CWA's Ambient Water Criteria Standard for Ammonia

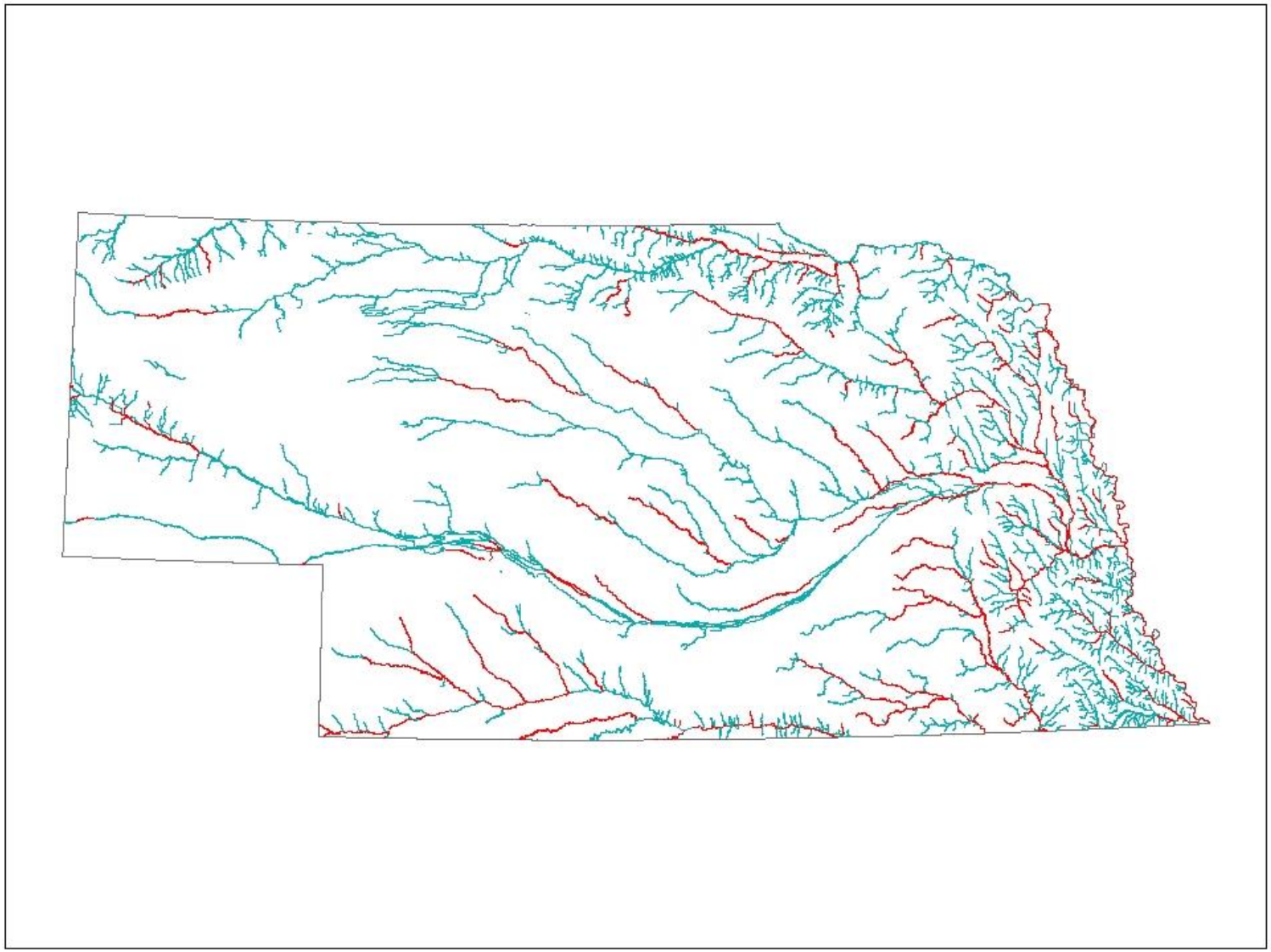
Basis for Permit Limits

- Technology based effluent limits (TBELs)
  - Biochemical oxygen demand (BOD)
  - Total suspended solids (TSS)
  - Effluent limitation guidelines (ELGs)
  - 40 CFR and Title 119
- Water quality based effluent limits (WQBELs)
  - Ammonia
  - Title 117

Updated Ammonia Criteria

- Water quality based protection for freshwater mussels and snails
- Federal Register/Volume 78, No. 163/August 22, 2013
- Title 117, Nebraska Surface Water Quality Standards, December 13, 2014

Applied Statewide



Title 117 Criteria

- Coldwater and Warmwater Aquatic Life Use Class Specific Criteria
  - Acute
  - Chronic

ONE-HOUR AVERAGE CRITERIA FOR TOTAL AMMONIA (mg/l)
Warmwater Aquatic Life Use Classes

