APPENDIX E

WATER QUALITY DATA

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Table E-1. Water-quality and Aquatic-life Criteria and Standards

		Aquatic Life			Water Supply	Drinking Water Standard	Human-health criteria for consumption of:	
Analyte	CAS Number (B)	General Criteria	Acute toxicity (µg/L)	Chronic toxicity (µg/L)	Agriculture	(mg/L)	Water + Organism (µg/L)	Organism Only (µg/L)
pH		6.5 to 9.0						
Specific conductance					2000			
Chloride			860 mg/L	230 mg/L [d]		250*		
Total dissolved solids						500*		
Metals								
Antimony	7440360		88 [c]	30 [d]		0.006		
Arsenic	7440382		340 [c]	16.7 [b]		0.01		16.7 [e]
Barium	7440393					2		
Beryllium	7440417		130 [a]	5.3 [d]		0.004		
Cadmium	7440439		See Table E-3			0.005		
Chromium	7440473					0.1		

Analyte	CAS Number (B)	General Criteria	Aquatic Life		Water Supply	Drinking Water Standard	Human-health criteria for consumption of:	
			Acute toxicity (µg/L)	Chronic toxicity (µg/L)	Agriculture	(mg/L)	Water + Organism (µg/L)	Organism Only (µg/L)
Cobalt	7440484							
Copper	7440508		(0.960)e (0,9422[ln hardness]-1.700) c	(0.960)e (0,8545[ln hardness]-1.702) d		1*		
Lead [2]	7439921		(CF) e (1.273[ln hardness]-1.460) c	(CF) e (1.273[ln hardness]-4.705) d		0.015**		
Mercury [3]	7439976		1.4 [c]	0.77 [d]		0.002		
Nickel	7440020		(0.998) e (0.846[ln hardness]+2.255) c	(0.997) e (0.846[ln hardness]+0.0584) d				
Selenium [4]	7782492		20 [c]	5.0 [d]	0.02 mg/L	0.05		
Silver	7440224		(0.85) e (1.72[ln hardness]-6.52) c	(Reserved)		0.10*		
Thallium	7440280		1400 [a]	6.3 [b]		0.002		6.3 [f]
Uranium, natural	7440611					0.03		
Vanadium	7440622							
Zinc	7440666		(0.978) e (0.8473[ln	(0.986) e (0.8473[ln		5*		

Analyte	CAS Number (B)	Aquatic Life		Water Supply	Drinking Water Standard	Human-health criteria for consumption of:	
		General Criteria	Acute toxicity (µg/L)	Chronic toxicity (µg/L)	Agriculture	(mg/L)	Water + Organism (µg/L)	Organism Only (µg/L)
			hardness]+0.884) c	hardness]+0.884) d				
Nutrients								
Ammonia, as nitrogen	7664417		***See note below					
Nitrite, as nitrogen	14797650					1		
Nitrite plus nitrate, as nitrogen					100	10		
Other Compounds								
Cotinine	486566							
5-Methyl-1H-benzotriazole	136856							
Anthraquinone	84651							
Acetophenone	98862							
Acetyl hexamethyl tetrahydronaphthalene (AHTN)	21145777							
Anthracene	120127		(Reserved)	110000 [b]			9.6 [g]	110000 [f]
Atrazine	1912249		330 [c]	12 [d]		0.003		
1,4-Dichlorobenzene	106467		1120 [a]	763 [b]				

Analyte	CAS Number (B)	Aquatic Life			Water Supply	Drinking Water Standard	Human-health criteria for consumption of:	
		General Criteria	Acute toxicity (µg/L)	Chronic toxicity (µg/L)	Agriculture	(mg/L)	Water + Organism (µg/L)	Organism Only (µg/L)
Benzo[a]pyrene	50328		(Reserved)	0.49 [b]		0.0002		0.49 [e]
Benzophenone	119619							
Bromacil	314409							
Bromoform	75252		(Reserved)	3600 [b]			0.043 [h]	3600 [e]
3-tert-Butyl-4-hydroxy anisole (BHA)	25013165							
Caffeine	58082							
Camphor	76222							
Carbaryl	63252							
Carbazole	86748							
Chlorpyrifos	2921882		0.083 [c]	0.041 [d]				
Cholesterol	57885							
3-beta-Coprostanol	360689							
Isopropylbenzene	98828							
N,N-diethyl-meta-toluamide (DEET)	134623							
Diazinon	333415							
Dichlorvos	62737							

Analyte	CAS Number (B)	Aquatic Life			Water Supply	Drinking Water Standard	Human-health criteria for consumption of:	
		General Criteria	Acute toxicity (µg/L)	Chronic toxicity (µg/L)	Agriculture	(mg/L)	Water + Organism (µg/L)	Organism Only (µg/L)
Bisphenol A	80057							
Triethyl citrate (ethyl citrate)	77930							
Tetrachloroethylene	127184					0.005		
Fluoranthene	206440		3980 [a]	370 [b]			0.3 [g]	370 [f]
Hexahydrohexamethylcyclopenta benzopyran (HHCB)	1222055							
Indole	120729							
Isoborneol	124765							
Isophorone	78591		117000 [a]	26000 [b]			0.36 [h]	26000 [e]
Isoquinoline	119653							
d-Limonene	5989275							
Menthol	89781							
Metalaxyl	57837191							
Metolachlor	51218452		390 [c]	100 [d]				
Naphthalene	91203		2300 [a]	620 [b]				
1-Methylnaphthalene	90120							
2,6-Dimethylnaphthalene	581420							
2-Methylnaphthalene	91576							

