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Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement

Contribution of ecological risks assessment in the management of Polluted Sites and Soils

Presentation of a method for site management

What consideration for ecological issues in PSS restoration ?

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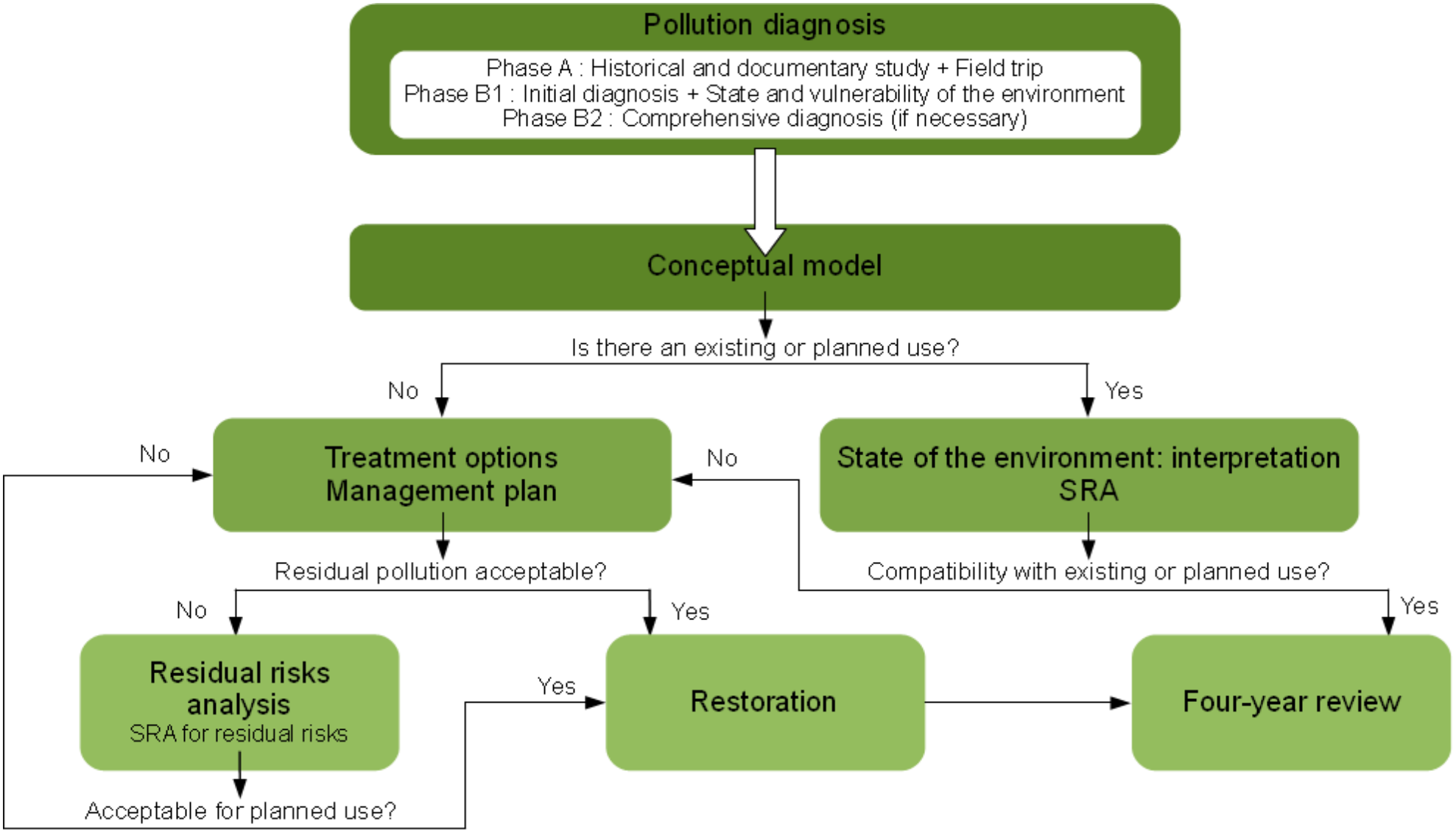
Regulations and framework (Fr)

