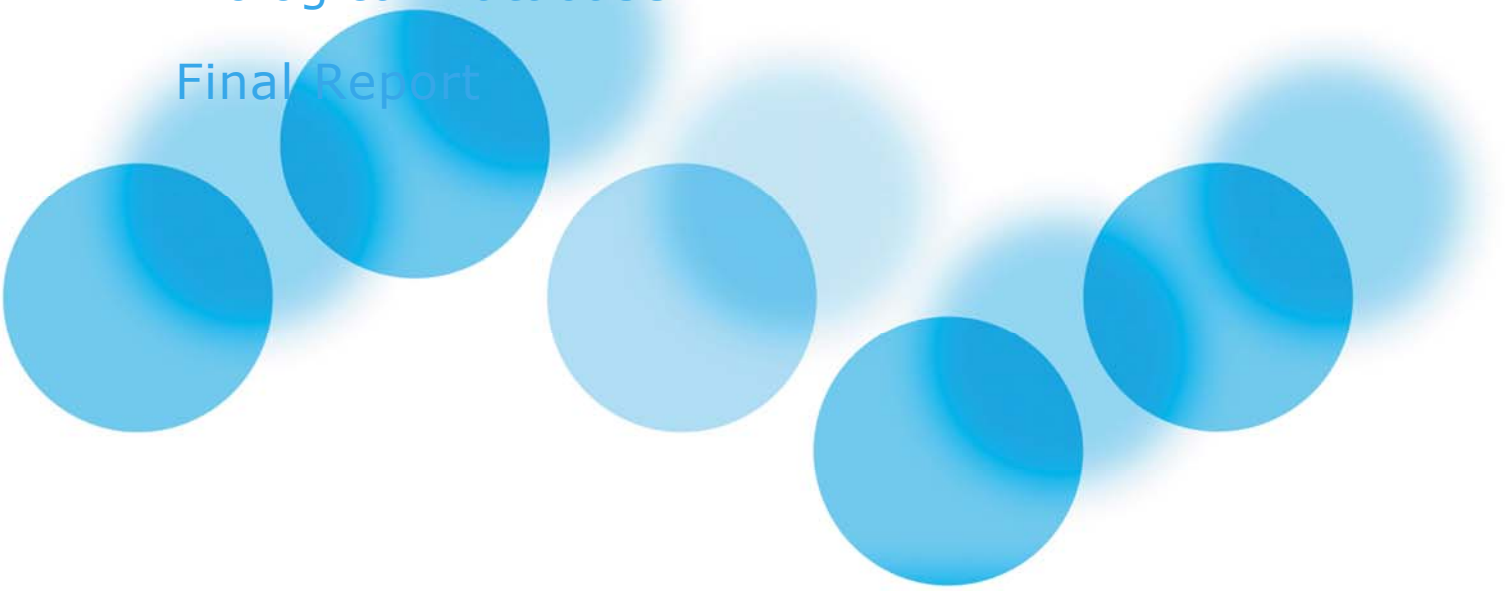
UNDP I GEF
DANUBE
REGIONAL
PROJECT

January 2007

DEVELOPMENT OF OPERATIONAL TOOLS FOR MONITORING, LABORATORY AND INFORMATION MANAGEMENT

Objective 2: Development of the ICPDR Biological Database

Final Report



WORKING FOR THE DANUBE AND ITS PEOPLE

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PROJECT

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ABBREVIATIONS

DEFF	Data Exchange Format
DRB	Danube River Basin
DRP	Danube Regional Project
EG	Expert Group
EU	European Union
EU WFD	EU Water Framework Directive
GEF	Global Environment Facility
ICPDR	International Commission for the Protection of the Danube River
JDS	Joint Danube Survey
TNMN	Transnational Monitoring Network
UNDP	United Nations Development Programme

1. INTRODUCTION

The database development was based on the already available TNMN and JDS databases of the ICPDR. The main aims of this development project was the upgrade of taxa coding to incorporate current results of projects on the European level (AQEM, STAR, Euro-limpacs), improvement of data input tools and enhancement of the query functionalities.

A survey among the members of the MA Expert Group (January 2006) had the following main results:

- The database should contain TNMN and Danube surveys' data.
- The main target groups are water quality experts, members of other expert groups of the ICPDR and biologists in general.
- A common coding system should be established (as opposed to keeping national coding).
- The application should facilitate the data collection process (and not only hold already validated data).
- Data input should be done via standard Excel sheets, which are uploaded and validated during import.
- The most important queries are
  - to compare data over time,
  - to query data of a specific location and compare data from two or several locations
  - to review biological data together with chemical data.
- The most useful format for exporting data is MS Excel spreadsheet.