Analyte	CAS Number (B)	Aquatic Life			Water Supply	Drinking Water Standard	Human-health criteria for consumption of:	
		General Criteria	Acute toxicity (µg/L)	Chronic toxicity (µg/L)	Agriculture	(mg/L)	Water + Organism (µg/L)	Organism Only (µg/L)
p-Cresol	106445							
4-Cumylphenol	599644							
para-Nonylphenol (total)	84852153							
4-n-Octylphenol	1806264							
4-tert-Octylphenol	140669							
Phenanthrene	85018		30 [a]	6.3 [b]				
Phenol	108952						21 [g]	
Pentachlorophenol	87865		$e^{(1.0085(pH)-4.869}$ [c]	$e^{(1.0085(pH)-5.134}$ [d]		0.001		
Tributyl phosphate	126738							
Triphenyl phosphate	115866							
Tris(2-butoxyethyl)phosphate	78513							
Tris(2-chloroethyl)phosphate	115968							
Di-2-Ethylhexyl phthalate	117817		2000 [a]	59.2 [b]		0.006		59.2 [e]
Diethyl phthalate	84662		(Reserved)	120000 [b]			23 [g]	120000 [f]
Prometon	1610180							
Pyrene	129000		(Reserved)	11000 [b]			0.96 [g]	11000 [f]
Methyl salicylate	119368							

Analyte	CAS Number (B)	Aquatic Life			Water Supply	Drinking Water Standard	Human-health criteria for consumption of:	
		General Criteria	Acute toxicity (µg/L)	Chronic toxicity (µg/L)	Agriculture	(mg/L)	Water + Organism (µg/L)	Organism Only (µg/L)
3-Methyl-1(H)-indole (Skatole)	83341							
beta-Sitosterol	83465							
beta-Stigmastanol	19466478							
Triclosan	3380345							
Tris(dichlorisopropyl)phosphate	13674878							

Source: NDEQ. July 31, 2006. Nebraska Administrative Code, Title 117, Nebraska Surface Water Quality Standards. Available online at http://www.deq.state.ne.us/RuleAndR.nsf/pages/117-TOC.

Notes:

[2] The conversion factor for lead (acute and chronic) is hardness dependant and defined by CF=1.46203 - [(ln hardness)(0.145712)]

[3] Chronic criterion for mercury applies to total recoverable concentration

[4] Criteria for selenium apply to total recoverable concentrations

[a] Concentrations not to be exceeded at any time

[b] Twenty-four hour average concentration

[c] One-hour average concentration

[d] 4-day average concentration

[e] Human health criteria at the 10-5 risk level for carcinogens based on the consumption of fish and other aquatic organisms

[f] Human health criteria based on the consumption of fish and other aquatic organisms

[g] Human health criteria based on the consumption of water, fish, and other aquatic organisms

[h] Human health criteria at the 10-5 risk level for carcinogens based on the consumption of water, fish, and other aquatic organisms

* Secondary drinking water recommendations

*** Acute Ammonia standard is pH dependant and chronic ammonia standard is pH and temperature dependant. Many of the waterbodies in the study area have site specific ammonia criteria.

Table E-2. E coli Recreational Standards

Use Dependant Standard	Organism Count
Geometric mean (minimum of 5 samples over a 30-day period)	126/100 mL
Designated beaches (single occurrence)	235/100 mL
Moderate use (single occurrence)	298/100 mL
Light use (single occurrence)	406/100 mL
Infrequent use (single occurrence)	576/100 mL

Source: NDEQ. July 31, 2006. Nebraska Administrative Code, Title 117, Nebraska Surface Water Quality Standards. Available online at http://www.deq.state.ne.us/RuleAndR.nsf/pages/117-TOC.

Table E-3. Cadmium Standard

Cadmium	Acute	Chronic
Class A	(ACF) $e^{(1.0166[\ln \text{hardness}]-2.849)}$ a	(CCF) $e^{(0.7409 [\ln \text{hardness}]-4.719)}$ b
Class B	(ACF) $e^{(1.0166[\ln \text{hardness}]-2.849)}$ a	(CCF) $e^{(0.7409 [\ln \text{hardness}]-4.719)}$ b

Source: NDEQ. July 31, 2006. Nebraska Administrative Code, Title 117, Nebraska Surface Water Quality Standards. Available online at http://www.deq.state.ne.us/RuleAndR.nsf/pages/117-TOC.

Notes:

ACF = 1.136672-[ln hardness (0.041838)]

CCF = 1.101672-[ln hardness (0.041838)]

[a] One-hour average concentration

[b] 4-day average concentration

Table E-4. Dissolved Oxygen Warmwater Standards

Dissolved Oxygen	1-day minimum (April-Sept)--early life stages	1-day minimum (April-Sept)--all life stages	7-day mean minimum (October-March)	7-day mean minimum for early life stages (April-September)	30-day mean (October-March)
Class A	5.0	3.0	4.0	6.0	5.5
Class B	5.0	3.0	4.0	6.0	5.5

Source: NDEQ. July 31, 2006. Nebraska Administrative Code, Title 117, Nebraska Surface Water Quality Standards. Available online at http://www.deq.state.ne.us/RuleAndR.nsf/pages/117-TOC.

Table E-5. Lake North Beach Data

Date	E. coli (# per 100 mL)	Date	E. coli (# per 100 mL)
5/3/2004	No Data	7/19/2004	18
5/10/2004	4	7/26/2004	20
5/17/2004	2	8/2/2004	5
5/24/2004	248	8/9/2004	3
5/31/2004	78	8/16/2004	2
6/7/2004	44	8/23/2004	26
6/14/2004	38	8/30/2004	13
6/21/2004	50	9/6/2004	5
6/28/2004	15	9/13/2004	7
7/5/2004	29	9/20/2004	2
7/12/2004	91	9/27/2004	18
5/2/2005	6	7/18/2005	2
5/9/2005	410	7/25/2005	2
5/16/2005	436	8/1/2005	5
5/23/2005	10	8/8/2005	2
5/30/2005	49	8/15/2005	113
6/6/2005	55	8/22/2005	2
6/13/2005	96	8/29/2005	7
6/20/2005	16	9/5/2005	4
6/27/2005	35	9/12/2005	1
7/4/2005	25	9/19/2005	1
7/11/2005	4	9/26/2005	15
5/1/2006	0	7/17/2006	1
5/8/2006	8	7/24/2006	0
5/15/2006	7	7/31/2006	0
5/22/2006	10	8/7/2006	3
5/29/2006	0	8/14/2006	No Data
6/5/2006	5	8/21/2006	3
6/12/2006	5	8/28/2006	1
6/19/2006	1	9/5/2006	0

