



MERITURVALLISUUDEN JA -LIIKENTEEN TUTKIMUSKESKUS
KOTKA MARITIME RESEARCH CENTRE



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KYMENLAAKSON LIITTO
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SAFGOF

Evaluation of Traffic Increase in the Gulf of Finland 2007-2015 and the Effect of Increase on the Environment and Traffic Chain Activities

WMU-IMO Conference on Oil Spill Risk Management

7.3.2011 Jenni Kuronen

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KOTKA MARITIME RESEARCH CENTRE

Kotka Maritime Research Centre

- Strengthens research regarding maritime transport, maritime safety and environmental effects of maritime transport
- Established in Kotka in 2005 by the City of Kotka together with four Finnish Universities
- Special feature: interdisciplinary research
- 3 professors and 1 research director



Photo: Kymenlaakso University of Applied Sciences

Contents

- Presentation of the SAFGOF project
- Presentation of the SAFGOF meta-model
- Open sea oil recovery sub-model
- Some results from the meta-model
- Map user interface
- Conclusions and future challenges

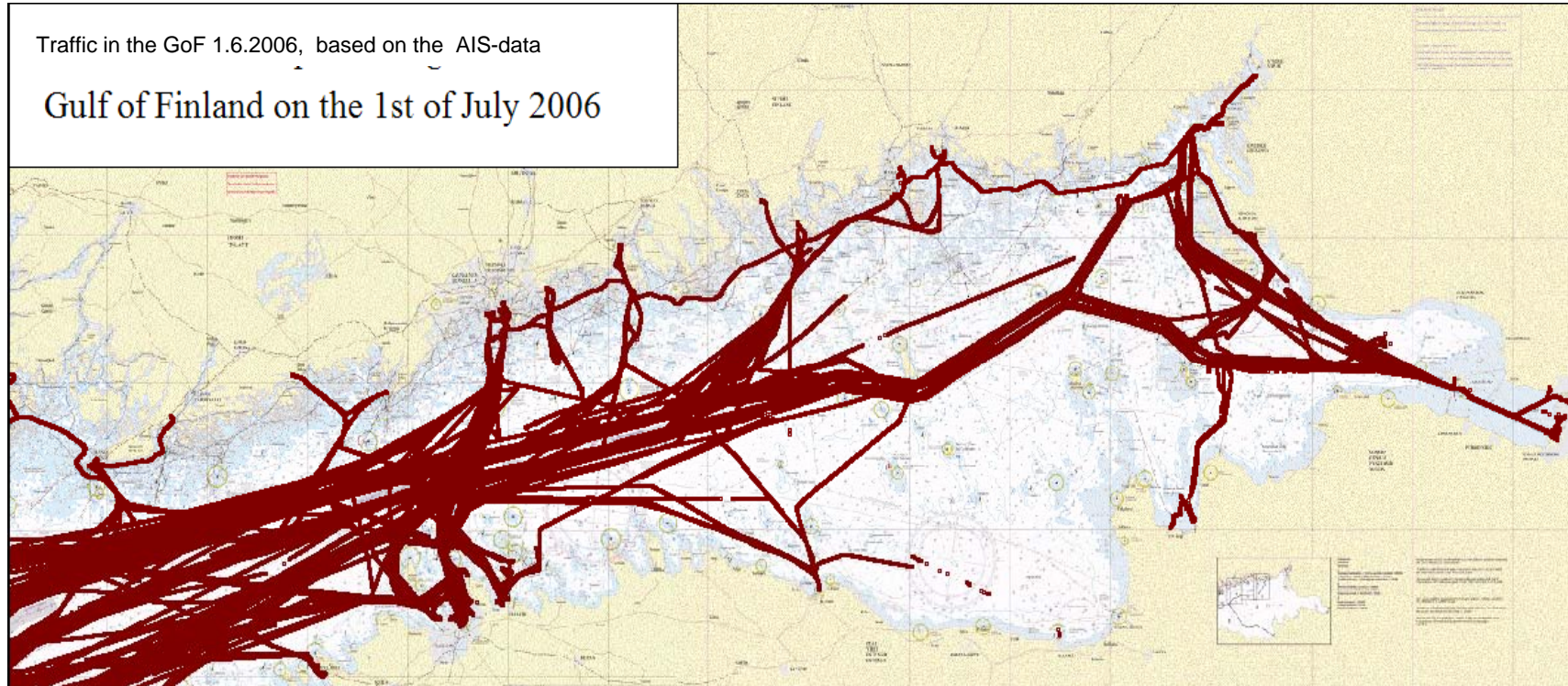
SAFGOF project



Photo: Kotka Maritime Research Centre

- Evaluation of Traffic Increase in the Gulf of Finland 2007-2015 and the Effect of Increase on the Environment and Traffic Chain Activities
- 2008-2010
- Focus on the risks of oil transports

Maritime traffic in the GoF



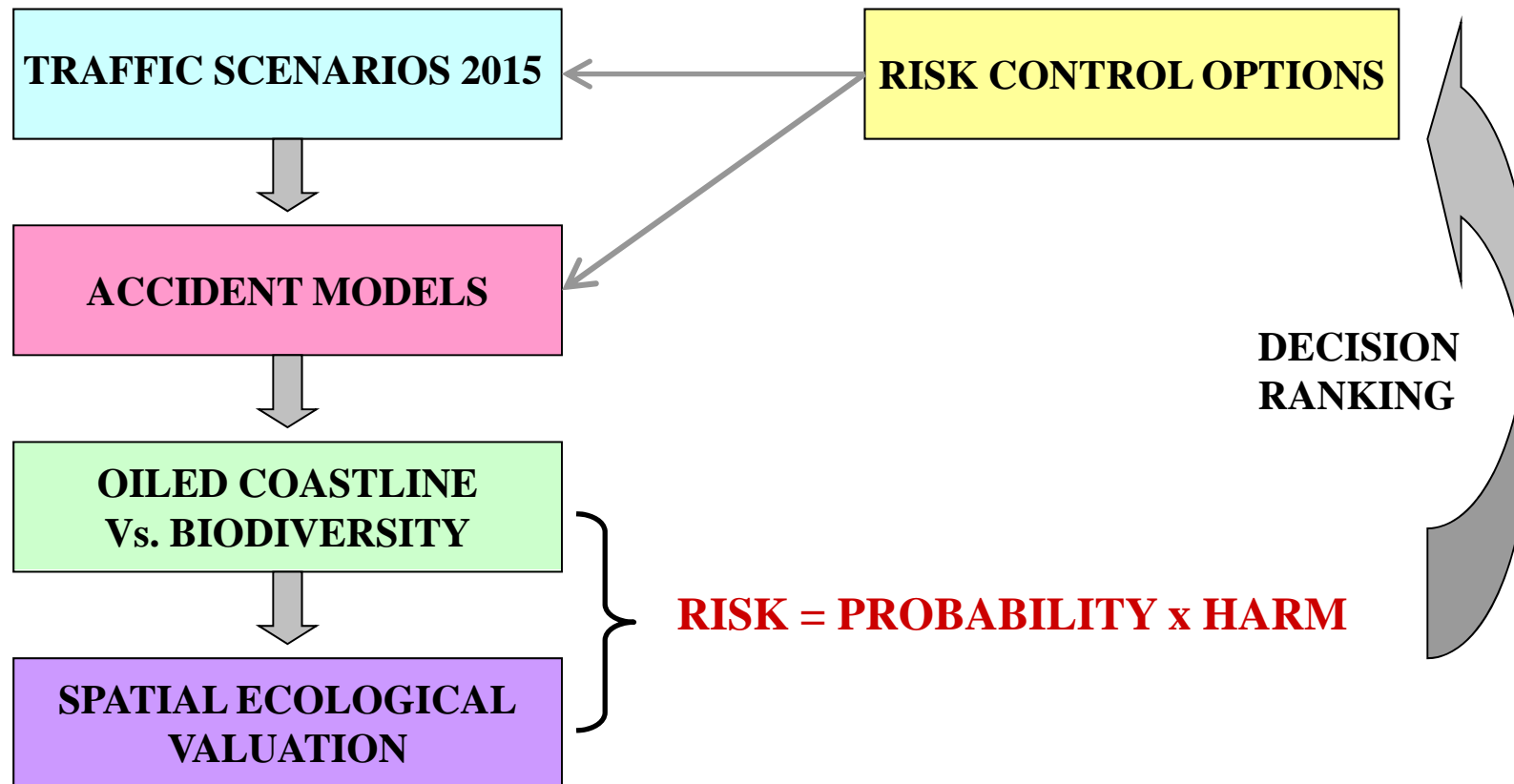
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Kujala, P., Hänninen, M., Arola, T. & Ylitalo, J. (2009): *Analysis of the marine traffic safety in the Gulf of Finland*. Reliability Engineering and System Safety, 94 (8).

