Attachment S

KANSAS SURFACE WATER QUALITY STANDARDS

Tables of Numeric Criteria

Prepared by The Kansas Department of Health and Environment

Bureau of Water

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Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria.

	USE CATEGORY					
	AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
PARAMETER	ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
RADIONUCLIDES (pCi/L)						
gross beta radioactivity	a	a	a	a	a	50
gross alpha particles including radium-226,but not radon or uranium	a	a	a	a	a	15
radium 226 and 228 combined	a	a	a	a	a	5
strontium 90	a	a	a	a	a	8
tritium	a	a	a	a	a	20,000
METALS (µg/L)						
antimony, total	88	30	a	a	640	6
arsenic, total	340	150	200	100	20.5	10
arsenic (III)	360	50	a	a	b	b
arsenic (V)	850	48	a	a	a	a
barium	a	a	a	a	a	1,000
beryllium, total	a	a	a	a	a	4
boron, total	a	a	5,000	750	a	a
cadmium, total	table 1b	table 1b	20	10	170	5
chromium, total	a	40	1,000	100	a	100
chromium (III)	table 1b	table 1b	a	a	3,433,000	50
chromium (VI)	16	11	a	a	3,400	50
copper, total	table 1b	table 1b	500	200	a	1,300
lead, total	table 1b	table 1b	100	5,000	a	15
mercury, total	1.4	0.77	10	a	0.146	b
nickel, total	table 1b	table 1b	500	200	4,600	610
selenium, total	20	5	50	20	4,200	170
selenium (V)	11.2	a	a	a	a	a
silver, total	table 1b	a	a	a	a	50
thallium, total	1,400	40	a	a	b	2
zinc, total	table 1b	table 1b	25,000	2,000	26,000	7,400
OTHER INORGANIC SUBSTANCES (µg/L)						
ammonia	table 1c	table 1c	a	a	a	a
asbestos (µfibers/L)	a	a	a	a	a	7,000,000
Chloride	860,000	c	a	a	a	250,000
chlorine, total residual	19	11	a	a	a	a
cyanide (free)	22	5.2	a	a	220,000	200
Fluoride	a	a	2,000	1,000	a	2,000
nitrate (as N)	a	a	a	a	a	10,000
nitrite + nitrate (as N)	a	a	100,000	a	a	10,000
phosphorus, elemental (white)	a	0.1	a	a	a	a

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria (continued).

	USE CATEGORY					
	AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
PARAMETER	ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
sulfate	a	a	1,000,000	a	a	250,000
ORGANIC SUBSTANCES (µg/L)						
Benzenes.....						
aminobenzene (analine)	14	6.7	a	a	a	a
benzene	5,300	a	a	a	51	5
chlorobenzene	250	50	a	a	1,600	130
dichlorobenzenes, total	1,120	763	a	a	2,600	a
o-dichlorobenzene	1,120	763	a	a	2,600	600
m-dichlorobenzene	1,120	763	a	a	960	b
p-dichlorobenzene	a	a	a	a	2,600	75
other chlorinated benzenes, total	250	50	a	a	a	a
1,2,4-trichlorobenzene	250	a	a	a	940	260
1,2,4,5-tetrachlorobenzene	250	50	a	a	1.1	0.97
pentachlorobenzene	250	50	a	a	1.5	1.4
hexachlorobenzene	6.0	3.7	a	a	0.00029	b
ethylbenzene	32,000	a	a	a	28,712	700
nitrobenzene	27,000	a	a	a	690	b
pentachloronitrobenzene	250	50	a	a	a	a
vinylbenzene (styrene)	a	a	a	a	a	100
Ethers.....						
chloroalkyl ethers, total	238,000	a	a	a	a	a
bis(2-chloroethyl)ether	238,000	a	a	a	0.53	b
bis(2-chloroisopropyl)ether	238,000	a	a	a	65,000	b
bis(chloromethyl)ether	238,000	a	a	a	0.00029	0.00010
2-chloroethyl vinyl ether	360	120	a	a	a	a
halogenated ethers, total	360	122	a	a	a	a
chloromethyl methyl ether	238,000	a	a	a	0.00184	a
4,4'-dibromodiphenyl ether	360	120	a	a	a	a
hexabromodiphenyl ether	360	120	a	a	a	a
nonabromodiphenyl ether	360	120	a	a	a	a
pentabromodiphenyl ether	360	120	a	a	a	a
tetrabromodiphenyl ether	360	120	a	a	a	a
tribromodiphenyl ether	360	120	a	a	a	a
Halogenated Hydrocarbons.....						
chlorinated ethanes						
1,2-dichloroethane	18,000	2,000	a	a	b	b
1,1,1-trichloroethane	18,000	a	a	a	173,077	200
1,1,2-trichloroethane	18,000	9,400	a	a	16	b
tetrachloroethanes, total	9,320	a	a	a	a	a
1,1,1,2-tetrachloroethane	9,320	a	a	a	a	a