Date	E. coli (# per 100 mL)	Date	E. coli (# per 100 mL)
6/26/2006	1	9/11/2006	23
7/5/2006	1	9/18/2006	42
7/10/2006	1	9/25/2006	82
5/7/2007	127	7/23/2007	1
5/14/2007	150	7/30/2007	2
5/21/2007	22	8/6/2007	9
5/28/2007	59	8/13/2007	9
6/4/2007	866	8/20/2007	5
6/11/2007	135	8/27/2007	80
6/18/2007	579	9/3/2007	4
6/25/2007	93	9/10/2007	2
7/2/2007	12	9/17/2007	96
7/9/2007	2	9/24/2007	144
7/16/2007	4	10/1/2007	No Data
5/12/2008	69	6/2/2008	1300
5/19/2008	2	6/9/2008	345
5/26/2008	816	6/16/2008	*121

Source: NDEQ. 2008. Beaches. Retrieved on June 23, 2008. http://www.deq.state.ne.us/Beaches.nsf/.

Table E-6. Lake North Beach E. Coli Data Summary

Year	Seasonal Geometric Mean (# per 100 mL)	Max (# per 100 mL)
2004	14	248
2005	10	436
2006	2	82
2007	24	866
2008 (as of August 2008)	39	1300

Source: NDEQ. 2008. Beaches. Retrieved on June 23, 2008. http://www.deq.state.ne.us/Beaches.nsf/.

Table E-7. Lake North Beach Microcystin Data

Week Starting	Level of Microcystin (ppb)
5/7/2007	0.04
5/14/2007	0.08
5/21/2007	0.03
5/28/2007	0
6/4/2007	0.08
6/11/2007	0.2
6/18/2007	0.04
6/25/2007	0.04
7/2/2007	0.05
7/9/2007	0
7/16/2007	0.17
7/23/2007	0.29
7/30/2007	0
8/6/2007	0
8/13/2007	0
8/20/2007	0.02
8/27/2007	0.03
9/3/2007	0.62
9/10/2007	0.01
9/17/2007	0
9/24/2007	0.01
5/12/2008	0
5/19/2008	0.04
5/26/2008	0
6/2/2008	0
6/9/2008	0.03
6/16/2008	0

Source: NDEQ. 2008. Beaches. Retrieved on June 23, 2008. http://www.deq.state.ne.us/Beaches.nsf/.

Table E-8. Loup Power Canal Segment LP1-21800 Water Quality Data

Date	E. coli (# per 100 mL)	Date	E. coli (# per 100 mL)
5/11/04	18	07/19/05	22
5/18/04	12	07/26/05	13
5/26/04	820	08/09/05	11
6/1/04	24,192	08/16/05	47
6/9/04	57	08/23/05	10
6/15/04	580	08/30/05	32
6/22/04	110	09/07/05	10
6/30/04	24	09/13/05	5
7/7/04	10,462	09/20/05	<1
7/14/04	114	09/27/05	19
7/21/04	50	5/3/06	9
7/28/04	17	5/9/06	15
8/4/04	26	5/16/06	5
8/11/04	157	5/24/06	28
8/18/04	4	5/31/06	8
8/24/04	10	6/6/06	9
8/31/04	1	6/12/06	28
9/8/04	9	6/20/06	225
9/15/04	21	6/26/06	13
9/22/04	8	7/6/06	53
9/29/04	687	7/12/06	28
05/16/05	11200	7/18/06	4
05/24/05	37	7/26/06	16
06/02/05	157	8/1/06	16
06/07/05	12033	8/9/06	164
06/15/05	313	8/24/06	16
06/22/05	2420	8/29/06	4
06/28/05	141	9/5/06	12
07/06/05	48	9/12/06	>24200
07/12/05	26	9/20/06	435

Date	E. coli (# per 100 mL)	Date	E. coli (# per 100 mL)
		9/27/06	276

Source: NDEQ. June 23, 2008. Personal communication (email) from Patrick O'Brien, TMDL Coordinator, Surface Water Section, Water Quality Division, Planning Unit, Nebraska Department of Environmental Quality, to George Hunt, Environmental Engineer, HDR Engineering, regarding water quality data.

Table E-9. Loup Power Canal Segment MP1-10200 Water Quality Data

Date	E. coli (# per 100 mL)	Date	E. coli (# per 100 mL)
05/16/05	7701	5/3/06	78
05/24/05	148	5/9/06	88
06/02/05	364	5/16/06	64
06/07/05	2420	5/24/06	76
06/15/05	980	5/31/06	365
06/22/05	192	6/6/06	72
06/28/05	547	6/12/06	88
07/06/05	93	6/20/06	387
07/12/05	59	6/26/06	6
07/19/05	206	7/6/06	18
07/26/05	28	7/12/06	55
08/10/05	78	7/18/06	104
08/16/05	22	7/26/06	22
08/23/05	89	8/1/06	84
08/30/05	1203	8/9/06	24200
09/07/05	365	8/24/06	72
09/13/05	260	8/29/06	61
09/20/05	104	9/5/06	613
09/27/05	57	9/12/06	24200
		9/20/06	548
		9/27/06	816

Source: NDEQ. June 23, 2008. Personal communication (email) from Patrick O'Brien, TMDL Coordinator, Surface Water Section, Water Quality Division, Planning Unit, Nebraska Department of Environmental Quality, to George Hunt, Environmental Engineer, HDR Engineering, regarding water quality data.

