



YMPÄRISTÖMINISTERIO
 RIJKSÖPPNINGSÄRETT
 MINISTRY OF THE ENVIRONMENT

Status of and policy on contaminated sites in Finland
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 20.9.2006 Nordrocs, Malmö

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Content of the presentation

- Contaminated sites in Finland
 - Inventories
 - Authorities
 - Remediations
 - Some statistics based on decisions (2005)
- Legislation
- Costs, liabilities and funding
- Contaminated sediments/dredged material


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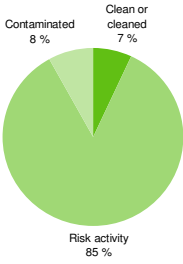
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SITES, AUTHORITIES, STATISTICS

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Contaminated sites in Finland



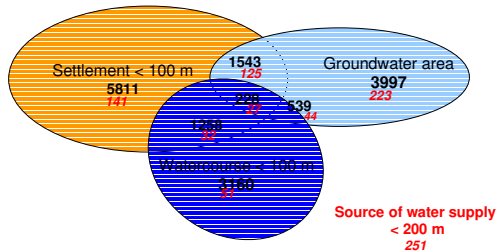
Status	Percentage
Risk activity	85 %
Contaminated	8 %
Clean or cleaned	7 %

- Inventories:
 - early 1990's and 1998-1999
- Updating going on
- Total amount of sites
 - 20 000
- Including present and past activities

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- Location of suspected areas



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- Authorities and their Duties

- Ministry of the Environment
 - policy, legislation, funding
- 13 Regional Environmental Centres + Helsinki
 - promotion of remediation
 - permitting (approval of notification / environmental permit) and supervising soil remediation projects
- 3 Environmental Permit Authorities
 - permitting large projects and those financed by the state
- Municipalities (more than 400)
 - supervising, land use planning,
- Finnish Environment Institute
 - research, expert organization

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- Database for soil status - MATTI

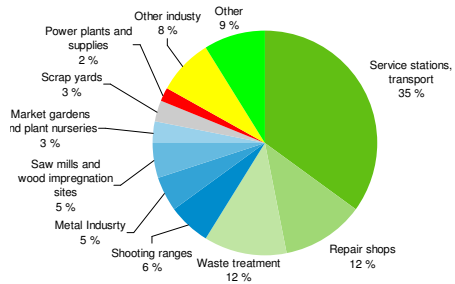
- National database system – linked to other environmental databases
 - state environment authorities
- Inauguration going on
- Target
 - to improve handling and dissemination of information
 - on line use for public municipal authorities



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- Activities in inventory



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- Typical contaminants and sources of contamination

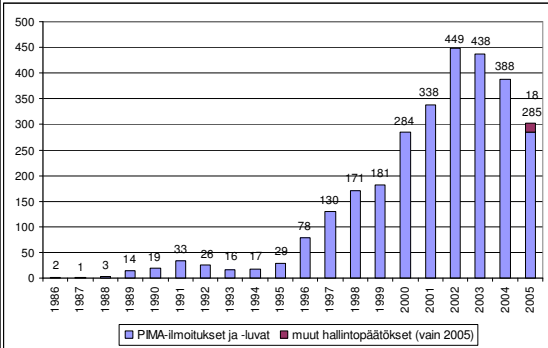
Contamination sources	Contaminants								
	Pb	Other heavy metals	As	Oils, petrol	PAH	PCB	Chlorophenois, dioxins and furans	Cyanides	Pesticides
Service stations, oil spills				x					
Sawmills, impregnation plants		Cu, Cr	x			x	x		
Other industry	x	hm	x	x	x	x		x	
Scrap yards, depots, traffic	x	hm		x	x	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

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Environmental permit or notification decisions for restoration of contaminated sites in Finland 1986 – 2005.