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria (continued).

USE CATEGORY						
	AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
PARAMETER	ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
1,1,2,2-tetrachloroethane	9,320	2,400	a	a	3.3	b
pentachloroethane	7,240	1,100	a	a	a	a
hexachloroethane	980	540	a	a	3.3	b
chlorinated ethylenes, total	11,600	a	a	a	a	a
1,1-dichloroethylene	11,600	a	a	a	7,100	b
cis-1,2-dichloroethylene	11,600	a	a	a	a	70
trans-1,2-dichloroethylene	11,600	a	a	a	140,000	100
trichloroethylene	45,000	21,900	a	a	30	5
tetrachloroethylene	5,280	840	a	a	3.3	5
chlorinated propanes/propenes						
1,2-dichloropropane	23,000	5,700	9.0	a	15	0.50
1,3-dichloropropene	6,600	244	a	a	14.1	b
Other Halogenated Hydrocarbons.....						
halogenated methanes, total	11,000	a	a	a	15.7	100
bromomethane	11,000	a	a	a	1,500	b
1,2-dibromoethane	a	a	a	a	a	0.05
tribromomethane(bromoform)	11,000	a	a	a	140	b
bis(2-chloroethoxy)methane	11,000	a	a	a	15.7	a
bromodichloromethane	11,000	a	a	a	17	b
bromochloromethane	11,000	a	a	a	15.7	a
bromotrichloromethane	11,000	a	a	a	15.7	a
dibromochloromethane	11,000	a	a	a	13	b
dibromochloropropane	a	a	a	a	15.7	0.2
dibromodichloromethane	11,000	a	a	a	15.7	a
dichlorodifluoromethane	11,000	a	a	a	15.7	a
dichloromethane(methylene chloride)	11,000	a	a	a	590	4.7
trichloromethane(chloroform)	28,900	1,240	a	a	470	b
tribromochloromethane	11,000	a	a	a	15.7	a
trichlorofluoromethane	11,000	a	a	a	15.7	a
tetrachloromethane(carbon tetrachloride)	35,200	a	a	a	b	5
di(2-ethylhexyl)adipate	a	a	a	a	a	500
hexachlorobutadiene	90	9.3	a	a	18	b
hexachlorocyclopentadiene	7	5.2	a	a	206	50
vinyl chloride	a	a	a	a	525	2
Miscellaneous Organics.....						
dioxin (2,3,7,8 TCDD)	0.01	0.00001	a	a	0.000000005	b
Isosphorone	117,000	a	a	a	b	b
polychlorinated biphenyls, total	2	0.014	a	a	0.000064	b
tributyltin oxide	0.149	0.026	a	a	a	a

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria (continued).

