

Western Ecological Research Center

Publication Brief for Resource Managers

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Sources of Organochlorine Contaminants and Mercury in Seabirds from the Aleutian Archipelago of Alaska

The Aleutian archipelago of Alaska, which separates the North Pacific Ocean from the Bering Sea, supports a diverse and abundant community of resident and migratory seabirds, comprising over 26 species and 10 million birds. However, comparatively little data exist on sources of environmental contaminants for this community despite extensive published reports on contaminants in seabirds from the high arctic. USGS scientists Dr. Keith Miles and Mark Ricca (Western Ecological Research Center) and Dr. Robert Anthony (Oregon Cooperative Fish and Wildlife Research Unit) collected and analyzed concentrations of organochlorine compounds and mercury in liver samples from representative seabirds inhabiting the western and central archipelago to help describe point and distant sources of contaminants. Their work has been published recently in the online edition of *Science of the Total Environment*.

The authors collected glaucous-winged gulls, northern fulmars, and tufted puffins along a natural longitudinal gradient in the western and central Aleutian archipelago (Buldir, Kiska, Amchitka, and Adak Islands), and an additional 8 seabird species representing different foraging and migratory guilds from Buldir Island. Concentrations of total polychlorinated biphenyls (PCBs) and most chlorinated pesticides (e.g., DDE) in glaucous-winged gulls consistently exhibited a 'U'-shaped pattern of high levels at the westernmost island of Buldir and easternmost island of Adak, and low levels at the central islands of Kiska and Amchitka. Mercury concentrations in glaucous-winged gulls increased in a westward direction while the highest concentrations were detected in northern fulmars from Buldir. Seabirds that foraged higher in the food web tended to

Management Implications:

- The east side of Adak Island (a Naval installation closed in the mid 1990s) was a likely point-source of PCBs and DDE, particularly in glaucous-winged gulls.
- Conversely, elevated concentrations of organochlorines and mercury, along with PCB congener and chlorinated pesticide compositional patterns detected at Buldir Island (a remote island with no 20th century human activity) indicated exposure from distant sources ostensibly influenced by a combination of atmospheric-oceanic processes and the migratory movements of seabirds.
- Our results indicate seabirds inhabiting the Aleutians are still exposed to environmentally persistent metabolites of chlorinated compounds derived from local and distant sources. Furthermore, contaminant concentrations in seabirds may pose risks to apex predators such as bald eagles that consume seabirds.

have higher concentrations of total PCBs, DDE, and mercury, but correlations between these contaminants and trophic status were lower than expected based on previous studies of arctic seabirds.

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[Note: This journal article will also appear in a future print issue of *Science of the Total Environment*.]