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Remediations

- About 3000 sites remediated
 - Small remediations after oil and chemical accidents excluded
- Every year starts about 300 – 400 new remediation works
- Lots of service stations, sawmills, wood impregnating sites and landfills
- Future remediations: repair-shops, dry cleaning, shooting ranges and glasshouse areas
- Amount of excavated contaminated soil 500 000 tonnes / year

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Remediation methods (2005)

Remediation methods	Number
Excavation (off-site)	250
Excavation + isolation	5
Excavation + soil vapour extraction	4
Excavation + other methods	11
Isolation	8
Soil vapour extraction	3
MNA	4
Reactive barriers	1
Experimental methods	3
Groundwater treatment	1
No treatment (monitoring)	3
Remains to be decided later	10
Total	303

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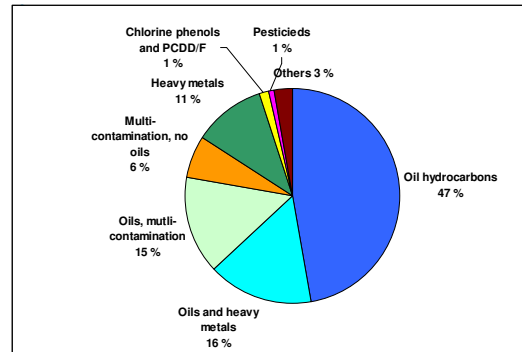
Treating methods

- A wide range of methods exist
 - bioremediation by composting, soil washing, thermal desorption, solidification or stabilization, landfilling and isolation or containment etc.
- Treatment facilities that can take on different types of contaminated soil.
- Disposing at landfills is rather common
 - Slightly contaminated soil
 - used for the building of roads and handling areas, the coating of wastes in daily practices, or in the closing phase.
 - Also more heavily contaminated soils
 - as such (after sieving) or as, for instance, stabilized material.
 - Special landfills for contaminated soil (monofills).
 - Criticism: BAT? Drivers ?? No tax.
 - The Council Decision establishing criteria and procedures for the acceptance of waste in landfills was implemented 1.9.2006
- The utilization of contaminated soil outside waste handling areas is not common.

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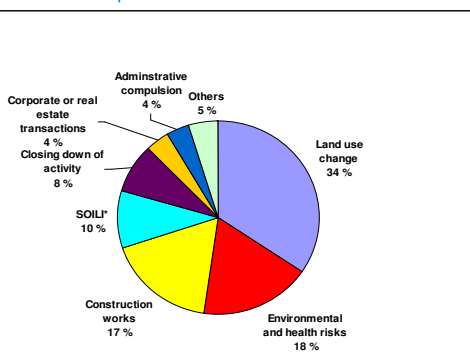
Contaminants in soil 2005 (in decisions)



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Reason to proceed



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LEGISLATION

- Swedish translations
 - <http://www.finlex.fi/sv/>

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• 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 / notification for restoration of soil (78 §)
- Ordering restoration (79 §)
- Reporting duty concerning a polluted area (104 §)
- Implementing Directive on environmental liability (2004/35/CE) -> minor (or even none) revisions
- Future Soil Framework Directive???

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• Other important legislation

- Waste Act
 - Excavated contaminated soil = waste
- [Government Decision on landfill sites](#)
 - Council Decision (criteria)
- [Regulation on POPs](#)
- (old) Waste Management Act
 - Liabilities (old cases)
- [Land Use and Building Act](#)
 - Land use planning, building permits
- EIA-legislation
- Act on Compensation for Environmental Damage
- The Environmental Damage Insurance Act

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• 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.
 - Contamination is related to the effects not the concentration of the harmful substances

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• 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.
 - Risk assessment and RBLM has not been used very often
- SAMASE-guidelines were meant to be temporary, but they have been used now for more than ten years.
- The preparation of a [government decree on assessment of soil contamination and remediation needs](#) started 1997.
- The decree is supposed to be finalized in few months

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- The upcoming government decree on assessment of soil contamination and remediation needs (1/2)
 - Scope: soil contamination
 - not** sediments, excavated contaminated soil (waste), groundwater
 - The assessment of soil contamination and remediation need should be based on effects of hazardous substances on human health and environment (not concentrations) =>> some level of **case-specific (risk) assessment** is always required
 - The elements of the assessment are described in the decree
 - concentrations, amounts, background levels, soil and groundwater conditions, diffusion, spreading, exposure current and approved use of land, uncertainties ...

