

A.1 BRIDGES

Methodology

The following sources were referenced in September 2010, in preparation of this issue brief:

NBI Data <http://www.fhwa.dot.gov/bridge/britab.cfm>
National Highway System (NHS) <http://www.fhwa.dot.gov/planning/nhs/index.html>
Suff. Ratings <http://www.transportation.org/sites/bridges/docs/Sufficiency%20Ratings%20Explained.pdf>
Non-regulatory Supplement <http://www.fhwa.dot.gov/legsregs/directives/fapg/0650dsup.htm>
National Bridge Inventory (NBI) <http://www.fhwa.dot.gov/bridge/nbi.htm>
“Bridging the Gap” National Bridge info <http://www.transportation1.org/bridgereport/struggle.html>
ASCE 2009 Report Card http://www.infrastructurereportcard.org/sites/default/files/RC2009_bridges.pdf
State and Local Report Cards <http://www.infrastructurereportcard.org/state-and-local-report-cards>
Q&A NBIS <http://www.fhwa.dot.gov/bridge/nbis/index.htm>
Functional Classification Guidelines http://www.fhwa.dot.gov/planning/fcsec2_1.htm
FHWA <http://www.fhwa.dot.gov/>

After reviewing alternate sources of qualitative information, the National Bridge Inventory was adopted as the primary data source for the statistical analysis developed in this issue brief. NBI data was chosen because of its consistency over a number of years and its applicability to the entire United States. The National Bridge Inventory is a collection of information (database) covering just over 600,000 of the Nation’s bridges located on public roads, including Interstate Highway, U.S. highways, State and county roads, as well as publicly-accessible bridges on federal lands. It presents a State by State summary analysis of the number, location, and general condition of highway bridges within each State.

The NBI qualitative assessment of Kentucky bridges was compared, county-by-county, by number of bridges and by deck area, for calendar year 2009, the most recent NBI data available. NBI bridge count data for Kentucky was then compared, year-by-year to comparable data for the United States, Puerto Rico, and the District of Columbia for the period from 1992 through 2009.

The 2003 ASCE Kentucky Infrastructure Report Card Bridge Issue Brief was also reviewed for comparison, background, and consistency purposes. However, independent analysis was undertaken of NBI data for the time period encompassed by the 2003 Bridge Issue Brief.

Tables of 2009 NBI Deficiency Data

Table A.1 - State-by-State Comparison and Ranking by Number of Bridges

State	# Bridges	# SD	%SD	# FO	%FO	# Def	%Def	Rank
ARIZONA	7,489	210	2.8%	669	8.9%	879	11.7%	1
MINNESOTA	13,131	1,209	9.2%	392	3.0%	1,601	12.2%	2
NEVADA	1,749	44	2.5%	171	9.8%	215	12.3%	3
WISCONSIN	13,917	1,207	8.7%	734	5.3%	1,941	13.9%	4
UTAH	2,905	169	5.8%	279	9.6%	448	15.4%	5
ILLINOIS	26,263	2,373	9.0%	1,792	6.8%	4,165	15.9%	6
FLORIDA	11,803	303	2.6%	1,620	13.7%	1,923	16.3%	7
DELAWARE	862	37	4.3%	108	12.5%	145	16.8%	8
COLORADO	8,476	598	7.1%	861	10.2%	1,459	17.2%	9
NEW MEXICO	3,890	381	9.8%	303	7.8%	684	17.6%	10
MONTANA	4,984	402	8.1%	485	9.7%	887	17.8%	11
TEXAS	51,136	1,752	3.4%	7,679	15.0%	9,431	18.4%	12
GEORGIA	14,710	949	6.5%	1,828	12.4%	2,777	18.9%	13
IDAHO	4,100	367	9.0%	420	10.2%	787	19.2%	14
TENNESSEE	19,939	1,246	6.2%	2,686	13.5%	3,932	19.7%	15
KANSAS	25,543	2,901	11.4%	2,252	8.8%	5,153	20.2%	16
NORTH DAKOTA	4,437	696	15.7%	237	5.3%	933	21.0%	17
WYOMING	3,054	401	13.1%	270	8.8%	671	22.0%	18
SOUTH CAROLINA	9,253	1,238	13.4%	802	8.7%	2,040	22.0%	19
INDIANA	18,546	1,927	10.4%	2,184	11.8%	4,111	22.2%	20
ARKANSAS	12,557	933	7.4%	1,876	14.9%	2,809	22.4%	21
OREGON	7,215	477	6.6%	1,188	16.5%	1,665	23.1%	22
OHIO	28,119	2,795	9.9%	3,866	13.7%	6,661	23.7%	23
ALABAMA	15,959	1,686	10.6%	2,105	13.2%	3,791	23.8%	24
ALASKA	1,151	129	11.2%	146	12.7%	275	23.9%	25
MISSISSIPPI	17,038	2,820	16.6%	1,300	7.6%	4,120	24.2%	26
SOUTH DAKOTA	5,920	1,231	20.8%	238	4.0%	1,469	24.8%	27
MICHIGAN	10,906	1,467	13.5%	1,265	11.6%	2,732	25.1%	28
NEBRASKA	15,436	2,878	18.6%	1,046	6.8%	3,924	25.4%	29
VIRGINIA	13,529	1,241	9.2%	2,242	16.6%	3,483	25.7%	30
MARYLAND	5,183	372	7.2%	971	18.7%	1,343	25.9%	31
WASHINGTON	7,638	405	5.3%	1,620	21.2%	2,025	26.5%	32
IOWA	24,799	5,358	21.6%	1,320	5.3%	6,678	26.9%	33
NORTH CAROLINA	18,006	2,442	13.6%	2,682	14.9%	5,124	28.5%	34
CALIFORNIA	24,462	3,228	13.2%	3,888	15.9%	7,116	29.1%	35
OKLAHOMA	23,712	5,286	22.3%	1,616	6.8%	6,902	29.1%	36
LOUISIANA	13,328	1,723	12.9%	2,170	16.3%	3,893	29.2%	37
MISSOURI	24,156	4,289	17.8%	3,016	12.5%	7,305	30.2%	38
NEW HAMPSHIRE	2,403	373	15.5%	382	15.9%	755	31.4%	39
KENTUCKY	13,729	1,362	9.9%	3,064	22.3%	4,426	32.2%	40
MAINE	2,394	364	15.2%	421	17.6%	785	32.8%	41
CONNECTICUT	4,186	378	9.0%	1,028	24.6%	1,406	33.6%	42
NEW JERSEY	6,486	692	10.7%	1,603	24.7%	2,295	35.4%	43
VERMONT	2,707	437	16.1%	524	19.4%	961	35.5%	44
WEST VIRGINIA	7,038	1,056	15.0%	1,528	21.7%	2,584	36.7%	45
NEW YORK	17,372	2,140	12.3%	4,341	25.0%	6,481	37.3%	46

