

NRD Managers,

Attached is the file, 'VolAcrDepth_RepNRDs_80_20.xls'. This is a file with groundwater, surface water and commingled irrigation data for the years 1980 to 2000, plus projected data for the years 2001 to 2020. 1981 to 2000 are the numbers used in the current groundwater model and years 2001 to 2020 are the data used in the scenarios ran by McDonald-Morrissey Associates. The years 2021 through 2040 were not included in this data set, as they are simply a repeat of the years 2001 through 2020.

Depths of applications for the model were generated on a county-by-county basis; therefore there are a few years in the Upper and Lower Republicans when the depth of commingled application (on a NRD basis) is higher than exclusive. This occurs when there is a county with a very high proportion of commingled acreage which skews the NRD average depth calculations. Since the depths of applications used in the model were generated on a county-wide basis, commingled depth is never higher than exclusive on a county basis; however, when a NRD average depth is calculated, the numbers can become a little deceiving. For that reason, I have also included the county-by-county depths of applications, which are the true numbers. The NRD averages were calculated as indicated in the following example for the Lower Rep. NRD using only portions of counties inside the model region:

with a high depth of CO application

$$\text{Depth} = \frac{(\text{Furnas} \text{ " * acres}) + (\text{Harlan} \text{ " * acres}) + (\text{Franklin} \text{ " * acres}) + (\text{Nuckolls} \text{ " * acres})}{(\text{Furnas acres}) + (\text{Harlan acres}) + (\text{Franklin acres}) + (\text{Nuckolls acres})}$$

Here, " means depth of irrigation application. This example applies to NRD calculations for the depth of surface water exclusive (SW_EX), surface water commingled (SW_CO), ground water exclusive (GW_EX), and ground water commingled (GW_CO) irrigation water applications. For future correspondence, I will use the abbreviations just listed.

For the future scenarios, 1981 through 2000 Precipitation recharge, SW_EX Volume, SW_EX Acreage, SW_EX Depth, CO acreage, SW_CO Volume, SW_CO Depth, GW_CO Volume, and GW_CO Depths were repeated twice, once for 2001 through 2020 and once for 2021 through 2040. However, GW_EX data were done differently. For GW_EX acreage, year 2000 acreage was used for all the years 2001 through 2040. GW_EX volume was determined by adjusting 1981 to 2000 volumes to use in the years 2001 through 2020 as shown in the following example:

$$\text{GW_EX Volume} = \frac{\text{Volume pumped in 1981} * \text{Number of wells in year 2000}}{\text{Number of wells in 1981}}$$

2021 through 2040 GW_EX volumes were a simple repeat of the 2001 through 2020 GW_EX volumes. The 2001 through 2040 GW_EX depths were then determined using the GW_EX acreages and volumes.

Hopefully this data will be helpful. I will see you all at the meeting on the 19th.

Paul Koester
Hydrogeologist
Nebraska Department of Natural Resources
301 Centennial Mall South
4th Floor State Office Building
P.O. Box 94676
Lincoln, Nebraska 68509-4676
402-471-1225 Phone
402-471-2900 Fax
Homepage: www.dnr.state.ne.us

GROUNDWATER:

GW_EX_VOL: Groundwater exclusive volume of applied water by NRD.

GW_EX_ACRES: Acreage of groundwater exclusive irrigation application by NRD.

GW_EX_DEPTH: Depth of groundwater exclusive irrigation application by NRD (GW_EX_VOL/GW_EX_ACRES).

SURFACE WATER:

SW_EX_VOL: Surface water exclusive volume of applied water by NRD.

SW_EX_ACRES: Acreage of surface water exclusive irrigation application by NRD.

SW_EX_DEPTH: Depth of surface water exclusive irrigation application by NRD (SW_EX_VOL/SW_EX_ACRES).

COMMINGLED:

CO_ACREAGE: Total commingled acreage by NRD. The acreage is the same for both SW and GW; this acreage receives different application depths from SW and GW, so the total depth of applied commingled water will be the sum of SW_CO and GW_CO.

GW_CO_VOL: Groundwater commingled volume of applied water by NRD.

GW_CO_DEPTH: Depth of groundwater commingled irrigation application by NRD (GW_CO_VOL/CO_ACREAGE).

SW_CO_VOL: Surface water commingled volume of applied water by NRD.

SW_CO_DEPTH: Depth of surface water commingled irrigation application by NRD (SW_CO_VOL/CO_ACREAGE).

COUNTY DATA:

SWCO_COUNTY_DEPTH: Surface water commingled depth of application for counties in the four NRDS

SWEX_COUNTY_DEPTH: Surface water exclusive depth of application for counties in the four NRDS

Note: Future model runs were performed by repeating the 1980 through 2000 data twice; however the irrigated groundwater acreage for the years 2000 through 2040 was held constant at the 2000 levels.
GW_EX depths, volumes calculated as outlined in letter.