- Draft decree (2/2)
 - Trigger value is given as a starting point for the assessment
 - Risk based soil quality guidelines are presented to help the assessment of soil contamination and need to remediate
 - upper guideline for industrial, stocking and traffic areas
 - lower guideline for others
 - Reliable investigations
 - reliable and representative sampling
 - reliable and mainly accredited analyzing methods
 - Annex: values for 52 substances or groups of sbs
 - Symbols
 - (e) environmental risk; (t) health risk; (p) groundwater

- The upcoming guide book on assessing contamination and remediation need
 - More detailed information about the assessment procedure
 - Excavated (contaminated) soil
 - Administrative procedures – permits, notification, statements etc.
 - The procedure how the values were derived
 - Fact sheets

liitte

Esitetty

Esitetään osatietoja haitta- ja voimakehittämättömyysarvioinnin osasta. Maaperän laatu on tarkasteltavana se, mikä vaikuttaa voimakehittämättömyyden määrittämiseen. Esitetään osatietoja haitta- ja voimakehittämättömyysarvioinnin osasta, joka on tarkasteltavana se, mikä vaikuttaa voimakehittämättömyyden määrittämiseen. Maaperän laatu on tarkasteltavana se, mikä vaikuttaa voimakehittämättömyyden määrittämiseen. Esitetään osatietoja haitta- ja voimakehittämättömyysarvioinnin osasta, joka on tarkasteltavana se, mikä vaikuttaa voimakehittämättömyyden määrittämiseen.

Esitetty	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)	ES-C _{0.1} (mg/kg)
Terveyttä	130 ¹⁾	1,0 ²⁾	30 ³⁾	240 ⁴⁾	0,66				
Ympäristöä						1,0 ⁵⁾	130 ⁶⁾	130 ⁷⁾	
	0,3	1,5	3,3 ⁸⁾	20 ⁹⁾	1,97233	1,0			

¹⁾ ES-C_{0.1} ja K_{0.1} -Ei-toimitusmaastiedot.
²⁾ ES-C_{0.1} ja K_{0.1} -Ei-toimitusmaastiedot.
³⁾ Toimitusalueen OSM-alueen raja-arvo. 0,1 % luokitusarvo: 17,53 mg/kg. BCD_{0.1} tilavuusosuus: NOBC_{0.1}-sidosmäärä: 41 mg/l (90 %), 8-201 mg/l ja se on
ja, LK/C_{0.1}-arvo on 61 mg/l.
⁴⁾ Toimitusalueen OSM-alueen raja-arvo ja käyttäessä sokerinhuuonetta 10 (hannocitriinimäärä, Van de Plasche & Backing 1993). ES-C_{0.1} tilavuusosuus: NOBC_{0.1}-sidosmäärä 340 mg/l (90 %), 8-201 mg/l.
⁵⁾ Toimitusalueen raja-arvo ja käyttäessä sokerinhuuonetta 10 (hannocitriinimäärä, Van de Plasche & Backing 1993). ES-C_{0.1} tilavuusosuus: NOBC_{0.1}-sidosmäärä 340 mg/l (90 %), 8-201 mg/l.
⁶⁾ Toimitusalueen raja-arvo ja käyttäessä sokerinhuuonetta 10 (hannocitriinimäärä, Van de Plasche & Backing 1993). ES-C_{0.1} tilavuusosuus: NOBC_{0.1}-sidosmäärä 340 mg/l (90 %), 8-201 mg/l.
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⁸⁾ Toimitusalueen raja-arvo ja käyttäessä sokerinhuuonetta 10 (hannocitriinimäärä, Van de Plasche & Backing 1993). ES-C_{0.1} tilavuusosuus: NOBC_{0.1}-sidosmäärä 340 mg/l (90 %), 8-201 mg/l.
⁹⁾ Toimitusalueen raja-arvo ja käyttäessä sokerinhuuonetta 10 (hannocitriinimäärä, Van de Plasche & Backing 1993). ES-C_{0.1} tilavuusosuus: NOBC_{0.1}-sidosmäärä 340 mg/l (90 %), 8-201 mg/l.

Tuotteen maaperän: **3,3 mg/kg** Toimitusalueen pinnalla määritetty raja-arvo, seiniänsä, johon käytetty arviointitietoa 2.
Osoittaa luokitus: **3,3 mg/kg** Toimitusalueen pinnalla määritetty raja-arvo, seiniänsä, johon käytetty arviointitietoa 2.
Alueen raja-arvo: **1,0 mg/kg** Toimitusalueen pinnalla määritetty raja-arvo, seiniänsä, johon käytetty arviointitietoa 2.
Ympäristön raja-arvo: **0,3 mg/kg** Toimitusalueen pinnalla määritetty raja-arvo, seiniänsä, johon käytetty arviointitietoa 2.

The future guidelines

- Guideline values are based either on potential risks to humans or the environment (lower value is chosen)
- **Lower guideline value**
 - Ecotoxicological 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 (Risk Human) 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**
 - 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.

