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Dynamics of Mercury in Eared Grebes on Great Salt Lake

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Total mercury was measured in primary and breast feather and in liver and breast muscle tissues of eared grebes (*Podiceps nigricollis*) during the fall migration at Great Salt Lake, Utah and for reference, also at Mono Lake, California in 2006. A subset of liver and breast muscle tissues was also analyzed for methylmercury and selenium. Grebes typically arrive at Great Salt Lake starting in August and into September and depart by late December.

Concentrations of total mercury in grebes from Great Salt Lake increased in all tissues except primary feathers during a 64 day period between October and December (Figure 1). The most pronounced change in total mercury occurred in the liver, increasing nearly threefold ($F_{2,27} = 20.78$; $P = < 0.001$) from a mean of 10.2 mg/kg to 27.4 mg/kg on a dry weight basis, followed by breast feather ($F_{2,27} = 4.80$; $P = 0.016$) and breast muscle ($F_{2,27} = 3.48$; $P = 0.045$). Notably, mean liver methylmercury (9.7 to 22.2 mg/kg) and selenium (13.7 to 23.2 mg/kg) concentrations also increased during this same period. Mercury concentrations in breast (mean = 13.9 mg/kg) and primary (12.4 mg/kg) feathers and liver (7.3 mg/kg) and breast muscle (1.6 mg/kg) from eared grebes at Mono Lake were generally lower than those from Great Salt Lake in mid-October. The grebes at Mono Lake staged for a much shorter period than those at Great Salt Lake in 2006, thus later seasonal comparisons were not possible.

Feathers had the highest concentrations of mercury, supporting evidence that this tissue is an important mechanism for excretion of mercury. Breast muscle had the lowest mercury concentrations; however, all Great Salt Lake samples still exceeded recommended human

consumption screening criteria of 0.3 mg/kg wet weight. Mean concentrations of methylmercury comprised 72% and 96% of total mercury in liver and breast muscle of Great Salt Lake eared grebes, respectively.

When compared to historic data (1992–2000), our data indicated that liver mercury concentrations have increased in eared grebes at Great Salt Lake over the past two decades. Increases (mean = 0.34 mg/kg in 1996 - 2000 and 1.02 mg/kg in 2006) were also observed in brine shrimp (*Artemia franciscana*), the predominant food of grebes at Great Salt Lake.

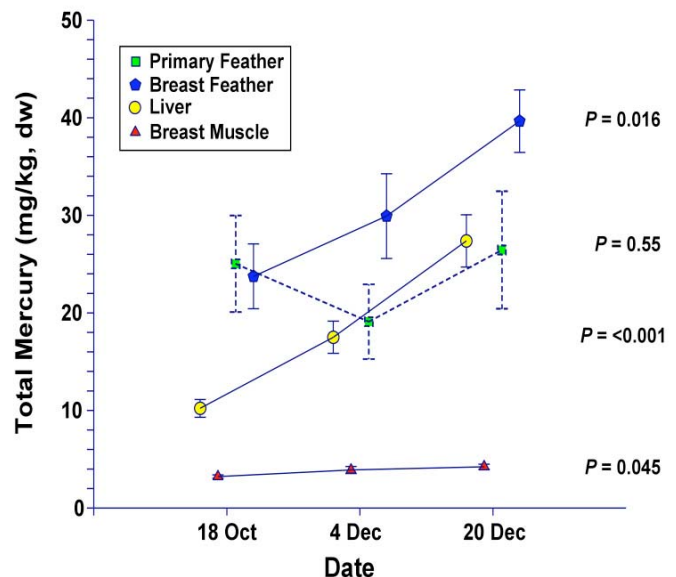


Figure 1—Seasonal concentrations (mean and standard error) of total mercury in tissues from eared grebes collected on Great Salt Lake during 2006. P-values indicate level of significance between sample dates. Concentrations are in mg/kg dry weight.