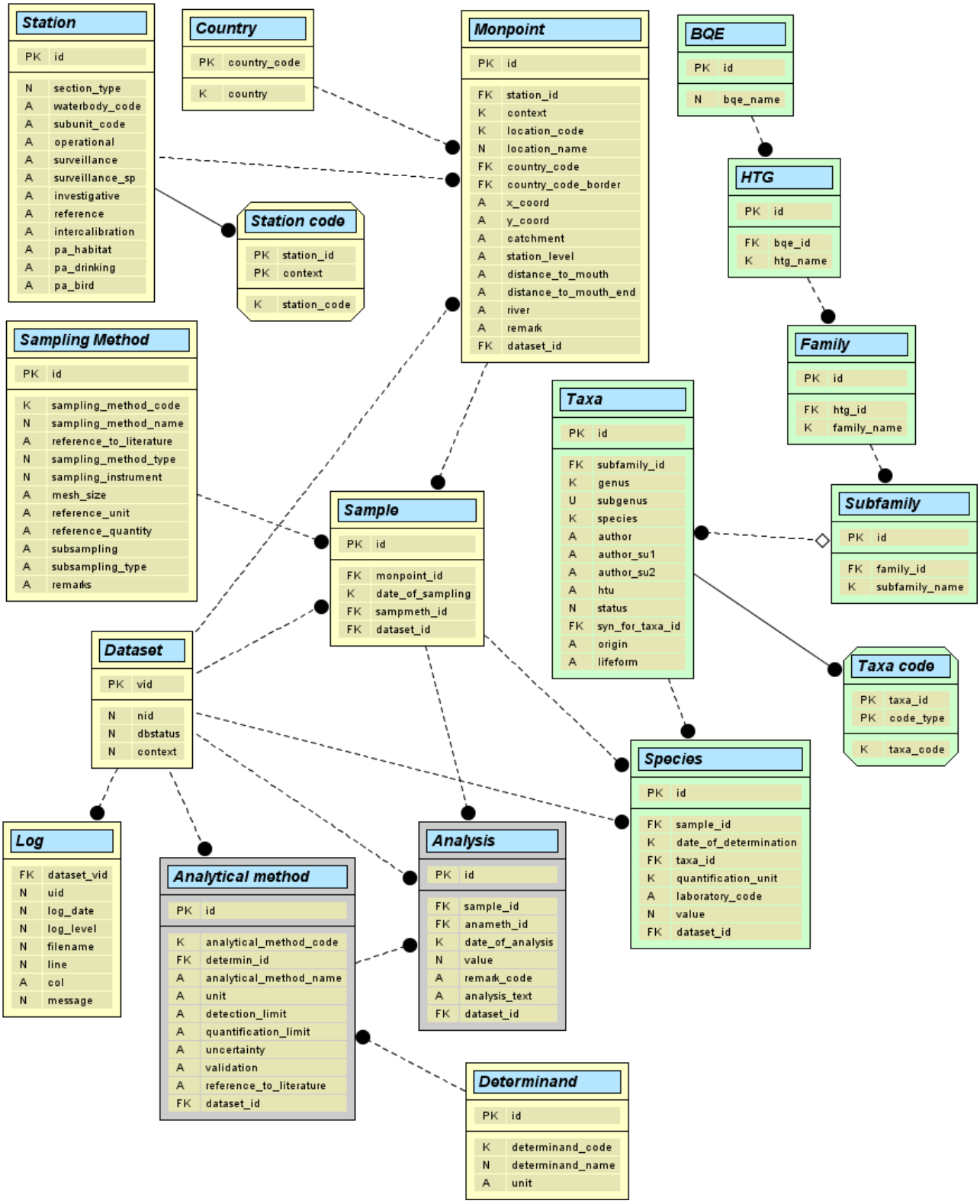
2. DATABASE STRUCTURE

The diagram on the following page shows the Entity-Relationship model of the new database. The boxes represent the entities (which are implemented as database tables). The lines show the relations between the entities, where a dot marks the "many"-side of a one-to-many relation.

The following entities/tables were taken from TNMN/JDS databases and therefore are compatible with the Data Exchange Format (DEFF):

- Country
- Monpoint
- Sampling method
- Determinand
- Analytical method
- Sample
- Analysis

Some of these tables have been extended and new tables have been added to reach the project goals.


Station
PK id
N section_type
A waterbody_code
A subunit_code
A operational
A surveillance
A surveillance_sp
A investigative
A reference
A intercalibration
A pa_habitat
A pa_drinking
A pa_bird
Country
PK country_code
K country
Monpoint
PK id
FK station_id
K context
K location_code
N location_name
FK country_code
FK country_code_border
A x_coord
A y_coord
A catchment
A station_level
A distance_to_mouth
A distance_to_mouth_end
A river
A remark
FK dataset_id
BQE
PK id
N bqe_name
HTG
PK id
FK bqe_id
K htg_name
Station code
PK station_id
PK context
K station_code
Sampling Method
PK id
K sampling_method_code
N sampling_method_name
A reference_to_literature
N sampling_method_type
N sampling_instrument
A mesh_size
A reference_unit
A reference_quantity
A subsampling
A subsampling_type
A remarks
Family
PK id
FK htg_id
K family_name
Taxa
PK id
FK subfamily_id
K genus
U subgenus
K species
A author
A author_su1
A author_su2
A htu
N status
FK syn_for_taxa_id
A origin
A lifeform
Subfamily
PK id
FK family_id
K subfamily_name
Sample
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FK monpoint_id
K date_of_sampling
FK sampmeth_id
FK dataset_id
Dataset
PK vid
N nid
N dbstatus
N context
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PK taxa_id
PK code_type
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K quantification_unit
A laboratory_code
N value
FK dataset_id
Log
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N uid
N log_date
N log_level
N filename
N line
A col
N message
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K analytical_method_code
FK determin_id
A analytical_method_name
A unit
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A quantification_limit
A uncertainty
A validation
A reference_to_literature
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Analysis
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FK anameth_id
K date_of_analysis
N value
A remark_code
A analysis_text
FK dataset_id
Determinand
PK id
K determinand_code
N determinand_name
A unit

3. DATABASE CHANGES

The database structure was adjusted to accommodate both chemical and biological data from TNMN as well as other sources, like JDS. The changes can be summarized as follows:

- **Stations** were introduced. A station consists of or groups several monitoring points. It has attributes for the type (operational, surveillance, investigative, etc.) and location of the station (section, water body). The stations table potentially serves as a point of connection to the DRB GIS (template Surface Water Station) and WISE.
- **Station codes** are previous monitoring point codes and other station codes. Each station can have several codes, which is unique for a data source (or other context). This setup allows (but does not force) several codes for the same station for different purposes (e.g. TNMN, JDS1, JDS2, Aquaterra, EIONET, Yearbook).
- The **location in profile** code list (L,M,R) has been extended to allow pooled samples (P), suspended matter (S) and biological samples at additional locations (A-H).
- Further minor changes in the monitoring points to allow border stations and to be compatible with DRB GIS and WISE (coordinates in decimal degrees)
- The **sampling methods** were extended with fields for biological sampling: sampling method type, sampling instrument, mesh size, reference unit, reference quantity, subsampling, subsampling type, remarks. Code lists for sampling instruments.
- In the **analytical methods**, the field quantification limit was added.
- The structure of the tables for the **taxa lists** have been completely changed, to allow a hierarchical structure of biological quality elements – higher taxonomic groups – families – subfamilies – genus – subgenus and species. Additionally to the author of the species, authors for first and second subunit (subspecies, variety, form, morphotype) can be specified. Each taxa can have several codes from different origins (e.g. Ecoprof, AQEM, EuroLimpacs) – this setup allows also the use of national codes. Synonyms can also be defined in this new structure.
- Additional code lists for quantification units, etc. were developed.
- The database was changed to include artifical primary and foreign keys instead of natural, multi-field keys. This facilitates database administration and changes of coding in the future.

4. DATA PROCESSING

- Taxa lists have been compiled from various sources – see the following chapter.
- Templates in Excel format for upload of monitoring points, analytical methods and samples with analysis or species lists were developed. They will be available online with the database.
- A list of sampling methods was drafted – see annex.

5. STATUS OF TAXA LISTS AS OF 29 JANUARY 2007

5.1. Benthic invertebrates:

History:

The original taxa list was taken from the Austrian software Ecoprof (4425 taxa). This was amended and coded during the AQEM project (taxa from 8 countries). It was further extended during the STAR project (taxa from 14 countries) and during the Euro-limpacs project (22 countries) and made available on the web (www.freshwaterecology.info).

Current status:

As of 2006-12-20 there are 12538 valid and 1479 synonym taxa available.

Next steps:

The list should be reviewed by DRB countries and additional taxa should be reported.

5.2. Macrophytes:

History:

The taxa list in the JDS (63 taxa) was not coded. The Ecoprof taxa list has only about 40 taxa and was therefore not used. The taxa list from the KOW database (midcc.at) has 433 taxa and was extended for European purposes within the intercalibration exercise (http://ec.europa.eu/environment/water/water-framework/objectives.html).

This list is currently under final review and should be available when the project finished (May 2007). There is already an agreement with the intercalibration group to use their data.

Current status:

not available yet

Next steps:

Incorporate European taxa list when it is available.