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The future trigger value

- Insignificant concentration of hazardous substances in soil
- Takes into account the prevention of soil, surficewater and groundwater pollution
- Derived by taking into account (among others) natural background levels, risk levels used for the guideline values, drinking water criteria and the criteria for inert waste.

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Excavated soil (guide book - draft)

- Excavated contaminated soil = WASTE
- Cons. < trigger value
 - not-contaminated soil which can be used everywhere
 - criteria for treated contaminated soil
- Trigger value < conc. < lower guideline value
 - not-contaminated soil having somewhat increased concentrations of hazardous substances
 - no permit or notification for excavation or reuse on-site
 - permit or notification for reuse off-site
 - can be disposed at most landfills for surplus soil
- Cons. > lower guideline value
 - contaminated excavated soil
 - permit or notification is needed

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Doubts

- The decree on assessment of soil contamination and remediation needs is still a draft!!
- The Ministry of Social Affairs and Health and some stakeholders do not want to see values in the Decree.
- Do authorities accept site-specific (risk) assessment solutions?
 - Expert help will be organized. An assessment "team" will be organized in the Finnish Environment Institute. Also health authorities will be in the team
 - Simplified excel-procedures will be provided later on.

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Contaminated groundwater

- No exact definition
- Groundwater pollution prohibition (EPA 8 §)
 - Absolute or relative?
- Quality criteria is mainly based on drinking water quality
 - The Ministry of Social Affairs Decree
 - WHO
- Groundwater Daughter Directive (proposal)
 - Next step: conciliation committee --> 3rd reading
 - EU-wide quality standards (nitrates and pesticides)
 - National threshold values for MSs to define (harmonized methodology)
 - Government Decree in the end of 2008?
 - They will be used (75 % of the parametric values) to indicate a starting point for implementing measures to reverse the significant and sustained upwards trends
 - Important in assessing the need for remediation in the future?

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COSTS, LIABILITY AND FUNDING

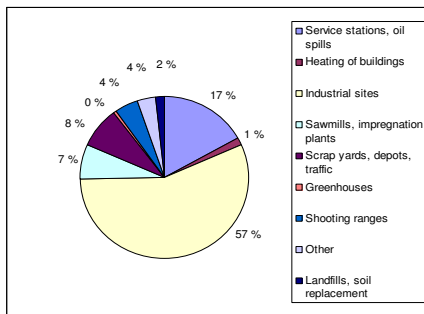
- COSTS, LIABILITY AND FUNDING

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Number of sites 430 (2003): total costs of remediation 50 – 60 M€

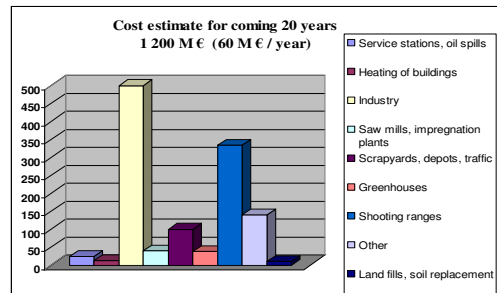


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Future costs of remediation



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• Liability to remediate – who pays?

- 1st: polluter
- 2nd: property owner
- 3rd: local municipalities (or state)
 - In cases where the polluter cannot be assigned, clean-up costs are, in practise, 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, but only clean-up costs which has occurred after 1.1.1999.

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• 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**
 - SOILL programme (since 1996) an agreement between petroleum industry enterprises and public bodies on the remediation of polluted decommissioned service station sites (application period is closed, 1100 applications)

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• SEDIMENTS

• Contaminated sediments

- There is no systematic inventory of sites with (possible) contaminated sediments
 - No guidelines
- Some remediations have been carried out in connection with contaminated land management (saw-mills, landfills)
- Disposal of contaminated dredged material has become an important environmental challenge in recent years
 - Permit is needed for notable dredging and dumping of dredged material
 - Instructions for dredging and depositing dredged material (HELCOM and OSPAR guidelines as model)

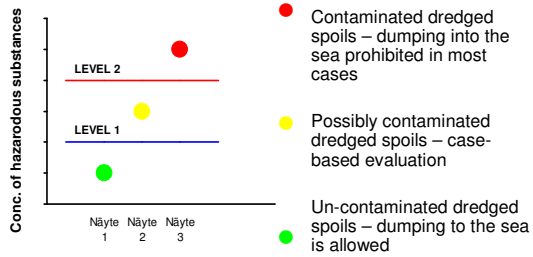
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• Contaminated dredged material – quality criteria



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Thank You!
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