European Environment Agency

Tender specifications

Open call for tender No. EEA/BSS/06/003

Developing a calculation module for producing baseline data and indexes of river systems fragmentation by transversal obstacles

1. Title of contract

Developing a calculation module for producing baseline data and indexes of river systems fragmentation by transversal obstacles.

2. Purpose and context of the contract

The EEA is progressively implementing the tools capable of producing the data and outcomes required to produce environmental accounts. Regarding water issues, the EEA has installed the NOPOLU *Système 2* (developed by Beture-Cerec, group Jaakko Poyry) application to stepwise develop its spatial assimilation and integration platform.

This application manages disaggregated and aggregated water related data and catchment issues and produces among other the WIRQ (Weighted Index of River Quality) that is the technical part of the river quality accounts and is designed to constitute a platform that can contain or serve models.

The next step is to develop the calculation complements to the programme to build fragmentation data and aggregate as indexes. These complements must be considered as extensions of the current water quality accounts developments. This is because a) the existing facilities in handling and calculating hydrological data should not be duplicated and b) reservoirs are a key component of the resource accounts, currently implemented under NOPOLU *Système 2*.

This call for tender comprises the description of the expected outcomes, the type of data that has to be manipulated and the relevant information about the NOPOLU *Système 2* platform which constitutes the basis of the expected development.

The development will be carried out by a consultant who will develop, adjust, check and install the ad hoc calculation modules to the current platform.

3. Subject of contract

3.1 Objectives

River systems, described by routed sets of reaches and nested elementary catchments, are fragmented by obstacles that modify their hydrological

regime, the sediment and aquatic fauna migration and fragment the terrestrial corridors that large river valleys constitute. The classes of obstacles to consider in this call for tender are the transversal obstacles that make a discontinuity in the upstream-downstream exchanges.

The obstacles to consider are the following:

1. Physical obstacles to fish and aquatic fauna migration and sediment transport: cascades, natural lakes and dams making reservoirs;

2. Quality obstacles to fish and aquatic fauna, represented by segments of river having a quality that may represent a chemical barrier;

3. Physical obstacles to terrestrial fauna, represented by artificial (or other) areas and physical obstacles, as dams making reservoirs (natural lakes are less likely to represent obstacle in this case).

The longitudinal obstacles, that impede exchanges between the river and one or both sides of its alluvial plain, are not part of the current tender.

Hydraulic fragmentation indexes are not part of this tender because it has been considered that a) they are better addressed in the implementation of the resource water accounts, and b) consequently, other information (e.g. water usage, abstractions, rainfall) should be mobilised first. The mobilisation time required for this data would have jeopardized the production of fragmentation indexes related to the other issues mentioned above. However, simplified indicators, such as change in residence time of water in river system ("ageing" of water, as exposed by Vörösmarty or Nillsson) should be presented, because they call only for data manipulated for the purpose of the other indicators.

The objective of the calculation module is to provide the necessary elements to compute maps, variables and indexes of river system fragmentation as resulting from the presence of different obstacles and the development with time of these variables, eventually leading to indicators or indexes.

The calculation module must be developed so that it is consistent with the current water quality accounts and hydrological calculation module that provide the basic information related to the second class of obstacles mentioned above.

3.2 Technical content of the services ordered

In the current data model and data files, rivers are stored as sets of one-dimensional reaches (when available, width, slope, depth are attributes related to the reach) having a length in the range between 0.5 – 5 km, belonging to an elementary catchment.

The important features: monitoring points, gauging stations, dams, etc., are attached to their reach of placement and documented separately, but are considered to be co-registered to a river reach. The management of attaching a supplementary item / correcting error in attachment must be envisaged and documented.

The calculation module is expected to provide for any period of time (rounded to the year) for obstacle presence and ad hoc external variables the detailed values of fragmentation, as defined for each category of target, broken down by cause. Since the periods of calculation may extend on decades, the calculations will be presented to the system with stored scenarios making it possible to check the timeliness and consistency of events as well as computing forged situations. This must especially be the case when land cover, hydrological and meteorological data are needed.

The time references of the different categories must be handled separately, assuming standard values of replacement when periods are not covered.

Data management of "lakes" must take into account that a natural lake may have its characteristics changed when dammed to extend its capacity. This is managed for the time being by different dates attributing a lake / reservoir element. In other words, a "lake" entry may have as many copies as its characteristics have changed along time and history of damming.

