

Contaminated Land Management in Finland - state of the art

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YMPÄRISTÖMINISTERIÖ
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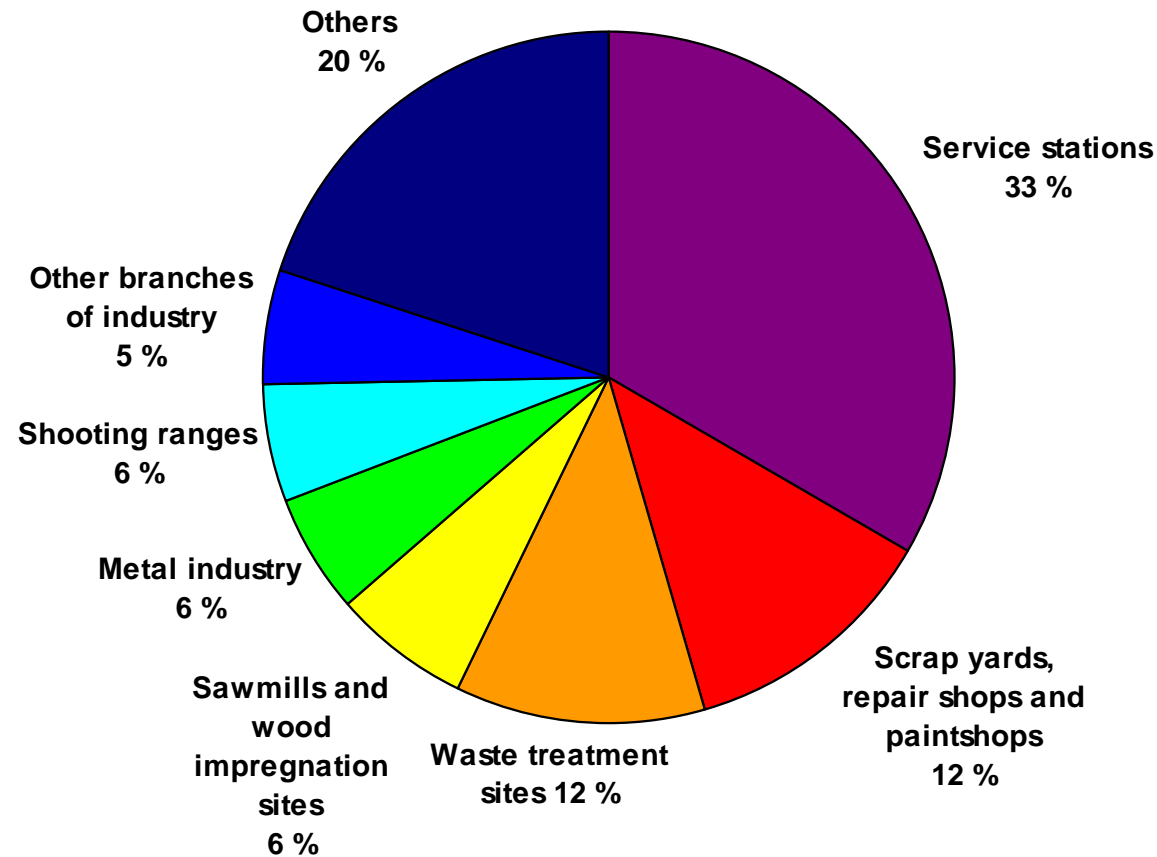


Contaminated sites in Finland

- Two inventories:
 - early 1990's and 1998-1999
- Total amount of 20 000
- Including present and past activities
- At first historical investigations on sites where has been such an activity that might have caused soil contamination