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	335,454	162,746	134,105	258,745
1982	274,492	170,662	138,680	235,768
1983	341,234	165,035	150,873	262,370
1984	434,227	222,036	194,615	336,030
1985	444,184	229,905	151,642	262,864
1986	395,330	224,573	174,595	298,887
1987	364,095	199,919	150,228	311,056
1988	411,707	216,945	219,989	447,019
1989	405,087	232,937	209,900	366,583
1990	504,479	269,608	206,988	387,113
1991	462,725	272,189	265,796	508,553
1992	334,672	153,048	139,767	267,977
1993	256,517	53,685	39,673	91,437
1994	494,491	241,160	167,212	302,327
1995	438,950	244,970	235,022	457,202
1996	328,157	155,139	119,036	264,993
1997	489,008	258,485	228,107	427,200
1998	502,817	264,412	186,360	323,778
1999	379,790	122,328	146,927	275,690
2000	662,758	342,389	253,700	496,677
2001	383,546	195,504	171,976	305,734
2002	309,564	201,838	176,032	274,567
2003	376,591	195,564	191,445	297,534
2004	467,103	261,530	243,569	377,375
2005	474,467	269,430	188,531	294,170
2006	421,527	262,099	215,909	333,796
2007	386,249	233,418	185,551	345,796
2008	434,993	250,703	268,706	493,109
2009	424,620	265,164	252,429	401,833
2010	523,562	303,698	244,821	419,837
2011	477,927	302,610	309,310	547,356
2012	340,544	169,556	159,780	284,643
2013	260,067	62,013	45,145	96,468
2014	501,384	265,975	188,781	318,044
2015	444,940	268,981	260,884	477,174
2016	330,944	168,887	129,297	273,335
2017	490,637	271,076	238,415	436,731
2018	503,935	270,192	190,579	326,410
2019	380,210	123,865	148,762	276,974
2020	662,758	342,389	253,700	496,677
Avg 1981-2000	413,009	210,108	175,661	329,113
Avg 1991-2000	434,989	210,781	178,160	341,583
Avg 2001-2040	429,778	234,225	203,181	353,878

GW_EX_VOL

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	328,442	200,288	161,747	348,228
1982	324,549	185,091	159,411	349,677
1983	247,755	127,486	110,302	189,939
1984	375,009	189,061	168,518	350,170
1985	358,749	218,578	172,136	355,064
1986	313,867	173,472	174,487	319,149
1987	315,729	159,923	155,161	298,321
1988	321,819	160,119	160,395	319,024
1989	347,579	177,069	187,285	380,900
1990	354,819	186,747	187,623	384,670
1991	369,124	187,693	187,511	393,445
1992	367,348	187,158	186,330	382,132
1993	359,287	169,453	179,075	355,338
1994	368,186	185,592	192,557	401,249
1995	373,972	172,756	185,889	388,212
1996	384,156	191,329	193,202	403,323
1997	376,528	196,214	214,079	405,908
1998	370,954	198,694	211,201	401,132
1999	368,395	195,690	208,859	409,755
2000	383,371	204,594	223,030	426,180
2001	383,371	204,594	223,030	426,180
2002	383,371	204,594	223,030	426,180
2003	383,371	204,594	223,030	426,180
2004	383,371	204,594	223,030	426,180
2005	383,371	204,594	223,030	426,180
2006	383,371	204,594	223,030	426,180
2007	383,371	204,594	223,030	426,180
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2011	383,371	204,594	223,030	426,180
2012	383,371	204,594	223,030	426,180
2013	383,371	204,594	223,030	426,180
2014	383,371	204,594	223,030	426,180
2015	383,371	204,594	223,030	426,180
2016	383,371	204,594	223,030	426,180
2017	383,371	204,594	223,030	426,180
2018	383,371	204,594	223,030	426,180
2019	383,371	204,594	223,030	426,180
2020	383,371	204,594	223,030	426,180
Avg 1981-2000	350,482	183,350	180,940	363,091
Avg 1991-2000	372,132	188,917	198,173	396,667
Avg 2001-2040	383,371	204,594	223,030	426,180

GW_EX_ACRES

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	12.26	9.75	9.95	8.92
1982	10.15	11.06	10.44	8.09
1983	16.53	15.53	16.41	16.58
1984	13.89	14.09	13.86	11.52
1985	14.86	12.62	10.57	8.88
1986	15.11	15.53	12.01	11.24
1987	13.84	15.00	11.62	12.51
1988	15.35	16.26	16.46	16.81
1989	13.99	15.79	13.45	11.55
1990	17.06	17.32	13.24	12.08
1991	15.04	17.40	17.01	15.51
1992	10.93	9.81	9.00	8.42
1993	8.57	3.80	2.66	3.09
1994	16.12	15.59	10.42	9.04
1995	14.09	17.02	15.17	14.13
1996	10.25	9.73	7.39	7.88
1997	15.58	15.81	12.79	12.63
1998	16.27	15.97	10.59	9.69
1999	12.37	7.50	8.44	8.07
2000	20.75	20.08	13.65	13.98
2001	12.01	11.47	9.25	8.61
2002	9.69	11.84	9.47	7.73
2003	11.79	11.47	10.30	8.38
2004	14.62	15.34	13.11	10.63
2005	14.85	15.80	10.14	8.28
2006	13.19	15.37	11.62	9.40
2007	12.09	13.69	9.98	9.74
2008	13.62	14.70	14.46	13.88
2009	13.29	15.55	13.58	11.31
2010	16.39	17.81	13.17	11.82
2011	14.96	17.75	16.64	15.41
2012	10.66	9.94	8.60	8.01
2013	8.14	3.64	2.43	2.72
2014	15.69	15.60	10.16	8.96
2015	13.93	15.78	14.04	13.44
2016	10.36	9.91	6.96	7.70
2017	15.36	15.90	12.83	12.30
2018	15.77	15.85	10.25	9.19
2019	11.90	7.27	8.00	7.80
2020	20.75	20.08	13.65	13.98
Avg 1981-2000	14.15	13.78	11.76	11.03
Avg 1991-2000	14.00	13.27	10.71	10.24
Avg 2001-2040	13.45	13.74	10.93	9.96