SAFGOF meta-model

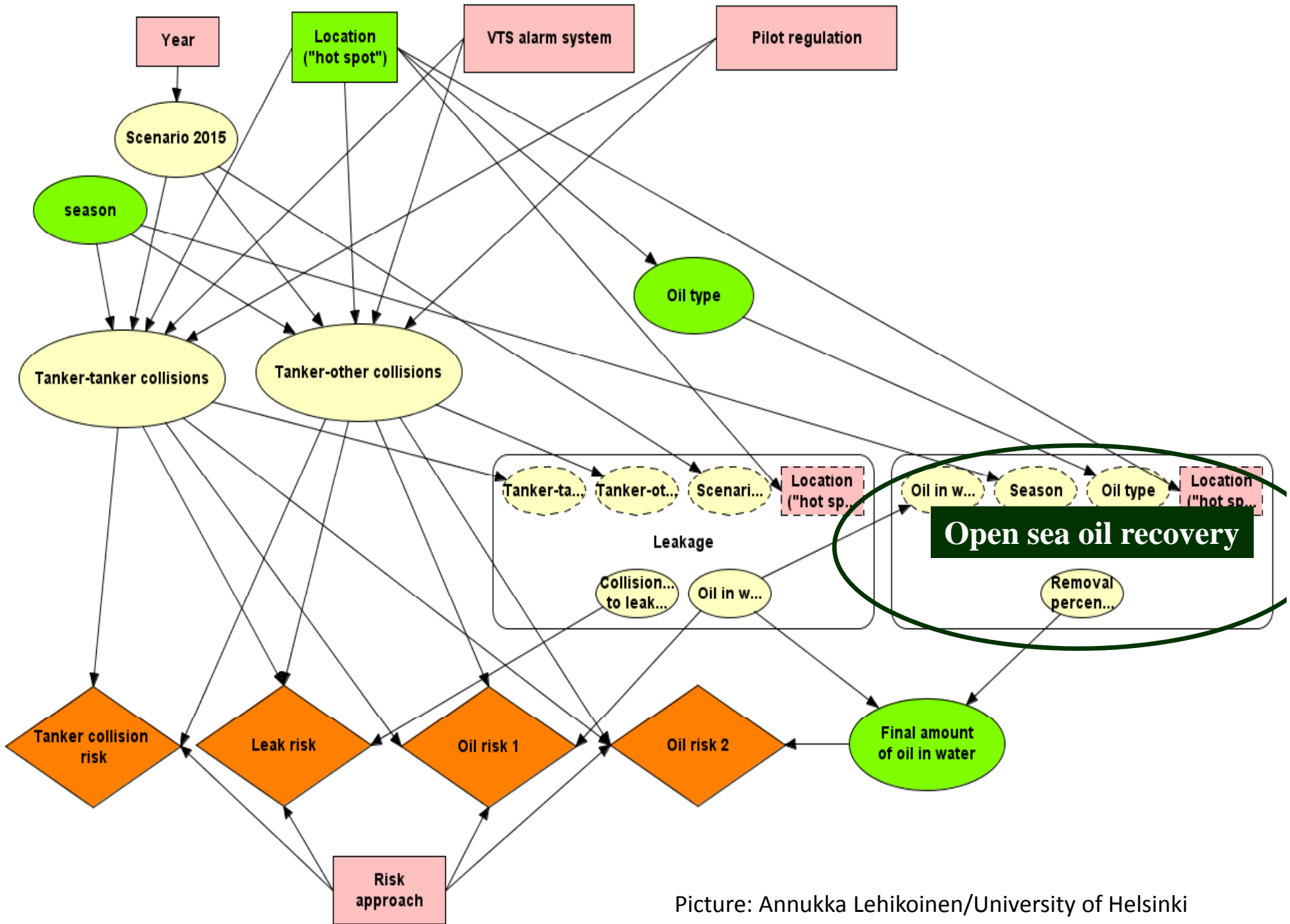
- Aim: to evaluate probability and consequences of an oil accident in the GoF and to evaluate which risk control options (RCO) are most effective to prevent an accident/or to minimize the consequences
- “Product”: cross-disciplinary, integrative risk assessment and decision support tool = SAFGOF meta-model
- Bayesian belief network, probabilistic model
- Probabilistic oil drifting maps with the user interface