The precise content of variables is not totally defined in this tender; suggestions of relevant and feasible variables are nevertheless expected in the bid in order to assess if the calculation results produced by the application can present the required data for further aggregation.

The possible indicators should be presented in three categories, from the most aggregated to the most sophisticated:

- Very aggregated, for the sake of top decision makers (example: total length of river transformed into lakes for area X). This class does not necessarily require accurate positioning of items to be computed.

- Disaggregated, with possibility of aggregation, with a view to State of the Environment (SoE) reporting. For example, cumulated proportion of sediment cut, cumulated delay in fish passage, etc.

- Very detailed, for the sake of application managers and for research purposes. This category does not have to be detailed in the bid, but should refer to the data model related to the application and possibility of further tables management.

The list below is indicative of the type of information that is expected.

a. Fish and aquatic fauna

Regarding fish and aquatic fauna, an obstacle impacts differently considering upstream or downstream journeys: fish can be prevented in migrating upwards, and can pass the obstacle journeying downwards. By contrast, other aquatic fauna, especially drifting invertebrates, are considered only on the downstream transport. The obstacle may prevent the downstream colonisation. Biological information is provided as separate documentation, as prepared by the European Topic Centre on Biological Diversity (ETC/BD) (led by Museum National d'Histoire Naturelle, Paris).

From the calculation point of view, an obstacle could be described by the following parameters that are obviously specie or fauna group depending or obstacle-specie depending:

- o The height of the obstacle: in the case of large dams, most cannot be passed without special equipment / processes.

- o The length of river transformed from lotic to lentic system.

Both variables may contribute to milieu perturbation indexes, besides computation of impact of a certain species.

- o *Proportion* / rate of individuals that can pass the obstacle way up and way down (possibly complemented by confidence interval or contextual variables related to discharge for example);

- o The *delay* that the obstacle is supposedly inflicting to the journeying of species (possibly complemented by confidence interval or contextual variables related to discharge or season for example);

- o The *fatigue* induced by obstacle and its cumulative effect.

Notwithstanding further adjustments, the aforementioned parameters impact the result differently. The proportions of pass-through are multiplicative whereas the delay is additive. Indeed, the final result or index should consider both factors. A system of X obstacles each allowing pass-through of n_i ($n_i < 1$) yields a total proportion $p = n_1 \times n_2 \times \ldots n_x$ (equivalent to n^X if all n_i are identical) of initial number of individual reaching the upper part of the river. The delay in reaching this part is $d_1 + d_2 + \ldots d_x$ (equivalent to $X \times d$) if all delays are identical. The fatigue could be addressed, for example, by a number of tries a fish can do before abandoning.

Since it is not the whole river system which is suitable for any species migration, the range of possible excursions (between most upstream and most downstream reaches of the river system) should be documented. For example, if obstacles are situated on reaches on the upstream of normal (historical) area

of Atlantic salmon spawning area, they do not contribute to fragmenting / impeding its reproduction.

The adjusting of current river tables (the data model is available as documentation) should be carried out in such a way that:

- o *No current structure should be changed, except if the necessity is demonstrated and the possible consequences are mitigated by the consultant;*

- o *The size of added tables should be minimum, strongly encouraging the use of default values and targeted values only where they exist;*

- o *If a modification concerns the NOPOLU Système 2 structure, compatibility with former versions must be documented and ensured;*

- o *The updating of these tables should be easy, especially considering that default values have to be placed.*

Defining the range of possible excursions is not part of the tender, but the ad hoc consideration of the different issues related to species is.

Suggestions for final indexes are expected in the tender. These suggestions are not contractual; their final design is subject to change. It is therefore very important that the different information is adequately stored and documented. The obtained data is dated (it depends on the year / period of the installation of obstacles), is catchment depending (final indexes are computed over large catchment, per RBD[1], etc.), and on the characteristics of species under threat. When relevant, distinction between reproduction areas and migratory routes should be considered in the available data.

Needed data, especially those related to geography, should be explicated and documented.

b. Sediment transport

Sediment transport is deeply impacted by the presence of obstacles. These obstacles are both transversal and act as settlement tanks (dams and natural lakes, flood plains) and longitudinal (encroachments, dykes, etc.) that mainly cut the sediment exchanges (erosion, sedimentation) between the river active bed and its floodplains. This later component on longitudinal fragmentation is not part of the tender.