GW_EX_DEPTH

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	7,961	10,973	20,346	70,100
1982	6,411	12,244	31,692	67,379
1983	3,180	13,435	39,514	64,799
1984	4,198	14,240	45,235	87,222
1985	5,132	12,959	31,601	59,552
1986	5,466	13,540	39,224	69,265
1987	6,334	13,026	31,530	60,545
1988	6,078	12,002	44,001	77,255
1989	6,494	12,793	35,697	69,360
1990	4,981	13,816	32,817	83,878
1991	3,804	10,716	27,357	86,357
1992	4,480	7,394	15,503	57,210
1993	3,892	8,211	5,319	14,277
1994	3,866	13,169	29,585	65,402
1995	2,925	13,241	35,676	80,035
1996	4,142	9,884	18,521	41,369
1997	3,808	13,342	30,884	74,698
1998	5,004	11,462	27,690	60,435
1999	4,978	9,701	26,922	48,313
2000	4,528	11,355	32,535	73,954
2001	7,961	10,973	20,346	70,100
2002	6,411	12,244	31,692	67,379
2003	3,180	13,435	39,514	64,799
2004	4,198	14,240	45,235	87,222
2005	5,132	12,959	31,601	59,552
2006	5,466	13,540	39,224	69,265
2007	6,334	13,026	31,530	60,545
2008	6,078	12,002	44,001	77,255
2009	6,494	12,793	35,697	69,360
2010	4,981	13,816	32,817	83,878
2011	3,804	10,716	27,357	86,357
2012	4,480	7,394	15,503	57,210
2013	3,892	8,211	5,319	14,277
2014	3,866	13,169	29,585	65,402
2015	2,925	13,241	35,676	80,035
2016	4,142	9,884	18,521	41,369
2017	3,808	13,342	30,884	74,698
2018	5,004	11,462	27,690	60,435
2019	4,978	9,701	26,922	48,313
2020	4,528	11,355	32,535	73,954
Avg 1981-2000	4,883.12	11,875.16	30,082.44	65,570.27
Avg 1991-2000	4,142.79	10,847.66	24,999.26	60,205.09
Avg 2001-2040	4,883.12	11,875.16	30,082.44	65,570.27

SW_EX_VOL

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	4,219	14,086	27,965	71,932
1982	4,219	14,086	27,965	71,549
1983	4,219	13,530	27,984	67,857
1984	4,219	13,530	27,750	67,422
1985	4,219	13,530	27,750	67,422
1986	4,219	13,530	27,525	67,210
1987	4,219	13,530	27,525	67,171
1988	4,219	12,727	25,292	67,634
1989	4,219	12,679	25,162	67,371
1990	4,219	12,603	24,992	67,085
1991	3,580	12,513	24,017	66,560
1992	3,580	12,397	23,002	66,301
1993	3,580	13,957	27,071	66,419
1994	3,580	13,957	27,072	66,421
1995	3,580	13,886	26,369	66,421
1996	3,580	13,758	26,367	66,084
1997	3,580	13,778	25,863	65,947
1998	3,580	13,468	25,394	64,840
1999	3,580	13,553	25,394	64,608
2000	3,580	13,221	25,385	<u>64,376</u>
2001	4,219	14,086	27,965	71,932
2002	4,219	14,086	27,965	71,549
2003	4,219	13,530	27,984	67,857
2004	4,219	13,530	27,750	67,422
2005	4,219	13,530	27,750	67,422
2006	4,219	13,530	27,525	67,210
2007	4,219	13,530	27,525	67,171
2008	4,219	12,727	25,292	67,634
2009	4,219	12,679	25,162	67,371
2010	4,219	12,603	24,992	67,085
2011	3,580	12,513	24,017	66,560
2012	3,580	12,397	23,002	66,301
2013	3,580	13,957	27,071	66,419
2014	3,580	13,957	27,072	66,421
2015	3,580	13,886	26,369	66,421
2016	3,580	13,758	26,367	66,084
2017	3,580	13,778	25,863	65,947
2018	3,580	13,468	25,394	64,840
2019	3,580	13,553	25,394	64,608
2020	3,580	13,221	25,385	64,376
Avg 1981-2000	3,899.84	13,415.97	26,292.24	67,031.48
Avg 1991-2000	3,580.44	13,448.59	25,593.43	65,797.76
Avg 2001-2040	3,899.84	13,415.97	26,292.24	67,031.48