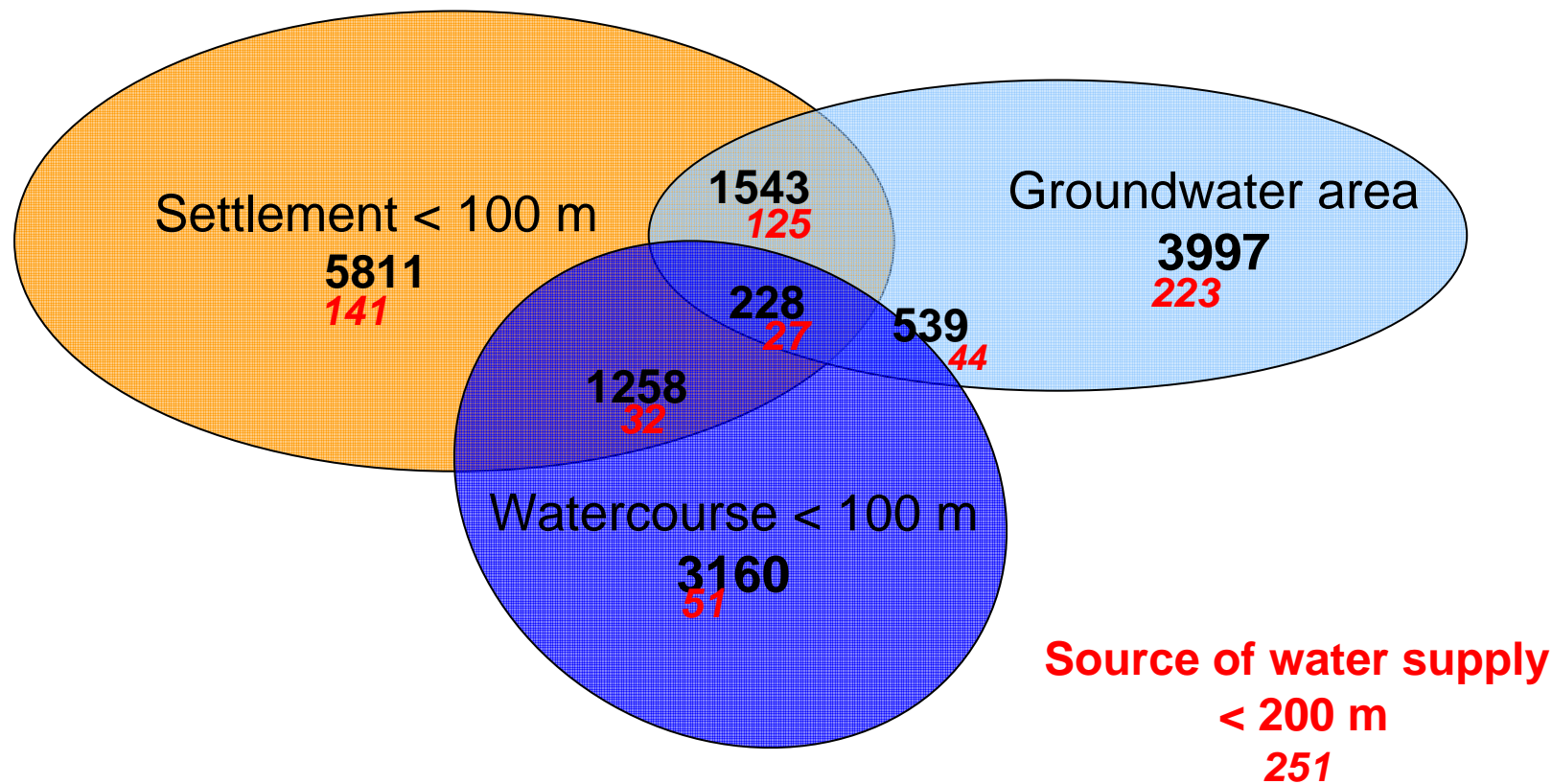
Activities on potentially contaminated soil sites



Typical contaminants and sources of contamination

Contamination sources	Contaminants								
	Pb	Other heavy metals	As	Oils, petrol	PAH	PCB	Chlorophenols, dioxins and furans	Cyanides	Pesticides
Service stations, oil spills				X					
Saw mills, impregnation plants		Cu, Cr	X		X		X		
Other industry	X	hm	X	X	X	X		X	
Scrap yards, depots, traffic	X	hm		X	X	X		X	
Greenhouses	X	hm	X	X					X
Shooting ranges	X	Sb			X				
Other sites	X	hm	X	X	X	X	X	X	X
hm = Cu, Zn, Cd, Cr, Ni, Sb, Hg, etc									

Location of suspected areas



Environmental Protection Act (EPA)

- Soil pollution is prohibited (7 §)
- Groundwater pollution is prohibited (8 §)
- Duty to treat soil and groundwater (75 §)
- Duty to notify (76 §)
- Duty to investigate (77 §)
- Environmental permit for restoration of soil (78 §)
- Ordering restoration (79 §)
- Reporting duty concerning a polluted area (104 §)
- Implementing Directive on environmental liability (2004/35/CE) -> revisions, new legislation?