The principle of the SAFGOF meta-model



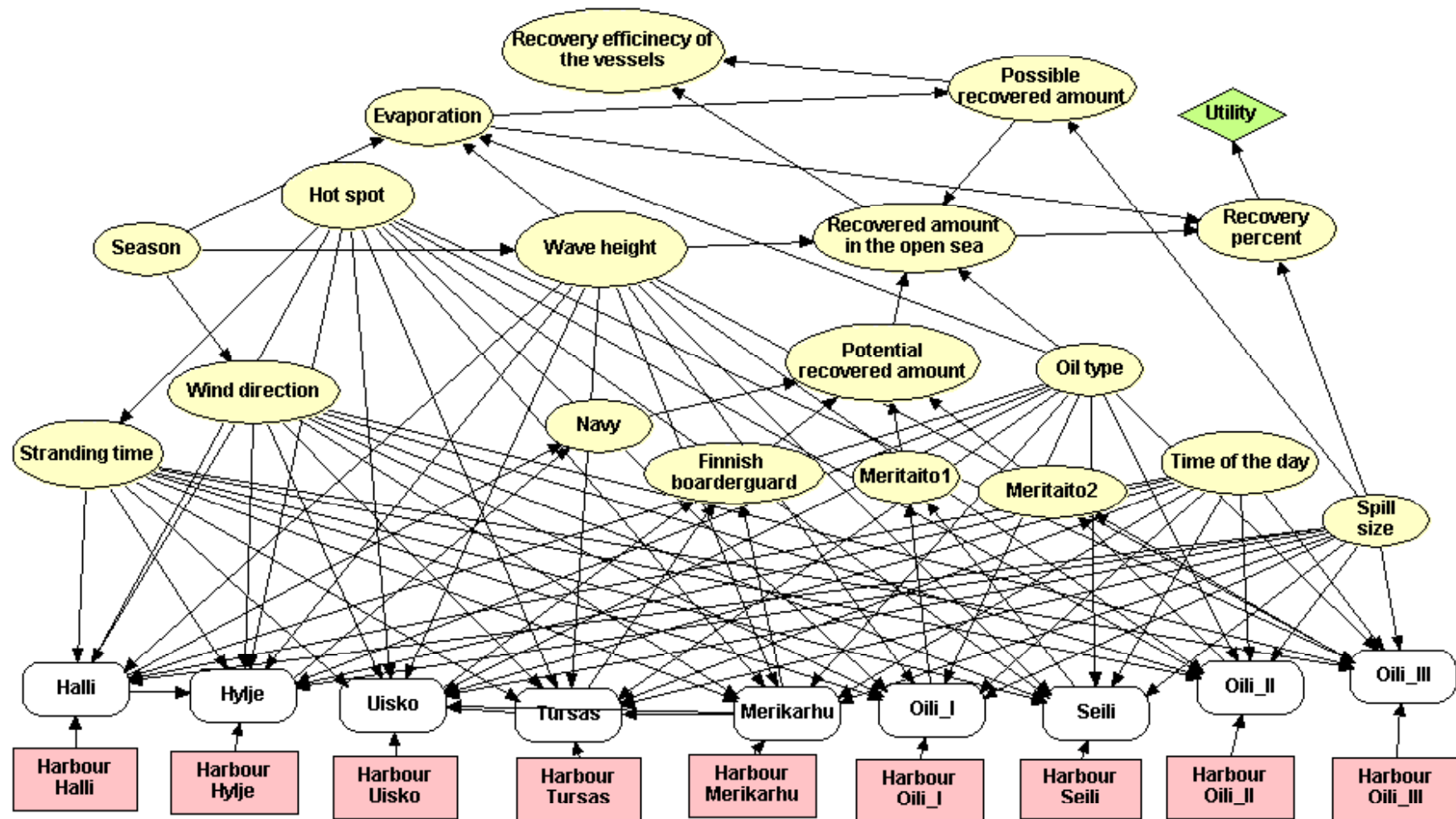
Klemola, E., Kuronen, J., Kalli, J., Arola, T., Hänninen, M., Lehikoinen, A., Kuikka, S., Kujala, P. & Tapaninen, U. (2009): *A cross-disciplinary approach to minimizing risks of maritime transport in the Gulf of Finland.*

