TESS Workshop on Decision Support from Predictive Modelling
7 October 2010 Tallinn Estonia

List of Participants	
Organisation	Name of participant
AUTH	Basil Manos (Coordinator)
	Jason Papathanasiou
	Dimitra Manou
BOURNEU	Antonio Uzal
Anatrack Ltd	Robert Kenward
	Nicholas Aebischer
ERENA	Pedro Beja
	Rui Morgado
	Carlos Rio Carvalho
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ESUSG	Robin Sharp
FACE	Gabor von Bethlenfalvy
	Angus Middleton
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SZIU	Judith Gallo
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IST	Mari Ivask
	Kristjan Piirimae
	Eve Aruvee
	Annely Kuu
	Kadri Tillemann
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ELO-IIMA-FCS	Guillaume Jannsens
University of Reading	Josef Tzanopoulos
Helmholz-Centre for Environmental Research	Oliver Schweiger
ECI, University of Oxford	Pam Berry
ALTERRA	Rob Jongman
SEIT	Kaja Peterson
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Estonian University of Life Sciences	Kalev Sepp
Tallinn University of Technology	Erkki Truve
Estonian Ministry of Environment	Liina Eek
	Ray Raiesmaa
Estonian Environmental Board	Maris Noor
Estonian Centre of Environmental Board	Peeter Ennet

Programme		
Welcome/ Introduction	Prof Erkki Truve & Prof Mari Ivask IST[1] - AUTH[2] - Anatrack	09:00 – 09:30
Models in the TESS database	Kristjan Piirimae (IST[1])	09:30 – 10:30
Coffee break		10:30 – 10:50
Session 1. Origins of socio-ecological modelling		
Modelling theory from problem to model	Robert Kenward (Anatrack[3])	10:50 – 11:30
Prediction of threats to species	Oliver Schweiger (FP6-ALARM)	11:30 – 12:00
Modelling threats to ecosystems	Pam Berry (FP6-RUBICODE)	12:00 – 13:00
Lunch break		13:00 – 14:00
Session 2. Developments in FP7		
Advances in habitat definitions and predictions	Rob Jongman (FP7-EBONE)	14:00 - 14:30
Scaling methods for indicator development	Josef Tzanopoulos (FP7-SCALES)	14:30 – 15:00
From models to knowledge systems in TESS	Jason Papathanasiou (AUTH[2])	15:00 – 15:30
Coffee break		15:30 – 16:00
Session 3. Considerations for future Policy		
Gap analysis for ecosystem service models	Kristjan Piirimae (IST[1])	16:00 –17:10
Practical discussion on the development of TESS model database and its potentials in the creation of integrated Environmental DSS	Discussion: Chair Pedro Beja	17:10-17:50
Final summing up	Nicholas Aebischer (Anatrack)	17:50-18:00
Dinner		19:30

The TESS Second Workshop, on 7 October 2010 was held in Tallinn, Estonia. It followed a well-attended first public workshop in London in 2009 (http://www.tess-project.eu/events_workshops_london.shtml) and presented the Work-Package 4 database of predictive models for the management of European biodiversity. The workshop assessed performance and scalability of the models and compared the availability of different categories with the need for prediction revealed by surveys at all levels of government and society in Work-Packages 2, 3 and 5. To integrate experience of various research projects, invited speakers discussed a variety of current solutions and challenges in the modelling of terrestrial ecosystems.

The total number of persons attending the meeting was 41. Participants were experts from the 13 TESS partner institutions and from other EC-supported projects concerned with environmental prediction, as well as invited representatives from national and local governments.

The Workshop was opened by Vice-rector of Tallinn University of Technology **Prof. Erkki Truve. Prof. Basil Manos** from the Aristotle University of Thessaloniki welcomed the participants on behalf of the coordinating organization of the project. The Workshop was chaired by **Prof. Mari Ivask** (IST).

Prof. Robert Kenward (Anatrack) made a short introduction to the consortium, objectives, structure, and goals of TESS project.
Dr. Kristjan Piirimäe (IST) reported on models in the TESS database. His presentation consisted of five topics: market demand, scope of the database, feasibility of TESS, technical solution and technical results. The participants discussed about complexicity and usability of database. All partners and other participants were asked to send the models to database www.tess.ttu.ee.

In Session 1 the origins of socio-ecological modeling were presented by **Prof.Robert Kenward** (Anatrack) on behalf of authors **Prof Steve Rushton** and **Drs Roy Sanderson, Peter Lurz and Mark Shirley** from Newcastle University), who gave an overview of modeling and discuss issues including:
- How do you model?
- How do you integrate models from different disciplines?
- How do you test complex models?

