



Committee on the
Challenges of Modern Society



PILOT STUDY ON THE USE OF LANDSCAPE SCIENCES FOR ENVIRONMENTAL ASSESSMENT

A Science Framework for International Cooperation

Committee on the Challenges of Modern Society

North Atlantic Treaty Organization

NATO/CCMS Pilot Study on the Use of Landscape Sciences for Environmental Assessment

A Summary of the National Contributions

AUSTRALIA

1. **Title:** Evidence Based Environmental Management.
2. **Principle Investigator(s):**
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3. **Pilot Study Contribution:** Landscape assessment tool to help land managers and decision-makers access spatial and technical evidence to support on-the-ground remedial actions.
4. **Objectives:**
The 4P approach (purpose, place, planning, and practice) to converting knowledge into practical application incorporates indicators, scenario modeling, and planning procedures to identify and quantify the severity of landscape degradation. Options to remediate specific problems and improve environmental management can then be identified and applied. Such options are usually based on pilot studies, other sources field evidence (literature, newsletter, etc), evaluations of previous actions, scenario models of various kinds, local knowledge, and past experience. An example would be the use of trees to remediate dry-land salinity; tree species, location in the landscape and knowledge about groundwater flow systems are key considerations. Decisions may range from the national level decision makers seeking to implement major remediation initiatives to community groups attempting to remediate a local landscape or conservation issue. The issue is how to get ready access to specific landscape environmental data bases, information that is difficult to access by individuals. The challenge is to develop a tool that combines spatial data with local information to form detailed evidence on which to base a decision. What this tool should look like and the information it should contain is the purpose of this project.
5. **Products/Deliverables:** Spatial analysis and decision support tool for improved remediation actions.
6. **Timeline:** December 2004

AUSTRIA

1. **Title:** Landscapes in Transition - Integrated Study on Environmental and Human Factors Driving Urbanization.
2. **Principal Investigator(s):**
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3. **Pilot Study Contribution:** Many current conceptualizations of urbanization processes assume linear relationships - change is driven by present-day economic, demographic, and technological conditions. This project incorporates a more integrated cycle: of land-use change affecting landscapes, of altered landscapes affecting ecological processes, and of both influencing the ways in which humans monitor and respond to their surroundings, engendering further cycles of change. It will deliver a spatially explicit simulation urbanization model which will initially be calibrated for the city of Salzburg and its urban fringe.
4. **Objectives:**
Methodologically, the research project aims to linking human dimensions aspects of urban/rural interfaces with ecological aspects of urban/rural interfaces. Such linkages offer the promise of new insights for understanding the forces that shape, and are shaped by, urbanization and offer more compelling understanding of the causes and consequences of urbanization-related policies.
5. **Products/Deliverables:** Landscape assessment report and scientific papers.
6. **Timeline:** October 2005

BULGARIA

1. **Title:** Use of Bioindicators for Landscape Assessment in Yantra River Basin - Central North Bulgaria.
2. **Principle Investigator(s):**
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3. **Pilot Study Contribution:** Landscape assessment and indicators development.
4. **Objectives:**
 1. Landscape characterization in Yantra River basin
 2. Implication of biological indicators for water quality assessment
 3. Development of GIS based model for landscape assessment
5. **Products/Deliverables:** Landscape assessment report.
6. **Timeline:** December 2005

FINLAND

1. **Title:** Landscape Assessment of Reindeer Herding for the Development of Sustainable Land Use Strategies.
2. **Principal Investigator(s):**

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3. **Pilot Study Contribution:** Landscape indicators and landscape theory.
4. **Objectives:**

To utilize the techniques of landscape ecological systems analysis and remote sensing to derive scenarios for future land use regimes on the basis of ecological models and develop a linkage between ecological and social subsystems.
5. **Products/Deliverables:** Landscape assessment report.
6. **Timeline:** December 2005

GEORGIA

1. **Title:** Landscape Assessment of Georgia's Protected Areas based on Aerial and Satellite Imagery and GIS Applications.
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3. **Pilot Study Contribution:** Landscape assessment and landscape characterization (remote sensing maps).
4. **Objectives:**
To link parameters of landscape components with the measurable indicator of Georgia's Protected Areas Systems.
5. **Products/Deliverables:** Landscape assessment report.
6. **Timeline:** December 2005

