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A review of toxic metal contamination in marine turtle tissues and its implications for human health

David A.N. Ross, Héctor M. Guzmán, Catherine Potvin, Vincent J. van Hinsberg



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1 **A review of toxic metal contamination in marine turtle tissues and its implications for human**
2 **health**

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4 David A. N. Ross^{a,*}, Héctor M. Guzmán^b, Catherine Potvin^a, Vincent J. van Hinsberg^c

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7 ^a*Department of Biology and Neotropical Environment Option (NEO), McGill University, 1205 Dr.*
8 *Penfield Ave., Montreal, Quebec, Canada, H3A 1B1; *davidanross5@gmail.com,*
9 *catherine.potvin@mcgill.ca*

10 ^b*Smithsonian Tropical Research Institute, PO Box 0843-03092, Balboa, Ancon, Panama;*
11 *guzmanh@si.edu*

12 ^c*Department of Earth and Planetary Sciences, McGill University, 3450 University St., Montreal, Quebec,*
13 *Canada, H3A 0E8; vincent.vanhinsberg@mcgill.ca*

14
15 *Corresponding author at: Department of Biology and Neotropical Environment Option (NEO), McGill
16 University, 1205 Dr. Penfield Ave., Montreal, Quebec, Canada, H3A 1B1. *Email address:*
17 davidanross5@gmail.com

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20 **Abstract:** Despite global awareness of trace-metal contamination in the ocean, its bioaccumulation
21 through the food web, and resulting detrimental effects on health, the quantitative toxicology of marine
22 turtles is still poorly known. Assessments are generally limited in number of species investigated, number
23 of tissues analyzed, and geographical distribution of samples. The gaps in current knowledge prevent the
24 use of that data in informing data-deficient regions of the potential exposure to toxic levels of heavy
25 metals through sea turtle consumption, particularly from eggs given their widespread human
26 consumption. We collated 95 studies reporting As, Cd, Hg, and/or Pb concentrations in edible sea turtle
27 tissues and analyzed the data for differences among tissues and geographic locations. The majority (68%)
28 of observations were from *Caretta caretta* or *Chelonia mydas*, with 59% of data from liver, kidney,
29 muscle, or blood; and only 8.2% from eggs. We observed the expected tissue-selective distributions for
30 all metals, but with significance only for As (muscle) and Cd (kidney). Cd posed the highest potential
31 health concern, through consumption of kidney and liver, while Pb and Hg posed the highest concern
32 through egg and muscle tissue, respectively. Data are sparse, however our conclusions show that heavy
33 metal exposure through regular sea turtle consumption may pose a health concern. Future analyses, with
34 priority given to eggs, adult olive ridleys, and adult hawksbills are needed to fully understand the human-
35 health risks of global sea turtle consumption.

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37 **Key words:** Sea turtle; Trace metals; Pollution; Bioaccumulation; Toxicity

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