SW_EX_ACRES

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	22.64	9.35	8.73	11.69
1982	18.23	10.43	13.60	11.30
1983	9.04	11.92	16.94	11.46
1984	11.94	12.63	19.56	15.52
1985	14.60	11.49	13.67	10.60
1986	15.54	12.01	17.10	12.37
1987	18.02	11.55	13.75	10.82
1988	17.29	11.32	20.88	13.71
1989	18.47	12.11	17.02	12.35
1990	14.17	13.15	15.76	15.00
1991	12.75	10.28	13.67	15.57
1992	15.02	7.16	8.09	10.35
1993	13.04	7.06	2.36	2.58
1994	12.96	11.32	13.11	11.82
1995	9.80	11.44	16.24	14.46
1996	13.88	8.62	8.43	7.51
1997	12.76	11.62	14.33	13.59
1998	16.77	10.21	13.09	11.18
1999	16.68	8.59	12.72	8.97
2000	15.17	10.31	15.38	13.79
2001	22.64	9.35	8.73	11.69
2002	18.23	10.43	13.60	11.30
2003	9.04	11.92	16.94	11.46
2004	11.94	12.63	19.56	15.52
2005	14.60	11.49	13.67	10.60
2006	15.54	12.01	17.10	12.37
2007	18.02	11.55	13.75	10.82
2008	17.29	11.32	20.88	13.71
2009	18.47	12.11	17.02	12.35
2010	14.17	13.15	15.76	15.00
2011	12.75	10.28	13.67	15.57
2012	15.02	7.16	8.09	10.35
2013	13.04	7.06	2.36	2.58
2014	12.96	11.32	13.11	11.82
2015	9.80	11.44	16.24	14.46
2016	13.88	8.62	8.43	7.51
2017	12.76	11.62	14.33	13.59
2018	16.77	10.21	13.09	11.18
2019	16.68	8.59	12.72	8.97
2020	15.17	10.31	15.38	13.79
Avg 1981-2000	14.94	10.63	13.72	11.73
Avg 1991-2000	13.88	9.66	11.74	10.98
Avg 2001-2040	14.94	10.63	13.72	11.73

SW_EX_DEPTH

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	650	28,709	13,748	38,982
1982	650	28,709	13,748	39,365
1983	650	29,024	13,652	39,258
1984	650	29,024	13,887	39,693
1985	650	29,024	13,887	39,693
1986	650	29,024	14,112	39,905
1987	650	29,024	14,112	39,943
1988	650	27,963	13,544	40,289
1989	650	28,011	13,674	40,551
1990	650	28,087	13,845	40,838
1991	650	28,177	14,819	41,363
1992	650	28,293	15,834	41,622
1993	650	29,538	17,395	41,890
1994	650	29,538	17,396	41,891
1995	650	29,609	18,099	41,891
1996	650	29,736	18,101	42,227
1997	650	29,717	18,605	42,364
1998	650	30,027	19,075	42,336
1999	650	29,942	19,075	42,568
2000	650	30,274	19,083	42,800
2001	650	28,709	13,748	38,982
2002	650	28,709	13,748	39,365
2003	650	29,024	13,652	39,258
2004	650	29,024	13,887	39,693
2005	650	29,024	13,887	39,693
2006	650	29,024	14,112	39,905
2007	650	29,024	14,112	39,943
2008	650	27,963	13,544	40,289
2009	650	28,011	13,674	40,551
2010	650	28,087	13,845	40,838
2011	650	28,177	14,819	41,363
2012	650	28,293	15,834	41,622
2013	650	29,538	17,395	41,890
2014	650	29,538	17,396	41,891
2015	650	29,609	18,099	41,891
2016	650	29,736	18,101	42,227
2017	650	29,717	18,605	42,364
2018	650	30,027	19,075	42,336
2019	650	29,942	19,075	42,568
2020	650	30,274	19,083	42,800
Avg 1981-2000	649.57	29,072.41	15,784.51	40,973.44
Avg 1991-2000	649.57	29,485.15	17,748.21	42,095.18
Avg 2001-2040	649.57	29,072.41	15,784.51	40,973.44

CO_ACREAGE

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	341	17,847	5,500	14,958
1982	303	18,833	6,246	13,290
1983	503	41,263	8,852	28,464
1984	389	28,678	7,898	19,417
1985	417	23,196	5,975	14,736
1986	411	31,454	7,057	19,226
1987	419	26,906	6,557	21,264
1988	471	26,621	9,091	29,079
1989	396	28,465	7,385	19,858
1990	537	28,847	7,388	20,666
1991	412	28,108	10,100	27,167
1992	301	16,609	5,691	15,220
1993	192	7,196	1,842	5,622
1994	460	30,351	7,245	15,891
1995	426	35,045	10,988	25,120
1996	318	19,770	5,374	14,017
1997	538	29,775	9,520	22,452
1998	598	33,008	8,080	17,261
1999	444	13,421	6,482	14,409
2000	732	37,680	10,051	24,871
2001	341	17,847	5,500	14,958
2002	303	18,833	6,246	13,290
2003	503	41,263	8,852	28,464
2004	389	28,678	7,898	19,417
2005	417	23,196	5,975	14,736
2006	411	31,454	7,057	19,226
2007	419	26,906	6,557	21,264
2008	471	26,621	9,091	29,079
2009	396	28,465	7,385	19,858
2010	537	28,847	7,388	20,666
2011	412	28,108	10,100	27,167
2012	301	16,609	5,691	15,220
2013	192	7,196	1,842	5,622
2014	460	30,351	7,245	15,891
2015	426	35,045	10,988	25,120
2016	318	19,770	5,374	14,017
2017	538	29,775	9,520	22,452
2018	598	33,008	8,080	17,261
2019	444	13,421	6,482	14,409
2020	732	37,680	10,051	24,871
Avg 1981-2000	430.29	26,153.72	7,366.10	19,149.48
Avg 1991-2000	441.98	25,096.41	7,537.29	18,203.15
Avg 2001-2040	430.29	26,153.72	7,366.10	19,149.48

