



Release:
June 2012

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Mercury May Reduce Body Condition of Endangered California Clapper Rails

The loss of historic tidal marshes in San Francisco Bay has prompted expansive habitat restoration efforts. However, San Francisco Bay has a legacy of mercury contamination from historic mercury mining and gold extraction. There is concern that mercury could become more bioavailable within the estuary during marsh restoration efforts, and possibly impact breeding wildlife in the Bay, including the endangered California clapper rail (*Rallus longirostris obsoletus*).

USGS researchers examined mercury exposure in 133 California clapper rails within tidal marsh habitats of San Francisco Bay from 2006 to 2010, and reported their findings in *Environmental Pollution*. Birds were collected from Arrowhead Marsh, Colma Creek Marsh, Cogswell Marsh, and Faber-Laumeister Marsh.

Overall, 15% of blood and 56-63% of feather samples from clapper rails were over 1.0 $\mu\text{g/g}$ ww and 9.0 $\mu\text{g/g}$ fw, respectively. These mercury concentrations put birds at risk for potentially impaired reproduction. Additionally, 31% of abandoned clapper rail eggs were considered at high risk (>1.0 $\mu\text{g/g}$ fww) for potential reproductive impairment based on toxicity endpoints for other species. The egg mercury concentrations observed in 2007-2010, were similar to those found for clapper rails in the South San Francisco Bay during 1986-1987 and 1991-1992 studies.

Importantly, body condition was negatively related to mercury concentrations in clapper rails. Model averaged estimates indicated a potential decrease in body mass of 20-22 g (5-7%) over the observed range of mercury concentrations. The results indicate the potential for detrimental effects of mercury contamination on California clapper rails in tidal marsh habitats.

Management Implications

- Mercury contamination of tidal marsh habitats in San Francisco Bay are elevated and may be reducing the body condition of endangered California clapper rails.
- Monitoring programs for clapper rails should be spatially widespread so that local mercury contamination hotspots can be identified for appropriate conservation and mitigation actions.
- Although use of feathers for assessing mercury contamination is typically not recommended for mercury monitoring programs, feather mercury concentrations in California clapper rails were found to be strongly correlated with blood mercury concentrations due to the clapper rails' limited movements and extremely small annual home ranges. Feathers may therefore be a viable sampling tissue for assessing mercury contamination in clapper rails if more invasive sampling methods (blood, eggs) are restricted.

THIS BRIEF REFERS TO:

Ackerman, JT, CT Overton, ML Casazza, JY Takekawa, CA Eagles-Smith, RA Keister, MP Herzog. 2012. Does mercury contamination reduce body condition of endangered California clapper rails? *Environmental Pollution* 162: 439-448. doi: 10.1016/j.envpol.2011.12.004

<http://www.werc.usgs.gov/ProductDetails.aspx?ID=4730>

<http://www.werc.usgs.gov/ackerman>

<http://www.werc.usgs.gov/southbayrestoration>



A California clapper rail undergoes measurements for body condition.