

Lead in Soils Environmental Implications

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Recognition of a Problem

- In 1965 Clair Patterson published “*Contaminated and Natural Lead Environments of Man*”
- Indicated elevated levels of lead in the environment as a result of anthropogenic effects

Lead

- Lead is a metallic element that occurs naturally in all soils as a result of regional geology
- Background levels in and around St. John's are ~25 ppm.
- Lead does not break down and is not rapidly absorbed by plants, so it remains in the soil

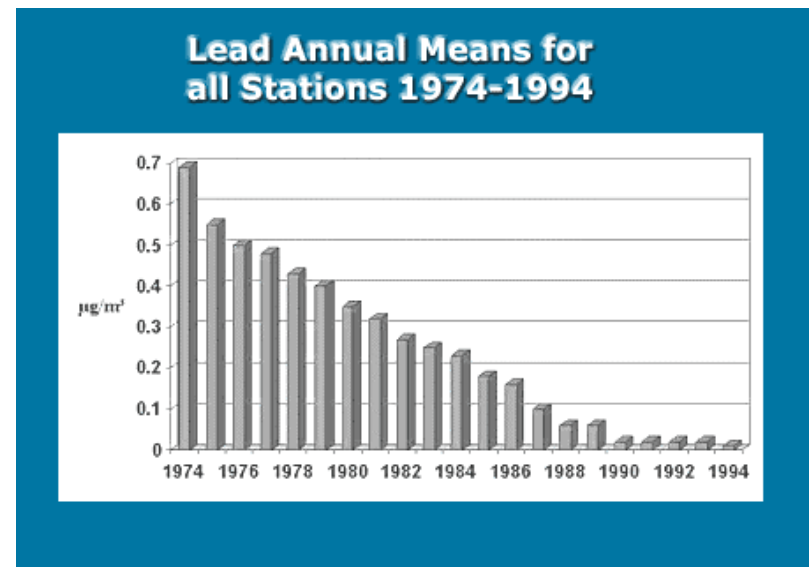
Anthropogenic Sources of Lead

Main sources include:

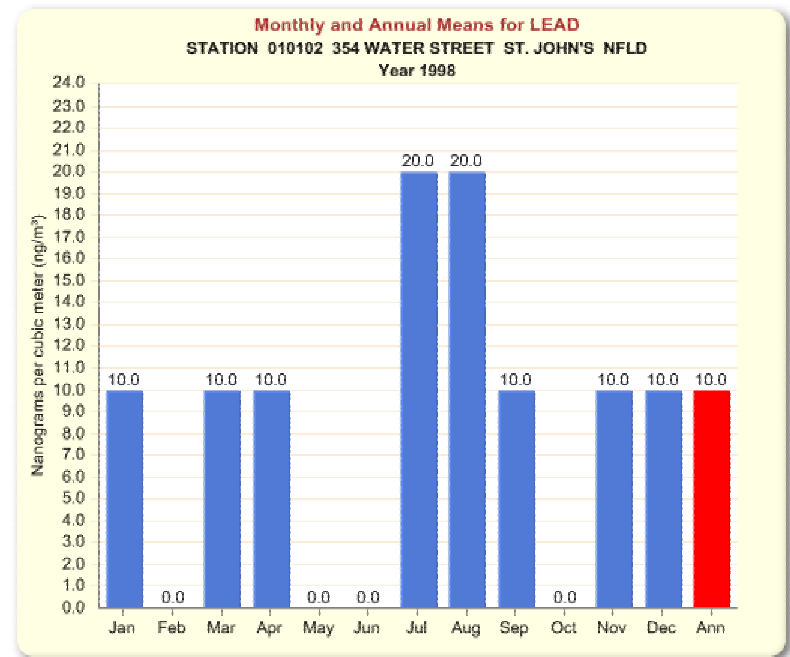
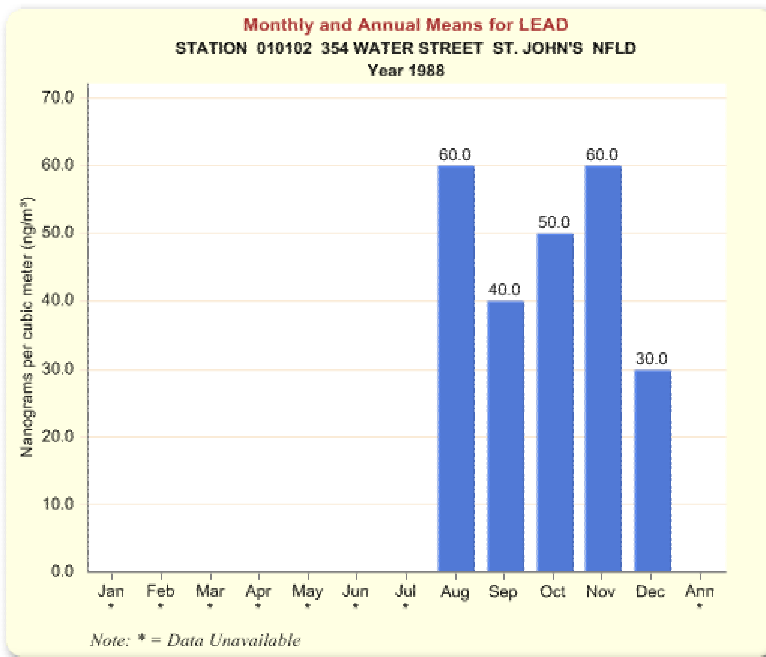
- Leaded gasoline (banned in 1990)
- Lead-based paint (banned in 1978)
- Coal burning

Lead Levels in the Atmosphere

- National Air Pollution Surveillance (NAPS) monitors for atmospheric pollutants across Canada
- Reduction initiatives have resulted in significant reductions in atmospheric lead levels



Lead Levels in the Atmosphere – St. John's NAPS Monitoring Station



CCME Soil Quality Guidelines

- Evaluation based on risk to the environment as well as human health
- In the evaluation (human health), they use the most sensitive receptor (small children up to four years of age) and the most extreme exposure (24 hrs/day, 365 days/yr) to determine a value (i.e. 140 ppm for lead in residential/parkland soils) which will have a “No Observable Effects Level” over a lifetime of exposure
- They are **NOT REGULATIONS**

CCME Soil Quality Guideline - Lead

Agricultural	Residential/ Parkland	Commercial	Industrial
70 ppm	140 ppm	260 ppm	600 ppm

What to do if Levels Exceed the CCME Guideline?

- CCME Guidelines are very conservative, and in some cases are exceeded by normal background levels which are a result of the geology of the area
- If the soil exceeds the guideline it doesn't mean that the soil is unsafe
- A Risk-Based Assessment may determine that the soil can tolerate much higher levels than are in the CCME Guideline

Risk-Based Assessment

- Evaluation of the entire property to determine: metal concentrations throughout the soil; amount of exposed soil; who is exposed; as well as actual exposure levels
- Site specific – what may be considered safe for one property may not be for another

US Environmental Protection Agency

- Soil lead levels below 400 ppm require 'no action'
- Levels between 400 ppm and 1200 ppm are considered a 'level of concern'
- Levels greater than 1200 ppm should require remedial action

Unsafe Lead Levels in Soils – What to do?

1. Cover it – place a protective barrier between you and the soil. This may be as simple as a newly seeded or sodded lawn, a raised sandbox or concrete/pavement cover.
2. Remove it – have a contractor remove the existing soil and replace it with ‘clean’ soil.

Thank You

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