

Lead is a Special Concern

There has been a lot of attention paid to lead levels in soil because it is well-known to cause adverse health effects, and is relatively widespread as a result of its historical use in many commercial products, from gasoline to paint. Table 3 shows the guidelines for garden soil use based on total lead content that have been developed by the states of New Jersey and Pennsylvania.

Table 3. Soil lead contamination levels and recommended actions.			
Contamination level	Total Lead in soil		Recommended Action
	mg/kg		
	PA	NJ	
none / very low	< 150	< 100	No need to be concerned about lead exposure.
low / elevated	150 - 400	100 - 300	Conduct best management practices (BMPs) to minimize lead exposure from vegetable gardens: apply phosphate fertilizer, maintain high pH for fruiting vegetables, keep soil mulched to minimize dust and lead inhalation.
medium / significant	400 - 1000	300 - 400	Conduct BMPs; do not grow leafy vegetables.
high / cleanup	> 1000	> 400	Do not grow a vegetable garden. Contact local health department for lead abatement measures.

Best Management Practices for Soils with Elevated Levels of Heavy Metals

Although heavy metals remain in soil for a very long time, there are some steps that can be taken to reduce the level of risk they pose. In some cases, heavy metal concentrations can be 'diluted' with deep tillage; for example, to distribute contaminated surface sediment that was deposited by flooding. In garden plots, dilution can be achieved by the addition of uncontaminated soil. Adding organic matter to the soil can help 'tie up' heavy metals chemically, reducing their availability for potential plant uptake. Similarly, liming to a neutral pH and maintaining optimal soil phosphorus levels can reduce heavy metal availability to plants. For some heavy metals, such as lead, there is little evidence that it is accumulated within crops; the main health hazard is through soil ingestion and inhalation. Soils high in heavy metals pose a greater health risk to children than to adults because children are still growing, and they are more likely to ingest soil directly.

Interpreting TOTAL Heavy Metals Soil Test Results

The US Environmental Protection Agency (EPA) and NY Department of Environmental Conservation (NYS DEC) have guidelines for determining the safety of various land uses based on total soil metal concentrations. Table 2 shows these limits, which are used to guide clean-up efforts. EPA levels are used to guide clean-up efforts of contaminated sites; NYS DEC levels are based on removing human health risks; unrestricted use includes agriculture.

	US EPA	NYS DEC	
	Soil level requiring clean-up	Unrestricted use*	Residential use
Copper (Cu)	--	270	270
Cadmium (Cd)	70	0.43	0.86
Chromium (Cr)	230	11	22
Nickel (Ni)	1600	72	140
Lead (Pb)	400	200	400
Zinc (Zn)	23,600	1100	2200

*Includes agricultural use.