Water Management of Transboundary Catchments

Contribution from the

TRANSCAT project

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INTRODUCTION

Border areas usually belong to the most problematic regions of many countries. In particular, borders rarely respect the hydrogeological limits of a natural catchment.

Usually the catchment, belonging to more states, is managed in different ways, depending on each state, respecting no interests, historical roots, and legislative rules of the neighbour across the border.

INTRODUCTION

These different approaches to utilization of the catchment may have catastrophic effects, and may cause hardly solvable problems and high financial and environmental costs.

Integrated water management in transboundary catchment areas in Europe is among the major issues to be addressed in the implementation of the WFD.

TRANSCAT

Integrated Water Management of Transboundary Catchments

Co-financed by the European Union under the 5th FP of Research

Duration: 1st February 2003 - 31st January 2006

Total budget: 2.6 M€ (1.88 M€ from the EC)

12 partners from 9 countries

http://transcat-project.net

Objectives

The main objective of TRANSCAT is to support borderland regions by developing an operational and integrated DSS for optimal water management of their catchments.

Key requirements are multilingual support, interactive visualisation interface and the possibility of plugging in numerical models, particularly of the cross-border water resource system.

Objectives

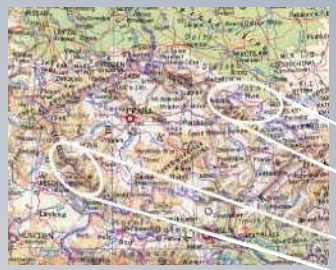
The system will support situations ranging from operational management, involving information basis and modelling, to strategic decision analysis and making, with the use of multiple option and multiple objective assessment tools, as well as distributed decision instruments facilitating participative management.

The system will be tested for the conditions of the transboundary pilot areas.

5 PILOT AREAS

(Czech Rep. / Poland)

Bělá river



Šumava catchment

(Czech Rep. / Germany)

Guadiana river

Portugal / Spain

Pasvik river

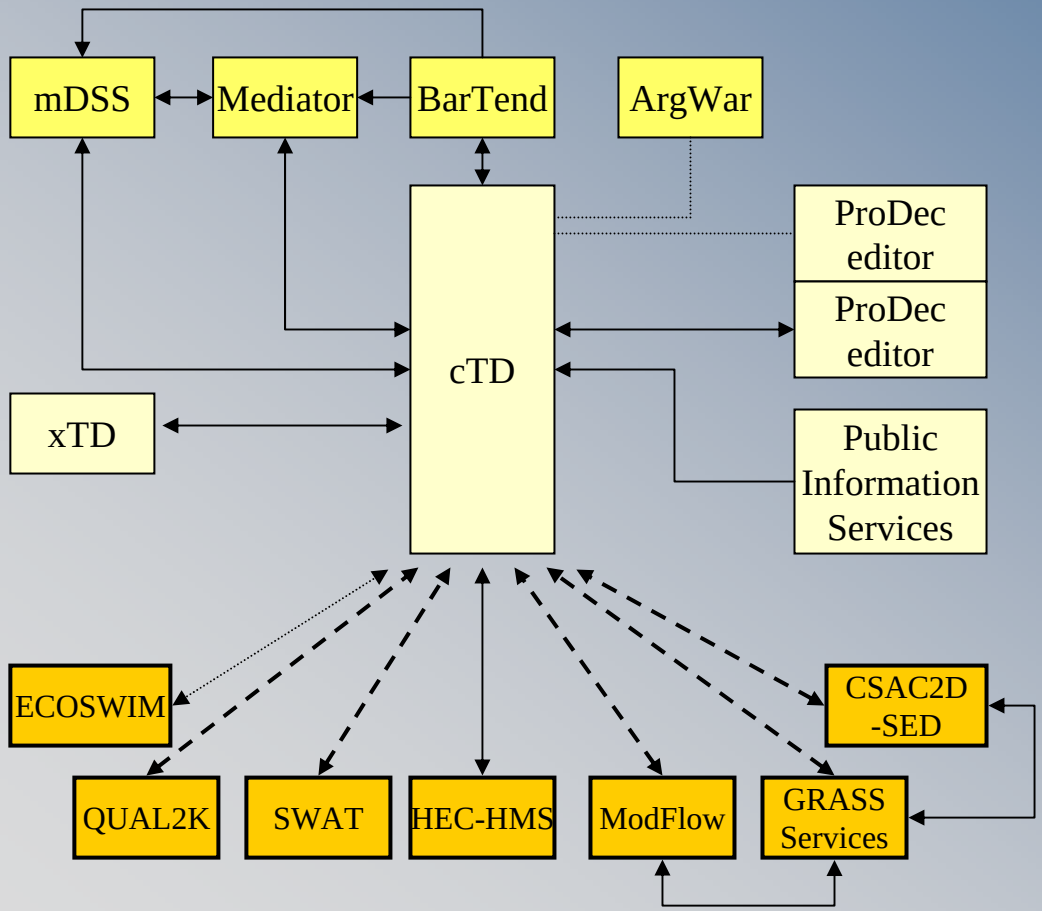
(Norway / Russia)