World Review of Intermodal Transportation Research 2(4), p. 343-363.



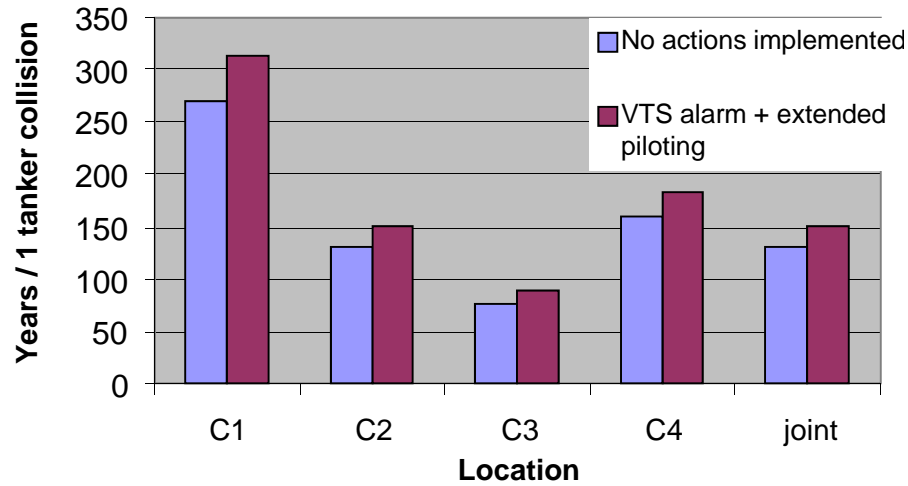
Picture: Annukka Lehtikoinen/University of Helsinki

