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Gold Mining and Mercury Bioaccumulation in a Floodplain Lake and Main Channel of the Tambopata River, Perú

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ABSTRACT

Contamination of water bodies by inorganic mercury (Hg[II]) used in placer mining of gold deposits in the Madre de Dios Department, Perú, contributes to the bioaccumulation of methylmercury (MeHg) in fish tissue. We measured MeHg and total Hg (THg) concentrations (mg/kg wet weight [ww] tissue) of thirteen fish species from the Tambopata River, Perú, and the connected oxbow lake Tres Chimbadas. We also used stable isotope analysis ($\delta^{15}\text{N}$ and $\delta^{13}\text{C}$) to estimate trophic positions of fishes. Average MeHg concentrations of fish species ranged from 0.042 mg/kg ww (*Satanoperca jurupari*) to 0.463 mg/kg ww (*Hoplias malabaricus*) in the main channel and from 0.090 mg/kg ww (*Parauchenipterus* sp.) to 1.282 mg/kg ww (*Pimelodina flavipinnis*) in the lake. Spearman rank correlation indicated that trophic position had no influence on MeHg concentrations of species in the main channel, but in the lake, trophic positions of species were positively associated with MeHg. Migrations of the pimelodid catfish surveyed from the main channel are well documented. Because little gold mining occurs at our study site, fishes from the main channel may be bioaccumulating MeHg from areas where mining is widespread. Fish species that reside in the lake are relatively sedentary and migration is limited by the brief period of floodplain inundation and the long, narrow corridor that connects the lake to the main channel; lake sediments are therefore the likely source for MeHg bioaccumulation. Five out of the eight fish species surveyed from the main channel and two out of the five species from the lake had MeHg levels higher than United States Environmental Protection Agency fish tissue criterion for human consumption.

KEYWORDS

Fishes; Giant Otter; Gold Mining; Mercury; Methylmercury; Perú

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