State	# Bridges	# SD	%SD	# FO	%FO	# Def	%Def	Rank
HAWAII	1,133	144	12.7%	349	30.8%	493	43.5%	47
PENNSYLVANIA	22,293	6,060	27.2%	3,714	16.7%	9,774	43.8%	48
PUERTO RICO	2,181	227	10.4%	843	38.7%	1,070	49.1%	49
MASSACHUSETTS	5,037	593	11.8%	1,980	39.3%	2,573	51.1%	50
RHODE ISLAND	739	163	22.1%	233	31.5%	396	53.6%	51
DIST. OF COL.	246	20	8.1%	131	53.3%	151	61.4%	52
TOTALS	603,245	71,179	11.8%	78,468	13.0%	149,647	24.8%	
Average	11,601					2,878	24.8%	

*Table A.2- Deficient Kentucky Highway Bridges, By County,
By Number of Bridges in Each County*

Kentucky County	# Bridges	# SD	% SD	# FO	% FO	Def	Percent Deficiencies	Rank
MEADE	22	0	0.0%	2	9.1%	2	9.09%	1
CALDWELL	107	4	3.7%	9	8.4%	13	12.15%	2
CHRISTIAN	259	11	4.2%	22	8.5%	33	12.74%	3
CRITTENDEN	87	6	6.9%	7	8.0%	13	14.94%	4
SIMPSON	37	0	0.0%	6	16.2%	6	16.22%	5
MARION	141	6	4.3%	18	12.8%	24	17.02%	6
MARSHALL	187	1	0.5%	31	16.6%	32	17.11%	7
WEBSTER	138	9	6.5%	15	10.9%	24	17.39%	8
CARLISLE	72	4	5.6%	9	12.5%	13	18.06%	9
OWEN	49	3	6.1%	6	12.2%	9	18.37%	10
LARUE	54	2	3.7%	8	14.8%	10	18.52%	11
TAYLOR	80	2	2.5%	13	16.3%	15	18.75%	12
TODD	78	1	1.3%	14	17.9%	15	19.23%	13
GALLATIN	51	2	3.9%	8	15.7%	10	19.61%	14
BOONE	123	3	2.4%	22	17.9%	25	20.33%	15
GRAVES	383	36	9.4%	42	11.0%	78	20.37%	16
LYON	83	4	4.8%	13	15.7%	17	20.48%	17
ROBERTSON	24	2	8.3%	3	12.5%	5	20.83%	18
MCCREARY	38	1	2.6%	7	18.4%	8	21.05%	19
LEWIS	127	9	7.1%	18	14.2%	27	21.26%	20
EDMONSON	37	0	0.0%	8	21.6%	8	21.62%	21
SCOTT	169	8	4.7%	29	17.2%	37	21.89%	22
MCCRACKEN	203	18	8.9%	27	13.3%	45	22.17%	23
POWELL	108	5	4.6%	19	17.6%	24	22.22%	24
WARREN	98	2	2.0%	20	20.4%	22	22.45%	25
NICHOLAS	80	6	7.5%	12	15.0%	18	22.50%	26
TRIMBLE	43	3	7.0%	7	16.3%	10	23.26%	27
FULTON	94	11	11.7%	11	11.7%	22	23.40%	28
BARREN	136	2	1.5%	30	22.1%	32	23.53%	29
UNION	126	6	4.8%	24	19.0%	30	23.81%	30
HANCOCK	70	6	8.6%	11	15.7%	17	24.29%	31
MUHLENBERG	151	7	4.6%	30	19.9%	37	24.50%	32
METCALFE	69	2	2.9%	15	21.7%	17	24.64%	33
ROCKCASTLE	89	5	5.6%	17	19.1%	22	24.72%	34
BATH	84	2	2.4%	19	22.6%	21	25.00%	35
BUTLER	97	4	4.1%	21	21.6%	25	25.77%	36
DAVISS	266	20	7.5%	49	18.4%	69	25.94%	37
HOPKINS	243	16	6.6%	48	19.8%	64	26.34%	38
CLINTON	34	2	5.9%	7	20.6%	9	26.47%	39
CALLOWAY	181	18	9.9%	30	16.6%	48	26.52%	40
FLEMING	109	14	12.8%	15	13.8%	29	26.61%	41
MENIFEE	45	7	15.6%	5	11.1%	12	26.67%	42
ALLEN	82	3	3.7%	19	23.2%	22	26.83%	43