5.3. Phytobenthos:

History:

The taxa list from the Austrian software Ecoprof was amended and coded during the STAR project (taxa from 14 countries). The taxa list was further extended during the Euro-limpacs project (22 countries) with the Omnidia database and is available on the web (www.freshwaterecology.info).

Current status:

As of 2006-11-07 there are 10271 valid taxa available.

Problem:

According to a recent meeting with phytobenthos experts, this list (merge from Ecoprof, Star and Omnidia by Michel Coste) should not be used because of incompatibilities and differences within the taxonomy of these three lists. According to the recommendation of the experts only one of these three lists (preferable Omnidia) should be used. An official contact between ICPDR and Michel Coste for the allowance to use these data should be established.

5.4. Fish:

History:

The taxa list from the FAME project was amended during the Euro-limpacs project and is available on the web (www.freshwaterecology.info).

Current status:

As of 2007-01-24 there are 351 valid taxa available.

Next steps:

The list should be reviewed by DRB countries and additional taxa should be reported. A responsible person for the compilation is necessary.

5.5. Phytoplankton:

History:

The JDS taxa list has 1737 taxa but is not coded. The Ecoprof list has only 480 taxa but is coded.

Current status:

not available yet

Next steps:

A decision should be drawn whether there is a better (more complete) taxa list available elsewhere. If not the Ecoprof list could be used and be amended with valid JDS taxa. A responsible person for the compilation is necessary.

5.6. Zooplankton:

History:

The JDS taxa list has 797 taxa but is not coded. The new taxalist is compiled from Ecoprof database.

Current status:

As of 2006-12-20 there are 284 valid and 3 synonym taxa available.

Next steps:

The list should be reviewed by DRB countries and additional taxa should be reported. A responsible person for the compilation is necessary.

6. USER INTERFACE CHANGES

The following features have been improved compared to the TNMN/JDS database user interfaces:

- Taxa can be searched via different paths:
  - Hierarchical selection from BQE down to Genus Species.
  - String search by Genus Species or Author.
  - Search by all available codes.
- Latest web technology (AJAX) was used to improve usability:
  - Hierarchical selection without page reloads.
  - Search results are shown while typing in the string search function.
  - Full result sets can be scrolled through without paging.
  - Table columns can be hidden/shown and column widths can be adjusted.
  - Details information can be accessed on the same screen as the search results.
  - Advanced features can be easily shown and hidden.
- Search parameters are shown on the same screen as the result set so they can be refined easily.
- Multiple sampling sites and determinants can be selected in an easy way.
- Selection of month introduced to allow seasonal selections.
- Interactive selection of matrix, instrument and method of sampling.
- Results can be exported easily into comma-separated-values files (CSV) or native Excel97-2003 format (XLS).
- Statistics give an overview on the amount of available data in the database.

7. GENERAL APPLICATION FEATURES

- Developed based on a widely used open-source framework (Drupal) which will also be used for the ICPDR Information System Danubis in the future.
- The application can be installed on any operating system supporting PHP and MySQL (Windows, Linux, Mac OS X and others).
- The application is also bundled with a lightweight server (incl. Apache, PHP and MySQL) so it can run on any Windows PC without installation.

8. SUGGESTED DATA COLLECTION PROCESS

The application was developed to be used as a tool during the data collection process which can take the following steps:

1. Data provider downloads code lists and templates1
2. ...prepares data according to code lists and templates
3. ...uploads filled templates and receives automatic validation result
    a) if there are errors, data has to be corrected and uploaded again
    b) if validation is successful, data is imported into the database
4. optional (not yet fully implemented): after import, new data is only accessible to specific users ("data reviewer") who views/tests this data and has the options to
    c) discard the new dataset
    d) approve the new dataset, making it available to all users
5. data is available to all users for querying

This process can be organized decentrally (each country has a data provider) or centrally (one data provider collects and compiles the data from all countries).

8.1. Database user roles

User role	Privilege
Viewer	can see approved data
Data provider	can upload new data for assigned data source (+ viewer's privileges)
Reviewer	can approve/discard data for assigned data source (+ viewer's privileges)
Administrator	can edit code lists (+ all other's privileges)

1 Templates define the input format (table matrix, fields) and have to be used for data input. Codelists define allowed content of specific fields.

8.2. Advantages of the suggested approach

- Transparent update process: history of changes can be viewed
- Clearly defined requirements for data: immediate response of validation
- Clear separation of approved and unapproved data, possibility to collect and share incomplete datasets
- Flexible organization: review can be done by central institution or in countries

9. RECOMMENDATIONS

- The taxa lists should be management centrally by appointed experts.
- New taxa should be introduced in a coordinated manner with international relevant databases and given a code from an existing system (AQEM, Star, ECOPROF, Euro-limpacs, freshwater.info)
- The database should be used and further improved and extended (e.g. ad-hoc data input tool, hydromorphology) in the Joint Danube Survey 2007 and any other related projects within the ICPDR.

10. FOLLOW-UP STEPS

- The database will be installed on the ICPDR server and available at the address http://www.icpdr.org/wq-db for registered users.
- The data collection process should be tested during 2007 for one biological quality element (Benthic-invertebrates). The experiences of this test should be used to define more specifically the general data collection process for all data in the future.
- The list of macrophytes will be imported once it is available.
- All data from Bucharest Declaration, TNMN and Danube Surveys databases should be imported into the new database.
- All Danube countries should nominate national experts for the review of taxa lists and data collection.

ICPDR Water Quality DB

Build 83
Date 2007-02-25 21:46:47

1. Overview

Revisions

Version	Date	Description
0.1	2005-09-27	First draft based on TNMN database extended with biological tables from Danube surveys database
0.2		working version
0.3		working version
0.4	2006-08-26	Draft including extended coding, sampling methods
0.5	2006-09-04	Added context to monpoint, changed dataset_log
0.6	2006-09-07	Added subgenus in table taxa
0.7	2006-09-23	Added additional authors for phytobenthos in table taxa
0.8	2006-11-07	Added table changelog, column lifeform in taxa
0.8.1	2006-12-20	Added subunit_code to station
0.9	2007-01-24	Substitute determin_id with quantifiation unit in species table
1.0	2007-02-25	Cosmetic changes

Other

2. DataTypes

Constant Types

Name	Domain	DataD equiv
integer		
boolean		
datetime		
text		

Variable Types

Name	Size	Domain	DataD equiv
varchar	n/a	n/a	n/a
analytical method code	7		
context	10	Field IN ('TNMN', 'JDS1', 'JDS2', 'ITR', 'ADS')	
country code	2		
dataset status	10	Field IN ('new', 'errors', 'validated', 'published')	
determinand code	5		
group code	1	Field IN ('B', 'F', 'H', 'Y', 'Z')	
location code	1	Field IN ('L', 'M', 'R', 'P', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'S')	
log action	10	Field IN ('insert', 'update', 'delete')	
long string	255		
reference unit	4		
sampling instrument	4		
sampling method code	5		
sampmeth type	2		
short string	32		
string	128		
string code	24		
subsamling type	3		