The presentation considered modelling of land use changes in relation to ecology, hydrology and economics and gave a number of examples; it stressed working effectively with stakeholders, reconciling numerical qualitative and scale approaches across disciplines and modelling at fine scale so that higher scale results emerged. **Dr. Oliver Schweiger** (FP6-ALARM) presented the main principles of assessing threats to biodiversity based on results of EU projects ALARM, MACIS and COCONUT. **Dr. Pam Berry** (ECI Oxford University Centre for the Environment) demonstrated the results of FP6 project RUBICODE related to modelling threats to ecosystems.

Session 2 introduced the developments in FP7. **Dr. Rob Jongman** (FP7-EBONE) introduced the European Biodiversity Observation Network. He posed the question of biodiversity information need and presented the habitat definition and estimation and

the integrated biodiversity observation system. EBONE is a European project for interoperating biodiversity observation systems in Europe, a pilot for the project on global biodiversity monitoring (GEOBON), improving systems to collect, manage, analyze and share data on biodiversity, thereby stimulating the science-policy interface on biodiversity. He defined the biodiversity data requirements and challenges for the future, with many examples of general habitats categories.

Dr. Josef Tzanopoulos' (FP7-SCALES) presentation on Scaling Methods for Indicator Development demonstrated the results of FP7 project SCALES. The aim of the project is to better integrate the issue of scale into policy, decision making, and biodiversity management in Europe. He introduced an assessment of the scale-sensitivity of drivers of change affecting European biodiversity under present and projected future conditions. Species needs and response were analyzed focusing on the scale-dependent impacts of drivers (and pressures) on components of biodiversity. He also discussed methods development, policy instruments, dissemination, training, and science-policy dialogue.

Dr. Jason Papathanasiou's (AUTH) presentation was about introducing the knowledge-based conception of decision making, knowledge acquisition in practice and about the structure of a typical rule-based expert system. In the second part of his presentation he explained the role of the Use Cases technique in the conceptual modeling of Information Systems and provided a methodology based on Use Cases for accessing the complexity of a system.

Session 3 was about Considerations for future Policy. **Dr.Kristjan Piirimäe (IST)** presented a gap analysis for ecosystem service models. Bridging the gaps should start from missing toolboxes, followed by missing computer programmes, followed by missing raw models, ending with missing variables and missing data. The existing crop management toolkits well cover soil health issues but lack wider field health issues such as ecosystems around the fields (grassy field margin etc.) providing biodiversity, biocontrol agents, pollinators and other services. An existing Sustainable Forest Management Toolkit well addresses forest health issues. However, it has been applied mostly in Canada and would need adaption to European conditions. There's no recreational site management toolkit yet, so such a toolkit would need to be created.

The Workshop continued with discussion, chaired by **Dr. Pedro Beja** (ERENA), on the development of TESS model database and its potential for the creation of integrated Environmental DSS. Discussion focused on main questions: are all models in database necessary? How could the database be improved? When can it be considered finished? What are the real gaps in database? How do scale-issues affect the utility of models in the database. There is scope for partners and guests of workshop to add further information during next two weeks. The second part of discussion focused on question – how to implement the model database in TESS design?

Dr. Nicholas Aebischer (Anatrack) summed up the workshop. He emphasized the strength of the project – acquiring knowledge from local people. A system to provide decision support for managers of land and species would need to interpolate much additional knowledge to provide a basis for decisions. He categorized the many considerations in the presentations into four groups:

1. Data, which as Rob Jongman explained is the bottom level of information and has huge amounts available, but some exists without being available; efficiency depends on sharing effort, knowledge and data; it may be possible to substitute habitats for species; Robert Kenward addressed what's needed, with possibility of modeling species from habitats changes, with different requirements shown by national and local authorities' questions; Joseph Tzanopoulos warned about effects of different scales and differences in sensitivities to drivers; Oliver Schweiger's talk emphasized the differences among species and the dynamic nature of communities, while Kristjan Piirimäe covered issues of data required for models in the database).
2. Conceptual Frameworks. The need to integrate ecological and economic aspects as ecosystem services was clear from the presentation of Pam Berry.
3. Implementation was covered by Jason Papathanasiou, with a recommendation for Use Cases for different scenarios to be developed for the design, ideally with one workshop to produce them and a second to assess their complexity and hence feasibility; Kristjan Piirimäe addressed algorithm management, noting that supporting and regulating services of ecosystems seemed poorly covered compared with productive services, which were quite well represented for agriculture and forestry, but poor for wildlife management; universality of models of different types was apparent, including rule-based, associative and agent-based, which could aid construction of an inference engine; the paper from Newcastle had emphasized the need for spatial capability in the modeling, and to work at as fine a scale as possible.
4. Usability was addressed in many presentations although no presentations were specifically on this issue. The Case Studies indicated that any automated advice system was going to need to be very easy to use, by individual stakeholders managing land and species as well as by local authorities; perhaps a half-way-house would be to provide information as text while awaiting a full implementation of the inference engine.