Kentucky County	# Bridges	# SD	% SD	# FO	% FO	Def	Percent Deficiencies	Rank
GRAYSON	108	14	13.0%	15	13.9%	29	26.85%	44
GREEN	52	1	1.9%	13	25.0%	14	26.92%	45
CUMBERLAND	74	1	1.4%	19	25.7%	20	27.03%	46
WAYNE	70	10	14.3%	9	12.9%	19	27.14%	47
HICKMAN	121	20	16.5%	13	10.7%	33	27.27%	48
LIVINGSTON	102	10	9.8%	18	17.6%	28	27.45%	49
GREENUP	149	12	8.1%	29	19.5%	41	27.52%	50
HENRY	90	10	11.1%	15	16.7%	25	27.78%	51
CARTER	178	16	9.0%	34	19.1%	50	28.09%	52
LAWRENCE	102	7	6.9%	22	21.6%	29	28.43%	53
MORGAN	105	9	8.6%	21	20.0%	30	28.57%	54
NELSON	147	9	6.1%	33	22.4%	42	28.57%	55
LINCOLN	131	7	5.3%	31	23.7%	38	29.01%	56
BULLITT	92	6	6.5%	21	22.8%	27	29.35%	57
WASHINGTON	92	5	5.4%	22	23.9%	27	29.35%	58
WOODFORD	61	1	1.6%	17	27.9%	18	29.51%	59
TRIGG	105	13	12.4%	18	17.1%	31	29.52%	60
BALLARD	88	11	12.5%	15	17.0%	26	29.55%	61
PULASKI	154	12	7.8%	34	22.1%	46	29.87%	62
HART	60	4	6.7%	14	23.3%	18	30.00%	63
OLDHAM	66	8	12.1%	12	18.2%	20	30.30%	64
BRACKEN	46	9	19.6%	5	10.9%	14	30.43%	65
HARDIN	202	15	7.4%	47	23.3%	62	30.69%	66
OHIO	227	24	10.6%	47	20.7%	71	31.28%	67
ROWAN	121	4	3.3%	34	28.1%	38	31.40%	68
ADAIR	129	8	6.2%	33	25.6%	41	31.78%	69
LOGAN	131	4	3.1%	38	29.0%	42	32.06%	70
RUSSELL	46	6	13.0%	9	19.6%	15	32.61%	71
MCLEAN	76	7	9.2%	18	23.7%	25	32.89%	72
SHELBY	127	27	21.3%	15	11.8%	42	33.07%	73
CLARK	113	5	4.4%	33	29.2%	38	33.63%	74
JOHNSON	95	2	2.1%	30	31.6%	32	33.68%	75
MASON	92	10	10.9%	21	22.8%	31	33.70%	76
CASEY	139	10	7.2%	38	27.3%	48	34.53%	77
FAYETTE	193	16	8.3%	51	26.4%	67	34.72%	78
BOYLE	86	4	4.7%	26	30.2%	30	34.88%	79
PENDLETON	88	18	20.5%	13	14.8%	31	35.23%	80
CARROLL	70	14	20.0%	11	15.7%	25	35.71%	81
OWSLEY	50	4	8.0%	14	28.0%	18	36.00%	82
HENDERSON	185	15	8.1%	52	28.1%	67	36.22%	83
SPENCER	55	8	14.5%	12	21.8%	20	36.36%	84
BREATHITT	118	8	6.8%	35	29.7%	43	36.44%	85
MAGOFFIN	96	9	9.4%	26	27.1%	35	36.46%	86
MONTGOMERY	76	4	5.3%	24	31.6%	28	36.84%	87
BOYD	84	5	6.0%	26	31.0%	31	36.90%	88
ELLIOTT	48	10	20.8%	8	16.7%	18	37.50%	89

Kentucky County	# Bridges	# SD	% SD	# FO	% FO	Def	Percent Deficiencies	Rank
JESSAMINE	53	2	3.8%	18	34.0%	20	37.74%	90
BRECKINRIDGE	90	9	10.0%	25	27.8%	34	37.78%	91
BELL	198	24	12.1%	52	26.3%	76	38.38%	92
KENTON	135	14	10.4%	38	28.1%	52	38.52%	93
JEFFERSON	622	83	13.3%	157	25.2%	240	38.59%	94
ESTILL	49	6	12.2%	13	26.5%	19	38.78%	95
MERCER	72	4	5.6%	24	33.3%	28	38.89%	96
MONROE	64	2	3.1%	23	35.9%	25	39.06%	97
KNOX	125	27	21.6%	22	17.6%	49	39.20%	98
MADISON	152	14	9.2%	48	31.6%	62	40.79%	99
FLOYD	144	14	9.7%	45	31.3%	59	40.97%	100
FRANKLIN	117	22	18.8%	27	23.1%	49	41.88%	101
MARTIN	62	6	9.7%	20	32.3%	26	41.94%	102
HARRISON	137	17	12.4%	41	29.9%	58	42.34%	103
ANDERSON	80	11	13.8%	23	28.8%	34	42.50%	104
GRANT	75	9	12.0%	23	30.7%	32	42.67%	105
LAUREL	131	15	11.5%	41	31.3%	56	42.75%	106
LEE	38	10	26.3%	7	18.4%	17	44.74%	107
CAMPBELL	125	11	8.8%	45	36.0%	56	44.80%	108
WHITLEY	154	31	20.1%	38	24.7%	69	44.81%	109
WOLFE	72	17	23.6%	16	22.2%	33	45.83%	110
GARRARD	62	8	12.9%	21	33.9%	29	46.77%	111
KNOTT	110	10	9.1%	44	40.0%	54	49.09%	112
BOURBON	105	14	13.3%	39	37.1%	53	50.48%	113
PERRY	148	33	22.3%	43	29.1%	76	51.35%	114
PIKE	287	31	10.8%	121	42.2%	152	52.96%	115
JACKSON	49	6	12.2%	20	40.8%	26	53.06%	116
HARLAN	249	79	31.7%	65	26.1%	144	57.83%	117
LETCHER	156	25	16.0%	66	42.3%	91	58.33%	118
CLAY	165	61	37.0%	39	23.6%	100	60.61%	119
LESLIE	96	41	42.7%	18	18.8%	59	61.46%	120
County Code Null	15	1	6.7%	5	33.3%	6	40.00%	
TOTALS	13,731	1,362	9.9%	3,064	22.3%	4,426	32.23%	
Area is in SqM								
SD = Structurally Deficient								
FO = Functionally Obsolete								

Table A.3 - Deficient Kentucky Highway Bridges, By County, By Bridge Deck Area in Each County