Table E-10. Loup Power Canal Segment LO1-20200 Water Quality Data

Date	Temperature (°C)	DO (mg/L)	pH	Conductivity (umho/cm)	Ammonia (mg/L)	Chloride (mg/L)
1/9/01	0.00	11.60	9.10	284	0.11	3.20
2/7/01	0.00	11.10	9.70	290	0.10	2.77
3/6/01	0.10	12.80	8.00	271	0.22	2.85
4/3/01	7.50	11.40	8.50	280	0.09	3.17
5/8/01	16.00	9.50	8.00	300	0.13	6.00
6/6/01	16.80	11.50	8.00	301	0.06	3.33
7/10/01	26.17	9.12	8.71	270	0.08	3.03
8/7/01	33.60	6.98	9.36	275	0.07	3.17
9/12/01	22.13	10.92	8.88	242		2.59
10/1/01	18.67	11.00	8.63	258		2.62
11/6/01	14.84	10.24	8.33	265		3.03
12/3/01	0.70	9.80	7.80	174	0.18	3.37
1/7/02	0.5	13.2	8	306	0.10	2.86
2/4/02	0.01	13.1	8.6	290	0.11	2.89
3/4/02	-0.1	13.4	8.4	362	0.10	3.26
4/3/02	4.38	12.5	8.2	265	< 0.05	2.85
5/9/02	10.66	11.6	8.5	299	< 0.05	3.17
6/3/02	23.11	8.55	8.8	284	< 0.05	3.10
7/25/02	25.38	8.24	8.7	291	< 0.05	3.34
8/15/02	21.83	9.36	8.7	241	0.05	2.78
9/12/02	20.41	8.9	8.4	241	< 0.05	2.37
10/9/02	12.75	10.7	8.3	253	< 0.05	2.76
11/5/02	6.12	12.5	7.8	271	0.05	2.64
12/2/02	0.84	13.9	7.8	263	0.08	2.61
1/13/03	1.14	13.9	9	312	0.15	2.6
2/3/03	-0.15	13.2	8.8	243	0.07	2.3
3/3/03	0	13.6	8.2	259	0.07	2.5
4/7/03	1.72	13.3	8.3	237	0.06	2.5
5/15/03	16.27	9.2	8	295	0.06	3.6
6/3/03	16.6	8.1	8.8	305	< .05	3.2

Date	Temperature (°C)	DO (mg/L)	pH	Conductivity (umho/cm)	Ammonia (mg/L)	Chloride (mg/L)
7/10/03	26.44	8	8.6	266	< .05	3.1
8/6/03	26.77	8.28	8.7	265	0.07	2.7
9/10/03	21.99	7.67	8.7	259	< .05	2.3
10/7/03	16.22	9.77	7.7	267	< .05	2.2
11/3/03	4.34	12	7.9	253		
12/1/03	1.3	14	8.4	256		
1/12/04	0.6	13.4	8.0	385	0.18	3.87
2/4/04	-0.2	11.9	8.0	382	0.08	2.66
3/2/04	0.9	13.1	8.0	283	0.15	4.70
4/6/04	13.0	11.0	8.8	271	0.08	3.20
4/19/04	15.1	11.0	8.9	255	< 0.05	3.26
5/5/04	17.9	10.7	8.5	303	< 0.05	3.19
5/17/04	17.1	10.1	8.6	280	< 0.05	2.90
6/7/04	24.4	8.0	8.5	274	0.11	3.37
6/23/04	23.0	8.6	8.7	262	< 0.05	3.33
7/6/04	23.0	7.1	8.1	224	0.10	8.18
7/22/04	26.4	7.9	8.6	284	< 0.05	3.23
7/30/04	24.2	9.1	8.7	288	< 0.05	3.30
8/17/04	22.4	16.5	8.3	282	< 0.05	2.76
9/1/04	27.1	9.1	8.6	267	< 0.05	2.48
9/22/04	18.3	10.5	8.8	242	< 0.05	2.62
10/5/04	12.8	10.6	8.4	251	0.23	2.49
11/3/04	8.3	8.9	8.5	257	< 0.05	2.22
12/8/04	3.3	9.3	8.5	266	< 0.05	2.80
1/12/05	1.20	9.50	8.10	365	0.10	3.76
2/10/05	0.20	13.10	8.50	321	0.20	3.25
3/10/05	10.00	8.90	7.70	264	< 0.05	1.99
4/5/05	15.70	8.33	8.28	275	< 0.05	3.10
4/18/05	18.45	13.00	8.34	275	< 0.05	2.83
5/2/05	5.26	9.52	8.11	268	0.08	2.76
5/16/05	18.39	9.59	7.79	261	0.30	4.30

Date	Temperature (°C)	DO (mg/L)	pH	Conductivity (umho/cm)	Ammonia (mg/L)	Chloride (mg/L)
6/6/05	25.24	6.96	8.17	267	0.22	4.79
6/20/05	30.00	7.21	8.69	260	< 0.05	3.26
7/11/05	30.98	7.33	8.58	283	< 0.05	3.92
7/25/05	28.49	7.87	8.34	282	< 0.05	3.32
8/8/05	29.64	7.56	8.80	255	0.06	2.84
8/22/05	24.32	8.54	8.51	255	< 0.05	2.36
9/12/05	24.05	2.07	7.52	263	< 0.05	2.31
9/26/05	13.15	13.57	8.43	229	< 0.05	2.63
10/11/05	12.66	7.93	7.91	252	< 0.05	2.22
11/9/05	8.00	10.20	8.40	255	0.16	2.58
12/7/05	0.10	12.50	8.00	326	0.09	4.35
1/11/06	1.80	11.30	8.20	246	0.11	2.6
2/8/06	0.60	11.90	8.40	254	< 0.05	2.1
3/8/06	7.40	9.60	8.10	257	0.10	2.5
4/5/06	12.80	9.60	7.90	305	0.08	3.4
4/17/06	17.40	9.00	7.80	334	0.13	3.6
5/3/06	15.70	8.80	8.00	277	0.05	3.4
5/18/06	17.86	9.73	8.76	301	< 0.05	3.2
6/7/06	22.73	8.65	8.24	294	< 0.05	2.7
6/19/06			7.79	256	< 0.05	3.4
7/11/06	23.42	8.83	8.39	264	0.06	2.8
7/24/06	25.85	6.80	8.70	295	< 0.05	4.0
8/7/06	23.63	8.42	8.48	279	0.10	4.6
8/23/06	24.55	6.99	8.25	249	< 0.05	3.3
9/12/06	20.14	9.33	8.11	244	0.22	3.8
9/25/06				NA	0.06	2.2
10/12/06	8.90	10.10	7.00	267	< 0.05	2.28
11/8/06	12.40	10.40	7.60	293	0.16	2.55
12/6/06	3.50	12.60	7.40	291	0.13	2.72

Source: NDEQ. June 23, 2008. Personal communication (email) from Patrick O'Brien, TMDL Coordinator, Surface Water Section, Water Quality Division, Planning Unit, Nebraska Department of Environmental Quality, to George Hunt, Environmental Engineer, HDR Engineering, regarding water quality data.