USE CATEGORY						
	AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
PARAMETER	ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
Nitrogen Compounds.....						
nitrosamines, total	5,850	a	a	a	1.24	0.0008
N-nitrosodibutylamine	5,850	a	a	a	0.22	0.0063
N-nitrosodiethanolamine	5,850	a	a	a	1.24	a
N-nitrosodiethylamine	5,850	a	a	a	1.24	0.0008
N-nitrosodimethylamine	5,850	a	a	a	3.0	b
N-nitrosodiphenylamine	5,850	a	a	a	6.0	b
N-nitrosodi-n-propylamine	a	a	a	a	0.51	.005
N-nitrosopyrrolidine	5,850	a	a	a	34	0.016
acrylonitrile	7,550	2,600	a	a	0.25	b
benzidene	2,500	a	a	a	0.0002	b
3,3'-dichlorobenzidine	a	a	a	a	0.02	b
1,2-diphenyl hydrazine	270	a	a	a	0.20	b
Polynuclear Aromatic Hydrocarbons, total	a	a	a	a	0.0311	0.2
acenaphthene	1,700	520	a	a	990	670
acenaphthylene	a	a	a	a	0.0311	a
anthracene	a	a	a	a	40,000	b
benzo(a)anthracene	a	a	a	a	0.018	b
benzo(a)pyrene	a	a	a	a	0.018	b
benzo(b)fluoranthene	a	a	a	a	0.018	b
benzo(g,h,i)perylene	a	a	a	a	0.0311	a
benzo(k)fluoranthene	a	a	a	a	0.018	b
2-chloronaphthalene	a	a	a	a	1,600	1,000
chrysene	a	a	a	a	0.018	b
dibenzo(a,h)anthracene	a	a	a	a	0.018	b
fluoranthene	3,980	a	a	a	b	b
fluorene	a	a	a	a	5,300	b
ideno(1,2,3-cd)pyrene	a	a	a	a	0.018	b
naphthalene	2,300	620	a	a	a	a
phenanthrene	30	6.3	a	a	0.0311	a
pyrene	a	a	a	a	4,000	b
Phthalate Esters						
phthalates, total	940	3	a	a	a	a
butylbenzyl phthalate	a	a	a	a	1,900	1,500
di(2-ethylhexyl) phthalate	400	360	a	a	b	b
dibutyl phthalate	940	3	a	a	b	b
diethyl phthalate	a	a	a	a	b	17,000
dimethyl phthalate	940	3	a	a	1,100,000	b
Phenolic Compounds.....						
phenol	10,200	2,560	a	a	1,700,000	b
2,4-dimethyl phenol	1,300	530	a	a	850	380

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria (continued).

	USE CATEGORY					
	AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
PARAMETER	ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
chlorinated phenols						
2-chlorophenol	4,380	2,000	a	a	150	81
3-chlorophenol	a	a	a	a	29,000	a
2,4-dichlorophenol	2,020	365	a	a	b	b
2,4,5-trichlorophenol	100	63	a	a	3,600	1,800
2,4,6-trichlorophenol	a	970	a	a	2.4	b
pentachlorophenol	table 1b	table 1b	a	a	3.0	b
3-methyl-4-chlorophenol	30	a	a	a	a	a
nitrophenols, total	230	150	a	a	a	a
2,4-dinitrophenol	a	a	a	a	5,300	b
4,6-dinitro-o-cresol	a	a	a	a	280	b
Toluenes.....						
toluene	17,500	a	a	a	b	1,000
dinitrotoluenes, total	330	230	a	a	9.1	a
2,4-dinitrotoluene	330	230	a	a	3.4	b
xylene	a	a	a	a	a	10,000
PESTICIDES (µg/L)						
acrolein	68	21	a	a	290	190
acrylamide	a	a	a	a	a	0.01
alachlor (lasso)	760	76	100	a	a	2
aldicarb	a	a	a	a	a	3
aldicarb sulfone	a	a	a	a	a	2
aldicarb sulfoxide	a	a	a	a	a	3
aldrin	3	0.001	1	a	0.00005	b
atrazine (aatrex)	170	3	a	a	a	3
bromoxynil (MCPA)	a	a	20	a	a	a
carbaryl (sevin)	a	0.02	100	a	a	a
carbofuran (furadan)	a	a	100	a	a	40
chlordane	2.4	0.0043	3	a	0.00081	b
chlorpyrifos	0.083	0.041	100	a	a	a
2,4-D	a	a	a	a	a	100
dacthal (DCPA)	a	14,300	a	a	a	a
dalapon	a	110	a	a	a	200
diazinon (spectracide)	a	0.08	100	a	a	a
DDT and Metabolites.....						
4,4'-DDE (p,p=-DDE)	1,050	a	a	a	0.00022	b
4,4'-DDD (p,p=-DDD)	a	a	a	a	0.00031	b
DDT, total	1.1	0.001	50	a	0.000024	b
dieldrin	0.24	0.056	1	a	0.000054	b
dinoseb (DNBP)	a	a	a	a	a	7
diquat	a	a	a	a	a	20
disulfoton (disyston)	a	a	100	a	a	a
endosulfan, total	0.22	0.056	a	a	159	b
alpha-endosulfan	0.22	0.056	a	a	89	62