Open sea oil recovery

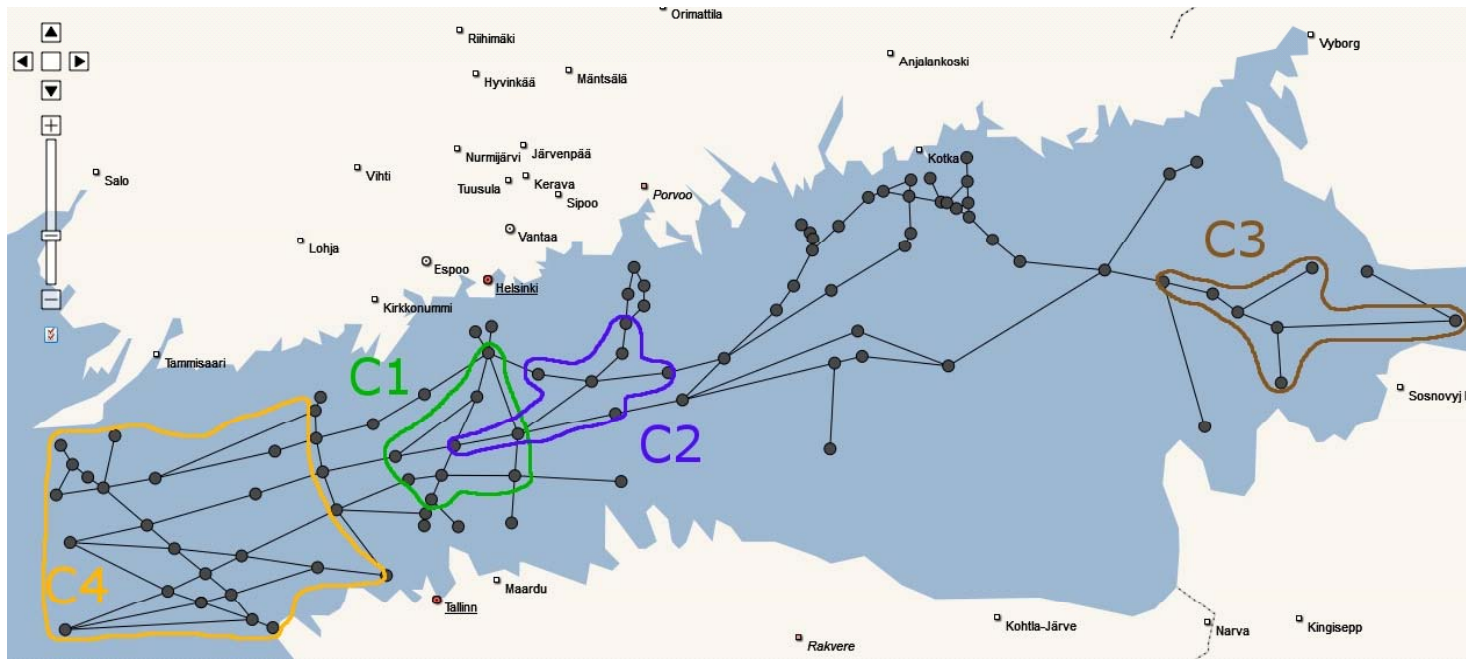
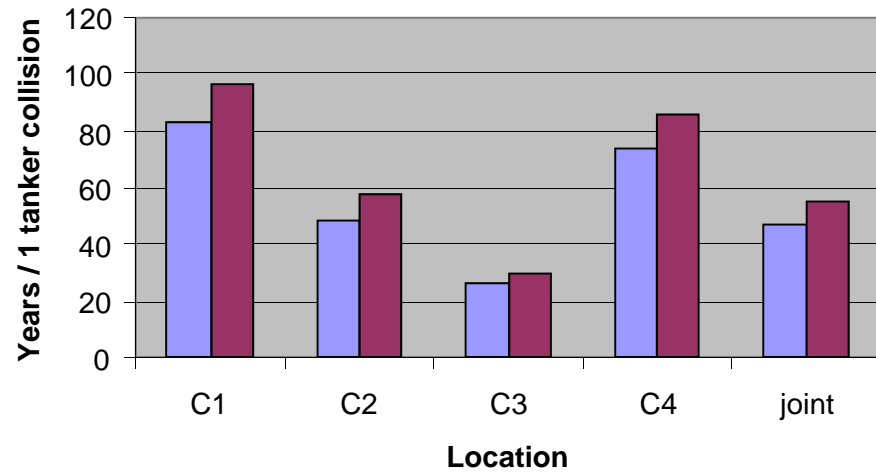