Temperature (°C) \ pH	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8	9.0
0.0	48.86	43.80	37.65	30.81	23.96	17.77	12.66	8.77	5.97	4.05	2.77	1.92	1.38
2.0	48.86	43.80	37.65	30.81	23.96	17.77	12.66	8.77	5.97	4.05	2.77	1.92	1.38
4.0	48.86	43.80	37.65	30.81	23.96	17.77	12.66	8.77	5.97	4.05	2.77	1.92	1.38
6.0	48.86	43.80	37.65	30.81	23.96	17.77	12.66	8.77	5.97	4.05	2.77	1.92	1.38
8.0	48.86	43.80	37.65	30.81	23.96	17.77	12.66	8.77	5.97	4.05	2.77	1.92	1.38
10.0	48.86	43.80	37.65	30.81	23.96	17.77	12.66	8.77	5.97	4.05	2.77	1.92	1.38
12.0	42.22	37.85	32.53	26.62	20.70	15.35	10.94	7.58	5.16	3.50	2.39	1.66	1.19
14.0	35.77	32.07	27.56	22.56	17.54	13.01	9.27	6.42	4.37	2.97	2.02	1.41	1.01
16.0	30.30	27.17	23.35	19.11	14.86	11.02	7.85	5.44	3.71	2.51	1.72	1.19	0.86
18.0	25.67	23.02	19.78	16.19	12.59	9.34	6.65	4.61	3.14	2.13	1.45	1.01	0.73
20.0	21.75	19.50	16.76	13.72	10.67	7.91	5.64	3.90	2.66	1.80	1.23	0.86	0.62
22.0	18.43	16.52	14.20	11.62	9.04	6.70	4.78	3.31	2.25	1.53	1.04	0.73	0.52
24.0	15.61	14.00	12.03	9.85	7.66	5.68	4.05	2.80	1.91	1.29	0.88	0.62	0.44
26.0	13.23	11.86	10.19	8.34	6.49	4.81	3.43	2.37	1.62	1.10	0.75	0.52	0.37
28.0	11.21	10.05	8.64	7.07	5.50	4.08	2.90	2.01	1.37	0.93	0.63	0.44	0.32
30.0	9.50	8.51	7.32	5.99	4.66	3.45	2.46	1.70	1.16	0.79	0.54	0.37	0.27

THIRTY-DAY AVERAGE CRITERIA FOR TOTAL AMMONIA (mg/l)
Warmwater Aquatic Life Use Classes

Temperature (°C) \ pH	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8	9.0
0.0	4.85	4.65	4.36	3.98	3.49	2.94	2.35	1.80	1.32	0.95	0.68	0.49	0.36
2.0	4.85	4.65	4.36	3.98	3.49	2.94	2.35	1.80	1.32	0.95	0.68	0.49	0.36
4.0	4.85	4.65	4.36	3.98	3.49	2.94	2.35	1.80	1.32	0.95	0.68	0.49	0.36
6.0	4.85	4.65	4.36	3.98	3.49	2.94	2.35	1.80	1.32	0.95	0.68	0.49	0.36
8.0	4.54	4.36	4.09	3.73	3.28	2.75	2.20	1.68	1.24	0.89	0.64	0.46	0.34
10.0	3.99	3.83	3.60	3.28	2.88	2.42	1.94	1.48	1.09	0.78	0.56	0.40	0.30
12.0	3.51	3.37	3.16	2.88	2.53	2.13	1.70	1.30	0.96	0.69	0.49	0.35	0.26
14.0	3.09	2.96	2.78	2.53	2.23	1.87	1.50	1.14	0.84	0.61	0.43	0.31	0.23
16.0	2.71	2.60	2.44	2.23	1.96	1.64	1.32	1.01	0.74	0.53	0.38	0.27	0.20
18.0	2.38	2.29	2.15	1.96	1.72	1.44	1.16	0.88	0.65	0.47	0.33	0.24	0.18
20.0	2.10	2.01	1.89	1.72	1.51	1.27	1.02	0.78	0.57	0.41	0.29	0.21	0.16
22.0	1.84	1.77	1.66	1.51	1.33	1.12	0.89	0.68	0.50	0.36	0.26	0.19	0.14
24.0	1.62	1.55	1.46	1.33	1.17	0.98	0.79	0.60	0.44	0.32	0.23	0.16	0.12
26.0	1.42	1.37	1.28	1.17	1.03	0.86	0.69	0.53	0.39	0.28	0.20	0.14	0.11
28.0	1.25	1.20	1.13	1.03	0.90	0.76	0.61	0.46	0.34	0.25	0.18	0.13	0.09
30.0	1.10	1.05	0.99	0.90	0.79	0.67	0.53	0.41	0.30	0.22	0.15	0.11	0.08

Applying Water Quality Standards

- Stream Design Flows
  - 1q10 and 30q5
- Stream Pollutant Background Data
- Stream Characteristics (Slope, Sinuosity, etc.)
- Effluent Characteristics (pH, Temperature, Flow, etc.)

Wasteload Allocation Worksheet

General Information

Facility	Receiving Water	Title 117 ID:	Prepared By:	Date	Review by:	Review Date

Assigned Beneficial Uses

State Resource Water	Aquatic Life Use Class	Recreation (Y/N)	Agriculture (A/B)	Water Supply	Aesthetics	Key Species

Is the waterbody IR Category 5 ?

