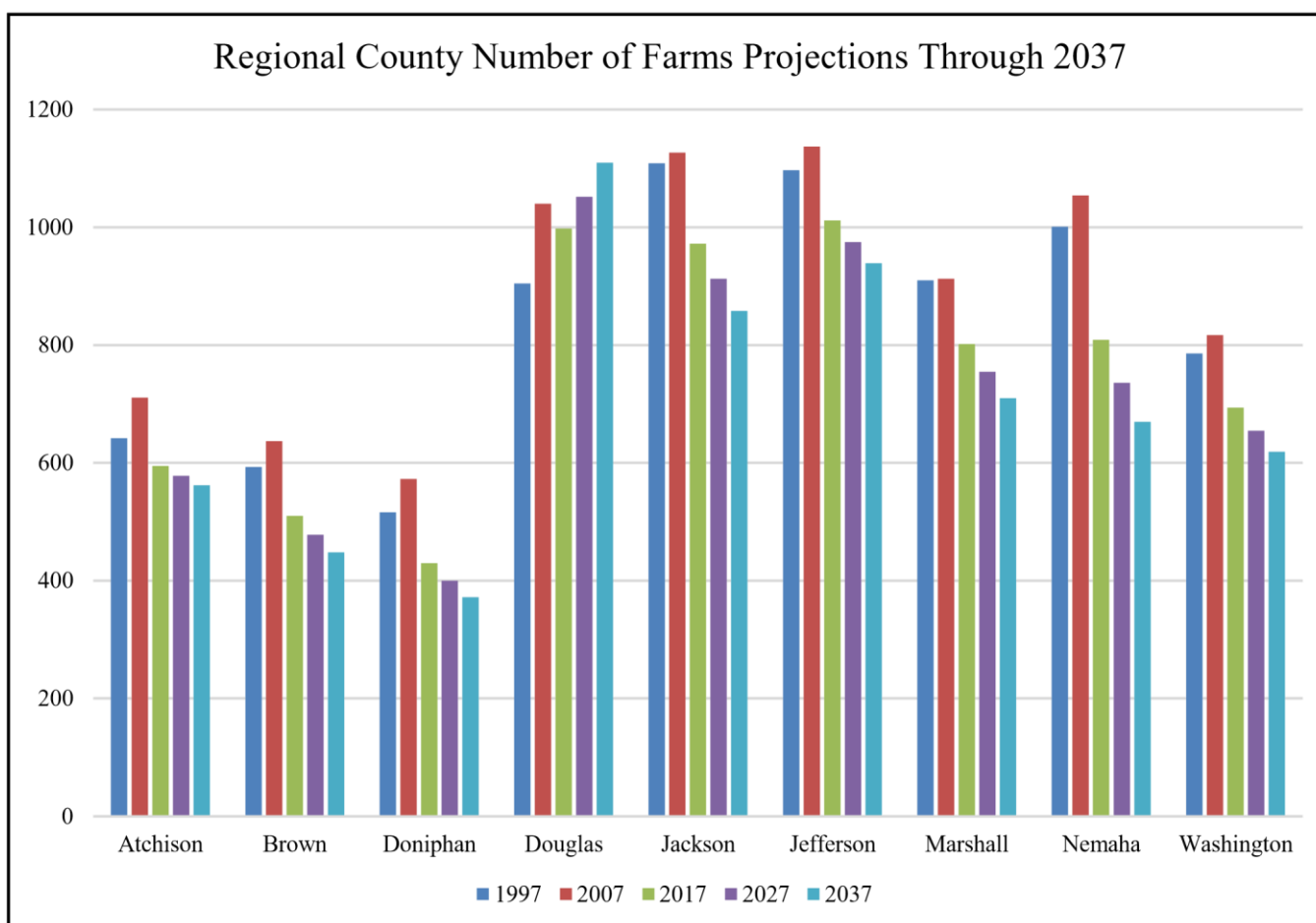
The USDA National Agricultural Statistics Service data indicates the region will experience steady increase in the total farm acreage through the year 2037.