Kentucky County	Area	SD Area	% SD Area	FO Area	% FO Area	Def Area	% Deficiencies	Rank
MEADE	9,528	0	0.0%	151	1.6%	151	1.6%	1
LARUE	13,340	178	1.3%	853	6.4%	1,031	7.7%	2
LYON	38,945	323	0.8%	2,792	7.2%	3,115	8.0%	3
OWEN	20,618	544	2.6%	1,155	5.6%	1,699	8.2%	4
GALLATIN	33,771	160	0.5%	2,980	8.8%	3,139	9.3%	5
CHRISTIAN	77,575	1,542	2.0%	6,263	8.1%	7,805	10.1%	6
SIMPSON	9,160	0	0.0%	1,007	11.0%	1,007	11.0%	7
ROBERTSON	4,177	263	6.3%	226	5.4%	489	11.7%	8
CALDWELL	21,870	1,434	6.6%	1,209	5.5%	2,643	12.1%	9
WEBSTER	29,761	1,053	3.5%	2,632	8.8%	3,684	12.4%	10
ELLIOTT	14,753	956	6.5%	942	6.4%	1,898	12.9%	11
WARREN	73,869	535	0.7%	9,145	12.4%	9,680	13.1%	12
FLEMING	21,264	1,275	6.0%	1,556	7.3%	2,831	13.3%	13
BULLITT	41,661	1,833	4.4%	3,731	9.0%	5,564	13.4%	14
CARLISLE	16,855	1,078	6.4%	1,260	7.5%	2,337	13.9%	15
BARREN	59,950	184	0.3%	8,205	13.7%	8,389	14.0%	16
ALLEN	25,338	220	0.9%	3,370	13.3%	3,591	14.2%	17
SCOTT	62,667	1,257	2.0%	7,709	12.3%	8,966	14.3%	18
PULASKI	88,451	4,502	5.1%	8,174	9.2%	12,676	14.3%	19
HENDERSON	102,470	4,760	4.6%	10,104	9.9%	14,863	14.5%	20
BOONE	78,075	723	0.9%	10,659	13.7%	11,382	14.6%	21
POWELL	34,900	2,023	5.8%	3,159	9.1%	5,182	14.8%	22
TODD	13,804	0	0.0%	2,073	15.0%	2,073	15.0%	23
HANCOCK	12,311	409	3.3%	1,504	12.2%	1,913	15.5%	24
TAYLOR	15,181	312	2.1%	2,068	13.6%	2,380	15.7%	25
CALLOWAY	36,111	1,962	5.4%	3,723	10.3%	5,685	15.7%	26
MARTIN	19,282	624	3.2%	2,496	12.9%	3,120	16.2%	27
GRAVES	89,635	4,929	5.5%	9,760	10.9%	14,689	16.4%	28
METCALFE	18,386	288	1.6%	2,741	14.9%	3,029	16.5%	29
GARRARD	17,021	824	4.8%	1,988	11.7%	2,812	16.5%	30
WASHINGTON	24,804	905	3.6%	3,234	13.0%	4,138	16.7%	31
BELL	61,682	2,071	3.4%	8,427	13.7%	10,497	17.0%	32
WOODFORD	18,302	105	0.6%	3,063	16.7%	3,167	17.3%	33
KNOX	30,664	2,923	9.5%	2,400	7.8%	5,323	17.4%	34
BATH	29,648	120	0.4%	5,029	17.0%	5,149	17.4%	35
MERCER	18,232	552	3.0%	2,678	14.7%	3,230	17.7%	36
ROWAN	34,135	308	0.9%	5,788	17.0%	6,096	17.9%	37
DAVISS	153,735	13,416	8.7%	14,315	9.3%	27,732	18.0%	38
WAYNE	13,140	897	6.8%	1,510	11.5%	2,407	18.3%	39
CRITTENDEN	12,668	979	7.7%	1,362	10.8%	2,342	18.5%	40
ADAIR	31,663	417	1.3%	5,550	17.5%	5,967	18.8%	41
LEWIS	19,446	877	4.5%	2,835	14.6%	3,712	19.1%	42
MARION	19,600	475	2.4%	3,357	17.1%	3,832	19.6%	43

Kentucky County	Area	SD Area	% SD Area	FO Area	% FO Area	Def Area	% Deficiencies	Rank
NICHOLAS	12,567	629	5.0%	1,835	14.6%	2,464	19.6%	44
SPENCER	27,486	3,812	13.9%	1,604	5.8%	5,416	19.7%	45
GRAYSON	25,616	3,043	11.9%	2,092	8.2%	5,135	20.0%	46
MORGAN	23,214	1,319	5.7%	3,410	14.7%	4,729	20.4%	47
LINCOLN	24,349	602	2.5%	4,405	18.1%	5,006	20.6%	48
FULTON	20,770	876	4.2%	3,399	16.4%	4,275	20.6%	49
HARLAN	108,003	10,643	9.9%	11,715	10.8%	22,358	20.7%	50
MADISON	55,785	1,396	2.5%	10,268	18.4%	11,664	20.9%	51
HICKMAN	23,179	2,994	12.9%	1,878	8.1%	4,872	21.0%	52
BOYLE	23,280	1,261	5.4%	3,647	15.7%	4,908	21.1%	53
MARSHALL	83,320	6,820	8.2%	10,793	13.0%	17,613	21.1%	54
CARTER	61,835	3,952	6.4%	9,373	15.2%	13,325	21.5%	55
OLDHAM	15,894	2,400	15.1%	1,055	6.6%	3,455	21.7%	56
HARDIN	102,067	2,596	2.5%	19,613	19.2%	22,210	21.8%	57
LEE	10,850	1,245	11.5%	1,155	10.6%	2,400	22.1%	58
NELSON	53,640	5,284	9.9%	6,886	12.8%	12,170	22.7%	59
ANDERSON	33,908	1,560	4.6%	6,170	18.2%	7,730	22.8%	60
HENRY	26,233	1,898	7.2%	4,172	15.9%	6,070	23.1%	61
LAUREL	57,069	3,751	6.6%	9,660	16.9%	13,411	23.5%	62
MCCREARY	10,339	113	1.1%	2,430	23.5%	2,543	24.6%	63
ROCKCASTLE	17,746	354	2.0%	4,075	23.0%	4,430	25.0%	64
MASON	37,434	746	2.0%	8,604	23.0%	9,351	25.0%	65
CLARK	32,667	1,001	3.1%	7,214	22.1%	8,215	25.1%	66
BRECKINRIDGE	19,359	597	3.1%	4,282	22.1%	4,879	25.2%	67
LIVINGSTON	48,810	9,690	19.9%	3,191	6.5%	12,881	26.4%	68
CAMPBELL	139,255	4,371	3.1%	33,034	23.7%	37,405	26.9%	69
BREATHITT	27,408	890	3.2%	6,484	23.7%	7,373	26.9%	70
HOPKINS	83,679	4,191	5.0%	18,654	22.3%	22,845	27.3%	71
FLOYD	89,293	6,631	7.4%	18,259	20.4%	24,890	27.9%	72
LOGAN	32,748	478	1.5%	8,695	26.6%	9,173	28.0%	73
GREEN	14,222	44	0.3%	3,969	27.9%	4,013	28.2%	74
OHIO	50,857	6,216	12.2%	8,205	16.1%	14,421	28.4%	75
JESSAMINE	10,521	440	4.2%	2,554	24.3%	2,994	28.5%	76
LAWRENCE	30,425	5,714	18.8%	2,959	9.7%	8,673	28.5%	77
MAGOFFIN	21,447	565	2.6%	5,551	25.9%	6,116	28.5%	78
GRANT	33,967	4,378	12.9%	5,323	15.7%	9,702	28.6%	79
MCCRACKEN	160,690	11,920	7.4%	35,060	21.8%	46,980	29.2%	80
MONTGOMERY	20,023	992	5.0%	4,944	24.7%	5,935	29.6%	81
PIKE	133,772	4,018	3.0%	35,830	26.8%	39,848	29.8%	82
BRACKEN	12,044	2,646	22.0%	1,197	9.9%	3,843	31.9%	83
HART	30,648	6,579	21.5%	3,242	10.6%	9,821	32.0%	84
MENIFEE	4,932	1,014	20.6%	584	11.8%	1,597	32.4%	85
BUTLER	29,913	4,374	14.6%	5,478	18.3%	9,852	32.9%	86
TRIGG	36,157	3,112	8.6%	8,908	24.6%	12,020	33.2%	87
LETCHER	35,683	1,883	5.3%	10,227	28.7%	12,110	33.9%	88
ESTILL	16,249	1,582	9.7%	4,028	24.8%	5,610	34.5%	89