Variable Types

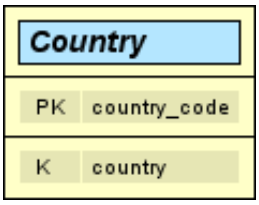
Name	Size	Domain	DataD equiv
taxa status	10	Field IN ('valid', 'redundant', 'deleted')	
tiny string	8		
decimal	n/a	n/a	n/a
coordinates	7,4		
standard decimal	10,2		
small integer	4		

3. ER Views

ER View	Description
	The basic constructs of an entity relationshop (ER) model are: 1) **Things** (=entities) about which data is kept, represented by a box; 2) **Relationships** between those things, represented by lines connecting the boxes; and 3) **Characteristics** of those things represented by attribute names within the box. ad 1) Round cornered boxes represent "dependent" entities — those whose unique identifier includes at least one relationship to another entity. "Independent" entities, whose identifiers are not derived from other entities, are shown with square corners. The box is divided, with identifying attributes (the primary key) above the division and non-identifying attributes below. ad 2) A **solid circle** next to an entity means **"one or more"** occurrences of that entity. Absence of a solid circle next to an entity means that only one occurrence of that entity is involved ("one and only one"). If a relationship is part of an entity's unique identifier, it is shown as a solid line; if not, it is shown as a dashed line. ad 3) Attributes are of the following types: **Primary key ("PK"):** Every entity has exactly one primary key displayed above the horizontal line in the entity box. **Key ("K"):** Entities can have alternate keys that also uniquely identify the entity. **Foreign key ("FK"):** In addition to a relationship line from an entity, the foreign key ("FK") that would implement the line in a relational database design is shown as an attribute of that entity. **Not-Null Attribute ("N"):** obligatory attribute **Attribute ("A")**: optional attribute The diagram uses the IDEF1X notation, for more information see http://www.idef.com/IDEF1X.html.

4. Overview of Entities and Relations

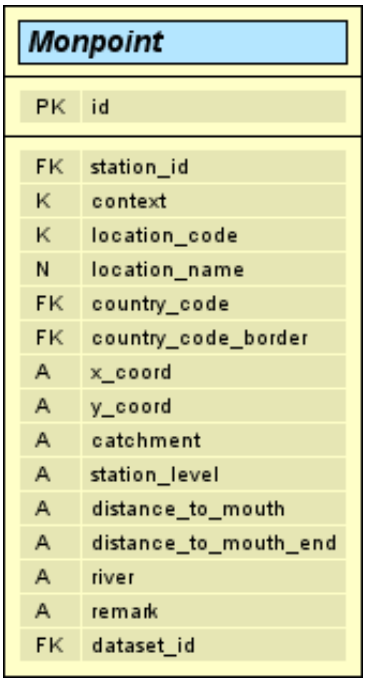
1. Country



Used tables

country

4.2. Monpoint



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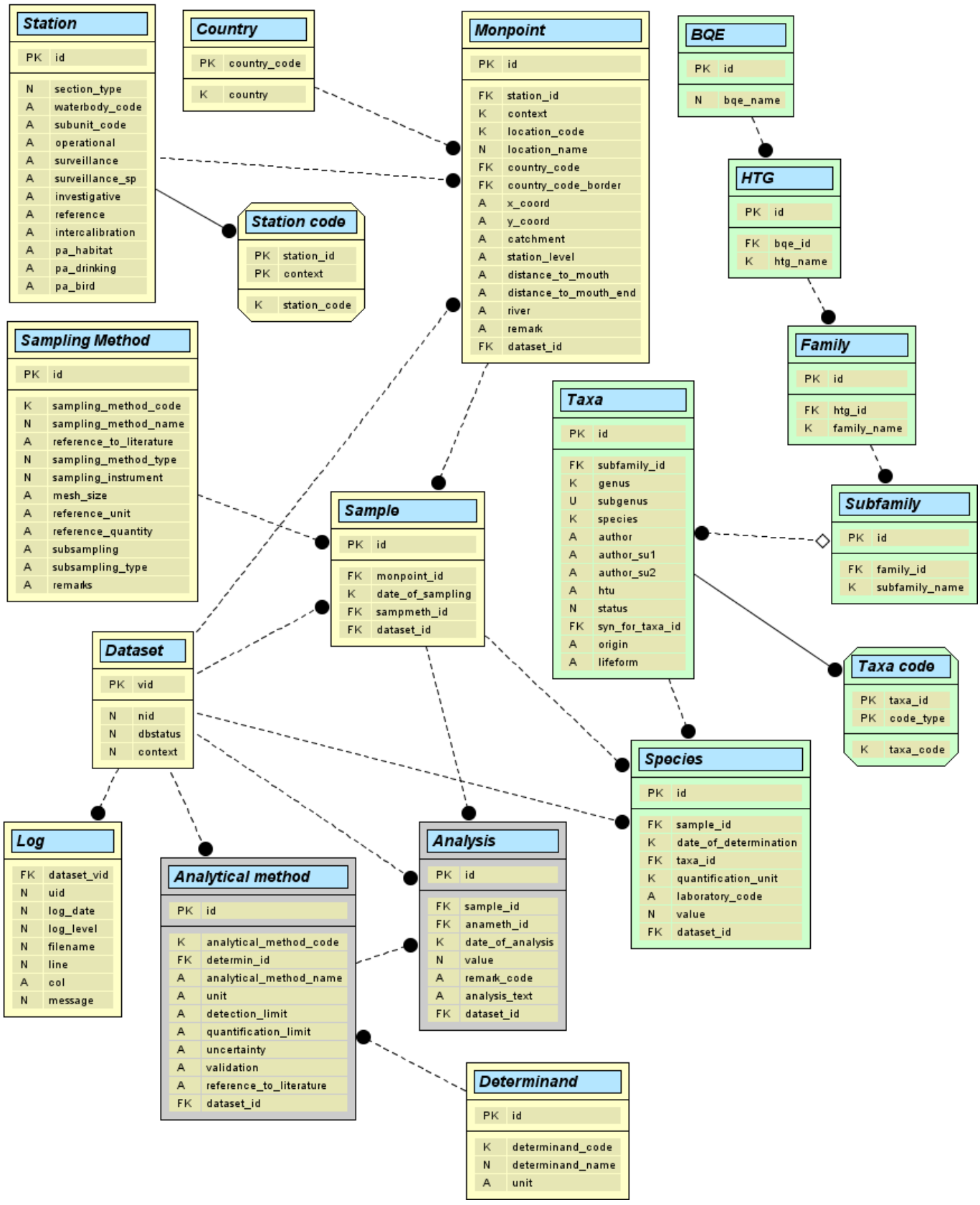
monpoint