From a calculation module requirement point of view, sediment transport calculation is considered as a series of settling tanks having each a sediment trapping yield defined by at least the following parameters:

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[1] River Basin District as defined by the Water framework directive

1. residence time of water in the reservoir / lake, as computed from generally accepted equations (e.g. Vörösmarty equation[2]),

2. in the case of artificial reservoirs, the sediment trapping yield is possibly tuned by the specific equipment and / or water regulations that apply considering the physical capabilities of the bottom gate of the dam.

Residence time is computed from the dam / lake position on the catchment system using, whenever possible, the discharge values stored in the platform into NOPOLU *Système 2* tables. If such data does not exist, default values, considering at least the catchment area, are taken instead.

Required data is specified so that better data can be collected and archived in the platform

The sediment trapping yields of a series of lakes / reservoirs are multiplicative values, the product of the yields applies on the respective share of sediment potentially emitted per elementary catchment. The calculation of the elementary catchment productivity is not part of the tender. The consultant will, however, ensure the links between the catchment related tables that must link to the ad hoc values permitting to compute realistic sediment transport cuts and the intermediate productions that are expected to build the fragmentation indexes.

The consultant will suggest the way to implement simply, with the existing or supplementary data to implement, the way to populate this table with the results of sediment production model / bibliographic data, flagging the data source.

Final results are stored in such a way that the possibility of comparison between sediment flux calculation and sediment transport as resulting from the implementation of the module is immediate. This may be done as automated export files suitable to import to statistical packages, simple mapping, etc.

c. Hydrologic characteristics

Production of fragmentation results related to hydrologic characteristics is not part of this tender, with the exception mentioned above. This might become

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[2] Vörösmarty, C. J., Meybeck, M., Fekete, B., *et al*, 1977. "The potential impact of neo-Castorization on sediment transport by the global network of rivers". in *Human Impact on Erosion and Sedimentation*. (Edited by D. Walling and J.-L. Probst). Wallingford (UK). IAHS Press. 261-272. pp.

the subject of a contract extension, hence tenderers must mention and justify the possibility to extend the calculation module to this end.

3.3 Geographical area to be covered

The module should work on the area defined by the catchment system implanted in the current application on the platform. The testing phase will be carried out and demonstrated on the French catchment system, as provided by the EEA to the consultant.

3.4 Qualification, experience of the consultant

The consultant must present the following qualifications:

- o Expertise in modelling related to river systems, with special focus on simplified modelling applied to large river systems;

- o Understanding and preferably experience related to water accounts implementation / calculation;

- o Management of databases managed by different systems (SQL, Access, etc.) with end-user friendly interfaces;

- o Qualification in and understanding of topics related to the objective of calculations: fluxes (and sediment fluxes), hydrologic management, water quality assessment, ecological assessment related to river systems.

3.5 Work schedule

The production of calculation modules, installed and tested on the EEA platform using the references river system, is expected to be completed 4 (four) months after contract signature date.

The work schedule comprises the following steps:

1. At the end of week 4, the calculation principles related to fish are presented, and the user interface mocked-up. The EEA agrees / suggests changes in the following week.

2. At the end of week 9, the calculation principles for the sediment trapping are presented, and the user interface mocked-up. The EEA agrees / suggests changes in the following week.

3. At the end of week 13, the modules are installed and checked on the EEA platform. The principles for index calculation and outputs are analysed jointly by the EEA, the consultant and experts from the

European Topic Centre on Terrestrial Environment (ETC/TE) along with experts invited by the EEA.

4. The consultant provides the calculation facilities for the indexes according to the suggestions collected as outcomes of an expert meeting on 'Fragmentation' that is scheduled for late autumn 2006. The final delivery of the calculation complements is to take place before the end of the contract (week 17).

3.6   *Place of performance*

The work will mainly be performed at the consultant's premises, but two visits to the EEA must be expected, one for a kick-off meeting to consider the possible methodological issues, the other to participate in the expert meeting mentioned above.

3.7   *Duration of contract*

The production proper should be achieved within four months. This period includes a definition of final facilities that may be adjusted. Hence the total duration of contract is set to 5 (five) months from contract signature date.

The contract may be renewed once for a period of up to 5 months for an amount of up to 15.000 Euro.

3.8   *Deliverables*

The deliverables comprise:

1. A calculation module (that may comprise as many programmes and functions as required), fully compatible with the current Nopolu application and EEA informatics organisation. "Fully compatible" means that the calculation module:

   o uses the existing tables, databases currently implemented in the platform and the GIS tables of the platform, along with the Eldred2 database;

   o produces results, the format and structure of which makes it possible to easily math them with the other outputs currently provided by the Nopolu applications, namely the water accounts modules.