Kentucky County	Area	SD Area	% SD Area	FO Area	% FO Area	Def Area	% Deficiencies	Rank
OWSLEY	8,852	755	8.5%	2,326	26.3%	3,081	34.8%	90
WHITLEY	69,279	4,404	6.4%	20,091	29.0%	24,495	35.4%	91
MONROE	12,555	100	0.8%	4,366	34.8%	4,466	35.6%	92
CLINTON	3,047	170	5.6%	915	30.0%	1,085	35.6%	93
JOHNSON	36,390	121	0.3%	12,895	35.4%	13,016	35.8%	94
FAYETTE	129,439	3,362	2.6%	43,479	33.6%	46,841	36.2%	95
RUSSELL	17,213	2,626	15.3%	3,607	21.0%	6,233	36.2%	96
MUHLENBERG	58,471	13,746	23.5%	7,854	13.4%	21,599	36.9%	97
KENTON	191,867	18,345	9.6%	52,582	27.4%	70,927	37.0%	98
HARRISON	25,249	4,977	19.7%	4,539	18.0%	9,516	37.7%	99
BOYD	53,749	1,080	2.0%	19,228	35.8%	20,307	37.8%	100
MCLEAN	24,876	1,203	4.8%	8,260	33.2%	9,463	38.0%	101
LESLIE	14,574	2,397	16.4%	3,453	23.7%	5,850	40.1%	102
GREENUP	89,420	4,576	5.1%	31,325	35.0%	35,901	40.1%	103
CLAY	29,668	5,084	17.1%	7,054	23.8%	12,137	40.9%	104
KNOTT	14,237	1,303	9.2%	4,545	31.9%	5,848	41.1%	105
CASEY	22,521	1,702	7.6%	7,680	34.1%	9,382	41.7%	106
FRANKLIN	73,529	18,873	25.7%	11,791	16.0%	30,664	41.7%	107
PENDLETON	21,746	4,698	21.6%	4,373	20.1%	9,071	41.7%	108
BALLARD	45,118	14,581	32.3%	4,268	9.5%	18,850	41.8%	109
SHELBY	42,734	14,935	34.9%	2,940	6.9%	17,875	41.8%	110
PERRY	65,416	10,969	16.8%	16,904	25.8%	27,873	42.6%	111
JEFFERSON	742,014	136,162	18.4%	180,021	24.3%	316,183	42.6%	112
JACKSON	6,278	1,002	16.0%	1,768	28.2%	2,771	44.1%	113
CUMBERLAND	13,924	31	0.2%	6,528	46.9%	6,559	47.1%	114
EDMONSON	9,585	0	0.0%	4,536	47.3%	4,536	47.3%	115
UNION	26,427	607	2.3%	12,154	46.0%	12,761	48.3%	116
BOURBON	18,295	2,631	14.4%	6,444	35.2%	9,075	49.6%	117
CARROLL	29,247	13,429	45.9%	1,343	4.6%	14,772	50.5%	118
WOLFE	17,189	5,951	34.6%	3,505	20.4%	9,456	55.0%	119
TRIMBLE	12,389	6,542	52.8%	839	6.8%	7,381	59.6%	120
County Code Null	33,201	14,186	42.7%	1,309	3.9%	15,495	46.7%	
TOTALS	5,496,296	509,401	9.3%	1,032,213	18.8%	1,541,614	28.0%	
Area is in SqM								
SD = Structurally Deficient								
FO = Functionally Obsolete								

