

EFI + Improvement and Spatial Extension of the European Fish Index



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Project overview

The overall objective of **EFI+** is to overcome existing limitations of the EFI by developing a new, **more accurate and pan-European fish index**. The scientific and technological objectives are to (1) evaluate the applicability of the existing EFI and make necessary improvements to the existing index in Central-Eastern Europe and in the Mediterranean ecoregions, (2) extend the scope of the existing EFI to cover very large rivers, (3) analyse relationships between hydromorphological pressures (incl. continuity disruptions) and fish assemblages to increase the accuracy of the EFI, (4) adapt existing software to the requirements of the new EFI to allow calculation of the ecological status for running waters, (5) implement and disseminate the EFI and supporting software by integration of the project results into the CIS activities (Common Implementation Strategy) and ongoing national and international monitoring programmes such as the Joint Danube Survey. These results will be presented in end-user workshops and at an international conference.

The following pages provide an overview of progress within the EFI+ project over the last few months.

WP 2 Data collection and the EFI+ central database

Between February and November 2007, data collection for the EFI+ project was conducted and, in December 2007, the EFI+ database was finalized. An important task during data collection process was to ensure adequate data quality.

The data collection process consisted of different activities, mostly done in parallel:

- **National data collection for the central database** (variables concerned fish community information, sampling methods, environmental and pressure variables). For the national data collection, five types of pressures are considered: Connectivity (7 variables), hydrology (9), morphology (7), water quality (7); and others that were defined as new pressure types (2). Altogether, we are considering 32 pressure variables.
- **Data collection for the central database on the European scale.** Data computation was done in a standardised manner and standardised information sources were used, for environmental and pressure variables. More than 70 variables were collated in this task and they cover a wide variety of environmental characteristics, e.g. catchment size, distance to sea, geology, temperature and precipitation as well as pressures such as land cover and road density.

- **Data collection for the historical distribution of diadromous species on national and European scales.** The impact of continuum interruption on migratory fish will be analysed by comparing particular metrics for the historical and present distribution of long distance migrants (diadromous species). A list of 18 fish species was selected for which information on both the historical distribution and the current distribution (using site specific data) was compiled.
- **Data collection on national scale for the large rivers database.** A new large rivers database was established, which includes sampling methods other than electric fishing. It holds 2730 fishing data sets obtained by electric fishing (samples in common with the central database) and data sets obtained by complementary gear, such as trawls, seine, fyke or gill nets.

The EFI+ central database:

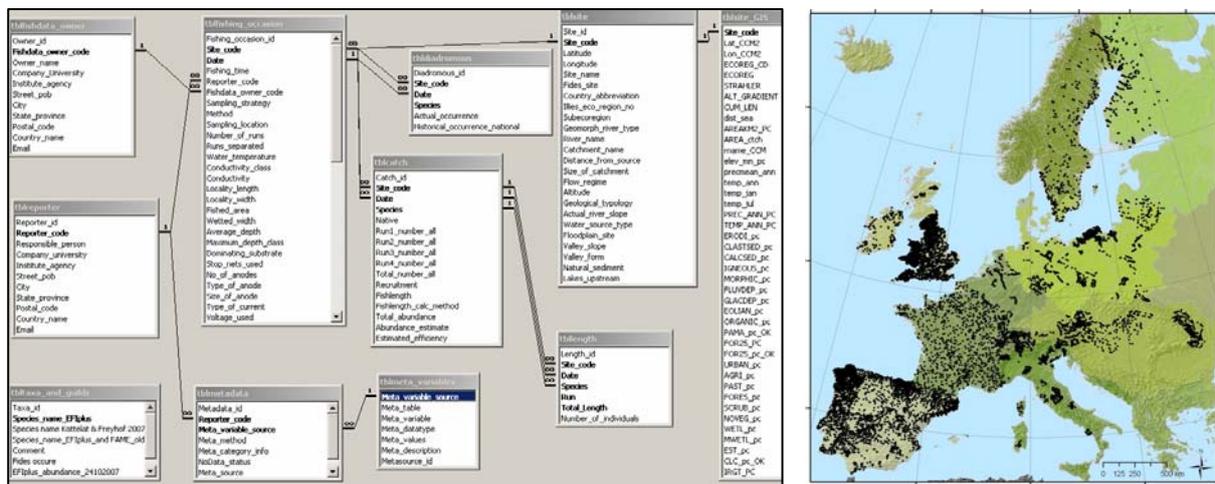


Fig. 1 gives an overview on the EFI+ database structure; Fig. 2 shows the distribution of 14221 EFI+ sites all over Europe

The EFI+ central database provides basic ecological and fish data needed for the EFI+ project’s analytical progress and contains the following tables:

- Tblsite:** Refers to the location sampled and the physical characteristics of the site.
- Tblfishing_occasion:** Refers to sampling procedure and assessment of the anthropogenic impact.
- Tblcatch:** Is used to report the catch for each species in a specific fishing occasion, including information on run, estimated abundance, and estimated biomass.
- Tbllength:** Captures the individual lengths of different species in a specific run, each row indicates one measured fish.
- Tbldiadromous:** Concerns the actual and historical occurrence of diadromous species.
- Tblsite_GIS:** Gives valuable information on all data collected on the European scale by GIS-analyses.