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria (continued).

USE CATEGORY						
	AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
PARAMETER	ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
beta-endosulfan	0.22	0.056	a	a	89	62
endosulfan sulfate	a	a	a	a	b	b
endothall	a	a	a	a	a	110
endrin	0.086	0.036	0.5	a	0.81	0.76
endrin aldehyde	a	a	a	a	0.30	b
epichlorohydrin	a	a	a	a	a	4
ethylene dibromide	a	a	a	a	a	0.05
fenchlorfos (ronnel)	a	a	100	a	a	a
glyphosate (roundup)	a	a	a	a	a	700
guthion	a	0.010	100	a	a	a
heptachlor	0.52	0.0038	0.1	a	0.000079	b
heptachlor epoxide	0.52	0.0038	0.1	a	b	b
hexachlorocyclohexane	100	a	a	a	0.0414	0.0123
alpha-HCH	100	a	a	a	0.0049	b
beta-HCH	100	a	a	a	b	b
delta-HCH	100	a	a	a	a	a
gamma-HCH (lindane)	0.95	0.08	5	a	0.0625	b
technical-HCH	a	a	a	a	0.0414	a
malathion	a	0.10	100	a	a	a
methoxychlor	a	0.03	1,000	a	a	40
methyl parathion	a	a	100	a	a	a
metribuzin (sencor)	a	100	a	a	a	a
mirex	a	0.001	a	a	0.000097	a
oxamyl (vydate)	a	0.001	a	a	a	200
parathion	0.065	0.013	100	a	a	a
picloram (tordon)	a	a	a	a	a	500
propachlor (ramrod)	a	8	a	a	a	a
simazine (princep)	a	a	10	a	a	4
toxaphene	0.73	0.0002	5	a	0.00028	b
2,4,5-T	a	a	2	a	a	a
2,4,5-TP (silvex)	a	a	a	a	a	10

a - criterion not available
b - US EPA has promulgated criterion for Kansas under the Code of Federal Regulations, Title 40, part 131.36
c - criterion under investigation

Table 1b. Hardness-Dependent Aquatic Life Support Criteria.

Formulae for calculation of hardness-dependent aquatic life support criteria for chromium III and total cadmium, total copper, total lead, total nickel, total silver and total zinc and pH-dependent aquatic life support criteria for pentachlorophenol. A WER value of 1.0 is applied in the hardness-dependent equations for total metals unless a site-specific WER has been determined and adopted by the department in accordance with K.A.R. 28-16-28e(a) and K.A.R. 28-16-28f(f). Hardness values in metal formulae are entered in units of mg/L as $CaCO_3$. Pentachlorophenol formulae apply only over the pH range 6.5-8.5.