Table A.4 - Cost to Upgrade The Kentucky Bridge Inventory, By County – 2010

Kentucky County	Area	SD Area	FO Area	Def Area	Estimated Cost
ADAIR	31,663	417	5,550	5,967	\$4,773,600
ALLEN	25,338	220	3,370	3,591	\$2,872,800
ANDERSON	33,908	1,560	6,170	7,730	\$6,184,000
BALLARD	45,118	14,581	4,268	18,850	\$15,080,000
BARREN	59,950	184	8,205	8,389	\$6,711,200
BATH	29,648	120	5,029	5,149	\$4,119,200
BELL	61,682	2,071	8,427	10,497	\$8,397,600
BOONE	78,075	723	10,659	11,382	\$9,105,600
BOURBON	18,295	2,631	6,444	9,075	\$7,260,000
BOYD	53,749	1,080	19,228	20,307	\$16,245,600
BOYLE	23,280	1,261	3,647	4,908	\$3,926,400
BRACKEN	12,044	2,646	1,197	3,843	\$3,074,400
BREATHITT	27,408	890	6,484	7,373	\$5,898,400
BRECKINRIDGE	19,359	597	4,282	4,879	\$3,903,200
BULLITT	41,661	1,833	3,731	5,564	\$4,451,200
BUTLER	29,913	4,374	5,478	9,852	\$7,881,600
CALDWELL	21,870	1,434	1,209	2,643	\$2,114,400
CALLOWAY	36,111	1,962	3,723	5,685	\$4,548,000
CAMPBELL	139,255	4,371	33,034	37,405	\$29,924,000
CARLISLE	16,855	1,078	1,260	2,337	\$1,869,600
CARROLL	29,247	13,429	1,343	14,772	\$11,817,600
CARTER	61,835	3,952	9,373	13,325	\$10,660,000
CASEY	22,521	1,702	7,680	9,382	\$7,505,600
CHRISTIAN	77,575	1,542	6,263	7,805	\$6,244,000
CLARK	32,667	1,001	7,214	8,215	\$6,572,000
CLAY	29,668	5,084	7,054	12,137	\$9,709,600
CLINTON	3,047	170	915	1,085	\$868,000
CRITTENDEN	12,668	979	1,362	2,342	\$1,873,600
CUMBERLAND	13,924	31	6,528	6,559	\$5,247,200
DAVIESS	153,735	13,416	14,315	27,732	\$22,185,600
EDMONSON	9,585	0	4,536	4,536	\$3,628,800
ELLIOTT	14,753	956	942	1,898	\$1,518,400
ESTILL	16,249	1,582	4,028	5,610	\$4,488,000
FAYETTE	129,439	3,362	43,479	46,841	\$37,472,800
FLEMING	21,264	1,275	1,556	2,831	\$2,264,800
FLOYD	89,293	6,631	18,259	24,890	\$19,912,000
FRANKLIN	73,529	18,873	11,791	30,664	\$24,531,200
FULTON	20,770	876	3,399	4,275	\$3,420,000
GALLATIN	33,771	160	2,980	3,139	\$2,511,200
GARRARD	17,021	824	1,988	2,812	\$2,249,600
GRANT	33,967	4,378	5,323	9,702	\$7,761,600
GRAVES	89,635	4,929	9,760	14,689	\$11,751,200
GRAYSON	25,616	3,043	2,092	5,135	\$4,108,000

Kentucky County	Area	SD Area	FO Area	Def Area	Estimated Cost
GREEN	14,222	44	3,969	4,013	\$3,210,400
GREENUP	89,420	4,576	31,325	35,901	\$28,720,800
HANCOCK	12,311	409	1,504	1,913	\$1,530,400
HARDIN	102,067	2,596	19,613	22,210	\$17,768,000
HARLAN	108,003	10,643	11,715	22,358	\$17,886,400
HARRISON	25,249	4,977	4,539	9,516	\$7,612,800
HART	30,648	6,579	3,242	9,821	\$7,856,800
HENDERSON	102,470	4,760	10,104	14,863	\$11,890,400
HENRY	26,233	1,898	4,172	6,070	\$4,856,000
HICKMAN	23,179	2,994	1,878	4,872	\$3,897,600
HOPKINS	83,679	4,191	18,654	22,845	\$18,276,000
JACKSON	6,278	1,002	1,768	2,771	\$2,216,800
JEFFERSON	742,014	136,162	180,021	316,183	\$252,946,400
JESSAMINE	10,521	440	2,554	2,994	\$2,395,200
JOHNSON	36,390	121	12,895	13,016	\$10,412,800
KENTON	191,867	18,345	52,582	70,927	\$56,741,600
KNOTT	14,237	1,303	4,545	5,848	\$4,678,400
KNOX	30,664	2,923	2,400	5,323	\$4,258,400
LARUE	13,340	178	853	1,031	\$824,800
LAUREL	57,069	3,751	9,660	13,411	\$10,728,800
LAWRENCE	30,425	5,714	2,959	8,673	\$6,938,400
LEE	10,850	1,245	1,155	2,400	\$1,920,000
LESLIE	14,574	2,397	3,453	5,850	\$4,680,000
LETCHER	35,683	1,883	10,227	12,110	\$9,688,000
LEWIS	19,446	877	2,835	3,712	\$2,969,600
LINCOLN	24,349	602	4,405	5,006	\$4,004,800
LIVINGSTON	48,810	9,690	3,191	12,881	\$10,304,800
LOGAN	32,748	478	8,695	9,173	\$7,338,400
LYON	38,945	323	2,792	3,115	\$2,492,000
MCCRACKEN	160,690	11,920	35,060	46,980	\$37,584,000
MCCREARY	10,339	113	2,430	2,543	\$2,034,400
MCLEAN	24,876	1,203	8,260	9,463	\$7,570,400
MADISON	55,785	1,396	10,268	11,664	\$9,331,200
MAGOFFIN	21,447	565	5,551	6,116	\$4,892,800
MARION	19,600	475	3,357	3,832	\$3,065,600
MARSHALL	83,320	6,820	10,793	17,613	\$14,090,400
MARTIN	19,282	624	2,496	3,120	\$2,496,000
MASON	37,434	746	8,604	9,351	\$7,480,800
MEADE	9,528	0	151	151	\$120,800
MENIFEE	4,932	1,014	584	1,597	\$1,277,600
MERCER	18,232	552	2,678	3,230	\$2,584,000
METCALFE	18,386	288	2,741	3,029	\$2,423,200
MONROE	12,555	100	4,366	4,466	\$3,572,800
MONTGOMERY	20,023	992	4,944	5,935	\$4,748,000
MORGAN	23,214	1,319	3,410	4,729	\$3,783,200
MUHLENBERG	58,471	13,746	7,854	21,599	\$17,279,200