Picture: Emilia Luoma/University of Helsinki

Current traffic / Tanker collision risk



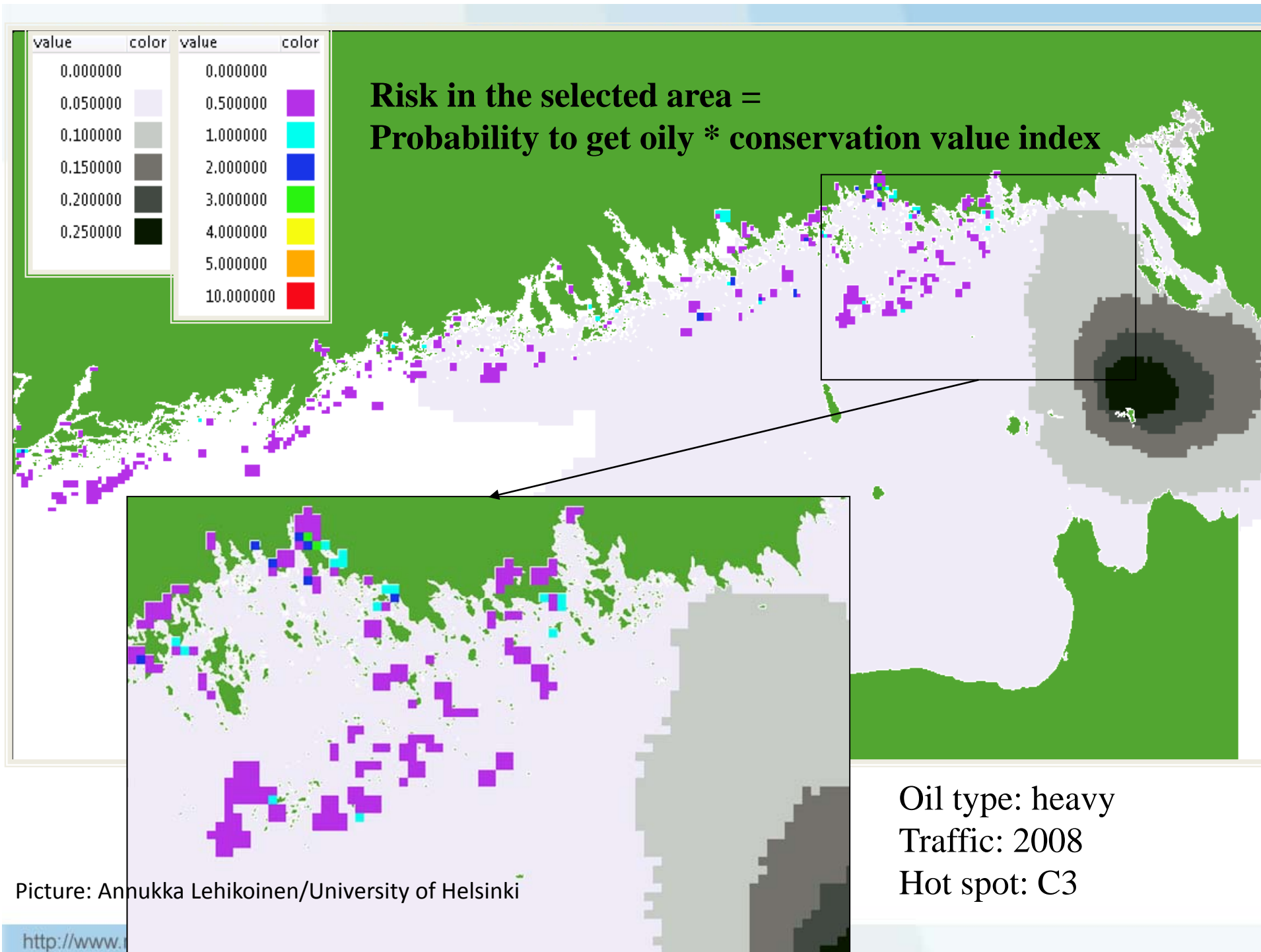
2015 traffic / Tanker collision risk



Picture: Annukka Lehikoinen/University of Helsinki

Change in the level of risk

- Average change of risk level 2008 -> 2015 about triple
- Hot spot C1: 3.2 – 3.6
- Hot spot C2: 2.6 – 2.8
- Hot spot C3: 3.0 – 3.3
- Hot spot C4: 2.1 – 2.3
- Implementation of VTS alarm system and extended pilotage obligations decrease the risks with about 18 %



Picture: Anhukka Lehtikoinen/University of Helsinki

Conclusions

- Modeling approach enables to analyze the risks and the effectiveness of RCO's taking into consideration interdisciplinary data and uncertainty
- The risk of an oil accident will increase remarkably in the GoF by year 2015 because of increase of (oil) traffic
- Risks of oil transportation vary between the hot spots

Future development

- The model is at prototype stage
- Future development with users (e.g. authorities)
- Inclusion of whole GoF into the model
- More RCO's should be included, taking into consideration also the costs of implementation
- Also costs of oil leakages should be included
- Map user interface: inclusion of other values, e.g. recreation, fishery etc.



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Thank you!



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