GERMANY

1. **Title:** Human Society - Environment Problem Sheds-Theoretical Basis, Methodological Developments and Practical Applications.
2. **Principal investigator(s):**
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7. **Pilot Study Contribution:** Landscape assessment (i.e., functional system analysis of spatial Human-Environmental-Interaction).
8. **Objectives:**
Related to scio-economical research, we aim at a synthesis of already existing knowledge in order to better guide the society towards sustainable development. Coming from functional, spatially explicit Landscape Science and Landscape Indicators, we follow the Systems-oriented DPSIR (Driving Force, Pressure, State, Impact, Response) concept in its interaction between: “Space and Landuse”, “Ecological Status”, “Economic and Social Consequences of Use”, “Awareness/Opinion Development” and “Decision Finding”.
9. **Products/Deliverables:** Landscape assessment report.
10. **Timeline:** December 2005

ITALY

1. **Title:** Development of a Risk Assessment Model at the Landscape Level.
2. **Principal Investigator(s):**
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2. **Pilot Study Contribution:** Landscape assessment.
3. **Objectives:**
Transfer and integration of ecological knowledge by simple fragility (vulnerability) models as tools either for baseline or displayed (retrospective) landscape risk assessment, based on habitat mosaics, endemic flora, and threatened vertebrate distributions/concentrations.
4. **Products/Deliverables:** Landscape assessment report, risk assessment methodology, and software development (ArcView extension).
5. **Timeline:** December 2005

LATVIA

1. **Title:** Introduction to Space Information Technologies for Environmental Assessment.
2. **Principal Investigator:**
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3. **Pilot Study Contribution:** Educational project.
4. **Objectives:**
To analyze existing environmental study programs in Universities of Latvia with the objective to improve them with courses and training laboratories on modern technologies of environmental assessment.
5. **Products/Deliverables:** Study courses developed.
6. **Timeline:** December 2005

LITHUANIA

1. **Title:** Quality Assessment of the Environment at the Landscape Level.
2. **Principal Investigator(s):**
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3. **Pilot Study Contribution:** Landscape assessment.
4. **Objectives:**
 1. Develop the criterion to recognize ability of a landscape to perform/maintain environmental self-regulation;
 2. Develop the criterion to recognize metrically and topologically organized land structures;
 3. Verify the model and criteria on Lithuanian landscapes;
 4. Continue field investigations to assess rates of soil erosion under different land use systems on the slopes of different steepness;
 5. Assess Lithuanian landscape's quality and prepare recommendations for decision-makers.
5. **Products/Deliverables:** Landscape assessment report with land-use recommendations.
6. **Timeline:** December 2005

NORWAY

1. **Title:** Monitoring Agricultural Landscapes.
2. **Principle Investigator(s):**
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3. **Pilot Study Contribution:**
Demonstration of a national monitoring programme to assess landscape change over time in agricultural landscapes. Presentation of a set of indicators to measure landscape change.

4. Objectives:

The project aims to establish a set of methods to quantify landscape change consistently at the national and regional level and to develop indicators of change relating to the four main themes: spatial structure, biodiversity, cultural heritage, and accessibility. The aim of the project is to provide an empirical basis on which to assess the success of agri-environmental policies and to define new environmental goals where necessary.

5. Products/Deliverables: Change detection and landscape indicator report.

6. Timeline: Development phase to be completed December 2005.

POLAND

1. **Title:** Principals of Application of Geographic Information Systems in Water Management and Environment Protection.

2. Principal Investigator(s):

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3. Pilot Study Contribution: Landscape assessment and planning.

4. Objectives:

Development of special information system - the data base in digital format - for 1MWW. This data base (basic maps) may be used in 1MUM and in other institutions for analysis (e.g. for landscape assessment, flood risk assessment, etc.).

5. Products/Deliverables: Different thematic layers, attribute data base, report.

6. Timeline: December 2004

POLAND

1. **Title:** The Influence of River Basin Biotic Structure on Water Dynamics - Ecohydrological Framework.