- No regulatory constraint
  - -Circular dated feb. 8th, 2007
  - -Recommendations only include a mandatory Sanitary Risks Assessment (SRA)
- No methodological framework
  - -Ecological Risks Assessment (ERA) is implemented in such projects abroad
  - -ERA is also implemented and studied in research (Fr)
  - -But in France, there is no such thing as a sound state of the art for the use of ERA
- Yet, risks do exist

French recommendations



Ecological Risks Assessment

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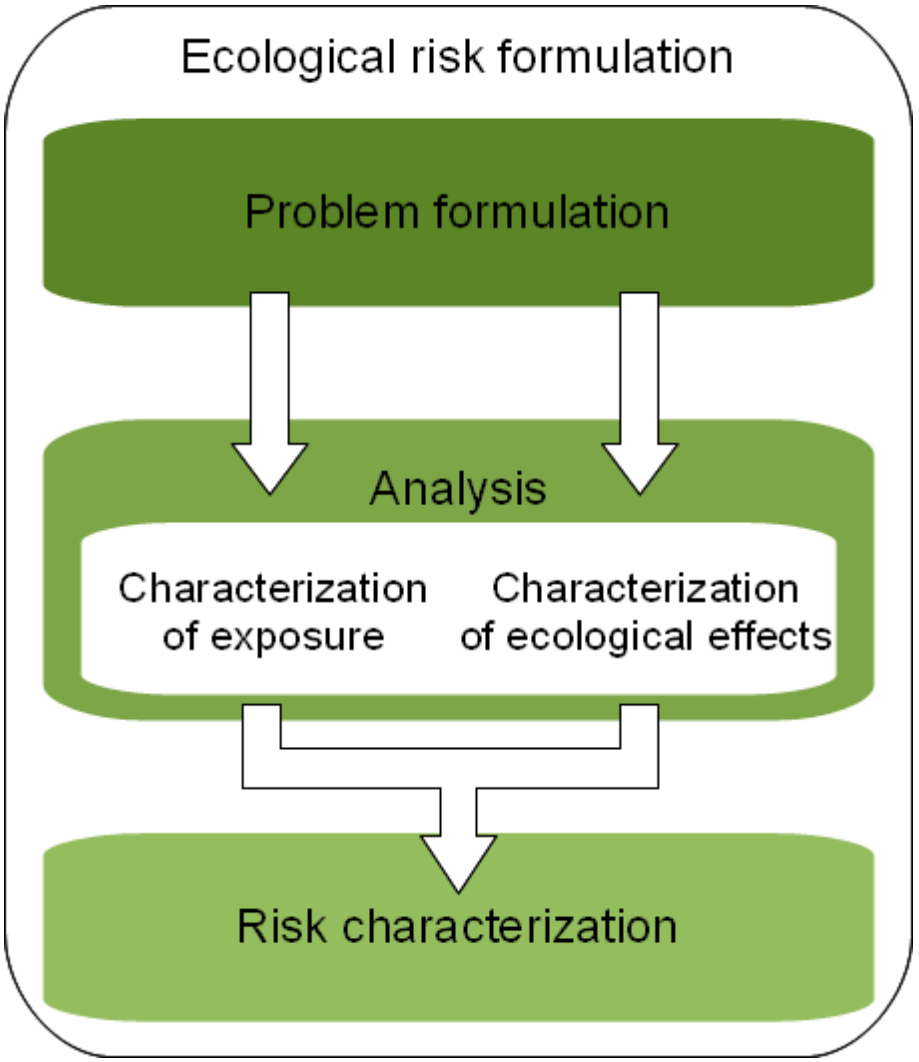
Introduction to ERA



- Different forms
  - -Ecotoxicological RA
  - -RA for the Ecosystems...
- Depends on
  - -The level of accuracy in considering the ecosystem functioning
  - -The stressors considered
  - -The purpose of the ERA