GW_CO_VOL

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	6.29	7.46	4.80	4.60
1982	5.60	7.87	5.45	4.05
1983	9.29	17.06	7.78	8.70
1984	7.19	11.86	6.82	5.87
1985	7.70	9.59	5.16	4.45
1986	7.59	13.00	6.00	5.78
1987	7.73	11.12	5.58	6.39
1988	8.71	11.42	8.05	8.66
1989	7.31	12.19	6.48	5.88
1990	9.91	12.32	6.40	6.07
1991	7.61	11.97	8.18	7.88
1992	5.56	7.04	4.31	4.39
1993	3.55	2.92	1.27	1.61
1994	8.50	12.33	5.00	4.55
1995	7.87	14.20	7.29	7.20
1996	5.87	7.98	3.56	3.98
1997	9.94	12.02	6.14	6.36
1998	11.05	13.19	5.08	4.89
1999	8.20	5.38	4.08	4.06
2000	13.52	14.94	6.32	6.97
2001	6.29	7.46	4.80	4.60
2002	5.60	7.87	5.45	4.05
2003	9.29	17.06	7.78	8.70
2004	7.19	11.86	6.82	5.87
2005	7.70	9.59	5.16	4.45
2006	7.59	13.00	6.00	5.78
2007	7.73	11.12	5.58	6.39
2008	8.71	11.42	8.05	8.66
2009	7.31	12.19	6.48	5.88
2010	9.91	12.32	6.40	6.07
2011	7.61	11.97	8.18	7.88
2012	5.56	7.04	4.31	4.39
2013	3.55	2.92	1.27	1.61
2014	8.50	12.33	5.00	4.55
2015	7.87	14.20	7.29	7.20
2016	5.87	7.98	3.56	3.98
2017	9.94	12.02	6.14	6.36
2018	11.05	13.19	5.08	4.89
2019	8.20	5.38	4.08	4.06
2020	13.52	14.94	6.32	6.97
Avg 1981-2000	7.95	10.79	5.69	5.62
Avg 1991-2000	8.16	10.20	5.12	5.19
Avg 2001-2040	7.95	10.79	5.69	5.62

GW_CO_DEPTH

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	928	21,368	8,641	34,251
1982	713	22,798	13,615	33,354
1983	475	26,098	16,704	33,684
1984	609	27,699	20,129	46,244
1985	602	24,859	13,783	31,327
1986	567	25,956	17,655	36,832
1987	619	25,328	14,352	32,269
1988	681	24,085	21,402	41,538
1989	752	25,723	17,962	37,649
1990	632	26,850	17,346	46,054
1991	621	21,616	16,784	48,510
1992	732	15,198	9,009	32,258
1993	635	16,503	2,814	8,100
1994	631	24,674	18,172	36,913
1995	478	24,788	23,633	45,448
1996	676	19,834	13,690	23,494
1997	622	25,758	20,841	42,955
1998	817	22,779	20,267	35,455
1999	813	19,679	20,248	28,508
2000	739	23,512	24,852	44,091
2001	928	21,368	8,641	34,251
2002	713	22,798	13,615	33,354
2003	475	26,098	16,704	33,684
2004	609	27,699	20,129	46,244
2005	602	24,859	13,783	31,327
2006	567	25,956	17,655	36,832
2007	619	25,328	14,352	32,269
2008	681	24,085	21,402	41,538
2009	752	25,723	17,962	37,649
2010	632	26,850	17,346	46,054
2011	621	21,616	16,784	48,510
2012	732	15,198	9,009	32,258
2013	635	16,503	2,814	8,100
2014	631	24,674	18,172	36,913
2015	478	24,788	23,633	45,448
2016	676	19,834	13,690	23,494
2017	622	25,758	20,841	42,955
2018	817	22,779	20,267	35,455
2019	813	19,679	20,248	28,508
2020	739	23,512	24,852	44,091
Avg 1981-2000	667.09	23,255.25	16,595.04	35,946.68
Avg 1991-2000	676.44	21,434.13	17,031.10	34,573.17
Avg 2001-2040	667.09	23,255.25	16,595.04	35,946.68

SW_CO_VOL

YEAR	UPPER REPUBLICAN	MIDDLE REPUBLICAN	LOWER REPUBLICAN	TRI BASIN
1981	17.14	8.93	7.54	10.54
1982	13.16	9.53	11.88	10.17
1983	8.78	10.79	14.68	10.30
1984	11.26	11.45	17.39	13.98
1985	11.11	10.28	11.91	9.47
1986	10.48	10.73	15.01	11.08
1987	11.43	10.47	12.20	9.69
1988	12.57	10.34	18.96	12.37
1989	13.90	11.02	15.76	11.14
1990	11.67	11.47	15.04	13.53
1991	11.48	9.21	13.59	14.07
1992	13.51	6.45	6.83	9.30
1993	11.74	6.70	1.94	2.32
1994	11.66	10.02	12.54	10.57
1995	8.82	10.05	15.67	13.02
1996	12.50	8.00	9.08	6.68
1997	11.49	10.40	13.44	12.17
1998	15.09	9.10	12.75	10.05
1999	15.02	7.89	12.74	8.04
2000	13.66	9.32	15.63	12.36
2001	17.14	8.93	7.54	10.54
2002	13.16	9.53	11.88	10.17
2003	8.78	10.79	14.68	10.30
2004	11.26	11.45	17.39	13.98
2005	11.11	10.28	11.91	9.47
2006	10.48	10.73	15.01	11.08
2007	11.43	10.47	12.20	9.69
2008	12.57	10.34	18.96	12.37
2009	13.90	11.02	15.76	11.14
2010	11.67	11.47	15.04	13.53
2011	11.48	9.21	13.59	14.07
2012	13.51	6.45	6.83	9.30
2013	11.74	6.70	1.94	2.32
2014	11.66	10.02	12.54	10.57
2015	8.82	10.05	15.67	13.02
2016	12.50	8.00	9.08	6.68
2017	11.49	10.40	13.44	12.17
2018	15.09	9.10	12.75	10.05
2019	15.02	7.89	12.74	8.04
2020	13.66	9.32	15.63	12.36
Avg 1981-2000	12.32	9.61	12.73	10.54
Avg 1991-2000	12.50	8.71	11.42	9.86
Avg 2001-2040	12.58	9.66	12.94	10.68