Station
PK id
N section_type
A waterbody_code
A subunit_code
A operational
A surveillance
A surveillance_sp
A investigative
A reference
A intercalibration
A pa_habitat
A pa_drinking
A pa_bird
Country
PK country_code
K country
Monpoint
PK id
FK station_id
K context
K location_code
N location_name
FK country_code
FK country_code_border
A x_coord
A y_coord
A catchment
A station_level
A distance_to_mouth
A distance_to_mouth_end
A river
A remark
FK dataset_id
BQE
PK id
N bqe_name
HTG
PK id
FK bqe_id
K htg_name
Station code
PK station_id
PK context
K station_code
Sampling Method
PK id
K sampling_method_code
N sampling_method_name
A reference_to_literature
N sampling_method_type
N sampling_instrument
A mesh_size
A reference_unit
A reference_quantity
A subsampling
A subsampling_type
A remarks
Family
PK id
FK htg_id
K family_name
Taxa
PK id
FK subfamily_id
K genus
U subgenus
K species
A author
A author_su1
A author_su2
A htu
N status
FK syn_for_taxa_id
A origin
A lifeform
Subfamily
PK id
FK family_id
K subfamily_name
Sample
PK id
FK monpoint_id
K date_of_sampling
FK sampmeth_id
FK dataset_id
Dataset
PK vid
N nid
N dbstatus
N context
Taxa code
PK taxa_id
PK code_type
K taxa_code
Species
PK id
FK sample_id
K date_of_determination
FK taxa_id
K quantification_unit
A laboratory_code
N value
FK dataset_id
Log
FK dataset_vid
N uid
N log_date
N log_level
N filename
N line
A col
N message
Analysis
PK id
FK sample_id
FK anameth_id
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N value
A remark_code
A analysis_text
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Analytical method
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A unit
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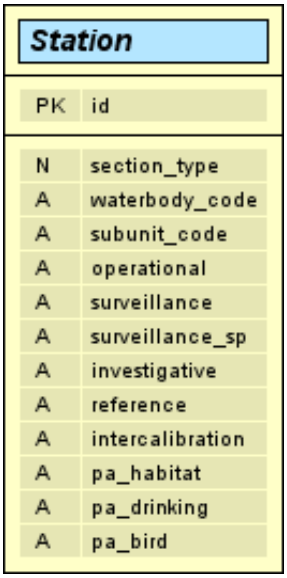
A quantification_limit
A uncertainty
A validation
A reference_to_literature
FK dataset_id
Determinand
PK id
K determinand_code
N determinand_name
A unit