Table E-11. Loup River Segment LO1-10000 Water Quality Data

Date	Temp (°C)	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
4/30/03	12.7	9.79	7.97	271	1989	0.10	0.70	3.54
5/5/03	12.61	7.98	7.45	249	24192	0.87	1.02	6.43
5/12/03	12.36	9.58	7.81	290	9804	0.14	0.67	3.57
5/19/03	18.65	8.14	8.12	318	959	0.13	0.88	4.44
5/27/03	18.42	9.12	8.31	308	687	< .05	<.05	4.26
6/2/03	17.1	8.91	8.55	371	211	< .05	0.18	5.50
6/9/03	18.22	8.77	7.97	369	3076	< .05	1.49	5.47
6/16/03	25.7	8.04	8.07	365	613	0.08	1.76	4.29
6/23/03	19.96	8.94	8.5	370	387	0.06	0.09	5.44
6/30/03	23.95	10.38	8.61	310	249	< .05	<.05	4.37
7/7/03	21.38	8.39	8.05	574	2419	0.06	0.89	4.79
7/14/03	25.38	9.88	8.65	335	411	0.05	<.05	4.83
7/21/03	24.82	9.83	8.51	351	1296	< .05	<.05	4.89
7/28/03	24.53	10.67	8.59	327	248	0.05	3.50	4.45
8/4/03	24.01	8.61	8.64	327	63	0.11	0.05	4.88
8/11/03	24.4	9.2	8.45	338	79	< .05	0.05	5.02
8/18/03	23.3	8.4	8.34	357	166.4	< .05	0.15	5.08
8/25/03	27.97	9.22	8.52	361	55	< .05	0.12	5.02
9/3/03	22.87	10.76	8.41	313	326	0.21	0.35	4.93
9/8/03	22.83	10.2	8.14	308	276	0.34	0.55	4.16
9/15/03	16.8	9.85	7.97	307	14136	0.45	1.28	5.76
9/22/03	16.61	9.29	8.36	302	921	0.11	0.69	4.10
9/29/03	10.47	10.18	8	320	53	0.05	0.74	4.67

Source: NDEQ. June 23, 2008. Personal communication (email) from Patrick O'Brien, TMDL Coordinator, Surface Water Section, Water Quality Division, Planning Unit, Nebraska Department of Environmental Quality, to George Hunt, Environmental Engineer, HDR Engineering, regarding water quality data.

Table E-12. Platte River Segment MP1-20000 Water Quality Data

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
1/9/01	0.00	11.20	9.50	955		0.10	1.82	39.44
2/6/01	0.10	11.80		953		0.11	1.90	38.36
3/6/01	0.40	12.60	8.20	911		0.12	1.93	36.56
4/3/01	5.80	11.60	8.50	869		0.07	2.29	35.63
4/18/01								
4/25/01	15.12	10.13	8.4	544		0.21	0.81	19.85
5/1/01	20.83	11.12	8.92	786		0.08	0.54	31.26
5/8/01	16.90	7.70	7.80	369		0.34	0.80	12.63
5/9/01	19.86	7.32	7.74	461	0	0.43	0.99	11.47
5/14/01	23.59	11.75	8.87	765	0	<0.05	1.22	27.88
5/21/01	15.13	10.48	8.48	717	48	0.07	1.48	26.46
5/29/01	16.35	9.95	8.56	853	325	0.07	1.26	33.42
6/4/01	14.15	9.51	8.43	751	1050	<0.05	1.63	28.30
6/6/01	16.40	11.10	8.10	741		0.07	1.90	25.76
6/12/01	26.35	9.18	8.66	794	0	0.09	0.45	36.44
6/19/01	19.81	9.09	8.39	725	0	0.05	1.08	31.03
6/25/01	28.1	8.66	8.66	808	0	0.11	0.50	34.28
7/2/01	28.2	10.9	8.8	748	0	<0.05	0.53	33.64
7/9/01	34.12	11.23	9.05	793	5	<0.05	0.05	41.87
7/10/01	25.07	10.04	8.79	893		0.08	<0.05	46.31
7/16/01	32.1			835	3	0.06	0.05	42.87
7/23/01	31.4	10.8		881	40	0.07	0.05	49.65
7/30/01	29.14	8.62	8.59	815	0	0.06	0.05	35.39
8/6/01	32.59	7.37		930	8	0.05	0.05	44.52
8/7/01	29.41	6.29	9.20	947		0.05	<0.05	46.36
8/13/01	25.81	8.21	8.65	942	0	0.07	0.05	45.40
8/20/01	22.41	9.94	8.73	458	2	0.09	0.05	35.20
8/27/01	27.7	8.1	8.7	815	45	0.06	0.05	37.97
9/5/01	26.7	7.5	8.7	877	0	<0.05	0.05	39.29