SW_CO_DEPTH

Year	Chase	Dundy	Franklin	Frontier	Furnas	Gosper	Harlan	Hayes	Hitchcock	Kearney
1981	42.79	19.05	5.97	0.00	6.83	12.92	7.35	0.00	11.14	9.78
1982	38.45	14.63	9.97	0.00	10.90	11.60	12.16	0.00	10.93	10.48
1983	5.05	9.76	14.95	0.00	11.24	11.49	13.22	0.00	12.17	11.03
1984	8.76	12.51	16.84	0.00	14.40	14.53	16.90	0.00	12.94	16.16
1985	27.19	12.35	13.69	0.00	9.19	11.19	10.81	0.00	11.28	9.93
1986	37.42	11.64	17.16	0.00	12.27	13.67	14.58	0.00	11.77	10.66
1987	47.80	12.70	11.32	0.00	9.58	11.35	11.10	0.00	11.83	9.95
1988	35.89	13.97	19.47	0.00	13.29	13.10	16.42	0.00	11.83	13.40
1989	35.45	15.44	12.74	0.00	13.52	12.46	15.64	0.00	12.53	11.26
1990	20.87	12.97	10.26	0.00	12.92	14.07	14.72	0.00	11.93	15.08
1991	0.00	12.75	10.11	0.00	12.06	13.36	13.82	0.00	10.14	16.68
1992	0.00	15.02	6.19	0.00	9.30	10.43	10.49	0.00	7.18	9.86
1993	0.00	13.04	0.73	0.00	3.05	2.88	3.31	0.00	8.37	1.76
1994	0.00	12.96	11.25	0.00	10.32	13.50	11.82	0.00	10.74	10.07
1995	0.00	9.80	13.33	0.00	12.75	13.22	14.46	0.00	10.53	15.04
1996	0.00	13.88	6.46	0.00	4.05	9.54	4.21	0.00	9.57	5.66
1997	0.00	12.76	12.00	0.00	12.39	13.75	14.18	0.00	11.43	13.58
1998	0.00	16.77	10.11	0.00	10.33	12.83	11.93	0.00	9.89	9.59
1999	0.00	16.68	11.35	0.00	8.21	10.11	9.91	0.00	9.21	8.26
2000	0.00	15.17	14.24	0.00	9.14	14.76	11.07	0.00	10.49	13.30
2001	42.79	19.05	5.97	0.00	6.83	12.92	7.35	0.00	11.14	9.78
2002	38.45	14.63	9.97	0.00	10.90	11.60	12.16	0.00	10.93	10.48
2003	5.05	9.76	14.95	0.00	11.24	11.49	13.22	0.00	12.17	11.03
2004	8.76	12.51	16.84	0.00	14.40	14.53	16.90	0.00	12.94	16.16
2005	27.19	12.35	13.69	0.00	9.19	11.19	10.81	0.00	11.28	9.93
2006	37.42	11.64	17.16	0.00	12.27	13.67	14.58	0.00	11.77	10.66
2007	47.80	12.70	11.32	0.00	9.58	11.35	11.10	0.00	11.83	9.95
2008	35.89	13.97	19.47	0.00	13.29	13.10	16.42	0.00	11.83	13.40
2009	35.45	15.44	12.74	0.00	13.52	12.46	15.64	0.00	12.53	11.26
2010	20.87	12.97	10.26	0.00	12.92	14.07	14.72	0.00	11.93	15.08
2011	0.00	12.75	10.11	0.00	12.06	13.36	13.82	0.00	10.14	16.68
2012	0.00	15.02	6.19	0.00	9.30	10.43	10.49	0.00	7.18	9.86
2013	0.00	13.04	0.73	0.00	3.05	2.88	3.31	0.00	8.37	1.76
2014	0.00	12.96	11.25	0.00	10.32	13.50	11.82	0.00	10.74	10.07
2015	0.00	9.80	13.33	0.00	12.75	13.22	14.46	0.00	10.53	15.04
2016	0.00	13.88	6.46	0.00	4.05	9.54	4.21	0.00	9.57	5.66
2017	0.00	12.76	12.00	0.00	12.39	13.75	14.18	0.00	11.43	13.58
2018	0.00	16.77	10.11	0.00	10.33	12.83	11.93	0.00	9.89	9.59
2019	0.00	16.68	11.35	0.00	8.21	10.11	9.91	0.00	9.21	8.26
2020	0.00	15.17	14.24	0.00	9.14	14.76	11.07	0.00	10.49	13.30