Table 3.36: Kansas Region K Farm Acreage Data Projections Through 2037

County	Farm Acreage, 1997	Farm Acreage, 2007	Farm Acreage, 2017	Farm Acreage, 2027	Farm Acreage, 2037	Projected Growth Percentage Through 2037
Atchison	232,748	254,101	235,896	238,267	240,661	1.0%
Brown	317,352	346,758	311,595	310,233	308,876	-0.4%
Doniphan	210,383	247,815	177,485	168,089	159,191	-5.3%
Douglas	213,635	220,636	230,364	239,217	248,410	3.8%
Jackson	305,431	339,291	334,572	350,791	367,795	4.8%
Jefferson	258,703	285,803	255,404	255,198	254,993	-0.1%
Marshall	472,591	514,818	499,934	515,042	530,607	3.0%
Nemaha	393,331	450,508	400,274	407,051	413,942	1.7%
Washington	509,631	548,034	525,675	534,758	543,997	1.7%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.

The USDA National Agricultural Statistics Service data indicates that approximately half of the counties in the region will experience a steady decrease in the total number of cattle through the year 2037.

Table 3.37: Kansas Region K Total Number of Cattle Data Projections Through 2037

County	Farm Acreage, 1997	Farm Acreage, 2007	Farm Acreage, 2017	Farm Acreage, 2027	Farm Acreage, 2037	Projected Growth Percentage Through 2037
Atchison	32,525	35,656	26,787	24,745	22,858	-7.6%
Brown	28,125	29,122	18,195	15,104	12,538	-17.0%
Doniphan	16,385	14,563	7,424	5,192	3,630	-30.1%
Douglas	26,964	22,642	20,579	17,992	15,731	-12.6%
Jackson	44,990	50,453	44,078	43,969	43,861	-0.2%
Jefferson	37,272	49,569	39,069	41,376	43,819	5.9%
Marshall	39,908	60,831	40,561	44,436	48,681	9.6%
Nemaha	59,170	66,730	58,596	58,768	58,941	0.3%
Washington	58,788	75,725	71,976	80,563	90,173	11.9%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.

Regional County Total Number of Cattle Projections Through 2037
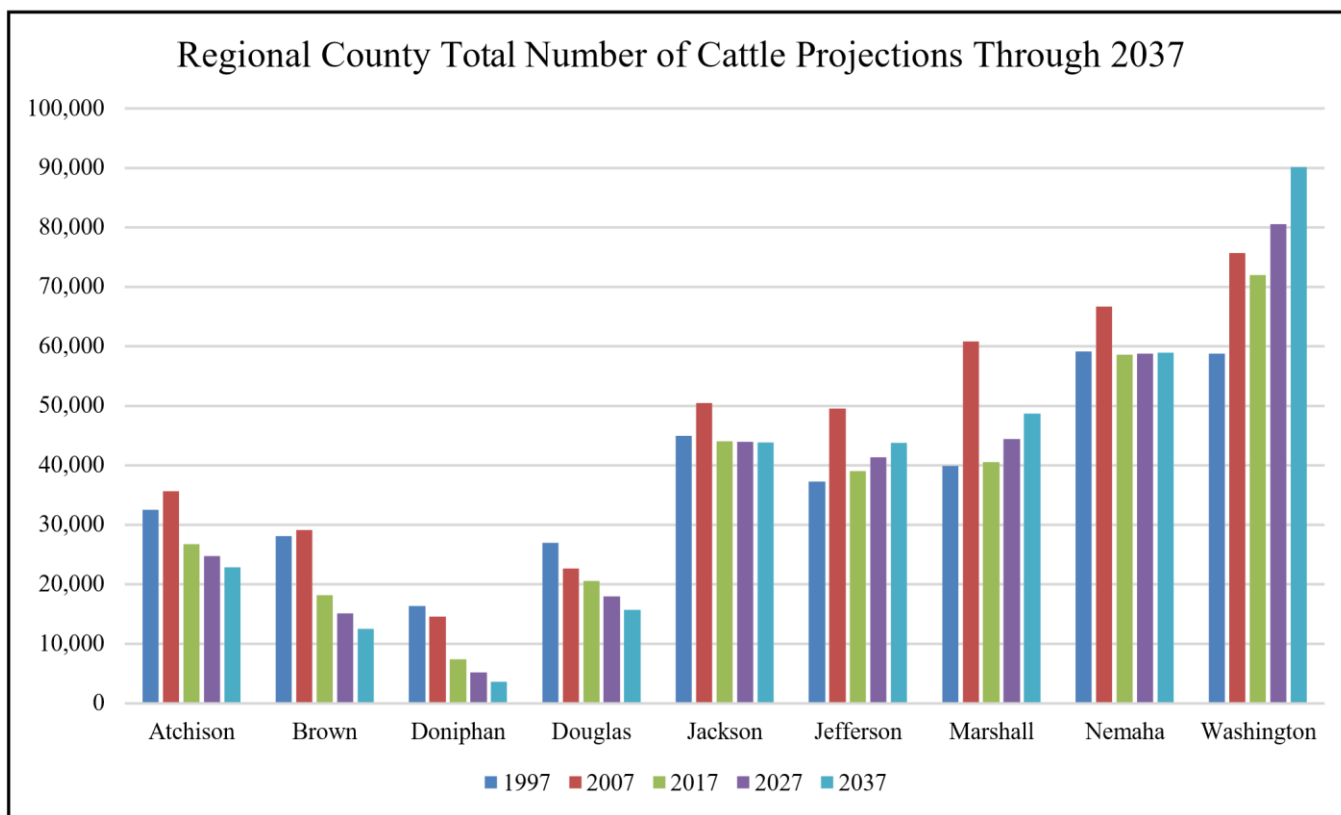
The USDA National Agricultural Statistics Service data indicates that the region will experience an increase in the total number of cattle through the year 2037.