ERA method: the advantages

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Operational nature

- ERA already used within the Cerema
  - The Dter Nord-Picardie uses it to assess the acceptability of alternative materials in road construction

- Guides and recommendations published abroad
  - United States Environmental Protection Agency
  - Centre d'Expertise et d'Analyse Environnementale du Québec

Two complementary steps

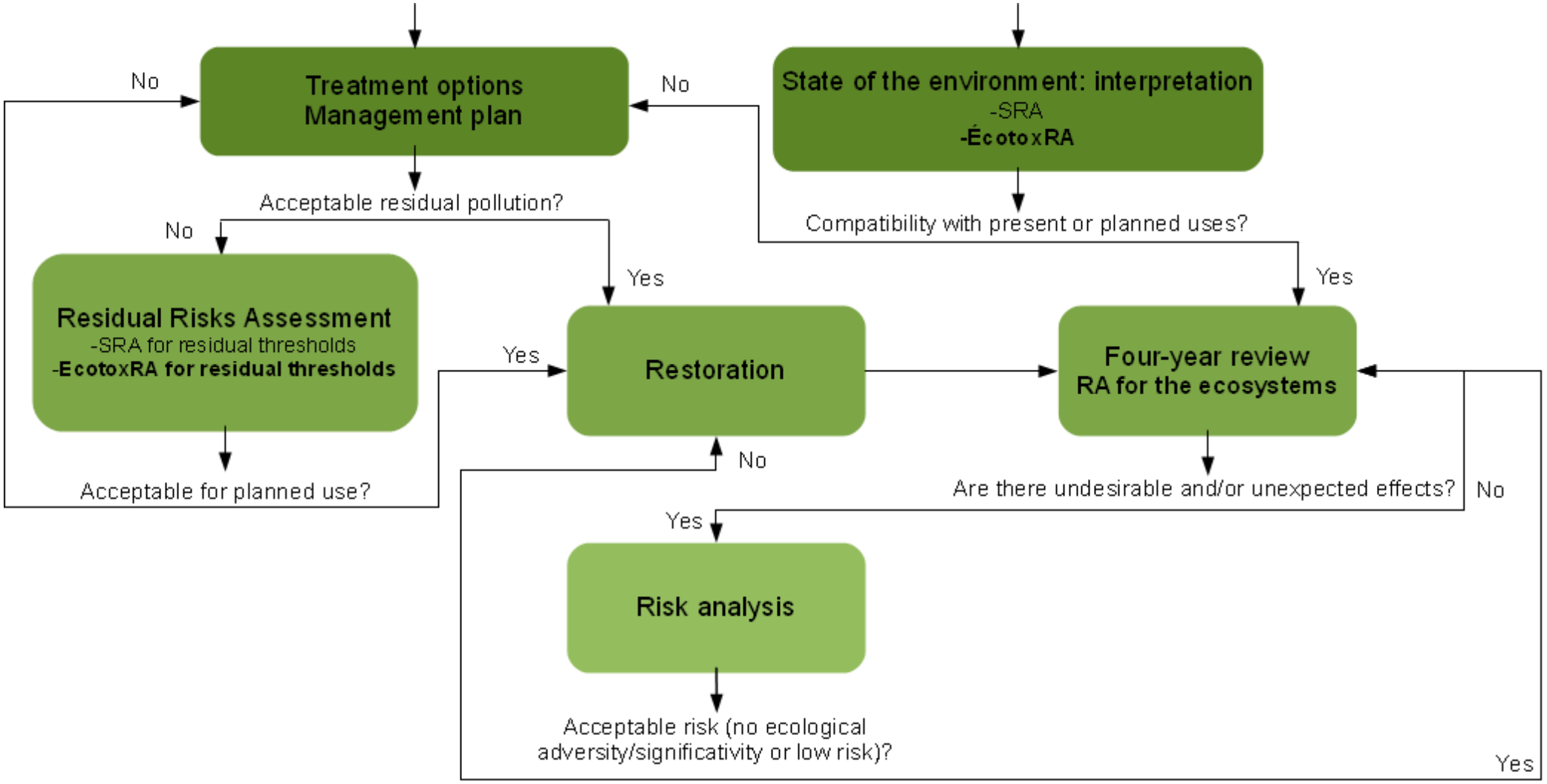
- Ecotoxicological Risks Assessment
  - Implemented in draft
  - Selection of a scenario:
    - Minimizing risk for the ecosystems
    - Addressing the demands for site management