Contaminated soil?

- No exact definition
- Soil pollution prohibition (EPA 7 §)
 - *Waste or other substances shall not be left or discharged on the ground or in the soil so as to result in such deterioration of soil quality as may endanger or harm health or the environment, substantially impair the amenity of the site or cause comparable violation of the public private good.*



Assessment of soil contamination and remediation needs

- Old generic guidelines (so-called SAMASE-guideline and limit value) have been widely used as planning and decision tool.
 - RBLM is not used very often
- Upcoming government decree on assessment of soil contamination and remediation needs
 - risk analysis is emphasized
 - also risk based soil quality guidelines for about 60 substances are presented and the procedure used to derive them is introduced in a guide book.

The future guidelines

- **Target value** is based on ecotoxicological risks and is defined as a concentration, which should protect 95 % of the species in the ecosystem.
- **Lower and upper guideline values** are based on potential risks to humans or the environment.
 - Ecotoxicological lower guideline value describes a risk level, which may cause adverse effects to half of the species or microbiological processes in the ecosystem.
 - Human risk based lower guideline value is determined on the basis of a modeling calculation and is defined as a soil concentration in a residential area expected to cause human exposure equivalent to tolerable daily intake of the compound in question.
 - Upper guideline value based on potential environmental risks describes the highest risk level, in which soil is still considered to be microbiologically functional. Health risk based upper guideline value is defined as the maximum acceptable soil concentration in an industrial area.

Authorities and their Duties

- Ministry of the Environment
 - policy, legislation, funding
- 13 Regional Environmental Centres
 - promotion of remediation
 - permitting and supervising soil remediation projects
- 3 Environmental Permit Authorities
 - permitting large projects and those financed by the state
- Municipalities (more than 400)
 - supervising



Remediation

- Over 2 600 sites remediated during last 15 years
- Small remediations after oil and chemical accidents excluded
- Every year starts over 400 new remediation work
- Lots of service stations, sawmills, wood impregnating sites and landfills
- Future remediations: repair-shops, dry cleaning, shooting ranges and glasshouse areas
- Costs: 50 –70 million euro/year, 1 – 1,2 milliard next 20 years
- Amount of excavated contaminated soil 500 000 tonnes / year



Most common reasons for remediation

- Change in land use
- Corporate or real estate transactions
- Closing down of activity
- Revealing of harmful effects
- Accidents

Risks:

- ***Health risks for people***
- ***Ecological risks***
- ***Risks for buildings or constructions***
- ***Financial risks***
- ***Psychological risks***



Liability to remediate

- 1st polluter**
- 2nd property owner**
- 3rd local municipalities or state**

- In cases where the polluter cannot be assigned, clean-up costs are, in practice, shared between the government (state budget) and local authorities.
- Current shares: 2/3 private sector, 1/3 public sector
 - Industry's share is 40 %
- **The Environmental Damage Insurance Act**
 - covers also costs of rehabilitating abandoned contaminated sites.
 - however the insurance covers only clean-up costs of pollution, which has occurred after 1.1.1999.

State Financing

- **State budget money** for remediation of "orphan" sites.
 - **ca 3 million euros/year**
 - A current state waste management system which makes it possible for the state to participate or finance on (mostly) max by 50 % of the remedial action costs in co-operation with municipalities or property owners.
 - lack of appropriate funds, whether from local authorities or government
- The funds of the **Oil Pollution Compensation Fund** can be used for cleaning up abandoned sites, which have been contaminated by oil.
 - **ca 2 million/year**
 - SOILI programme (since 1996) an agreement between petroleum industry enterprises and public bodies on the remediation of polluted decommissioned service station sites

Remediation techniques

- mostly soil excavation and landfilling