Table 3.38: Kansas Region K Agricultural Market Value Projections Through 2037

County	Market Value, 1997	Market Value, 2007	Market Value, 2017	Market Value, 2027	Market Value, 2037	Projected Growth Percentage Through 2037
Atchison	$34,484,000	$63,982,000	$85,204,000	$135,776,759	$216,366,935	59.4%
Brown	$67,473,000	$116,368,000	$131,843,000	$188,380,148	$269,161,655	42.9%
Doniphan	$44,177,000	$74,956,000	$81,227,000	$112,921,062	$156,981,868	39.0%
Douglas	$38,198,000	$41,262,000	$65,867,000	$88,147,336	$117,964,274	33.8%
Jackson	$27,486,000	$51,998,000	$71,039,000	$115,722,056	$188,510,455	62.9%
Jefferson	$33,526,000	$61,344,000	$75,731,000	$116,030,265	$177,774,259	53.2%
Marshall	$65,381,000	$111,011,000	$125,395,000	$177,276,048	$250,622,410	41.4%
Nemaha	$86,038,000	$146,896,000	$197,436,000	$301,227,271	$459,581,176	52.6%
Washington	$82,073,000	$151,846,000	$181,979,000	$277,388,578	$422,820,344	52.4%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.

Regional County Agricultural Market Value Projections Through 2037
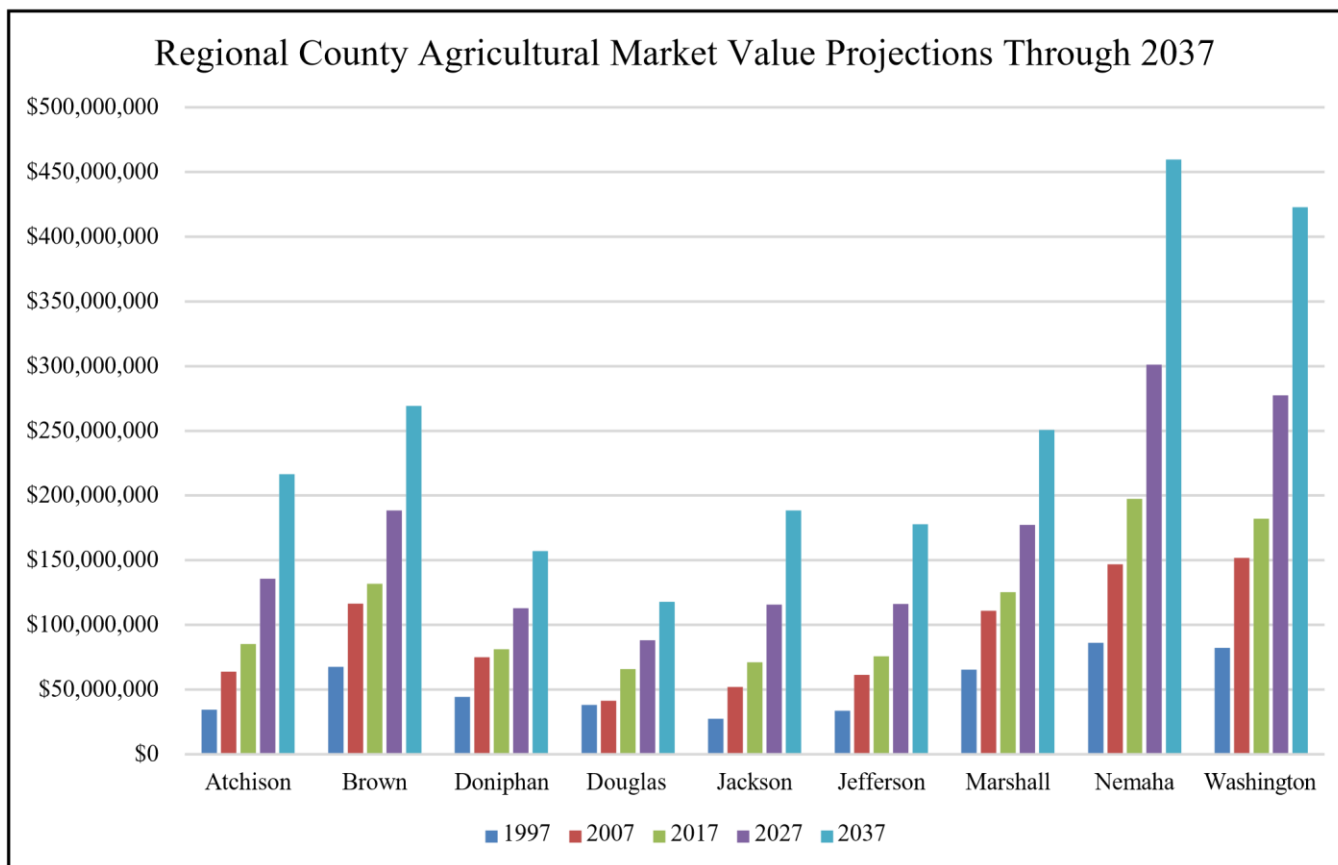
Future development speaks to the potential impacts of land use and demographic changes in hazard prone areas. Future development data is speculative as future conditions are subject to numerous unpredictable factors. While past trends are used to inform the discussion, these historical trends are no guarantee of future conditions.

For hazards that affect the entire planning area, the predicted overall decrease in population will tend to decrease potential vulnerability. It is difficult to quantify the exact change in vulnerability, but it can be depicted as generally directly proportional to the population change itself.

For hazards that affect the entire planning area, the predicted overall increase in structures will tend to increase potential vulnerability. It is difficult to quantify the exact change in vulnerability, but it can be depicted as generally directly proportional to the change in the number of structures.

As indicated in the data above, the majority of Kansas Region K participating jurisdiction have seen a slight increase or steady hold in farm acreage and an increase in the market value of produced agricultural goods. These continuing agricultural gains could result in increased exposure to both natural and man-made hazards.

3.13 – Regional Economic Activity Patterns

Kansas Region K's continued economic growth can impact future vulnerability in two ways, by location-based growth in identified hazard prone areas or by the industry type itself, as is the case with chemical manufacturing.

