

Freshwater Pond Stage II Ecological Risk Assessment

ECOLOGICAL RISK ASSESSMENT PROJECT

Site Location:
Client:
Date:

Northeastern Massachusetts
Confidential Client
2009

As a consequence of treating felt with mercuric sulfate (HgSO_4) at a former industrial facility, mercury was deposited in the sediments of this freshwater kettle pond. The six groups of taxa that exhibited the highest likelihood of becoming exposed and potentially adversely affected by mercury and methylmercury (which is formed in aquatic environments) included (1) benthic invertebrates; (2) forage fishes; (3) predatory fishes; (4) piscivorous mammals; (5) carnivorous birds; and (6) piscivorous birds.



Risk analyses included: additional sediment and surface water sampling; statistical comparisons with the reference site; chronic sediment toxicity testing using the freshwater amphipod *Hyallela azteca*; aquatic biota-sediment accumulation factors (BSAFs) used to model invertebrate tissue burdens; forage and predatory fish tissue residue analysis and comparison with NOAEL and LOAEL Toxicity Reference Values (TRVs); and an assessment of fish condition and the fish community. Food-web modeling was conducted for the bald eagle, belted kingfisher, great blue heron, and the mink whereby estimated daily doses were compared with published NOAEL and LOAEL TRVs. The comparison with the TRV was expressed as a Hazard Quotient (HQ) as part of the risk characterization.

In spite of statistically significant reductions in length and weight, amphipod survival was 85% or higher and indicates that benthic invertebrates are unaffected by the presence of mercury and methylmercury in Site sediments. Given HQs above the NOAEL and LOAELs for mercury and methylmercury, there is the potential for adverse ecological effects on forage and predatory fishes; the belted kingfisher; the great blue heron; and the mink. The bald eagle is the only receptor to not exhibit the potential for ecological harm.

The assessment of environmental harm conducted as part of this Stage II ERC, indicated that a condition of “No Significant Risk of Harm to the Environment” does not exist at the MCP disposal site. However, given the documented presence of elevated mercury and methylmercury concentrations within aquatic habitats and the tissues of biota throughout northeastern Massachusetts, which has been identified as a mercury “biological hotspot”, this ecological harm is not entirely related to the Site. In light of these regional conditions, the remediation of sediments within the freshwater pond would not significantly reduce potentially adverse effects on ecological receptors.