Does the Facility Discharge impairing pollutant?

Stream Design Flows

	Spring	Summer	Winter
1q10			
7q10			
30q5			
Source			
Confidence			

Receiving Waterbody Design Parameters

	Spring Value	Spring Source	Spring Confidence	Summer Value	Summer Source	Summer Confidence	Winter Value	Winter Source	Winter Confidence
Chronic Temp.				Chronic Temp.			Chronic Temperature		
Chronic pH				Chronic pH			Chronic pH		
Chronic NH3 background (mg/l)				Chronic NH3 background (mg/l)			Chronic NH3 background (mg/l)		
Chronic NH3 Criteria (mg/l)				Chronic NH3 Criteria (mg/l)			Chronic NH3 Criteria (mg/l)		
Acute NH3 background (mg/l)				Acute NH3 background (mg/l)			Acute NH3 background (mg/l)		
Other Chronic background				Other Chronic background			Other Chronic background		
Other Acute background				Other Acute background			Other Acute background		
Other Chronic Criteria				Other Chronic Criteria			Other Chronic Criteria		

Effluent Design Parameters

	Spring Value	Spring Source	Spring Confidence	Summer Value	Summer Source	Summer Confidence	Winter Value	Winter Source	Winter Confidence
Median MGD				Median MGD			Median MGD		
cubic feet/sec	0.000			0.000			0.000		
Temperature				Temperature			Temperature		
pH				pH			pH		
Acute NH3 Criteria (from criteria worksheet)				Acute NH3 Criteria (from criteria worksheet)			Acute NH3 Criteria (from criteria worksheet)		
Other Acute Criteria				Other Acute Criteria			Other Acute Criteria		

Receiving Stream Information

Known Stream Flow (cfs)	Known Average Velocity (ft/s)	Known Average Depth (ft)	Known Average Width (ft)	Stream Slope (ft/mile)	Ls/Lv	Chronic Mixing Zone to 5000 Ft?

Spring				Summer				Winter			
Chronic NH3 WLA	% Stream	Acute NH3 WLA	%Stream	Chronic NH3 WLA	% Stream	Acute NH3 WLA	% Stream	NH3 WLA	% Stream	Acute NH3 WLA	%Stream
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Chronic WLA	% Stream	Acute WLA	%Stream	Chronic WLA	% Stream	Acute WLA	% Stream	Chronic WLA	% Stream	Acute WLA	%Stream

General Information

Facility	Receiving Water	Title 117 ID:	Prepared By:	Date	Re

Assigned Beneficial Uses

State Resource Water	Aquatic Life Use Class	Recreation (Y/N)	Agriculture (A/B)	Water Supply	Aesthetics	

Is the waterbody IR Category 5 ?		Does the Facility Discharge impairing pollutant?	

Stream Design Flows

	Spring	Summer	Winter
1q10			
7q10			
30q5			
Source			

	Spring			
	Value	Value	Source	Confidence
Chronic Temp.				

	Spring			
	Value	Value	Source	Confidence
Chro				

Receiving Stream Information

Known Stream Flow (cfs)	Known Average Velocity (ft/s)	Known Average Depth (ft)	Known Average Width (ft)	Stream Slope (ft/mile)	Ls/Lv	Chronic Mixing Zone to 5000 Ft?

Chronic NH3 Criteria (mg/l)		Acute NH3 Criteria (from criteria worksheet)	
Acute NH3 background (mg/l)			
Other Chronic background		Other Acute Criteria	
Other Acute background			
Other Chronic Criteria			

Spring				Summer				Winter			
Chronic NH3 WLA	% Stream	Acute NH3 WLA	%Stream	Chronic NH3 WLA	% Stream	Acute NH3 WLA	% Stream	NH3 WLA	% Stream	Acute NH3 WLA	%Stream
Chronic WLA	% Stream	Acute WLA	%Stream	Chronic WLA	% Stream	Acute WLA	% Stream	Chronic WLA	% Stream	Acute WLA	%Stream

Changes in Permits

Temperature °C	pH	Criteria	WLA	Daily Maximum mg/L	Monthly Average mg/L
Chronic					
18.0	7.5	3.48	5.41	8.89	4.43
18.0	7.5	1.58	2.29	3.76	1.88
18.0	8.7	0.622	0.70	1.15	0.57
18.0	8.7	0.283	0.14	0.23	0.11
Acute					
20.0	7.9	11.9	12.32	12.32	6.14
20.0	7.9	4.70	4.84	4.84	2.41
20.0	9.0	1.561	1.60	1.60	0.80
20.0	9.0	0.62	0.62	0.62	0.31

Limits based on new criteria are shown in the highlighted cells.

Impacts

- Fixed media treatment technology
  - Trickling filters and Rotating biological contactors
- Older or overloaded treatment plants
- Effluent dominated receiving streams
- Lagoons

Future

- Compliance schedules
- Orders
- Integrated Planning
- AWIN
- Variance

Questions?

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