Kentucky County	Area	SD Area	FO Area	Def Area	Estimated Cost
NELSON	53,640	5,284	6,886	12,170	\$9,736,000
NICHOLAS	12,567	629	1,835	2,464	\$1,971,200
OHIO	50,857	6,216	8,205	14,421	\$11,536,800
OLDHAM	15,894	2,400	1,055	3,455	\$2,764,000
OWEN	20,618	544	1,155	1,699	\$1,359,200
OWSLEY	8,852	755	2,326	3,081	\$2,464,800
PENDLETON	21,746	4,698	4,373	9,071	\$7,256,800
PERRY	65,416	10,969	16,904	27,873	\$22,298,400
PIKE	133,772	4,018	35,830	39,848	\$31,878,400
POWELL	34,900	2,023	3,159	5,182	\$4,145,600
PULASKI	88,451	4,502	8,174	12,676	\$10,140,800
ROBERTSON	4,177	263	226	489	\$391,200
ROCKCASTLE	17,746	354	4,075	4,430	\$3,544,000
ROWAN	34,135	308	5,788	6,096	\$4,876,800
RUSSELL	17,213	2,626	3,607	6,233	\$4,986,400
SCOTT	62,667	1,257	7,709	8,966	\$7,172,800
SHELBY	42,734	14,935	2,940	17,875	\$14,300,000
SIMPSON	9,160	0	1,007	1,007	\$805,600
SPENCER	27,486	3,812	1,604	5,416	\$4,332,800
TAYLOR	15,181	312	2,068	2,380	\$1,904,000
TODD	13,804	0	2,073	2,073	\$1,658,400
TRIGG	36,157	3,112	8,908	12,020	\$9,616,000
TRIMBLE	12,389	6,542	839	7,381	\$5,904,800
UNION	26,427	607	12,154	12,761	\$10,208,800
WARREN	73,869	535	9,145	9,680	\$7,744,000
WASHINGTON	24,804	905	3,234	4,138	\$3,310,400
WAYNE	13,140	897	1,510	2,407	\$1,925,600
WEBSTER	29,761	1,053	2,632	3,684	\$2,947,200
WHITLEY	69,279	4,404	20,091	24,495	\$19,596,000
WOLFE	17,189	5,951	3,505	9,456	\$7,564,800
WOODFORD	18,302	105	3,063	3,167	\$2,533,600
County Code Null *	<u>33,201</u>	<u>14,186</u>	<u>1,309</u>	<u>15,495</u>	<u>\$12,396,000</u>
TOTALS	5,496,296	509,401	1,032,213	1,541,614	\$1,233,291,200
Area is in SqM					
SD = Structurally Deficient					
FO = Functionally Obsolete					
Cost based on \$800/SqM					

A.2 LEVEES

Methodology

According to the National Levee Database there are currently 24 federal flood protection systems in Kentucky which were considered for the purpose of this report. All are owned and maintained by municipalities or their respective municipal sewer agencies. None are federally owned or operated; however all of these systems were designed and constructed using a percentage of Federal funding and all were constructed by contractors under federally administered contracts.

The Routine Inspection Program produces an annual report that includes a rating for each flood protection system. The possible ratings are either “Acceptable”, “Minimally Acceptable” or “Unacceptable”. Because of the nature of the standards, it is unusual for any project to receive an “Acceptable” rating. A vast majority of the project ratings are “Minimally Acceptable”. While this creates some controversy with local municipal agencies, the standards are published and well known to the levees’ local sponsors. If a project is rated “Unacceptable” then a letter is sent to the local sponsor notifying them of a time line against which required repairs or improvements must be completed.

The USACE inspection rating is only one factor in assigning the rating for Kentucky’s flood protection systems. The estimated cost to perform repairs and upgrades is also considered. Each of the local project sponsors was contacted to get an estimate of their annual expenditures on their respective levee system. An estimate of the cost to perform all of the repairs and upgrades needed over and above the annual operating and maintenance cost was also estimated based on correspondence with the sponsors.

The letter grade for Kentucky’s flood protection systems was determined as follows. It was found that 92 percent of flood protection systems in Kentucky were rated in “minimally acceptable” condition. None were rated “Acceptable”. Because an “Acceptable” rating by USACE inspection standards is almost impossible to attain, in many cases a “Minimally Acceptable” rating is estimated to be equivalent to a grade in the range of “B” to “C”. In addition, five years of the annual operating and maintenance budgets from each project were added together and compared to the total estimated cost to make all upgrades, repairs and replacements. It was found that five years of O&M budgets added together would only be able to pay for about 25 to 30 percent of the amount needed to perform all repairs and upgrades needed. This unfortunate situation pushes the grade down to the lower register of the range.

The grades were then evaluated against a subjective assessment based on funding that has been budgeted to address the problem. With the exceptions of only two projects there is zero funding available for operating, maintenance or upgrades from the federal government. Additionally there is virtually no state funding for the federal flood protection projects.

