The AECOM team developed and executed an innovative class level risk assessment to assist managers of federal real properties with the task of allocating liability reduction resources among multiple properties with similar activities and infrastructure. A class risk assessment applies conditional probability theory: assessing the likelihood of actual environmental liability, conditional upon the class of activities and infrastructure present on that site. Using the power of statistical inference, only a limited number of differing classes of site need to be assessed in detail. While the example provided comes from the federal jurisdiction, the techniques and approaches are broadly applicable to other jurisdictions. For example, the AER and BC OGC may be persuaded to consider such a tool for defining an oil and gas producers overall environmental liability, and subsequent financial obligation to orphaned well programs.

On behalf of a federal agency, AECOM scoped and executed a class level human health and ecological risk assessment for 197 Stations along 1700 km of the unnamed river. The project was broken into two stages:

- Review of a-prior data, gap analysis, selection of analog Stations for field reconnaissance and development of detailed sampling and analysis program; and
- Field execution, data analysis, problem formulation, risk characterization for the analog Stations and final overall infrastructure risk ranking for all 197 Stations.

Exposure and risk characterization was estimated on a site-by-site basis using the statistical upper bounds on the soil contaminants of concern. The initial risk characterization was based upon a straightforward comparison of the soil upper bounds concentration against soil quality benchmarks for protection of: humans; direct ecological contact, wildlife and groundwater protection for aquatic life. Where initial risk characterizations showed potential risk, secondary lines of evidence were applied which involved qualitative observations on plant health and estimating incidental soil and water exposure to wildlife. Contaminant transfer into the biotic food chain was addressed by direct analytical testing of vegetation, which showed that this was not a pathway of concern.

Including a-prior data and the gap closure data collected by AECOM, there were 46 of the total 197 Stations with soil quality information that was assessed for human and environmental risk characterization. None of the assessed Stations showed human risks; however, various ecological receptors groups showed some magnitude of risk characterization. Depending on magnitude of exceedance relative to the benchmark, ecological relevance and strength of causal linkage, the lines of evidence were weighted. Based on the final weighted, cumulative risk ranking eighty nine percent of the assessed Stations showed negligible risk; six percent showed low risk; and, four percent showed moderate or high risk. The benefit to the federal real property manager is that limited liability reduction resources can be allocated to the four percent of Stations that pose the greatest risk.

To assist the federal real property manager in making an informed decision on environmental liability at the 151 unassessed Stations, AECOM applied the knowledge developed from the assessed 46 Stations to infer an environmental liability at the unassessed Stations. This was achieved by developing an infrastructure risk ranking for all 197 Stations based on available knowledge of activities and structures present. Increased infrastructure risk ranking positively correlated with actual assessed environmental risk ranking. The infrastructure risk ranking database is designed to be updated as site-specific information is gathered during annual maintenance reconnaissance trips conducted by the federal authority.

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