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
9/10/01	18.69	8.9	8.45	866	0	<0.05	0.05	40.40
9/12/01	27.90	8.39	8.60	859		0.06	<0.05	38.12
9/17/01	18.79	9.04	8.5	732	5	0.07	0.05	28.02
9/24/01	13.4	10.7	8.9	875	20	0.06	0.30	38.25
10/1/01	18.54	11.06	8.72	827		0.05	0.06	29.91
11/6/01	18.73	8.96	8.51	897			0.62	37.85
12/3/01	3.70	8.70	7.90	544		0.10	1.59	38.43
1/7/02	0	12.2	8.1	996		0.06	1.75	42.49
2/4/02	-0.2	12	8.8	1046		< 0.05	1.74	41.56
3/4/02	-0.1	11	8	1074		0.09	2.46	46.16
4/3/02	3.07	13.03	8.53	957		< 0.05	2.50	40.84
5/9/02	10.17	11.17	8.35	866		< 0.05	0.63	40.49
6/3/02	21.16	9.46	8.4	824		< 0.05	0.40	38.85
10/9/02	26.94	11.41	8.74	915		< 0.05	< 0.05	39.17
11/5/02	8.81	11.44	8.36	950		< 0.05	0.56	45.59
12/2/02	1.28	14.05	8.04	920		0.06	0.61	43.72
1/13/03	-0.06	14.1	8.82	996		0.08	1.17	43.84
2/3/03	0.11	13.31	8.91	750		< .05	1.20	32.04
3/3/03	1.37	12.84	8.48	831		0.08	1.54	36.57
4/7/03	4.52	12.69	8.67	806		0.06	0.88	37.81
5/15/03	14.65	10.02	8.27	785		0.06	0.61	34.88
6/3/03	18	7.7	8.8	768		< .05	0.50	38.16
7/10/03	35.02	7.58	8.8	807		< .05	0.46	42.31
1/12/04	3.2	11.6	8.3	873		0.13	0.83	41.30
2/4/04	-0.2	8.0	7.9	986		0.05	1.21	42.30
3/2/04	3.3	12.8	8.4	719		0.05	1.47	28.84
4/6/04	19.7	10.7	9.1	849		< 0.05	0.73	40.63
4/19/04	19.2	10.5	8.9	806		< 0.05	0.48	44.87
5/5/04	17.1	9.7	8.4	943		< 0.05	0.06	46.47
5/17/04	18.5	10.8	8.7	866		< 0.05	0.22	46.14

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
6/7/04	31.8	7.9	8.7	789		0.13	0.23	42.37
7/22/04	29.8	9.9	8.6	703		< 0.05	0.68	34.24
7/30/04	30.1	11.1	8.9	699		0.06	0.08	36.30
11/3/04	11.8	6.9	8.3	951		< 0.05	0.28	52.81
12/8/04	5.1	8.6	8.7	820		< 0.05	0.83	40.06
1/12/05	2.60	9.40	8.20	695		0.06	0.89	43.13
2/10/05	0.10	13.40	8.80	911		< 0.05	1.23	39.84
3/10/05	11.40	8.80	8.10	798		< 0.05	0.88	39.22
4/5/05	17.57	13.59	8.92	735		< 0.05	0.20	34.73
4/18/05	20.35	14.45	8.73	745		0.10	0.27	35.90
5/2/05	11.67	9.09	8.58	766		< 0.05	0.44	38.71
5/16/05	17.37	7.02	7.27	173		0.25	0.36	5.43
6/6/05	27.03	8.85	8.61	722		< 0.05	0.63	31.97
6/20/05	28.65	4.93	8.40	830		< 0.05	< 0.05	34.95
7/11/05	33.61	6.50	8.39	882		< 0.05	< 0.05	51.84
7/25/05	29.18	7.64	8.47	840		< 0.05	< 0.05	46.34
9/12/05	29.33	6.86	8.39	950		< 0.05	< 0.05	65.18
11/9/05	8.50	10.10	8.40	906		0.08	0.33	52.48
12/7/05	0.30	12.80	7.60	1033		< 0.05	0.83	57.87
1/11/06	1.00	12.10	8.20	850		0.11	1.31	42.12
2/8/06	0.30	11.90	7.80	892		0.11	1.72	43.76
3/8/06	7.20	9.80	8.00	872		0.12	1.27	44.23
4/5/06	11.00	9.60	7.50	812		0.09	0.62	39.03
4/17/06	19.20	8.90	7.60	786		0.05	1.29	34.45
4/24/06	16.50	10.52	8.36	771		0.08	1.01	41.16
5/1/06	23.91	11.47	9.03	726	10	0.07	0.83	38.64
5/3/06						< 0.05	0.91	46.54
5/9/06	22.93	8.83	9.05	960	29	< 0.05	0.42	9.15
5/15/06	19.20	10.32	8.75	993	4	< 0.05	< 0.05	59.61
5/22/06	25.98	8.74	8.81	1020	11	0.06	< 0.05	59.78

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
5/30/06	19.43	8.73	8.19	952	114	< 0.05	0.10	62.90
6/5/06	23.89	8.63	8.49	997	63	0.05	0.20	53.01
6/12/06	27.11	11.73		741	70	0.06	0.09	39.54
6/20/06	29.41	8.51	8.43	888	14	0.05	< 0.05	56.21
6/26/06				NA	11	0.09	< 0.05	72.14
7/3/06	28.61	8.29	8.47	NA	125	< 0.05	< 0.05	70.78
7/17/06	34.46	7.72	8.86	744	10	< 0.05	< 0.05	37.90
9/11/06	17.07	9.08	8.47	929	548	0.06	< 0.05	64.06
9/18/06	17.63	10.07	8.53	935	20	0.06	< 0.05	61.99
9/25/06	19.31	10.05	8.25	1004	12	0.05	< 0.05	62.03
10/12/06	11.00	9.90	7.10	934		< 0.05	< 0.05	54.33
11/8/06	17.30	10.40	8.00	942		0.30	< 0.05	55.22
12/6/06	3.80	12.60	6.90	942		0.12	0.38	50.87
4/24/06	15.90	9.60	8.48	290		0.08	< 0.05	4.42
5/1/06	14.53	11.26	8.41	295	22	< 0.05	0.10	3.51
5/9/06	16.19	9.79	9.35	291	93	< 0.05	< 0.05	107.89
5/15/06	14.91	10.79	9.07	305	133	0.14	< 0.05	2.85
5/22/06	21.90	8.95	9.22	325	98	< 0.05	< 0.05	4.99
5/30/06	24.90	7.94	8.16	431	8164	0.08	5.00	13.06
6/5/06	24.35	6.91	8.16	309	343	0.11	< 0.05	3.33
6/12/06	25.12	8.48		407	44	0.06	0.05	13.14
6/20/06	24.36	7.25	7.22	279	29	0.09	< 0.05	2.93
6/26/06					579	0.07	< 0.05	3.56
7/3/06	28.40	5.89	7.97		166	0.07	< 0.05	3.70
7/10/06	27.73	5.17	7.74	312	199	0.13	< 0.05	4.18
7/17/06	29.86	5.34	8.19	271	117	0.11	< 0.05	4.93
7/24/06	26.74	5.48	8.08	460	76	0.07	0.44	25.16
7/31/06	30.28	7.20	8.35	361	15	< 0.05	< 0.05	10.53
8/7/06	26.19	5.42	7.44	232	44	1.06	0.84	5.69
8/14/06	27.65	5.24	7.94	261	471	0.11	< 0.05	3.62