Gross domestic product (GDP) is a measure of the entire output of a defined economy, and roughly equals the total dollar amount of all goods and services produced within a defined area. GDP is the most comprehensive measure of economic activity and business growth. The following table, using data from the Bureau of Economic Analysis, details GDP for all Kansas Region K counties for the period 2012 to 2015 (the latest available data). Tribal data was not broken out by the Bureau of Economic Analysis but is included in the counties the tribal reservations span.

Table 3.39: Kansas Region K Gross Domestic Product, 2012 to 2015

County	2012	2013	2014	2015	State Rank in 2015 (out of 105)
Atchison	462,352	437,442	458,188	465,193	35
Brown	407,244	437,567	420,266	405,237	42
Doniphan	201,829	207,283	197,121	186,220	66
Douglas	3,970,883	4,047,613	4,143,378	4,198,350	5
Jackson	268,583	296,858	284,176	293,230	49
Jefferson	269,697	290,807	289,324	298,111	47
Marshall	619,559	573,139	514,709	476,579	33
Nemaha	418,814	468,106	474,285	483,461	31
Washington	177,496	198,010	169,924	167,601	73

Source: Bureau of Economic Analysis

The following table, using data from the Bureau of Economic Analysis, details the percentage GDP change from the preceding period for 2012 to 2015 (the latest available data).

Table 3.40: Kansas Region K GDP Percentage Change from Preceding Period, 2012 to 2015

County	2013	2014	2015	State Rank in 2015 (out of 105)
Atchison	-5.4%	4.7%	1.5%	28
Brown	7.4%	-4.0%	-3.6%	75
Doniphan	2.7%	-4.9%	-5.5%	86
Douglas	1.9%	2.4%	1.3%	31
Jackson	10.5%	-4.3%	3.2%	15
Jefferson	7.8%	-0.5%	3.0%	18
Marshall	-7.5%	-10.2%	-7.4%	99
Nemaha	11.8%	1.3%	1.9%	27
Washington	11.6%	-14.2%	-1.4%	57

Source: Bureau of Economic Analysis

The average Kansas Region K unemployment rate for March 2019 of 4.9% is higher than the average State of Kansas unemployment rate of 3.5%. The following chart details the regional unemployment rates, using data from the Kansas Department of Labor, for the months of March 2014 and March 2019.

Table 3.41: Kansas Region K Unemployment Rate, March 2014 and March 2015

County	March 2014	March 2019
Atchison	6.6%	5.1%
Brown	4.6%	3.7%
Doniphan	5.4%	4.1%
Douglas	4.7%	3.3%
Jackson	5.3%	3.7%
Jefferson	6.1%	3.9%
Marshall	3.8%	3.8%
Nemaha	3.4%	3.1%
Washington	4.0%	4.1%

Source: Kansas Department of Labor

3.14 – Climate Change

For hazards related to weather patterns, climate change should be considered as it may cause significant changes in patterns and event frequency. There is a scientific consensus that climate change is occurring, and recent climate modeling results indicate that extreme weather events may become more common. Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of some extreme weather events, including:

- Longer and hotter heat waves
- An increased risk of wildfires
- Higher wind speeds

- Greater rainfall intensity
- Increased tornado activity.

As climate modeling improves, future plan updates should include climate change as a factor in the ranking of natural hazards as these are expected to have a significant impact on Kansas Region K communities. Where applicable, potential climate change factors will be addressed in subsequent sections for relevant identified hazards.

According to the United State Environmental Protection Agency (EPA) "What Climate Change Means for Kansas" (August 2016), "In the past century, most of the state has warmed by at least half a degree (F). The soil is becoming drier. Rainstorms are becoming more intense, and floods are becoming more severe. Warming winters and changes in the timing and size of rainfall events have altered crop yields. In the coming decades, summers are likely to become increasingly hot and dry, creating problems for agriculture and possibly human health."

The following map, from the EPA Climate Change Indicators in the United States, illustrates modeled temperature changes during the last century.