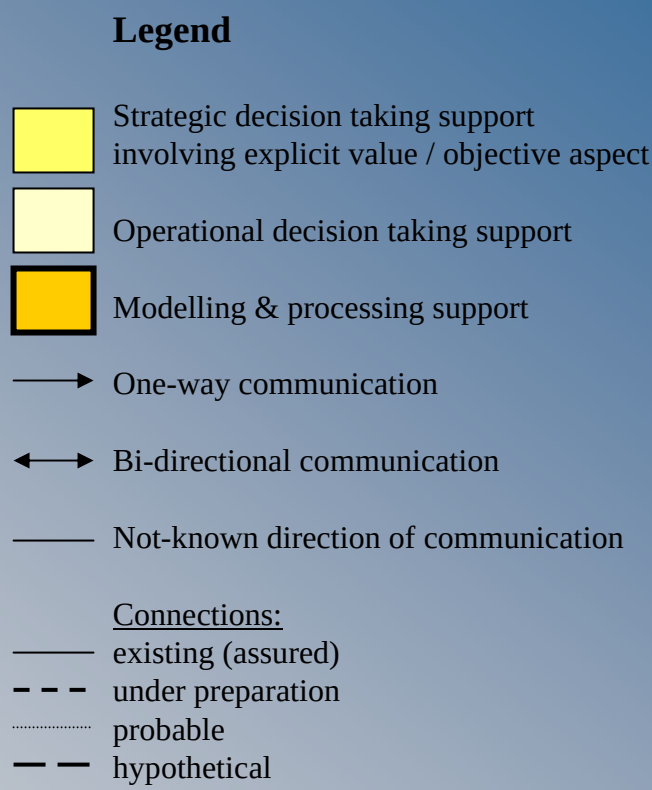
Nestos river

(Greece / Bulgaria)

TRANSCAT DSS – system components

The TRANSCAT DSS is composed of **three** essential kinds of elements, from the top to the bottom of the scheme, indicated with different colours:





TRANSCAT DSS – system components

•The *decision analytic applications* (DAs), including mDSS (MULINO), Mediator, ProDec, BarTend (Bargain) and ArgWar, most of them associated with strategic type of decisions (policies, large projects, etc.), but also with the design of decision procedures (ProDec).

•The DAs developed and/or included in the TDSS range from very simple ones, like BarTend, allowing for the establishment of bargaining output in well-structured uncomplicated situations, to relatively complex, like mDSS, which includes several stages and options in the process of evaluation within a broadly defined projects.

TRANSCAT DSS – system components

•The *core system* (CTD), being the main data provision, processing and interfacing tool, oriented mainly at operational functions. The cTD serves as the main interfacing tool for the elements of the system;

•The *models*, and the related applications, serving to represent individual components of the natural, technical and socio-economic object system (e.g. the HEC-HMS surface flow model, the MODFLOW underground flow model, etc.).

The modelling layer allows *prediction*, even if at a qualitative level, scenario or policy construction, or identification (e.g. through "simulation/derivation") of data items not observed directly.

The TDSS is not an integrated system in the sense of “stiff” connections between the system elements.