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
8/21/06	26.08	6.85	8.00	267	33	0.24	< 0.05	4.09
8/28/06	24.02	6.28	8.13	366	167	0.13	0.28	16.08
9/5/06	22.06	6.30	8.02	387	96	< 0.05	< 0.05	3.58
9/11/06	18.03	8.11	7.99	234	816	0.07	0.11	2.66
9/18/06	17.19	8.82	8.31	256	1986	0.16	0.20	3.68
9/25/06	13.68	10.17	7.88	271	236	0.06	0.54	2.75

Source: NDEQ. June 23, 2008. Personal communication (email) from Patrick O'Brien, TMDL Coordinator, Surface Water Section, Water Quality Division, Planning Unit, Nebraska Department of Environmental Quality, to George Hunt, Environmental Engineer, HDR Engineering, regarding water quality data.

Table E-13. Platte River Segment LP1-20000 Water Quality Data

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
7/25/02	23.67	8.75	8.54	394		< 0.05	0.80	10.64
8/14/02	26.68	10.12	8.83	345		0.06	0.70	11.88
9/11/02	18.3	9.38	8.26	319		0.08	< 0.05	7.57
10/8/02	17.06	11.83	8.5	278		0.06	1.40	4.50
11/6/02	4.74	13.34	7.92	324		< 0.05	1.29	6.39
12/3/02	-0.22	14.64	8.07	322		< 0.05	1.22	5.32
1/14/03	-0.17	14.94	8.95	430		0.06	1.43	9.36
2/4/03	-0.17	13.85	8.75	346		0.06	1.26	7.43
3/4/03	-0.22	13.06	8.23	365		0.08	1.22	8.50
4/9/03	4.57	12.39	8.42	297		0.06	0.96	5.65
5/14/03	15.81	8.53	8.08	346		0.12	1.14	8.60
6/3/03	14.05	9.85	8.75	447		< .05	0.54	13.89
7/10/03	23.52	8.6	8.35	407		0.06	0.35	11.85
8/7/03	22.81	7.57	8.35	349		0.08	<.05	7.43
9/10/03	19.24	9.51	8.09	283		0.05	1.11	7.81
10/7/03	16.53	10.14	8.45	315		0.22	0.93	8.22
11/5/03	2.35	13.33	7.98	311				
12/2/03	0.72	14.13	7.99	303				
1/12/04	-0.2	13.7	8.0	403		0.07	1.77	10.52
2/5/04	-0.2	12.5	7.8	449		< 0.05	1.90	10.40
3/3/04	0.8	13.4	8.0	322		0.28	3.12	10.07
4/6/04	13.7	10.2	8.8	358		< 0.05	0.71	8.49
4/20/04	13.1	9.8	9.0	326		< 0.05	0.44	8.86
4/27/04	14.3	9	8.7	368	80	0.06	0.53	6.32
5/3/04	11.2	9.7	8.9	395	13	0.05	0.42	7.58
5/10/04	21	6.1	8.5	463		0.07	0.74	13.68
5/17/04	17.28	9.51	8.3	395	225	0.17	0.64	11.38
5/24/04	17.89	6.14	7.42	237	24192	1.45	3.27	23.13
6/1/04	16.37	7.54	7.64	283	24192	0.45	1.93	10.98

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
6/7/04	22.29	6.69	7.69	341	10462	0.89	2.92	12.73
6/14/04	23.17	7.96	8.11	326	2613	0.13	1.66	6.87
6/21/04	20.55	8.91	7.97	321	2419	0.08	1.48	7.42
6/28/04	20.44	10.21	8.41	364		0.07	1.11	7.67
7/6/04	22.63	6.88	7.7	338	24192	0.54	2.46	21.12
7/12/04	26.69	6.62	7.96	253	17329	0.16	1.92	7.97
7/19/04	26.41	7.49	8.22	364	2419	0.15	1.09	12.24
7/26/04	25.44	8.71	8.37	361	921	0.10	1.19	5.07
8/2/04	27.19	9.67	8.88	369	135	< 0.05	0.30	9.59
8/9/04	24.67	8.65	8.67	361	91	< 0.05	< 0.05	7.50
8/16/04	19.28	13.4	8.32	304	118	< 0.05	1.41	9.65
8/23/04	24.63	10.42	8.58	363	145	0.10	0.59	11.07
8/30/04	21.1	9.84	8.57	329	74	0.07	0.53	9.74
9/7/04	22.93	9.01	8.68	370	201	0.09	1.05	167.96
9/13/04	22.74	8.14	8.71	340		< 0.05	< 0.05	8.90
9/20/04	20.44	9.6	8.33	309	99	0.15	0.41	10.12
9/27/04	19.16	9.52	8.25	292	6131	0.08	1.10	9.81
10/4/04	13.1	11.4	8.4	270		< 0.05	0.91	5.44
11/2/04	9.1	12.0	8.2	298		0.06	1.16	4.23
12/7/04	1.1	12.9	7.9	332		0.12	1.42	6.17
1/11/05	-0.21	13.38	7.66	535		0.08	1.43	17.80
2/7/05	-0.16	14.69	7.96	440		0.13	0.77	13.50
3/7/05	7.84	11.02	8.21	355		< 0.05	0.85	17.01
4/4/05	12.11	11.22	8.07	319		0.07	0.89	6.78
4/18/05	16.75	9.26	8.12	333		< 0.05	0.71	8.09
5/2/05	14.33	7.25	8.15	330		0.05	1.12	6.03
5/16/05	18.41	8.74	7.61	286		0.38	1.97	12.05
6/6/05	23.09	7.73	7.80	270		0.25	2.24	5.68
6/20/05	27.68	10.69	8.40	317		0.11	0.36	6.75
7/11/05	27.60	8.43	8.71	403		< 0.05	0.08	14.23