CADMIUM (ug/L):
acute criterion = WER[EXP[(1.0166(LN(hardness)))-3.924]]
chronic criterion = WER[EXP[(0.7409(LN(hardness)))-4.719]]

CHROMIUM III (ug/L):
acute criterion = WER[EXP[(0.819*(LN(hardness)))+3.7256]]
chronic criterion = WER[EXP[(0.819*(LN(hardness)))+0.6848]]

COPPER (ug/L):
acute criterion = WER[EXP[(0.9422*(LN(hardness)))-1.700]]
chronic criterion = WER[EXP[(0.8545*(LN(hardness)))-1.702]]

LEAD (ug/L):
acute criterion = WER[EXP[(1.273*(LN(hardness)))-1.460]]
chronic criterion = WER[EXP[(1.273*(LN(hardness)))-4.705]]

NICKEL (ug/L):
acute criterion = WER[EXP[(0.846*(LN(hardness)))+2.255]]
chronic criterion = WER[EXP[(0.846*(LN(hardness)))+0.0584]]

PENTACHLOROPHENOL (ug/L):
acute criterion = EXP[(1.005*pH)-4.830]
chronic criterion = EXP[(1.005*pH)-5.290]

SILVER (ug/L):
acute criterion = WER[EXP[(1.72*(LN(hardness)))-6.59]]

ZINC (ug/L):
acute criterion = WER[EXP[(0.8473*(LN(hardness)))+0.884]]
chronic criterion = WER[EXP[(0.8473*(LN(hardness)))+0.884]]

Table 1c. pH-Dependent Acute Aquatic Life Criteria For Total Ammonia.

Total ammonia as N, mg/L

ACUTE AQUATIC LIFE CRITERIA FOR AMMONIA, mg/L	
pH	CRITERIA
6.5	48.8
6.6	46.8
6.7	44.6
6.8	42.0
6.9	39.1
7.0	36.1
7.1	32.8
7.2	29.5
7.3	26.2
7.4	23.0
7.5	19.9
7.6	17.0
7.7	14.4
7.8	12.1
7.9	10.1
8.0	8.40
8.1	6.95
8.2	5.72
8.3	4.71
8.4	3.88
8.5	3.20
8.6	2.65
8.7	2.20
8.8	1.84
8.9	1.56
9.0	1.32

Table 1d. pH- And Temperature-Dependent Chronic Aquatic Life Criteria For Total Ammonia Early Life Stages Of Fish Present.

Total ammonia as N, mg/L

CHRONIC AQUATIC LIFE CRITERIA FOR AMMONIA, EARLY LIFE STAGES PRESENT, mg/L										
pH	TEMPERATURE, °C									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Table 1e. pH- And Temperature-Dependent Chronic Aquatic Life Criteria For Total Ammonia Early Life Stages Of Fish Absent.

Total ammonia as N, mg/L.

CHRONIC AQUATIC LIFE CRITERIA FOR AMMONIA, EARLY LIFE STAGES ABSENT*, mg/L								
pH	TEMPERATURE, °C							
	0-7	8	9	10	11	12	13	14**
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684
8.9	0.917	0.860	0.806	0.456	0.709	0.664	0.623	0.584
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503

*Early life stage absent criteria will apply to all Kansas surface waters during the months November through February except in surface water segments listed in Table 1f. The application of early life stage absent criteria outside of the months November through February shall require a segment-specific examination of the surface water for the presence of early life stages of fish.

** At 15 °C and above, the criterion for early life stages absent is equivalent to the criterion for early life stages present.

Table 1f. Surface Water Segments Where Early Life Stages Absent Chronic Aquatic Life Criteria Are Not Applicable.