2. **Principal Investigator(s):**
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3. **Pilot Study Contribution:** Biotic indicators of landscape use changes, development and application of ecohydrological methods at landscape scale for sustainable water management, application of phytotechnology as a tool for modeling of landscape processes and improvement of catchment ecosystem services.
4. **Objectives:**
 1. Assessment of catchment quality and its long term changes using fish indicators.
 2. Identification of key processes being drivers of environmental change.
 3. Development and application of ecohydrological methods into landscape management toward the improvement of catchment ecosystem services.
5. **Products/Deliverables:** Landscape assessment report, conceptual model and recommendations for land users and decision-makers.
6. **Timeline:** December 2005

ROMANIA

1. **Title:** New Gold Exploitation at Rosia Montana.
2. **Principal Investigator:**
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3. **Pilot Study Contribution:** Landscape assessment and characterization.
4. **Objectives:** Scenarios regarding the following:
 1. Action zero
 2. Green tourism
 3. Other industries (timber, processing milk products)
 4. Public information
5. **Products/Deliverables:** Landscape assessment report.
6. **Timeline:**
 1. First Report - December 2004
 2. Final Report - Fall 2005
 3. Report for Public Use: Summer 2006

ROMANIA

1. **Title:** Environmental Decline Assessment in Copsa Mica Area (Romania); GIS Approaches for Environmental Assessment.
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3. **Pilot Study Contribution:** Landscape assessment and planning.
4. **Objectives:**
This pilot study is being conducted with the collaboration of the Institute for Applied Science, Nürtingen, Germany. We have set up a new method of landscape modeling to extract the homogenous units in respect to terrain attributes and the land use/land cover categories. These units will be used as basis for environmental assessment and planning in the Copsa Mica area.
5. **Products/Deliverables:** Landscape assessment report for environmental planning.
6. **Timeline:** December 2005

RUSSIAN FEDERATION

1. **Title:** Impact of Land Cover and Land Use Changes on Runoff and Substances Washout in Catchments and Loading on Surface Waters and Coastal Zones.
2. **Principal Investigator(s):**
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3. **Pilot Study Contribution:** Landscape assessment and catchment modeling.
4. **Objectives:**
 1. To develop catchment model for assessment runoff and nutrient wash out depending on land cover and land use parameters.
 2. To link parameters of catchment model with the measurable indicators of land cover and land use changes.
 3. To assess nutrient nonpoint emission in surface water from various land covers.
 4. To apply model for large aquatic system of Lake Ladoga and Neva bay of the Gulf of Finland (North-West Russia) with total area about 290000 km².
 5. To assess influence of various land covers and elements of landscape on nutrient load and nutrient concentrations in various parts of studied aquatic system.
6. **Products/Deliverables:** Landscape assessment and modeling report; scientific papers.
7. **Timeline:** December 2005

RUSSIAN FEDERATION

1. **Title:** Coastal Zone Landscape Change Detection Using Remote Sensing Technique and In situ Data: Case Study of the Baltic Sea.
2. **Principal Investigator:**

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3. **Pilot Study Contribution:** Landscape change detection, indicators development.
4. **Objectives:**

Use remote sensing change detection to study coastal zone landscapes at multi-year scale. Assess the role of natural variability and socio-economic factors on coastal landscape change.

5. **Products/Deliverables:** Change detection and landscape indicators report.
6. **Timeline:** December 2005

TURKEY

1. **Title:** Landscape, Demographic Developments, Biodiversity, and Sustainable Land Use Strategy.

2. **Principal Investigator(s):**
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3. **Pilot Study Contribution:** Landscape assessment.
4. **Objectives:**
To develop a procedure of ecological risk assessment for conservation and ecosystem management policies based on the CORINE Land Cover Classification system.
5. **Products/Deliverables:** Landscape assessment report.
6. **Timeline:** December 2005

UKRAINE

1. **Title:** Use of Landscape Science Approaches for Development of a Concept of Ecological Corridor Networks in Ukraine.
2. **Principal Investigator(s):**

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3. **Pilot Study Contribution:** Landscape assessment.
4. **Objectives:**
 1. Development of a concept of ecological corridors network on a river basin scale
 2. Assessment of ecological, economic and social impacts of establishment of ecological corridors network.
5. **Products/Deliverables:** Landscape assessment report with approach for determining possible ecological corridor routes.
6. **Timeline:** July 2005

UNITED STATES

1. **Title:** A Landscape Assessment of Oregon with a Future Scenarios Analysis of the Willamette River Basin, Oregon, USA.
2. **Principal Investigator(s):**
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3. **Pilot Study Contribution:** Landscape assessment with alternative futures analysis.
4. **Objectives:**
To evaluate the hydrological consequences of current and future landscape options using remote sensing and GIS technology, process models, and landscape ecology theory.
5. **Products/Deliverables:** Landscape assessment report.
6. **Timeline:** February 2006