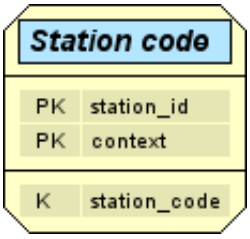
4.3. Station



Used tables

station

4.4. Station code



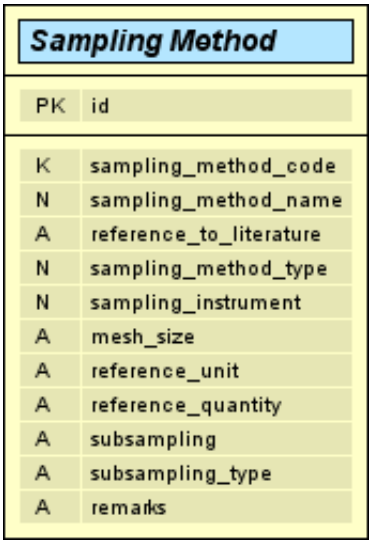
Used tables

station_code

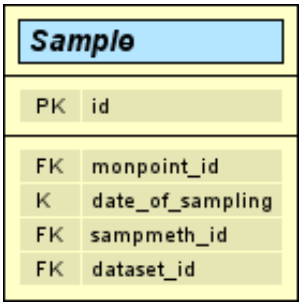
4.5. Sampling Method

Used tables

sampmeth



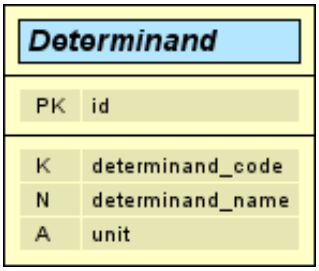
4.6. Sample



Used tables

sample

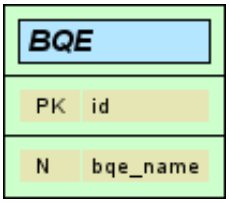
4.7. Determinand



Used tables

determin

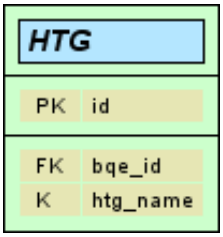
4.8. BQE



Used tables

bqe

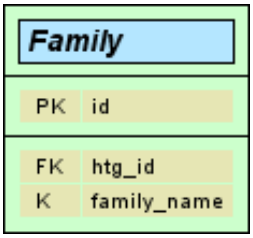
4.9. HTG



Used tables

htg

4.10. Family

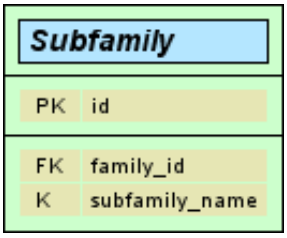


Used tables

family

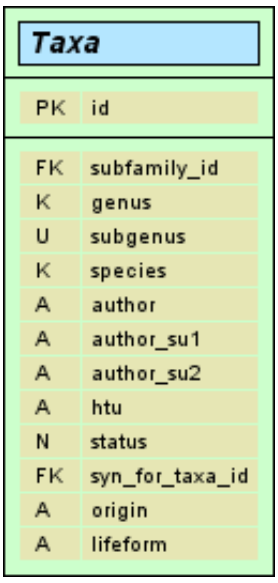
4.11. Subfamily

Used tables



subfamily

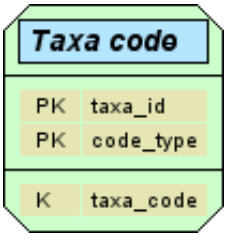
4.12. Taxa



Used tables

taxa

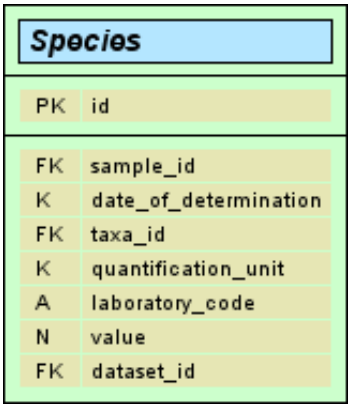
4.13. Taxa code



Used tables

taxa_code

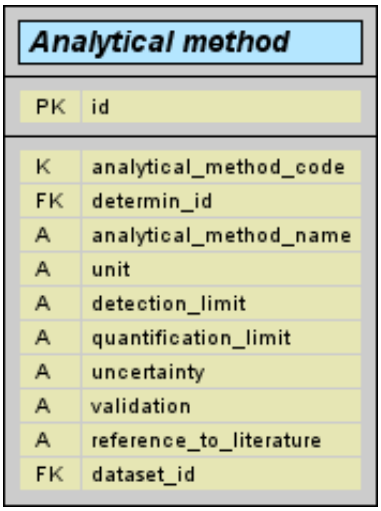
4.14. Species



Used tables

species

4.15. Analytical method



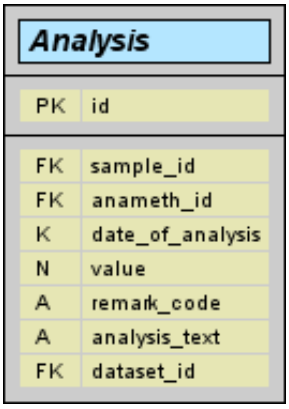
Used tables

anameth

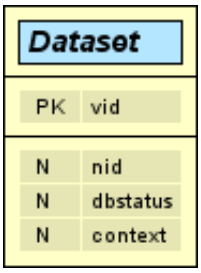
4.16. Analysis

Used tables

analysis



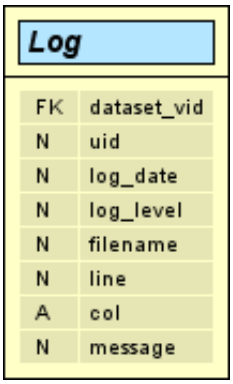
4.17. Dataset



Used tables

dataset

4.18. Log



Used tables

dataset_log

5. ICPDR Water Quality DB

Introduction

This data model describes the database structure for the ICPDR Water Quality database, which is based on TNMN (DEFF) and JDS databases and extended for biological data (species listing).
The (yellow) boxes (tables) are relevant for both chemical and biological data (general data: monitoring stations, samples and methods).
The (gray) boxes analysis and analytical methods contain chemical as well as biological data (determinand code 8x.xx).
The (green) biological part is derived from the Joint Danube Survey (JDS) database.
The database model was changed to include artifical primary keys instead of natural, multi-field primary keys. This facilitates database administration and changes of coding in the future.

Sub Folders

Name	Description
General data	These tables contain data of sampling sites, dates and methods.
Sampling data	
Analysis data	These tables include quantitative (chemical and biological) data.
Taxa list	These tables include the taxa list of the biological quality elements.
Species data	

1. General Note

This documentation is automatically generated from a database modelling tool called "Druid". A version which is more easier to navigate will be available at http://www.icpdr.org/wq-db-docs.

6. General data

These tables contain data of sampling sites, dates and methods.

1. country

This table defines countries.

See Also

monpoint

Field Summary

Name	Type	Description
country_code	country code	ISO 3166-alpha-2 code
country	string	country name

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
country_code	varchar(2)	x	-	-	x	DE
country	varchar(128)	-	x	-	x	

6.2. station

This table defines monitoring stations.

Each station can have several monitoring points (at different positions (L,M,R,..), with different coordinates, etc).

Each station can have several codes depending on context (monitoring network, survey) (e.g. L2130 for TNMN, DE_RV_BY11 for EIONET, D02 for the Yearbook)

See Also

station_code

monpoint

Field Summary

Name	Type	Description
id	integer	
section_type	integer	Section types of the Danube (Roof Report 2004)

waterbody_code	string code	European Water Body Code
subunit_code	string code	Code of the subunit for Water Management
operational	boolean	Operational monitoring
surveillance	boolean	Surveillance monitoring of overall surface water status (SM1)
surveillance_sp	boolean	Surveillance monitoring of specific pressures (SM2)
investigative	boolean	Investigative monitoring
reference	boolean	Reference station
intercalibration	boolean	Is the site part of the intercalibration network
pa_habitat	boolean	Is the site located in a protected area according to the Habitats Directive 92/43/EEC
pa_drinking	boolean	Is the site located in a protected area according to the Drinking Water Directive 80/778/EEC
pa_bird	boolean	Is the site located in a protected area according to the Birds Directive 79/409/EEC

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
section_type	integer	-	-	-	x	
waterbody_code	varchar(24)	-	-	-	-	
subunit_code	varchar(24)	-	-	-	-	
operational	boolean	-	-	-	-	
surveillance	boolean	-	-	-	-	
surveillance_sp	boolean	-	-	-	-	
investigative	boolean	-	-	-	-	
reference	boolean	-	-	-	-	
intercalibration	boolean	-	-	-	-	
pa_habitat	boolean	-	-	-	-	
pa_drinking	boolean	-	-	-	-	
pa_bird	boolean	-	-	-	-	

6.3. station_code

This tabes defines codes for stations.

Field Summary

Name	Type	Description
station_id	station(id)	
context	context	The context of the station code (e.g. monitoring network, survey)
station_code	string code	The monitoring point code in the TNMN has the following structure: CXXX (C = letter, X = number) The four-digit number reflects the river-km, in case of tributaries and arms the river-km of their mouth at the Danube river (except at the Danube delta where there are several arms). This field has been extended to allow also other codes, e.g.

		European Surface Water Station Code.

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
station_id	integer	x	-	-	x	
context	varchar(10)	x	-	x	x	
station_code	varchar(24)	-	-	x	x	L2130

Foreign Keys

Name	Import	On Update	On Delete
station_id	station(id)	NO ACTION	NO ACTION

6.4. dataset

This table contains general information on datasets.

See Also

- dataset_log
- monpoint
- sample
- anameth
- analysis
- species

Field Summary

Name	Type	Description
vid	integer	Version ID
nid	integer	Node ID
dbstatus	dataset status	status related to database import and publication
context	context	refers to the monitoring network or survey

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
vid	integer	x	-	-	x	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
nid	integer	-	-	-	x	
dbstatus	varchar(10)	-	-	-	x	
context	varchar(10)	-	-	-	x	

6.5. dataset_log

Field Summary

Name	Type	Description
dataset_vid	dataset(vid)	
uid	integer	User ID
log_date	datetime	Date and time of the log entry
log_level	small integer	Type of log entry
filename	short string	
line	integer	
col	short string	
message	long string	Descriptive text

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
dataset_vid	integer	-	-	-	x	
uid	integer	-	-	-	x	
log_date	datetime	-	-	-	x	
log_level	decimal(4)	-	-	-	x	
filename	varchar(32)	-	-	-	x	
line	integer	-	-	-	x	
col	varchar(32)	-	-	-	-	
message	varchar(255)	-	-	-	x	

Foreign Keys

Name	Import	On Update	On Delete
dataset_vid	dataset(vid)	NO ACTION	NO ACTION

6.6. codelist

Auxiliary table for all codelist values

Field Summary

Name	Type	Description
domain	short string	
value	short string	
meaning	string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
domain	varchar(32)	x	-	x	x	
value	varchar(32)	x	-	-	x	
meaning	varchar(128)	-	-	x	x	

6.7. changelog

Field Summary

Name	Type	Description
id	integer	
uid	integer	
tablename	short string	
log_id	integer	
log_date	datetime	
log_action	log action	
message	long string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
uid	integer	-	-	-	x	
tablename	varchar(32)	-	-	-	x	
log_id	integer	-	-	-	x	
log_date	datetime	-	-	-	x	
log_action	varchar(10)	-	-	-	x	
message	varchar(255)	-	-	-	-	