Flood Protection Projects

Table A.5- Project Summary

Project	Total length (miles)	Length Earth Levee (miles)	Length Concrete Floodwall (miles)	No. of Pump Stations	No. of Closures	Overall Project Rating (Basis)	Annual O&M Budget	Total Estimated Cost of Repairs
Appalachian Regional Hospital	0.41	0.15	0.26	1	0	M Note 1	No info. Avail.	No info. Avail.
Ashland	2.62	0.06	2.56	6	18	M Note 1	No info. Avail.	No info. Avail.
Ashland Long Branch	0.09	0.09	0	0	0	M Note 1	No info. Avail.	No info. Avail.
Barbourville	5.07	3.79	1.28	4	7	A Note 3	No info. Avail.	No info. Avail.
Bardstown	0.13	0.07	0.06	1	0	A Note 2	\$5,000	\$0
Catlettsburg	1.96	1.23	0.73	4	7	M Note 1	No info. Avail.	No info. Avail.
Covington	2.84	1.75	1.09	10	9	M Note 2	\$50,000	\$500,000
Dayton	1.65	1.55	0.10	2	1	M Note 2	\$69,000	\$75,000
Frankfort/South Frankfort	0.76	0.63	0.13	4	11	M Note 2	\$400,000	\$6,000,000
Harlan	1.67	0.89	0.78	1	5	A Note 3	No info. Avail.	No info. Avail.
Hawesville	0.88	0.88	0	1	6	M Note 2	\$20,000	\$3,000,000
Lebanon Junction	1.42	1.36	0.06	0	2	M Note 2	\$5,000	\$300,000
Louisville/ SW Jefferson County	30.02	25.72	4.36	17	72	M Note 2	\$2,000,000	\$35,000,000
Loyall/Rio Vista	1.98	1.63	0.35	0	4	A Note 3	No info. Avail.	No info. Avail.
Maysville	2.67	1.19	1.48	5	10	M Note 1	No info. Avail.	No info. Avail.
Middlesboro	2.87	2.87	0	0	0	U Note 3	No info. Avail.	No info. Avail.
Newport	2.28	1.52	0.76	3	9	M Note 2	\$40,000	\$10,000,000
Paducah	12.23	9.22	3.01	12	47	U Note 2	\$500,000	\$18,500,000
Pikeville	0.14	0.06	0.08	0	2	M Note 1	No info. Avail.	No info. Avail.
Pineville	2.76	1.38	1.38	1	5	U Note 3	No info. Avail.	No info. Avail.
Prestonsburg	0.05	0.05	0	1	0	U Note 1	No info. Avail.	No info. Avail.
Russell	0.28	0.28	0	1	0	M Note 1	No info. Avail.	No info. Avail.

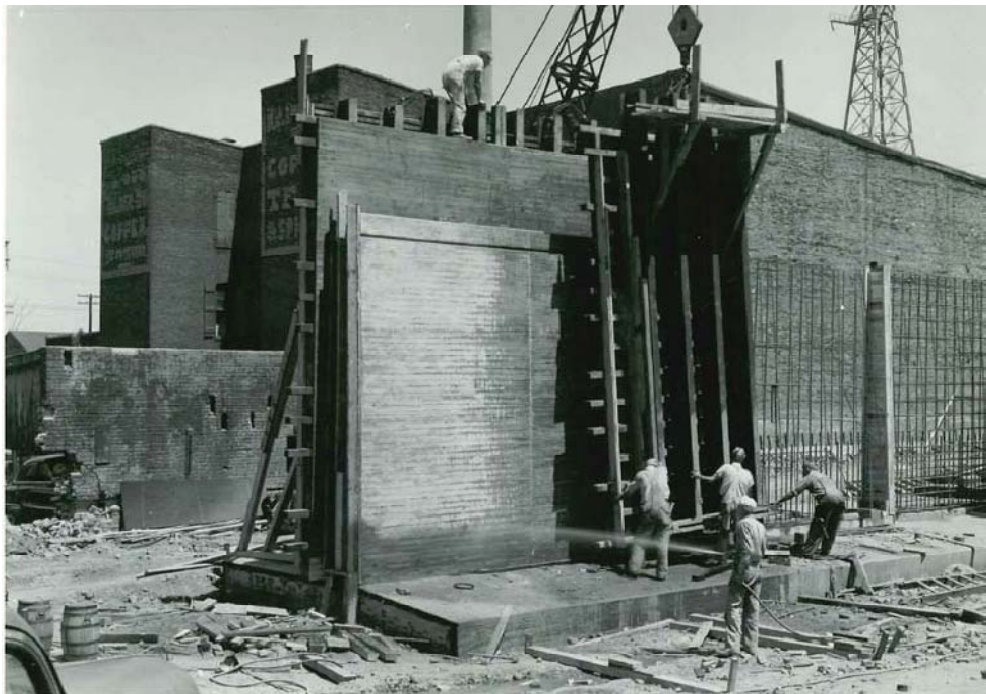
Project	Total length (miles)	Length Earth Levee (miles)	Length Concrete Floodwall (miles)	No. of Pump Stations	No. of Closures	Overall Project Rating (Basis)	Annual O&M Budget	Total Estimated Cost of Repairs
Sturgis	4.03	3.94	0.09	2	8	M Note 2	\$45,000	\$1,500,000
South Williamson	0.57	0.07	0.5	1	4	M Note 1	\$22,000 + Mowing	No info. Avail.
Taylorville	1.65	1.65	0	1	3	M Note 2	\$6,500	\$500,000
Uniontown	1.89	1.89		4	0	M Note 2	\$5,000	\$1,500,000
Wallsend	1.33	0.79	0.54	1	4	U Note 3	No info. Avail.	No info. Avail.
West Williamson	1.11	0.02	1.09	1	6	M ₁ Note 1	No info. Avail.	No info. Avail.
Williamsburg	1.04	0.95	0.09	1	0	A Note 3	No info. Avail.	No info. Avail.

Note 1: Rating Basis: 2010 Periodic Inspections (Huntington District, USACE)
Note 2: Rating Basis: 2008/2009 Annual Inspections (Louisville District, USACE)
Note 3: Rating Basis: 2008/2009 Annual Inspections (Nashville District, USACE)

Historical Photos



*Figure A.1- Construction of the Paducah Floodwall in 1941
This Project had 15,870 lf of concrete floodwall.*



*Figure A.2- Construction of the Louisville Floodwall in 1949
This project has 21,518 lf of concrete floodwall.*



*Figure A.3 – The Louisville Levee As Construction Was Completed in 1948
This project has 67,321 lf of earth levee.*

Signs of Deterioration



*Figure A.4 – Typical Freeze-Thaw Damaged Concrete at the Top of the Newport Floodwall in
Kentucky.*



*Figure A.5 – Concrete Roadway Closure Sill in Covington
The sill has been damaged over time by freeze-thaw and subsequent wheel impact.*



Figure A.6 – Heavily Corroded and Partially Broken 102-inch Sluice Gate in Pump Station in Paducah.



*Figure A.7 – The Bottom of a Deteriorated Corrugated Metal Pipe
The photo shows where the steel has been completely lost to corrosion
US Army Corps of Engineers*



*Figure A.8 –Aerial View of Replacement Procedure of an Original Levee Corrugated Metal
Pipe that Had Failed and Collapsed as a Result of Corrosion.
US Army Corps of Engineers*