EPA Modeled Temperature Changes During Last Century
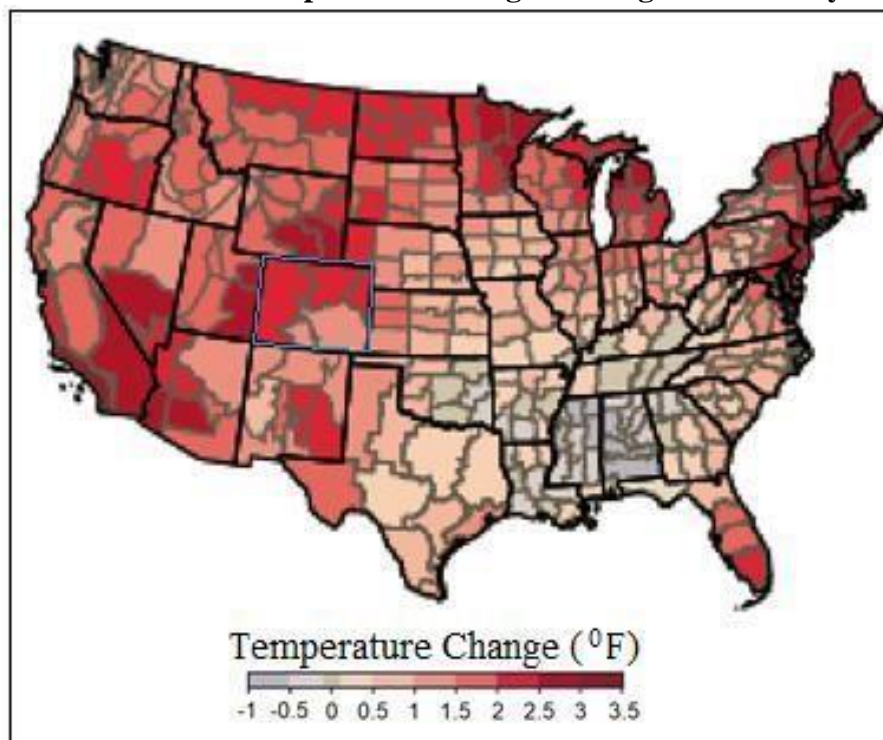
Concerning potential impacts on agriculture, the report states "Rising temperatures, drier soils, and decreasing water availability are likely to present challenges for Kansas's farms. Yields would decline by about 50 percent in fields that can no longer be irrigated. Even where ample water is available, higher temperatures would reduce yields of corn. Increased concentrations of carbon dioxide, however, may

increase yields of wheat and soybean enough to offset the impact of higher temperature. Although warmer and shorter winters may allow for a longer growing season, they may also promote the growth of weeds and pests, and shorten the dormancy for many winter crops, which could increase crop losses during spring freezes. The early flowering of winter wheat could have negative repercussions on livestock farmers who depend on it for feed. Livestock themselves may also be affected by more intense heat waves and lack of water. Hot weather causes cows to eat less, grow more slowly, and produce less milk, and it can threaten their health."

Concerning potential impacts on rainfall, flooding, and drought, the report states "Although summer droughts are likely to become more severe, floods may also intensify. During the last 50 years, the amount of rain falling during the wettest four days of the year has increased about 15 percent in the Great Plains. River levels associated with flooding have increased in eastern Kansas. Over the next several decades, the amount of rainfall during the wettest days of the year is likely to continue to increase, which would increase flooding."

Concerning potential impacts on tornados, the report states "Scientists do not know how the frequency and severity of tornados will change. Rising concentrations of greenhouse gases tend to increase humidity, and thus atmospheric instability, which would encourage tornados. But wind shear is likely to decrease, which would discourage tornados. Research is ongoing to learn whether tornados will be more or less frequent in the future. Because Kansas experiences about 100 tornados a year, such research is closely followed by meteorologists in the state."

Concerning potential impacts on human health, the report states "By 2050, Kansas is likely to have four times as many days above 100°F. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor. The elderly may be particularly prone to heat stress and other heat-related health problems, including dehydration, cardiovascular strain, and respiratory problems. Those with low incomes may be particularly vulnerable due to a lack of air conditioning. Power failures due to severe weather can also present risks, especially in lightly populated areas where access to the necessary support services may be limited."