7. Sampling data

1. monpoint

This table has the characteristics of all monitoring points.
Changes:
Replaced monitoringpoint_code with station_id to allow multiple and longer codes depending on context.
Renamed location_in_profile to profile and extended code list.
Renamed village to location_name.
Added country_code_border for monitoring points at borders.
Added distance_to_mouth_sediments for end of range of sediment sample

See Also

sample

Field Summary		
Name	**Type**	**Description**
id	integer	
station_id	station(id)	
context	context	The context of the station code (e.g. monitoring network, survey)
location_code	location code	
location_name	string	Name of the Sampling Site
country_code	country(country_code)	
country_code_border	country(country_code)	
x_coord	coordinates	Latitude (degrees)
y_coord	coordinates	Longitude (degrees)
catchment	standard decimal	The area in square km, from which water drains through the station
station_level	standard decimal	Altitude. The mean surface water level in meters above sea level
distance_to_mouth	standard decimal	River-km
distance_to_mouth_end	standard decimal	

river	string	Name of the river. A slash “/” in front indicates a tributary to the Danube river
remark	long string	
dataset_id	dataset(vid)	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
station_id	integer	-	-	x	x	
context	varchar(10)	-	-	x	x	
location_code	varchar(1)	-	-	x	x	M
location_name	varchar(128)	-	-	-	x	Jochenstein
country_code	varchar(2)	-	-	-	x	DE
country_code_border	varchar(2)	-	-	-	-	
x_coord	decimal(7,4)	-	-	-	-	48.5611
y_coord	decimal(7,4)	-	-	-	-	13.4564
catchment	decimal(10,2)	-	-	-	-	77086
station_level	decimal(10,2)	-	-	-	-	290
distance_to_mouth	decimal(10,2)	-	-	-	-	2204
distance_to_mouth_end	decimal(10,2)	-	-	-	-	
river	varchar(128)	-	-	-	-	Danube
remark	varchar(255)	-	-	-	-	in april 2002 changed longtitude, altitude
dataset_id	integer	-	-	-	x	

Foreign Keys

Name	Import	On Update	On Delete
station_id	station(id)	NO ACTION	NO ACTION
country_code	country(country_code)	NO ACTION	NO ACTION
country_code_border	country(country_code)	NO ACTION	NO ACTION
dataset_id	dataset(vid)	NO ACTION	NO ACTION

7.2. sampmeth

This table defines the sampling methods

Changes:

Added fields for biological sampling methods: sampling method type, sampling instrument, mesh size, reference unit, reference quantity, subsampling, subsampling type, remarks

See Also

sample

Field Summary

Name	Type	Description
id	integer	
sampling_method_code	sampling method code	The Sampling Method Code is in the following format: XX.WW (X, W = number) First two symbols XX refers to sampled media/organism group. Symbols WW are reserved for distinction between different methods of one media. There are the following possibilities of XX: 01 water 02 sediments 03 suspended matter 04 mussels 05 macrozoobenthos 06 phytobenthos 07 macrophytes 08 phytoplankton 09 zooplankton 10 pore water 11 fish
sampling_method_name	string	Name/description of the sampling method
reference_to_literature	string	Reference to standard, literature, etc.
sampling_method_type	sampmeth type	
sampling_instrument	sampling instrument	
mesh_size	small integer	
reference_unit	reference unit	
reference_quantity	standard decimal	

subsampling	boolean	only relevant for macro-invertebrates
subsampling_type	subsamling type	
remarks	text	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
sampling_method_code	varchar(5)	-	x	-	x	01.01
sampling_method_name	varchar(128)	-	-	-	x	Bucket
reference_to_literature	varchar(128)	-	-	-	-	
sampling_method_type	varchar(2)	-	-	-	x	
sampling_instrument	varchar(4)	-	-	-	x	
mesh_size	decimal(4)	-	-	-	-	
reference_unit	varchar(4)	-	-	-	-	
reference_quantity	decimal(10,2)	-	-	-	-	
subsampling	boolean	-	-	-	-	
subsampling_type	varchar(3)	-	-	-	-	
remarks	text	-	-	-	-	

7.3. sample

This table contains all samples taken.

Changes:

Removed time_of_sampling, the time is to be specified in the date_of_sampling field

See Also

analysis

species

Field Summary

Name	Type	Description
id	integer	
monpoint_id	monpoint(id)	
date_of_sampling	datetime	Date of sampling in the format DD.MM.YYYY
sampmeth_id	sampmeth(id)	
dataset_id	dataset(vid)	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
monpoint_id	integer	-	-	x	x	
date_of_sampling	datetime	-	-	x	x	18-JUN-02 00:00
sampmeth_id	integer	-	-	-	x	
dataset_id	integer	-	-	-	x	

Foreign Keys

Name	Import	On Update	On Delete
monpoint_id	monpoint(id)	NO ACTION	NO ACTION
sampmeth_id	sampmeth(id)	NO ACTION	NO ACTION
dataset_id	dataset(vid)	NO ACTION	NO ACTION

8. Analysis data

These tables include quantitative (chemical and biological) data.

1. determingroup

Auxiliary table for names of determinand groups

Field Summary

Name	Type	Description
id	integer	
group_code	determinand code	
group_name	string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
group_code	varchar(5)	-	x	-	x	81.00
group_name	varchar(128)	-	-	-	x	Basic biological determinands

8.2. determin

This table defines all determinands.

See Also

anameth

Field Summary

Name	Type	Description
id	integer	
determinand_code	determinand code	Format XX.XX (X – number)
determinand_name	string	Name of the determinand.
unit	string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
determinand_code	varchar(5)	-	x	-	x	81.10
determinand_name	varchar(128)	-	-	-	x	Macrozoobenthos no. of taxa
unit	varchar(128)	-	-	-	-	

8.3. anameth

This table defines all analytical methods used for analysis of the determinands.

Changes:

Added quantification limit

See Also

analysis

Field Summary

Name	Type	Description
id	integer	

		Analytical method code has the following structure:
		LLM.SXX (L, M = letter; S,X = numbers)
		First two symbols LL refers to laboratory in accordance to table below, third symbol M to the media. The rest of the code (symbols SXX) should be structured in order to specify the type of the standard used for analysis in the following way: S represents the code for the type of standard and the last two symbols XX should be used to differentiate one analytical method from the others (from 01 up to 99 is possible).
		LABORATORY CODES (LL)
		`AA on-board laboratory`
		`AB ARGE Gewässerschutz`
		`AC CBR Frankfurt a.M.`
		`AD GG&SBM Vienna`
		`AE ÖFZ Seibersdorf`
		`AF TZW Karlsruhe`

