

# WFD & BA requirements:

## Data bases and information output



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# Where do we stand in scheme 3?

1. Assessment of the present situation
2. Identification of required outputs of the database based on
  - a. WFD reporting requirements
  - b. information needs of the beneficiary organisations
3. Identify the infrastructural requirements: hardware, software and
4. personnel & training
5. Improvement and integration of existing databases or development of new integrated database
  - a. Functional design for the new system
  - b. Technical design
  - c. Development, installation and acceptance testing
6. Develop ArcGIS application based on WFD guidance document interacting with the database
7. National Explanatory Workshop

# Present situation – data exchange

- Routinely transfer of data from one BA to the others is limited because databases are not *connected*, this can be improved by:
  - access to an integrated database
  - support and maintenance for hard- and software
  - protocols to guarantee unique identification of locations where sample is collected
- Efficient exchange of data requires *standardised* storage (*free* formatted Excel files hamper this)
- Time of staff is often limited. The timely dissimination of aggregated data to users is then at risk, the use of appropriate software functions and automation may improve the situation.

# Present situation – data stores

## Identified:

1. Envis
2. LIMS at SGL
3. WQ database at Tersefanou laboratory
4. Amoeba at SGL (life data)
5. Spreadsheets at DFMR
6. WFD maps from Article 3, 5&6

# Envis

- Years of effort were put in Envis to build the database and, more importantly, to improve the quality of the data in the system
- The concept of the system progressive in the sense that that sharing of data is possible among the 3 owner agencies (MS-WDD-GSD).
- Functionality for WDD is limited, the hydrological functionality is insufficient
- There are some constraints on the functioning of the system.
- Some problems may dissolve by improved support and maintenance of the dbms (MsSQL)

# Lims - SGL

- A laboratory information management system is an integral part of the quality assurance (accreditation) of a laboratory.
- It manages the flow of samples through a laboratory and is well maintained at SGL
- Automated transfer of data from Lims to integrated database is foreseen
- Automation is only possible if samples in Lims can be uniquely linked to the locations maintained in the integrated database

# Tersefanou WQ database

- MsAccess database developed in house at WDD and in use since 1996
- Cannot store all data analysed by the laboratory so part of analysis is stored in Excel (used in reporting)
- Use of the database is limited and decreasing over the years
- Data set in the database is incomplete with respect to origin of the sample, probably partly overlapping with Envis
- The historical data may be transferred to the integrated database
- New database system offers the required data entry and reporting requirement

# Present situation – data stores

- Spreadsheets at DFMR

Formalised spreadsheets at DFMR may be used in future as an alternative entry of data next to direct data entry into the integrated database

- Amoeba at SGL (life project data)

Amoeba is an analysis tool for ecological risk assessment. The integrated database should support this tool to ensure easy future use

- WFD maps from Article 3, 5&6

These maps have to become officially part of the ArcGIS database system



# Outputs- WFD requirements

*With respect to the prescribed format:*

- described in Europe Guidance document no 9 on GIS
- including topology rules, specified data-model, formats (..ArcGis) etc...
- metadata information according to ISO 19115
- **12** maps and underlying tabular data:

Maps required Article 8 by 2007

- Map 6: Monitoring Network for Surface Water Bodies
- Map 10: Monitoring Network for Groundwater Bodies

Maps required Article 8 by 2009 (after two years of monitoring)

- Map 7: Ecological status & Ecological Potential of Surface Water Bodies
- Map 8: Chemical status Surface Water
- Map 9: Groundwater Status
- Map 12: Status of protected areas

# Outputs- WFD requirements

## *With respect to the content*

- Guidance document no 13: Overall approach to the classification of ecological status and ecological potential
- status of each waterbody is derived from monitoring selected sites for individual parameters contributing to QEs (biological & chemical and hydro morphological)
- the process to derive the status requires
  - time-aggregation, testing against reference conditions and quality standards (mathematical functions)
  - in the process criteria such as “moderate” or “major” deviations from reference are used, these are arbitrary, subjective and political the procedure should be documented !

So the database should try to formalise the ‘translation’ functions

# Requirements of the beneficiary agencies –

## SGL

- access to full analysis results of a sample (tabular)
- access to conditions at the time of sampling
  - the water level of a reservoir at the time of sampling or
  - chemical analysis results of neighbouring wells, which may be sampled and analysed by other parties;
- simplified indices for chemical, ecotoxicological and ecological information, graphically presented (like in Amoeba)

## DFMR

- aggregate data for analysis
- thematic maps
- time-series graphs

# Requirements of BA's - WDD

## Meteorology

- Precipitation (total annual, per river basin and as an area map)
- Monthly depth area precipitation and monthly evaporation

## Surface water

- Stream discharges (mean daily, monthly total, peak, mean, minimum)
- Graphs of mean daily discharge, monthly discharge and flow duration curve
- Springs and chain of wells (discharge and flow duration curves in graph)

## Groundwater

- Groundwater elevation (level maps)
- Groundwater extraction estimates
- Trends for groundwater levels

## Water quality

- Groundwater quality maps e.g. iso-lines (e.g. bi-yearly) maps
- Quality of reservoirs or springs as coloured symbols indicating the concentration value for relevant parameters such as e.g. pH, Cl, NO<sub>3</sub>
- Trend lines for selected variables in a ground or surface water point

# W F D – Geo Database Cyprus

## Data Stores

## I Database

## II Functions

## IIIa EU-Maps

**ENVIS  
(MsSQL)**

**LIMS SGL**

*Links to formal  
datastores*

**data  
structure**

**EQO &  
Ref.Cond.**

**Hymos**

**Data ENTRY**

*To determine the  
"status" and  
analyse data*

**index/cluster  
classify**

**expert  
judgements  
representative**

....USER.....

**SQL**

**Third party  
Applications**

**ArcGis  
Toolbox**

**Hymos**

**AMOEB**

rbm plans

status of water bodies  
surface and  
groundwater  
monitoring network

waterbodies  
waterbody types  
waterbodies at risk  
protected areas  
general maps

## IIIb BA-outputs

thematic maps  
time series graphs  
tabular data  
descriptive statistics  
mean daily flows from  
H readings and QH

**Tersefanou**

**Spread-  
sheets**

**Thematic maps**

**Art 5&6  
project results**

# Concluding

The integrated database should improve:

- interchangeability
- promote the sharing of data
- automated data transfer and processing
- reduce the risk of delays in information delivery

## Software

- maintenance and support required to guarantee sustainability
- Joined effort to transfer historical data from data stores to the integrated database

# Thank you

Suggestions and questions are welcome:  
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