SURFACE WATER	BASIN	SUBBASIN	HYDROLOGIC UNIT CODE	SEGMENT NUMBER
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	1
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	2
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	3
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	4
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	5
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	18
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	19
Kansas River	Kansas Lower Republican	Lower Kansas	10270104	21 From Bowersock dam east to segment 19
Missouri River	Missouri	Tarkio-Wolf	10240005	1
Missouri River	Missouri	Tarkio-Wolf	10240005	2
Missouri River	Missouri	Tarkio-Wolf	10240005	19
Missouri River	Missouri	Tarkio-Wolf	10240005	20
Missouri River	Missouri	Tarkio-Wolf	10240005	21
Missouri River	Missouri	Independence-Sugar	10240011	1
Missouri River	Missouri	Independence-Sugar	10240011	2
Missouri River	Missouri	Independence-Sugar	10240011	4
Missouri River	Missouri	Independence-Sugar	10240011	5
Missouri River	Missouri	Independence-Sugar	10240011	7
Missouri River	Missouri	Independence-Sugar	10240011	9
Missouri River	Missouri	Independence-Sugar	10240011	11
Missouri River	Missouri	Independence-Sugar	10240011	13
Missouri River	Missouri	Independence-Sugar	10240011	15
Missouri River	Missouri	Independence-Sugar	10240011	19

Table 1g. Temperature, Dissolved Oxygen, And pH Numeric Aquatic Life Criteria.

AQUATIC LIFE USE	DISSOLVED OXYGEN (DO)	PH	TEMPERATURE
SPECIAL	5.0 mg/L[a]	6.5-8.5[b]	32°C[c]
EXPECTED	5.0 mg/L[a]	6.5-8.5[b]	32°C[c]
RESTRICTED	5.0 mg/L[a]	6.5-8.5[b]	32°C[c]

a - The concentration of dissolved oxygen in surface waters shall not be lowered by the influence of artificial sources of pollution.
b - pH range outside the zone of initial dilution.
c - Beyond the zone of initial dilution a discharge shall not elevate the temperature of a receiving surface water above this temperature, except as provided in paragraph (c)(2)(E)(ii).

Table 1h. Natural Background Concentrations.

BASIN	WATERBODY	HUC 8	SEGMENT	POLLUTANT	NATURAL BACKGROUND CONCENTRATION
Cimarron	Cimarron River	11040006	1; starting at state line and traveling upstream toward Hayne.	Chloride	1,010 mg/L
Cimarron	Crooked Creek	11040007	1 and 2; starting at state line and traveling upstream to Copeland	Chloride	1,200 mg/L
Cimarron	Stumpie Arroyo	11040007	1247	Chloride	1,200 mg/L
Cimarron	Spring Creek	11040007	3	Chloride	1,200 mg/L
Cimarron	Remuda Creek	11040007	4	Chloride	1,200 mg/L
Cimarron	Cimarron River	11040008	1, 5, 11; starting at confluence with Bluff Creek and traveling upstream to the Oklahoma border.	Sulfate	465 mg/L
Cimarron	Cimarron River	11040008	1, 5, 11; starting at confluence with Bluff Creek and traveling upstream to the Oklahoma border.	Chloride	900 mg/L
Cimarron	Bluff Creek	11040008	2 & 13; starting at confluence with the Cimarron River and traveling upstream toward Minneola.	Sulfate	350 mg/L
Kansas-Lower Republican	Buffalo Creek	10250017	29 and 37; starting at the confluence with Republican River and traveling upstream to Mankato	Chloride	590 mg/L
Kansas-Lower Republican	Upper Kansas River	10270701	1, 3, 4, 6 and 7; starting at the confluence with the Big Blue River and traveling upstream to Junction City	Chloride	275 mg/L
Lower Arkansas	Rattlesnake Creek	11030009	1; above the Little Salt Marsh in Quivira National Wildlife Refuge QNWR	Chloride	1,400 mg/L
Lower Arkansas	Rattlesnake Creek	11030009	1; below the Little Salt Marsh in QNWR	Chloride	3,660 mg/L
Lower Arkansas	Rattlesnake Creek	11030009	1; below the Little Salt Marsh in QNWR	Sulfate	455 mg/L
Lower Arkansas	Peace Creek	11030010	6; starting at the confluence with the Arkansas River and traveling upstream to Stafford.	Chloride	1,800 mg/L

Table 1h. Natural Background Concentrations (continued).

