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North Carolina Surface Water Pollutant Standards for Metals

Effective 01/01/2015

Pollutant	Freshwater Aquatic Life			Saltwater Aquatic Life		Water Supply[1] (µg/L)	Human Health[2] (µg/L)	Carcinogen[3]
	Acute (µg/L)	Chronic (µg/L)	Trout (µg/L)	Acute (µg/L)	Chronic (µg/L)			
Arsenic (CAS # 7440-38-2)	340 (d)	150 (d)	-	69 (d)	36 (d)	10 (t)	10 (t)	Yes
Barium (CAS # 44-39-3)	-	-	-	-	-	1000 (t)	-	No
Beryllium (CAS # 7440-41-7)	65 (d)	6.5 (d)	-	-	-	-	-	No
Cadmium (CAS # 7440-43-9)	0.82 (d)(h)	0.15 (d)(h)	0.51 (d)(h)	40 (d)	8.8 (d)	-	-	No
Chromium III	180 (d)(h)	24 (d)(h)	-	-	-	-	-	No
Chromium VI	16 (d)	11 (d)	-	1100 (d)	50 (d)	-	-	No
Copper (CAS # 7440-50-8)	3.6 (d)(h) or Copper 2007 Revision (EPA-822-R-07-001)	2.7 (d)(h) or Copper 2007 Revision (EPA-822-R-07-001)	-	4.8 (d)	3.1 (d)	-	-	No
Lead (CAS # 7439-92-1)	14 (d)(h)	0.54 (d)(h)	-	210 (d)	8.1 (d)	-	-	No
Mercury (CAS # 7439-97-6)	-	0.012 (t)	-	-	0.025 (t)	-	-	No
Nickel (CAS # 7440-02-0)	140 (d)(h)	16 (d)(h)	-	74 (d)	8.2 (d)	25 (t)	-	No
Selenium (CAS # 7782-49-2)	-	5 (t)	-	-	71 (t)	-	-	No
Silver (CAS # 7440-22-4)	0.30 (d)(h)	0.06 (d)	-	1.9 (d)	0.1 (d)	-	-	No
Zinc (CAS # 7440-66-6)	36 (d)(h)	36 (d)(h)	-	90 (d)	81 (d)	-	-	No

Footnotes, Codes and Additional Information with Reference to Classifications & Standards

(d) = dissolved metal standard. See 15A NCAC 02B .0211 for more information.

(h) = hardness-dependent dissolved metal standard. **All hardness-dependent dissolved metal standards in this table assume ≤ 25 mg/L in-stream hardness**. See below for hardness-dependent dissolved metal guidelines and equations. See 15A NCAC 02B .0211 for more information.

(t) = based upon measurement of total recoverable metal. See 15A NCAC 02B .0211 for more information.

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Footnotes, Codes and Additional Information with Reference to Classifications & Standards

The standards in this table are adopted per section 15A NCAC 02B of the North Carolina Administrative Code.
To determine the appropriate standard, use the most stringent of all applicable columns as described below.

- For Class C waters, use the most stringent of Freshwater and Human Health.
- For Class SC waters, use the most stringent of Saltwater and Human Health.
- For Water Supply waters, use the most stringent of Freshwater, Water Supply, and Human Health.
- For Trout Waters, use the most stringent of Freshwater, Human Health, and Trout. If Trout Waters are located within a Water Supply, use the most stringent of Freshwater, Human Health, Water Supply, and Trout.

1. Water Supply standards are applicable to all Water Supply Classifications and are based on consumption of fish and water. See 15A NCAC 02B .0208 for equation.
2. Human Health standards are based on the consumption of fish only unless dermal contact studies are available. See 15A NCAC 02B .0208 for equations.
3. Carcinogens are listed in 15A NCAC 02B .0208.

Hardness-Dependent Dissolved Metal Standard Guidelines and Equations

Use the guidelines and equations below for determining hardness-dependent dissolved metal standards:

If in-stream hardness ≤25 mg/L, calculate at 25 mg/L hardness
If in-stream hardness >25, but <400 mg/L, calculate at actual stream hardness
If in-stream hardness >400, calculate at 400 mg/L hardness

Metal	Equations for Hardness-Dependent Metals (ug/L) (The Water Effects Ratio (WER) in the equations below = 1)	Standard @ 25 mg/L in-stream hardness (ug/L)
Cadmium, acute	WER*[{1.136672-[*ln* hardness](0.041838)}*e^{0.9151[*ln* hardness]-3.1485}]	0.82
Cadmium, chronic	WER*[{1.101672-[*ln* hardness](0.041838)}*e^{0.7998[*ln* hardness]-4.4451}]	0.15
Cadmium, acute, trout waters	WER*[{1.136672-[*ln* hardness](0.041838)}*e^{0.9151[*ln* hardness]- 3.6236}]	0.51
Chromium III, acute	WER*[0.316*e^{0.8190[*ln* hardness]+3.7256}]	180
Chromium III, chronic	WER*[0.860*e^{0.8190[*ln* hardness]+0.6848}]	24
Copper, acute	WER*[0.960*e^{0.9422[*ln* hardness]-1.700}]	3.6
Copper, chronic	WER*[0.960*e^{0.8545[*ln* hardness]-1.702}]	2.7
Lead, acute	WER*[{1.46203-[*ln* hardness](0.145712)}*e^{1.273[*ln* hardness]-1.460}]	14
Lead, chronic	WER*[{1.46203-[*ln* hardness](0.145712)}*e^{1.273[*ln* hardness]-4.705}]	0.54
Nickel, acute	WER*[0.998*e^{0.8460[*ln* hardness]+2.255}]	140
Nickel, chronic	WER*[0.997*e^{0.8460[*ln* hardness]+0.0584}]	16
Silver, acute	WER*[0.85*e^{1.72[*ln* hardness]-6.59}]	0.30
Zinc, acute	WER*[0.978*e^{0.8473[*ln* hardness]+0.884}]	36
Zinc, chronic	WER*[0.986*e^{0.8473[*ln* hardness]+0.884}]	36

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