Additional, Tblmetadatas, Tblreporter and Tblfishdata_owner assure traceability of background and provider data.

Tab. 1: Number of records included in the central database's tables

| | tblsite | tblfishing_occasion | tblcatch | tbldiadromous | tbllength |
|--------------|--------------|---------------------|---------------|---------------|----------------|
| Austria | 938 | 1172 | 6294 | 0 | 326039 |
| Finland | 530 | 530 | 2207 | 257 | 0 |
| France | 1145 | 6570 | 62576 | 65700 | 3896905 |
| Germany | 803 | 1817 | 18543 | 27240 | 648243 |
| Hungary | 193 | 193 | 2094 | 246 | 0 |
| Italy | 652 | 1152 | 4238 | 0 | 62847 |
| Lithuania* | 115 | 130 | 1086 | 280 | 17801 |
| Netherlands* | 182 | 790 | 5903 | 11850 | 135934 |
| Poland | 919 | 978 | 6926 | 3480 | 73140 |
| Portugal | 923 | 923 | 45227 | 7384 | 60431 |
| Romania | 263 | 323 | 1671 | 0 | 27722 |
| Spain | 4239 | 5189 | 14092 | 10010 | 233344 |
| Sweden | 615 | 5652 | 16751 | 7607 | 426826 |
| Switzerland | 717 | 969 | 2781 | 0 | 171583 |
| UK | 1987 | 3162 | 16361 | 22134 | 241111 |
| Total | 14221 | 29550 | 206750 | 156188 | 6321926 |

* Participating in the EFi+ project based on national funds.

WP 3 Pressure analysis and new metrics development

One objective of WP 3 was to evaluate the existing European Fish Index. The evaluation was based on the FIDES database of the FAME project. Another aim of WP 3 was to develop new candidate metrics that account, in particular, for new geographical (Mediterranean and Central/East European rivers) and river types (large rivers and low species rivers). These new metrics should also be more sensitive to hydromorphological pressures (including continuum disruptions). This work was based on the central database, on the large rivers database, and on the historical data collected for diadromous species.

Pressure analysis and hydromorphological pressure assessment: The objectives of this subtask were to identify human drivers and main pressures affecting fish, to analyse interrelations among pressures, to define a calibration dataset, and to produce a global pressure index. Pressure analysis and hydromorphological pressure assessment showed that the interactions between different pressures are dependent on river groups. River groups appear to be based on the size or longitudinal position of the section in the river network. Therefore, analysis of pressures was done separately for small, medium and large rivers. Finally, pressure indices have been calculated for all EFi+ sites using three different approaches and these will be analysed and discussed next. The final output of this task, a global pressure index, will be used in WP4 to separate calibration data (less impacted sites) from degraded conditions in order to develop reference models.

Mediterranean Rivers: For Mediterranean rivers the central database holds altogether 2105 sites. Sites have been delineated by defining an Index for Mediterraneity. In terms of metrics, the main target is to consider novel metrics, such as morphometric metrics, to define potential sentinel species, and to use “pseudo-species” by aggregating species or size classes. Additionally, metrics tested during the previous FAME project will be analysed again with the new EFi+ data set, since the EFi+ database holds a large and well distributed number of sites from Spain, Portugal and also some from Italy.

Central/Eastern Rivers: In the Central/East European data set, the samples from Poland, Lithuania, Hungary and Romania were analysed. The results showed some particularities for these countries.

Large Floodplain Rivers: For large rivers, metrics will be tested that account mainly for species composition in the mid channel and in the floodplain water bodies. These metrics will use the same guilds as those tested during development of the general index, with the inclusion of additional sampling methods from trawling, seining, gill and fyke nets.

Continuity disruptions – diadromous fish species: Continuity disruptions will be considered by developing metrics for the historical, potential and present occurrence of selected diadromous fish. In this period, all data on the historical and present distribution of fishes were compiled. As well, the environmental variables that will be necessary for modelling potential distributions of fishes were integrated or calculated.

Taxa and guilds: The taxa and guild classification of the FAME project was completely revised by an expert group. Several new guilds were added and physiological characteristics were compiled based on literature reviews. All species classifications from the previous FAME project were checked, discussed among the expert group, and reclassified if necessary.

Existing EFI evaluation: Parallel to the data collection in EFI+ the existing European Fish Index was evaluated in terms of necessary sampling effort (necessary number of individuals as basis for site and especially reference/calibration data selection) and in terms of biogeographical and regional effects.

Finally, the error associated with the EFI was analysed. The final products of the WP3 (identification of gaps in the existing EFI, pressure index, new metrics, revised taxa and guilds list) will be used in WP4.

Meetings and announcements

| | |
|---|--|
| April 10th -11th, 2008 | 3 rd EFI+ consortium meeting, Paris, France. |
| Summer 2008 | 2 nd EFI+ working group meeting, Madrid, Spain. |

EFI+ webpage:

For further information please visit the EFI+ webpage at <http://efi-plus.boku.ac.at>

EFI+ newsletter:

If you would like to be on the mailing list for this newsletter please send an email to Rafaela Schinegger from the BOKU-team (rafaela.schinegger@boku.ac.at)

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