BASIN	WATERBODY	HUC 8	SEGMENT	POLLUTANT	NATURAL BACKGROUND CONCENTRATION
Lower Arkansas	Arkansas River	11030013	3, 9, 18; starting at the confluence with Ninnescah River and ending at the confluence with the Little Arkansas River.	Sulfate	350 mg/L
Lower Arkansas	Slate Creek WA Watershed	11030013	Conservation Pool: Area: 26 acres Maximum Depth: 0.3 meters	Chloride	27,590 mg/L
Lower Arkansas	Slate Creek WA Watershed	11030013	Conservation Pool: Area: 26 acres Maximum Depth: 0.3 meters	Sulfate	2,500 mg/L
Lower Arkansas	Salt Fork Arkansas River	11060002	4, 6, 8, 10, 11, 13, and 15; starting at Kansas/Oklahoma state line and traveling upstream to west-central Comanche County.	Chloride	305 mg/L
Lower Arkansas	Salt Fork Arkansas River	11060002	4, 6, 8, 10, 11, 13, and 15; starting at Kansas/Oklahoma stateline and traveling upstream to west-central Comanche County.	Sulfate	730 mg/L
Lower Arkansas	Mule Creek	11060002	7; starting at the confluence with the Salt Fork Arkansas River; Headwaters in South-Central Kiowa County.	Sulfate	310 mg/L
Lower Arkansas	Medicine Lodge River	11060003	2; starting at the Oklahoma border and traveling upstream toward the confluence with Elm Creek.	Sulfate	450 mg/L
Lower Arkansas	Medicine Lodge River	11060003	8; starting at the confluence with Turkey Creek; Headwaters near Greensburg, in Kiowa County.	Sulfate	300 mg/L
Lower Arkansas	North Branch, Medicine Lodge River	11060003	24	Sulfate	300 mg/L
Lower Arkansas	Thompson Creek	11060003	26	Sulfate	300 mg/L
Lower Arkansas	Otter Creek	11060003	25	Sulfate	300 mg/L
Lower Arkansas	Soldier Creek	11060003	27	Sulfate	300 mg/L
Neosho	Doyle Creek	11070202	21	Sulfate	370 mg/L
Neosho	South Cottonwood River	11070202	17 and 18	Sulfate	840 mg/L
Neosho	French Creek	11070202	16	Sulfate	1,045 mg/L
Neosho	Clear Creek	11070202	4 and 5	Sulfate	290 mg/L
Upper Arkansas	Arkansas River	11030001	1, 3, 5, 7 & 9 from stateline to small stream E of Garden City.	Sulfate	1,875 mg/L
Upper Arkansas	Arkansas River	11030003	1	Sulfate	350 mg/L
Upper Arkansas	Arkansas River	11030004	11	Sulfate	350 mg/L
Upper Arkansas	Arkansas River	11030004	10 and 6	Sulfate	550 mg/L
Upper Arkansas	Arkansas River	11030004	10; beginning at the confluence of Mulberry Creek in east-central Ford County and ending at the confluence with Coon Creek.	Fluoride	1.45 mg/L

Table 1h. Natural Background Concentrations (continued).