Date	Temp °C	DO (mg/L)	pH	Conductivity (umho/cm)	E. coli (# per 100 mL)	Ammonia (mg/L)	NO3-NO2 (mg/L)	Chloride (mg/L)
7/25/05	28.96	7.71	8.51	394		< 0.05	0.17	11.22
8/8/05	31.83	8.89	8.37	318		0.09	< 0.05	4.95
8/23/05	23.83	9.03	8.31	317		0.06	0.12	8.37
9/12/05	27.70	9.36	8.48	259		< 0.05	0.07	3.91
9/27/05	21.43	10.33	8.49	231		0.06	0.12	4.67
10/10/05	13.56	8.33	7.97	214		< 0.05	0.85	3.34
11/7/05	8.68	10.88	7.85	301		0.10	1.10	5.07
12/6/05	-0.18	13.87	7.54	426		0.09	1.18	12.00
1/10/06	-0.22	14.26	7.76	332		0.18	1.34	5.53
2/6/06	-0.20	12.58	7.66	320		< 0.05	1.49	5.01
3/6/06	5.74	9.96	7.83	302		0.06	1.40	4.97
4/4/06	10.37	10.76	7.83	317		0.24	1.24	6.58
4/19/06	11.22	10.68	8.28	356		0.08	0.44	6.76
5/4/06	13.70	10.39	8.60	350		0.16	0.57	5.20
5/16/06	15.56	10.09	8.84	352		0.08	0.27	4.86
6/6/06	22.70	8.02	8.32	477		0.38	1.36	7.75
6/21/06	25.95	7.67	8.19	375		0.11	0.92	10.48
7/11/06	23.56	8.17	8.44	340		0.09	< 0.05	12.80
7/25/06	24.00	6.63	8.84	396		0.09	< 0.05	11.30
8/9/06	26.14	9.19	8.33	288		0.08	0.96	9.66
8/23/06	22.40	7.67	8.20	344		0.06	1.29	7.17
9/11/06	18.21	8.30	8.43	272		0.07	0.61	4.50
9/27/06	16.48	8.35	8.14	313		< 0.05	1.17	5.35
10/11/06	9.98	10.10	8.25	332		< 0.05	1.23	6.21
11/7/06	7.40	11.32	8.20	417		< 0.05	0.76	11.52
12/5/06	-0.18	13.73	8.18	436		0.08	1.64	9.67

Source: NDEQ. June 23, 2008. Personal communication (email) from Patrick O'Brien, TMDL Coordinator, Surface Water Section, Water Quality Division, Planning Unit, Nebraska Department of Environmental Quality, to George Hunt, Environmental Engineer, HDR Engineering, regarding water quality data.

Table E-14. Platte River Segment LP1-20000 Atrazine Data

Date	Atrazine (µg/L)
7/25/02	0.4
8/14/02	0.22
9/11/02	0.36
10/8/02	0.05
11/6/02	0.11
12/3/02	0.05
1/14/03	<0.05
2/4/03	0.1
3/4/03	<0.05
4/9/03	0.26
5/14/03	2.75
6/3/03	3.77
7/10/03	1.79
8/7/03	0.37
9/10/03	0.52
10/7/03	<0.05
11/5/03	0.07
12/2/03	<0.05
1/12/04	0.14
2/5/04	0.16
3/3/04	0.23
4/6/04	0.09
4/20/04	0.15
4/27/04	0.31
5/3/04	0.09
5/10/04	3.37
5/17/04	1.44
5/24/04	26.73
6/1/04	11.22
6/7/04	12.1

Date	Atrazine (µg/L)
6/14/04	4.18
6/21/04	3.46
6/28/04	1.5
7/6/04	4.08
7/12/04	1.94
7/19/04	0.62
7/26/04	0.54
8/2/04	0.68
8/9/04	0.52
8/16/04	0.4
8/23/04	0.35
8/30/04	0.27
9/7/04	0.21
9/13/04	0.28
9/20/04	0.22
9/27/04	0.15
10/4/04	0.15
11/2/04	0.11
12/7/04	0.08
1/11/05	0.14
2/7/05	0.13
3/7/05	0.06
4/4/05	<0.05
4/18/05	0.1
5/2/05	0.11
5/16/05	22.11
6/6/05	8.25
6/20/05	1.01
7/11/05	1.01
7/25/05	NA
8/8/05	0.31
8/23/05	0.28

Date	Atrazine (µg/L)
9/12/05	NA
9/27/05	<0.05
10/10/05	<0.05
11/7/05	<0.05
12/6/05	0.05
1/10/06	<0.05
2/6/06	<0.05
3/6/06	<0.05
4/4/06	<0.05
4/19/06	0.11
5/4/06	0.26
5/16/06	0.18
6/6/06	1.38
6/21/06	3.08
7/11/06	0.60
7/25/06	0.29
8/9/06	0.47
8/23/06	<0.05
9/11/06	<0.05
9/27/06	<0.05
10/11/06	<0.05
11/7/06	0.07
12/5/06	NA

Source: NDEQ. June 23, 2008. Personal communication (email) from Patrick O'Brien, TMDL Coordinator, Surface Water Section, Water Quality Division, Planning Unit, Nebraska Department of Environmental Quality, to George Hunt, Environmental Engineer, HDR Engineering, regarding water quality data.