Avg 1981-2000	14.98	13.69	11.41	0.00	10.29	12.04	11.90	0.00	10.79	11.08
Avg 1991-2000	0.00	13.89	9.58	0.00	9.16	11.44	10.52	0.00	9.76	10.38
Avg 2001-2040	14.98	13.69	11.41	0.00	10.29	12.04	11.90	0.00	10.79	11.08

SWEX_COUNTY_DEPTH

Lincoln	Nuckolls	Perkins	Phelps	Red Willow	Webster
17.49	17.43	0.00	12.12	8.89	10.64
20.89	25.65	0.00	11.46	10.31	16.10
17.28	34.65	0.00	11.52	11.85	22.23
21.36	36.55	0.00	15.43	12.55	25.08
21.16	23.74	0.00	10.58	11.55	19.00
25.41	27.64	0.00	12.59	12.07	22.82
21.49	28.58	0.00	10.90	11.48	17.78
24.02	46.80	0.00	13.89	11.20	27.81
23.96	36.03	0.00	12.66	12.01	19.54
25.54	36.31	0.00	15.11	13.45	17.31
24.60	27.97	0.00	15.59	10.31	14.83
19.82	5.14	0.00	10.42	7.15	6.16
10.35	2.28	0.00	2.76	6.71	1.34
22.25	24.11	0.00	12.00	11.48	16.40
24.58	31.63	0.00	14.41	11.69	20.39
17.81	27.44	0.00	7.63	8.36	13.47
21.87	22.79	0.00	13.43	11.67	16.99
39.82	27.02	0.00	11.45	10.30	16.03
30.84	29.80	0.00	8.99	8.42	17.70
36.45	38.21	0.00	13.74	10.26	22.24
17.49	17.43	0.00	12.12	8.89	10.64
20.89	25.65	0.00	11.46	10.31	16.10
17.28	34.65	0.00	11.52	11.85	22.23
21.36	36.55	0.00	15.43	12.55	25.08
21.16	23.74	0.00	10.58	11.55	19.00
25.41	27.64	0.00	12.59	12.07	22.82
21.49	28.58	0.00	10.90	11.48	17.78
24.02	46.80	0.00	13.89	11.20	27.81
23.96	36.03	0.00	12.66	12.01	19.54
25.54	36.31	0.00	15.11	13.45	17.31
24.60	27.97	0.00	15.59	10.31	14.83
19.82	5.14	0.00	10.42	7.15	6.16
10.35	2.28	0.00	2.76	6.71	1.34
22.25	24.11	0.00	12.00	11.48	16.40
24.58	31.63	0.00	14.41	11.69	20.39
17.81	27.44	0.00	7.63	8.36	13.47
21.87	22.79	0.00	13.43	11.67	16.99
39.82	27.02	0.00	11.45	10.30	16.03
30.84	29.80	0.00	8.99	8.42	17.70
36.45	38.21	0.00	13.74	10.26	22.24

23.35	27.49	0.00	11.83	10.59	17.19
24.84	23.64	0.00	11.04	9.64	14.55
23.35	27.49	0.00	11.83	10.59	17.19