BASIN	WATERBODY	HUC 8	SEGMENT	POLLUTANT	NATURAL BACKGROUND CONCENTRATION
Upper Republican	South Fork Republican River	10250003	2 and 4 (S. Fk. Republican River) starting at the Kansas-Nebraska state line and traveling upstream to southwest Cheyenne County and the Kansas-Colorado stateline.	Fluoride	1.45 mg/L
Upper Republican	Big Timber Cr	10250003	61	Fluoride	1.45 mg/L
Upper Republican	Delay Cr	10250003	66	Fluoride	1.45 mg/L
Upper Republican	Hackberry Cr	10250003	3	Fluoride	1.45 mg/L
Upper Republican	Bluff Cr	10250003	70	Fluoride	1.45 mg/L
Upper Republican	Valley Cr	10250003	69	Fluoride	1.45 mg/L
Upper Republican	Spring Cr	10250003	67	Fluoride	1.45 mg/L
Upper Republican	Sand Cr	10250003	68	Fluoride	1.45 mg/L
Upper Republican	South Fork Republican River	10250003	6, 7 and 9 (S. Fk. Republican River) starting at the Kansas-Nebraska state line and traveling upstream to southwest Cheyenne County and the Kansas-Colorado stateline.	Fluoride	1.20 mg/L
Upper Republican	Drury Cr	10250003	60	Fluoride	1.20 mg/L
Upper Republican	Crosby Cr	10250003	72	Fluoride	1.20 mg/L
Upper Republican	Battle Cr	10250003	71	Fluoride	1.20 mg/L
Upper Republican	Cowpe Cr	10250003	8	Fluoride	1.20 mg/L
Walnut	Whitewater River	11030017	18, 19, 21, and 23	Sulfate	390 mg/L
Walnut	Whitewater River, West Branch	11030017	22	Sulfate	390 mg/L
Walnut	Whitewater River, East Branch	11030017	24 and 25	Sulfate	390 mg/L
Walnut	Whitewater Creek	11030017	34	Sulfate	390 mg/L
Walnut	Prairie Creek	11030017	35	Sulfate	390 mg/L
Walnut	Wildcat Creek	11030017	26	Sulfate	390 mg/L
Walnut	Sand Creek	11030017	29	Sulfate	390 mg/L

Table 1h. Natural Background Concentrations (continued).

BASIN	WATERBODY	HUC 8	SEGMENT	POLLUTANT	NATURAL BACKGROUND CONCENTRATION
Walnut	W. Wildcat Creek	11030017	28	Sulfate	390 mg/L
Walnut	Gypsum Creek	11030017	30	Sulfate	390 mg/L
Walnut	E. Br. Whitewater Creek	11030017	31	Sulfate	390 mg/L
Walnut	Walnut Creek	11030017	44	Sulfate	390 mg/L
Walnut	Fourmile Creek	11030017	20	Sulfate	390 mg/L
Walnut	Dry Creek	11030017	32	Sulfate	390 mg/L
Walnut	Henry Creek	11030017	33	Sulfate	390 mg/L
Walnut	Eightmile Creek	11030018	30	Sulfate	520 mg/L

Table 1i. *Escherichia coli* Criteria For Classified Stream Segments.

USE	Colony Forming Units (CFUs)/100mL	
PRIMARY CONTACT RECREATION	Geometric Mean April 1 – Oct. 31	Geometric Mean Nov. 1 – March 31
Class A	160	2358
Class B	262	2358
Class C	427	3843
SECONDARY CONTACT RECREATION	Geometric Mean Jan. 1 – Dec. 31	
Class a	2358	
Class b	3843	

Table 1j. *Escherichia coli* Criteria For Classified Surface Waters Other Than Classified Stream Segments.

USE	Colony Forming Units (CFUs)/100mL			
PRIMARY CONTACT RECREATION	Geometric Mean April 1 – Oct. 31	Geometric Mean Nov. 1 – March 31	Single Sample Maximum April 1 – Oct. 31	Single Sample Maximum Nov. 1 – March 31
Swimming Beach	160	800	732	3655
Public Access	262	1310	1198	6580
Restricted Access	427	2135	1950	9760
SECONDARY CONTACT RECREATION	Geometric Mean Jan. 1 – Dec. 31		Single Sample Maximum Jan. 1 – Dec. 31	
Public Access	2135		9760	
Restricted Access	2135		9760	