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**7-6**

### **Determination of Total and Bioavailable Soil Lead from a Shooting Range in Central California.**

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Lead can pose a significant risk to environmental quality at and around shooting ranges due to its use in bullets and shot. The concentrations of Pb in soils, plants and surficial waters from a shooting range were determined in this study. Soil and plant samples were analyzed for total Pb (US EPA method 3050a) to determine the extent of Pb contamination. The toxicity characteristic leach procedure (TCLP; US EPA method 1311) was followed to ascertain bioavailable Pb. Soil samples ranged from 14.71 to 6346.15 mg Pb kg<sup>-1</sup> soil with an average value of 1157.43 ( $\pm 2000.57$ ) mg Pb kg<sup>-1</sup> soil across the shooting range. Plant samples ranged from 632.76 to 2896.00 mg Pb kg<sup>-1</sup> plant with an average value of 1410.31 ( $\pm 1287.11$ ) mg Pb kg<sup>-1</sup> plant, demonstrating significant Pb uptake. Bioavailable Pb was highest in the berm at 2038.00 mg Pb kg<sup>-1</sup> soil. Sampling at depth showed Pb concentrations of 72.92 mg Pb kg<sup>-1</sup> soil. When compared to surface samples (897.96 mg Pb kg<sup>-1</sup>), this shows some Pb is leaching through the profile. High Pb concentrations were detected in soil samples collected from the drainage (457.84 mg Pb kg<sup>-1</sup>), while low Pb levels were detected in the stormwater retention pond and sediments (0.11 mg Pb L<sup>-1</sup> and 39.36 mg Pb kg<sup>-1</sup> respectively). This indicates Pb is being transported through erosion of soil colloids. Elevated Pb levels from soil sampled in the drainage indicate most Pb present is attached to soil colloids and not free (Pb<sup>+2</sup>) to leach or runoff. Higher concentrations of Pb were detected in plant samples than extracted by TCLP bioavailable Pb estimations. This could present a problem for any pastoral activities and should come under further scrutiny.

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