

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES FOR MANGANESE

Standard:

The procedures described in the Tier II methodology indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be affected unacceptably if the four (4) day average concentration of manganese does not exceed 90 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 809 µg/L more than once every three (3) years on the average.

Calculations:

Acute Aquatic Life:

$$\text{SAV} = \text{lowest GMAV/SAF}$$

$$\text{Lowest GMAV} = 12,940 \text{ } \mu\text{g/L}$$

$$\text{SAF} = 8.0$$

$$\text{SAV} = 12,940/8.0 = 1618 \text{ } \mu\text{g/L}$$

$$\text{SMC} = \text{SAV}/2 = 1,618/2 = \mathbf{809 \text{ } \mu\text{g/L}}$$

Chronic Aquatic Life:

$$\text{SCV} = \text{SAV/SACR}$$

$$\text{SACR} = 18$$

$$\text{SCV} = 1,618/18 = \mathbf{90 \text{ } \mu\text{g/L}}$$

Notes:

Table 1. GMAVs and SMAVs for manganese

<u>Genus Mean Acute Value ($\mu\text{g/L}$)</u>	<u>Species</u>	<u>Species Mean Acute Value ($\mu\text{g/L}$)</u>	<u>Acute- Chronic Ratio</u>	<u>Reference Number</u>
333,000	Aquatic Sowbug <u>Asellus aquaticus</u>	333,000		1
694,000	Amphipod <u>Cratogeomys pseudogracilis</u>	694,000		1
12,940	Cladoceran <u>Daphnia magna</u>	9,800		2
	Cladoceran <u>Daphnia magna</u>	8,280		3
	Cladoceran <u>Daphnia magna</u>	26,700		4
208,060	Tubificid Worm <u>Tubifex tubifex</u>	208,060		5

References:

1. Martin, T.R., and D.M. Holdich 1986. The acute lethal toxicity of heavy metals to peracarid crustaceans (with particular reference to fresh-water asellids and gammarids). *Water Res.* 20(9): 1137-1147.
2. Biesinger, K.E. and G.M. Christensen 1972. Effects of various metals on survival, growth, reproduction, and metabolism of *Daphnia magna*. *J. Fish. Res. Board Can.* 29(12): 1691-1700.
3. Khangarot, B.J. and P.K. Ray 1989. Investigation of correlation between physicochemical properties of metals and their toxicity to the water flea *Daphnia magna* Straus. *Ecotoxicol. Environ. Saf.* 18(2): 109-120.
4. Baird, D.J., I. Barber, M. Bradley, A.M.V.M. Soares, and P. Calow 1991. A comparative study of genotype sensitivity to acute toxic stress using clones of *Daphnia magna* Straus. *Ecotox. Environ. Saf.* 21: 257-265.
5. Khangarot, B.S. 1991. Toxicity of metals to a freshwater tubificid worm, *Tubifex tubifex* (Muller). *Bull. Environ. Contam. Toxicol.* 46: 906-912.

Last Modified:
May 5, 1997