- Risk assessment for the ecosystems
  - Implemented while monitoring the site
  - On site observations leading to identifying undesirable and unexpected effects
  - Analysis of fields observations to:
    - Decide whether to address these anomalies
    - Propose corrective solutions

Adapted to the recommendations

- The ERA as it is currently used in France requires
  - -High skills in various fields of natural sciences
  - -A long study time to get to conclusions

- The method proposed
  - -Can be integrated into a project schedule
  - -Uses processes and tools site managers are usually already familiar with


Treatment options
Management plan
No
Acceptable residual pollution?
No
Residual Risks Assessment
-SRA for residual thresholds
-EcotoxRA for residual thresholds
Acceptable for planned use?
Yes
State of the environment: interpretation
-SRA
-ÉcotoxRA
No
Compatibility with present or planned uses?
Yes
Yes
Restoration
No
Four-year review
RA for the ecosystems
Are there undesirable and/or unexpected effects?
No
Yes
Risk analysis
Acceptable risk (no ecological adversity/significativity or low risk)?
Yes

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Steps of the method

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Preliminary step: Ecotoxicological RA

- Ecotoxicological Risks Assessment
  - Choose, *a priori*, an optimal scenario to preserve the ecosystems at risk
  - Selection can be done among scenarii defined during the SRA
    - Minimizing risk for the ecosystems
    - Most sustainable on site

- Objectives
  - Implement an environmental study before restoration
  - Set restoration procedures
  - Inform managers about risks

Preliminary step: Different stages

- Problem formulation
  - Analysis plan
  - Conceptual model
- Characterization of exposure
  - Concentration value(s) within the target ecosystem(s)
- Characterization of effects
  - References for the concentration value(s)
- Risk characterization
  - Risk quotient

Preliminary step: Advantages

- The preliminary ERA
  - Is affordable and short
  - Needs only a few field data
  - Uses tools site managers are familiar with (coherence with SRA)

- Unlike an environmental assessment *a posteriori*, the Ecotoxicological RA allows to prevent some of the risks *a priori*

Monitoring step:
RA for the Ecosystems

- Risks Assessment for the Ecosystems
  - -Assess, *a posteriori*, the achievement of restoration goals
  - -Comparison with the scenario (reference state)

- Objectives
  - -Identify stressors and exposure routes if significant differences observed
  - -Determine ecological adversity
  - -Propose technical solutions

Monitoring step: Different stages

- Observation campaigns
  - Identify ecological stress signs
  - Use of ecosystemic indicators
- Indicators analysis
  - Reviewed conceptual model
  - Ecological adversity analysis
- Risk analysis
  - Risk estimation

Monitoring step: Advantages

- Unlike an environmental assessment, the RA for the ecosystems allows to
  - Observe negative effects on field
  - Identify and act on the stressors causing these effects (rather than on the effects)

- This stage is a retrospective assessment based on the USEPA method, simplified into an operational method

Conclusions

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Multiple advantages

- The method
  - Is adapted to the environmental assessment process recommended in the circular dated feb. 8th, 2007
  - Is integrable within a project schedule
  - Uses tools known to managers
  - Allows to prevent and review high-risk site evolution by
    - Identifying the stressors causing risks
    - Proposing technical solution to the managers

Optimization

- An optimal implementation of the method will require
  - Support in the field of ecology (depending on the conceptual model)
  - The enlargement of the recommendation (indicators, risk estimation...) to risks caused by physical or biological stressors

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Contribution of ecological risks assessment in the management of Polluted Sites and Soils

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- Blondel T. 2007. *L'approche française en matière de gestion de sites et sols pollués : entre estimation du risque et pragmatisme…* Intersol 2007

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