analytical_method_code	analytical method code	AG UBA Berlin AH UBA Vienna AI WRI Bratislava AJ WRRC VITUKI AK EI AL ICIM AM TUBP AN IBISS MEDIUM CODES (M) W water S sediments P suspended matter (particles) M mussels B macrozoobenthos F macrophytes H phytobenthos Y phytoplankton Z zooplankton O pore water I fish CODE FOR TYPE OF STANDARDS (S) 0 standard unspecified 1 ISO/EN standards 2 US EPA standards 3 ASTM standards 4 DIN standards 5 USGS standards 6-8 other standards which are of international importance 9 completely national standards
determin_id	determin(id)	
analytical_method_name	string	
unit	string	
detection_limit	standard decimal	
quantification_limit	standard decimal	
uncertainty	standard decimal	
validation	boolean	
reference_to_literature	string	
dataset_id	dataset(vid)	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
analytical_method_code	varchar(7)	-	-	x	x	DEW.410
determin_id	integer	-	-	x	x	
analytical_method_name	varchar(128)	-	-	-	-	Unspecified
unit	varchar(128)	-	-	-	-	
detection_limit	decimal(10,2)	-	-	-	-	
quantification_limit	decimal(10,2)	-	-	-	-	
uncertainty	decimal(10,2)	-	-	-	-	
validation	boolean	-	-	-	-	N
reference_to_literature	varchar(128)	-	-	-	-	DIN 38410 Part 2
dataset_id	integer	-	-	-	x	

Foreign Keys

Name	Import	On Update	On Delete
determin_id	determin(id)	NO ACTION	NO ACTION
dataset_id	dataset(vid)	NO ACTION	NO ACTION

8.4. analysis

This table defines all analysis.

Changes:

Removed time_of_analysis, the time is to be specified in the date_of_analysis field

Field Summary

Name	Type	Description
id	integer	
sample_id	sample(id)	
anameth_id	anameth(id)	
date_of_analysis	datetime	Date of analysis in the format DD.MM.YYYY

value	standard decimal	Result of analysis
remark_code	string	
analysis_text	string	
dataset_id	dataset(vid)	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
sample_id	integer	-	-	x	x	
anameth_id	integer	-	-	x	x	
date_of_analysis	datetime	-	-	x	x	18-JUN-02 00:00
value	decimal(10,2)	-	-	-	x	93
remark_code	varchar(128)	-	-	-	-	
analysis_text	varchar(128)	-	-	-	-	
dataset_id	integer	-	-	-	x	

Foreign Keys

Name	Import	On Update	On Delete
sample_id	sample(id)	NO ACTION	NO ACTION
anameth_id	anameth(id)	NO ACTION	NO ACTION
dataset_id	dataset(vid)	NO ACTION	NO ACTION

9. Taxa list

These tables include the taxa list of the biological quality elements.

1. bqe

See Also

htg

Field Summary

Name	Type	Description
id	integer	
bqe_name	short string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
bqe_name	varchar(32)	-	-	-	x	Macrozoobenthos

9.2. htg

This table defines all higher taxonomic groups of taxa.

See Also

family

Field Summary

Name	Type	Description
id	integer	
bqe_id	bqe(id)	
htg_name	string	

Sql Summary

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
bqe_id	integer	-	-	-	x	
htg_name	varchar(128)	-	x	-	x	

Foreign Keys

Name	Import	On Update	On Delete
bqe_id	bqe(id)	NO ACTION	NO ACTION

9.3. family

This table defines all families of taxa

See Also

subfamily

Field Summary

Name	Type	Description
id	integer	
htg_id	htg(id)	
family_name	string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
htg_id	integer	-	-	-	x	
family_name	varchar(128)	-	x	-	x	CHIRONOMIDAE

Foreign Keys

Name	Import	On Update	On Delete
htg_id	htg(id)	NO ACTION	NO ACTION

9.4. subfamily

See Also

taxa

Field Summary

Name	Type	Description
id	integer	
family_id	family(id)	
subfamily_name	string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
family_id	integer	-	-	-	x	
subfamily_name	varchar(128)	-	x	-	x	

Foreign Keys

Name	Import	On Update	On Delete
family_id	family(id)	NO ACTION	NO ACTION

9.5. taxa

This table defines all taxa.

See Also

taxa
taxa_code
species

Field Summary

Name	Type	Description
id	integer	
subfamily_id	subfamily(id)	Must be filled, except for synonyms
genus	string	

subgenus	string	
species	string	
author	string	
author_su1	string	Author of first subunit (subspecies, variety, form, morphotype)
author_su2	string	Author of second subunit (subspecies, variety, form, morphotype)
htu	boolean	Higher Taxonomic Unit (e.g. "sp." or "Gen.sp."), auxiliary column for quick selection
status	taxa status	
syn_for_taxa_id	taxa(id)	Must be filled for synonyms
origin	string	origin database of this taxa
lifeform	integer	only for Phytobenthos, not used at the moment 1=benthic 2=planctic

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
subfamily_id	integer	-	-	x	-	
genus	varchar(128)	-	-	x	x	Xenopelopia
subgenus	varchar(128)	-	-	x	-	
species	varchar(128)	-	-	x	x	nigricans
author	varchar(128)	-	-	-	-	(FITTKAU, 1962)
author_su1	varchar(128)	-	-	-	-	
author_su2	varchar(128)	-	-	-	-	
htu	boolean	-	-	-	-	
status	varchar(10)	-	-	-	x	
syn_for_taxa_id	integer	-	-	-	-	
origin	varchar(128)	-	-	-	-	
lifeform	integer	-	-	-	-	

Foreign Keys

Name	Import	On Update	On Delete
subfamily_id	subfamily(id)	NO ACTION	NO ACTION
syn_for_taxa_id	taxa(id)	NO ACTION	NO ACTION

9.6. taxa_code

This table is used to assign multiple codes to the same taxa.

Field Summary

Name	Type	Description
taxa_id	taxa(id)	
code_type	short string	
taxa_code	short string	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
taxa_id	integer	x	-	-	x	123
code_type	varchar(32)	x	-	x	x	AQEM
taxa_code	varchar(32)	-	-	x	x	7175

Foreign Keys

Name	Import	On Update	On Delete
taxa_id	taxa(id)	NO ACTION	NO ACTION

10. Species data

1. species

This table describes all sampled species

Field Summary

Name	Type	Description
id	integer	
sample_id	sample(id)	
date_of_determination	datetime	
taxa_id	taxa(id)	
quantification_unit	string code	
laboratory_code	string code	The same codes are used as in the LL portion of the Analytical Method Code
value	standard decimal	
dataset_id	dataset(vid)	

Sql Summary

Name	Type	PrKey	Unq	MUnq	NotN	Example
id	integer	x	-	-	x	
sample_id	integer	-	-	x	x	
date_of_determination	datetime	-	-	x	x	19-JUN-02
taxa_id	integer	-	-	x	x	7175
quantification_unit	varchar(24)	-	-	x	x	
laboratory_code	varchar(24)	-	-	-	-	AA
value	decimal(10,2)	-	-	-	x	5
dataset_id	integer	-	-	-	x	

Foreign Keys

Name	Import	On Update	On Delete
sample_id	sample(id)	NO ACTION	NO ACTION
taxa_id	taxa(id)	NO ACTION	NO ACTION
dataset_id	dataset(vid)	NO ACTION	NO ACTION