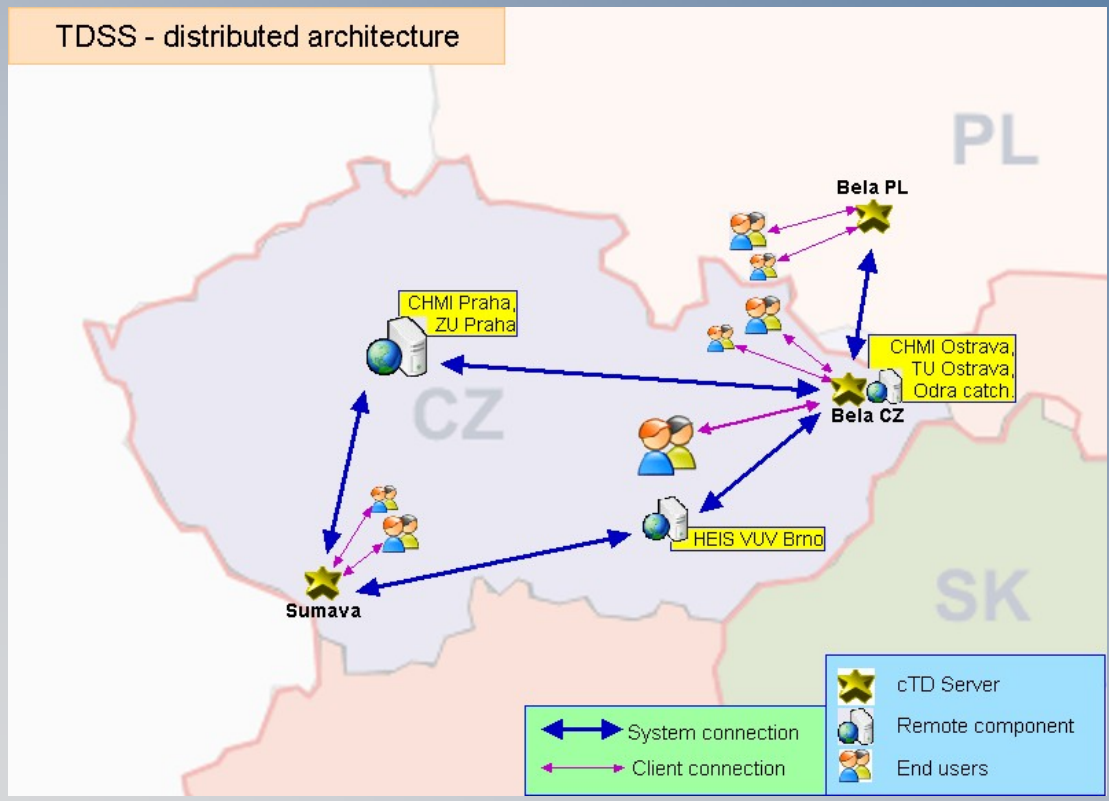
First, all of its elements can be used as self-standing entities. The connections are established according to needs.

A concrete TDSS implementation can be configured according to the needs of a specific object system.

Thus, out of the architecture outlined before, a subsystem would be carved out for purposes of a given object system.

TRANSCAT DSS – architecture

TDSS was designed as distributed system with special regard to environments in which it has to be implemented. These environments are transboundary catchments with occurence of demands, which are problematic to solve with conventional information systems.



TRANSCAT DSS [1\2]

CONNECTION WITH MODELLING SYSTEMS

1. Hydraulic/water balance modeling (simulation of runoff and precipitation, monitoring of water reserves changes due to requirements)

   Objective *e.g. permits for surface water and groundwater abstraction*

2. Underground water fluctuation/flow modeling in saturated and also in unsaturated zone including connection with surface water

   Objective *e.g. evaluation of quantitative condition of water, evaluation of quantitative impacts in changing of land use, permission of underground water abstraction*

TRANSCAT DSS [2\2]

CONNECTION WITH MODELLING SYSTEMS

3. Modeling of contaminant transport in underground water

   Objective *e.g. Evaluation of pollutant sources, setup and modification of discharging limits, evaluation of quantitative impacts in changing of land use, permission of underground water abstraction*

4. Modeling of surface water flow

   Objective *e.g. permission of surface water abstraction, discharge of sewage*

5. Modeling of contaminant transport in surface water

   Objective *e.g. Evaluation of pollutant sources, setup and modification of discharging limits, permission of surface water abstraction, discharge of sewage, evaluation of emergency ecological situations*

POSSIBILITIES OF ANALYSES AND MODELING FOR WFD

a) Assessment of pollution source (point-source, diffuse source)

b) Assessment of quantitative status of water

c) Assessment of land use change (qualitative, quantitative)

d) Long term forecast of supply and demand for water

e) Identification of protected areas

f) Ecological status assessment of water (biological quality of water, hydro-morphological quality of water, physiochemical quality of water)

g) Monitoring (Selection of monitoring places, Selection of qualitative compartments, Preparing of monitoring time schedule)

TRANSCAT Prototype

http://gis.vsb.cz/transcat