Year	Chase	Dundy	Franklin	Frontier	Furnas	Gosper	Harlan	Hayes	Hitchcock	Kearney
1981	0.00	17.14	5.37	0.00	6.15	11.63	6.62	9.14	10.03	8.80
1982	0.00	13.16	8.97	0.00	9.81	10.44	10.95	8.94	9.83	9.44
1983	0.00	8.78	13.46	0.00	10.11	10.34	11.90	8.60	10.95	9.93
1984	0.00	11.26	15.15	0.00	12.96	13.08	15.21	10.63	11.64	14.54
1985	0.00	11.11	12.32	0.00	8.27	10.08	9.73	8.24	10.15	8.94
1986	0.00	10.48	15.45	0.00	11.04	12.31	13.13	8.00	10.59	8.99
1987	0.00	11.43	10.19	0.00	8.62	10.22	9.99	8.53	10.65	8.96
1988	0.00	12.57	17.52	0.00	11.96	11.79	14.78	8.44	10.64	12.06
1989	0.00	13.90	11.46	0.00	12.17	11.22	14.08	8.57	11.27	10.13
1990	0.00	11.67	9.24	0.00	11.62	12.66	13.25	7.60	10.74	13.57
1991	0.00	11.48	9.10	0.00	10.85	12.02	12.44	7.02	9.12	15.01
1992	0.00	13.51	5.57	0.00	8.37	9.39	9.44	3.83	6.46	8.88
1993	0.00	11.74	0.66	0.00	2.75	2.59	2.98	5.50	7.54	1.59
1994	0.00	11.66	10.12	0.00	9.29	12.15	10.64	6.35	9.66	9.06
1995	0.00	8.82	11.99	0.00	11.47	11.90	13.02	6.12	9.48	13.53
1996	0.00	12.50	5.81	0.00	3.65	8.59	3.79	6.19	8.61	5.09
1997	0.00	11.49	10.80	0.00	11.15	12.38	12.77	7.07	10.29	12.22
1998	0.00	15.09	9.10	0.00	9.30	11.55	10.73	6.28	8.90	8.63
1999	0.00	15.02	10.22	0.00	7.39	9.10	8.92	7.22	8.29	7.43
2000	0.00	13.66	12.81	0.00	8.23	13.29	9.96	6.36	9.44	11.97
2001	0.00	17.14	5.37	0.00	6.15	11.63	6.62	9.14	10.03	8.80
2002	0.00	13.16	8.97	0.00	9.81	10.44	10.95	8.94	9.83	9.44
2003	0.00	8.78	13.46	0.00	10.11	10.34	11.90	8.60	10.95	9.93
2004	0.00	11.26	15.15	0.00	12.96	13.08	15.21	10.63	11.64	14.54
2005	0.00	11.11	12.32	0.00	8.27	10.08	9.73	8.24	10.15	8.94
2006	0.00	10.48	15.45	0.00	11.04	12.31	13.13	8.00	10.59	9.59
2007	0.00	11.43	10.19	0.00	8.62	10.22	9.99	8.53	10.65	8.96
2008	0.00	12.57	17.52	0.00	11.96	11.79	14.78	8.44	10.64	12.06
2009	0.00	13.90	11.46	0.00	12.17	11.22	14.08	8.57	11.27	10.13
2010	0.00	11.67	9.24	0.00	11.62	12.66	13.25	7.60	10.74	13.57
2011	0.00	11.48	9.10	0.00	10.85	12.02	12.44	7.02	9.12	15.01
2012	0.00	13.51	5.57	0.00	8.37	9.39	9.44	3.83	6.46	8.88
2013	0.00	11.74	0.66	0.00	2.75	2.59	2.98	5.50	7.54	1.59
2014	0.00	11.66	10.12	0.00	9.29	12.15	10.64	6.35	9.66	9.06
2015	0.00	8.82	11.99	0.00	11.47	11.90	13.02	6.12	9.48	13.53
2016	0.00	12.50	5.81	0.00	3.65	8.59	3.79	6.19	8.61	5.09
2017	0.00	11.49	10.80	0.00	11.15	12.38	12.77	7.07	10.29	12.22
2018	0.00	15.09	9.10	0.00	9.30	11.55	10.73	6.28	8.90	8.63
2019	0.00	15.02	10.22	0.00	7.39	9.10	8.92	7.22	8.29	7.43
2020	0.00	13.66	12.81	0.00	8.23	13.29	9.96	6.36	9.44	11.97

Avg 1981-2000	0.00	12.32	10.27	0.00	9.26	10.84	10.71	7.43	9.72	9.97
Avg 1991-2000	0.00	12.50	8.62	0.00	8.24	10.30	9.47	6.19	8.78	9.34
Avg 2001-2040	0.00	12.32	10.27	0.00	9.26	10.84	10.71	7.43	9.72	9.97

SWCO_COUNTY_DEPTH

Lincoln	Nuckolls	Perkins	Phelps	Red Willow	Webster
15.74	15.69	0.00	10.90	8.01	9.57
18.80	23.08	0.00	10.31	9.28	14.49
15.55	31.19	0.00	10.37	10.67	20.00
19.22	32.89	0.00	13.89	11.30	22.58
19.04	21.37	0.00	9.52	10.39	17.10
22.87	24.87	0.00	11.33	10.86	20.54
19.34	25.72	0.00	9.81	10.33	16.00
21.62	42.12	0.00	12.50	10.08	25.03
21.56	32.43	0.00	11.40	10.81	17.58
22.99	32.68	0.00	13.60	12.10	15.58
22.14	25.18	0.00	14.03	9.28	13.34
17.84	4.62	0.00	9.38	6.44	5.55
9.31	2.05	0.00	2.48	6.04	1.20
20.03	21.70	0.00	10.80	10.33	14.76
22.13	28.47	0.00	12.97	10.52	18.35
16.03	24.70	0.00	6.87	7.53	12.13
19.68	20.51	0.00	12.09	10.51	15.29
35.83	24.32	0.00	10.31	9.27	14.42
27.76	26.82	0.00	8.09	7.58	15.93
32.81	34.39	0.00	12.37	9.24	20.02
15.74	15.69	0.00	10.90	8.01	9.57
18.80	23.08	0.00	10.31	9.28	14.49
15.55	31.19	0.00	10.37	10.67	20.00
19.22	32.89	0.00	13.89	11.30	22.58
19.04	21.37	0.00	9.52	10.39	17.10
22.87	24.87	0.00	11.33	10.86	20.54
19.34	25.72	0.00	9.81	10.33	16.00
21.62	42.12	0.00	12.50	10.08	25.03
21.56	32.43	0.00	11.40	10.81	17.58
22.99	32.68	0.00	13.60	12.10	15.58
22.14	25.18	0.00	14.03	9.28	13.34
17.84	4.62	0.00	9.38	6.44	5.55
9.31	2.05	0.00	2.48	6.04	1.20
20.03	21.70	0.00	10.80	10.33	14.76
22.13	28.47	0.00	12.97	10.52	18.35
16.03	24.70	0.00	6.87	7.53	12.13
19.68	20.51	0.00	12.09	10.51	15.29
35.83	24.32	0.00	10.31	9.27	14.42
27.76	26.82	0.00	8.09	7.58	15.93
32.81	34.39	0.00	12.37	9.24	20.02

21.02	24.74	0.00	10.65	9.53	15.47
22.36	21.27	0.00	9.94	8.67	13.10
21.02	24.74	0.00	10.65	9.53	15.47