IRIS – Improving risk assessment of invasive alien species and cost-efficiency analysis of ballast water treatment methods

Plans for the main stage and seed money projects

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IRIS main project: Objectives

- Systematically collect and compile the existing knowledge (and complement it where necessary), concerning
  - AI Species and the risk of spreading
    - within the Baltic Sea (BS)
    - between the BS and the other sea areas
  - Ship traffic in the BS (volumes and routes)
  - Ballast Water Management (BWM) solutions
  - Hull fouling
- Approximate the amount of uncertainty related to all the knowledge
- To integrate the knowledge to produce probabilistic risk assessment tools

IRIS main project: Assessment tools

1) A model for evaluating the BW treatment exemptions
   - Based on the ecosystems' similarity analysis and learning from the past invasions in the Baltic Sea (similar species)
     - Risk = p(settling) x p(harm caused)
   - Producing route-specific risk level estimates
2) A model for analysing the cost-efficiency of the BWM methods
   - Ship type -specific and route-specific
     - Taking into account the route-specific target species (model 1)
     - Efficiency and reliability of the BWM methods for the target species
     - Costs of buying, retro-fitting and using the systems (given the ship type and / or the other relevant "ship parameters")
3) Applying the idea of the model 2 for the hull fouling management, where applicable

IRIS main project: Bayesian networks as method for the knowledge integration

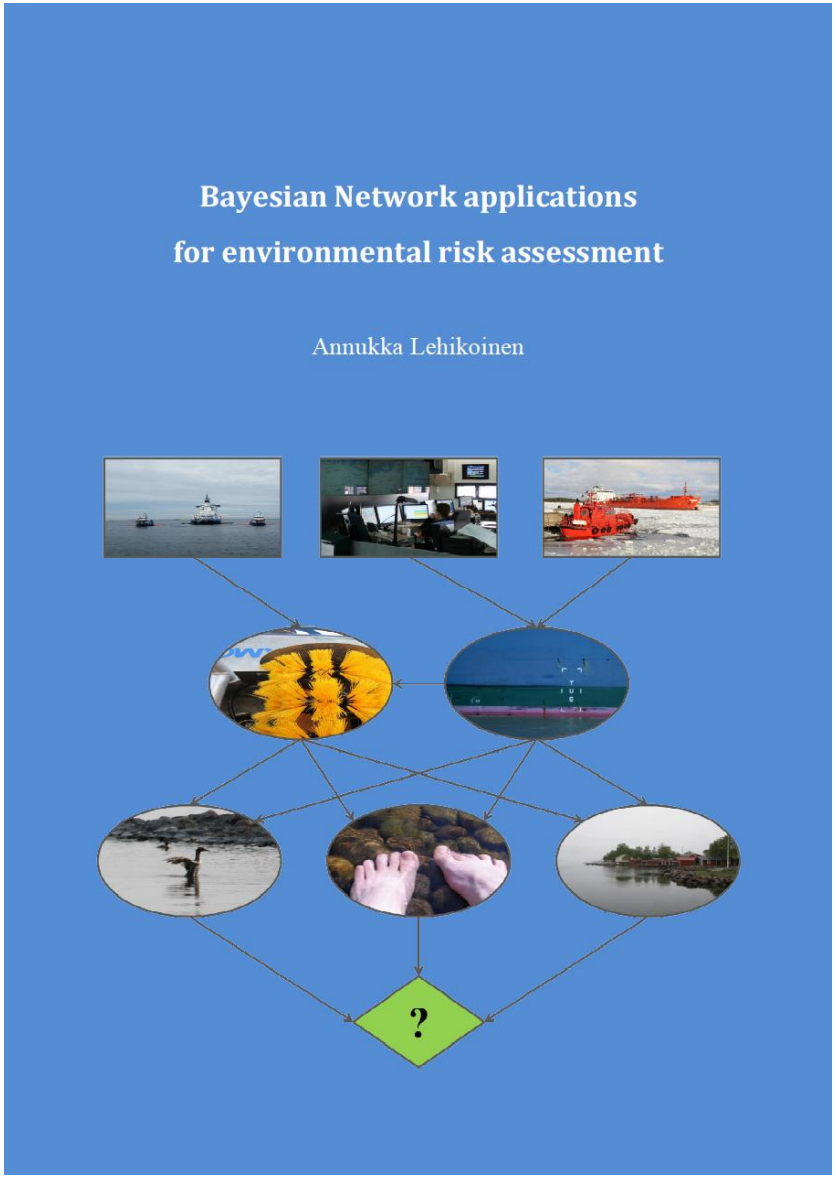
- Bayesian network (BN) is a tool for synthesizing knowledge, logic and rules.
  - Based on the probabilistic causal inference
- BNs represent artificial intelligence, providing aid for thinking about complex systems.
- The method have been successfully used in the earlier projects for divergent risk assessments, decision analytic problems and cost-efficiency analyses, e.g.
  - TOPCONS (2012-2014, ENPI CBC)
  - MIMIC (2011-2013, INTERREG IV A)
  - OILRISK (2009-2012, INTERREG IV A)
  - IBAM (2009-2011, BONUS)
  - EVAGULF (2006-2007, INTERREG III A)

PhD thesis 2014:

Bayesian Network applications for Environmental risk assessment

Annukka Lehikoinen

http://ethesis.helsinki.fi/



IRIS Seed money project - Partners

- **University of Helsinki** (Finland)
  - Fisheries and Environmental Management group (Dept. of Environmental Sciences)
- **Kotka Maritime Research Association** (Finland)
- **Chalmers University of Technology** (Sweden)
  - Dept. of Shipping and Marine Technology
- **Environmental Development Association** (Latvia)
- Finnish Environment Institute as a co-operative partner

IRIS Seed money project - Objectives

- Creating a detailed project plan with a realistic schedule
  - Reviewing literature and interviewing experts to figure out the level of current knowledge and the gaps in it
- Finding the suitable project consortium
- Networking with the relevant stakeholders
  - Interested representatives to be committed to the project
- Creating a realistic and balanced project budget
- Preparing the main project application for the first call of the BSR programme

Thank you for your attention!

- Ideas and comments are warmly welcome!
- You can contact us at any time:
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- Check also the following web-pages:
  - Kotka Maritime Research Centre**: www.merikotka.fi**
  - Fisheries and Environmental Management Group: **www.helsinki.fi/science/fem/**