2. Detailed documentation, comprising:

   o A users' guide to describe the calculation process and updating of tables, where necessary;

o An administrators' guide describing how to implement the module with new datasets, noticeably considering that the application will be developed and demonstrated on a limited dataset pending availability of European data sets;

o A developer's guide indicating the way to code changes in index calculation. Since this part is highly depending on the type of indicator, the guide will focus on the structure and place of tables of results that might be mobilized to this end and will illustrate the functions developed by the consultant in application of the recommendations issued by the expert meeting.

3. Application databases, especially the newly developed tables for the application proper. Modification of existing tables will be after checking with the EEA that this modification would not jeopardize the current utilisation of the platform.

Deliverables shall be issued in electronic format, placed on the EEA FTP, with two copies secured on disk (CD or Data DVD). Maps, graphs, and illustrations included in the text files shall be provided separately as graphic files (e.g. PNG, JPEG) and the documentation provided both in edited format (e.g. Adobe PDF) and editable format (MS Word).

3.9 Working language

Module captions, comments, and documentation are written in English.

3.10 Information about the expected calculation module

The calculation module is intended to be operated from NOPOLU *Système 2*. The offer can comprise the following three options that can be accepted provided they meet the different requirements mentioned in the sections above:

1. build a new NOPOLU *Système 2* application or include it as an extension of the water accounts application;

2. build an external application that links to the NOPOLU *Système 2* system (with possible insertion of linking modules); or

3. customise an existing application / model, and ensure links to use data currently managed by the NOPOLU *Système 2* application.

4. Participation in the tendering procedure

Participation in tendering procedures is open on equal terms to all natural and legal persons coming within the scope of the Treaties and to all natural and legal persons in a third country which has a special agreement with the

Communities in the field of public procurement on the conditions laid down in that agreement.

If the tenderer intends to subcontract part of the work, an indication of the proportion of the contract intended to be subcontracted must be included in the tender.

5. Documentation for tenderers

The following documentation will be available for the interested bidders upon request sent to: procurement@eea.europa.eu, eugenia.brad@eea.europa.eu or eva.carlson@eea.europa.eu.

a. Related to the current platform

A provisional note specifying the position and philosophy of SPAICE under development (this note is provisional, its use is restricted to the preparation of the bid)

> SPAICE note

b. Related to the river system to be used as reference

The GIS data file is not available at the moment of issuing this tender. That, as well as the final river system, should follow, with only changes in details, the data model described in the provisional report attached.

> EEA Data model note

c. Related to the Eldred2 database

> Eldred2 database structure

d. Related to the current data set implemented in the platform

This data set is described in the Nopolu brochures:

> NOP/main (system) and NOP /Eurowaternet

e. Related to specific datasets use for the water accounts

This data set is described in the Nopolu brochure:

> NOP/WQA (partly in French)

f. Related to fragmentation topic issues

A background note by the ETC/BD is provided.

6. Facilities provided to the tenderer awarded the contract

The consultant will be provided with:

o   A temporary copy of the relevant part of the Nopolu platform, if required. This provision will be made under limited conditions, in accordance with the licensing signed with Beture-Cerec;

o   Required GIS data, under the possible limitations related to licensing;

o   Relevant copy of the Eldred2 database;

o   Special path on the EEA FTP to exchange data;

o   All necessary information and data that is required.

7. Variants

Variants are accepted, within the limits specified in section **3.10** (***Information about the expected calculation module***).

8. Volume of contract

The indicative maximum budget available for the contract emanating from this tender is 50.000 Euro.

9. Price

The price tendered must be all-inclusive and expressed in euros, including for countries that are not part of the euro zone. For tenderers in countries that do not belong to the euro zone, the price quoted may not be revised in line with exchange rate movements. It is for the tenderer to select an exchange rate and assume the risks or the benefits deriving from any variation.

The price quoted will include a separate estimate for travel and subsistence expenses. This estimate must be based on the EEA's rules, as per the Annex 3 attached (Reimbursement of Travel Expenses). It must include any travel necessary to meet the contracting authority, and represents, at all events, the maximum amount of travel and subsistence expenses payable for all services under the contract. These expenses must be included in the price quoted.

The costs incurred in preparing and submitting tenders are borne by the tenderers and cannot be reimbursed.

10. Terms of payment

Interim payment:

Following approval of the provisional calculation module and an interim technical report, an interim payment corresponding to the relevant invoices and equal to 80% of the total amount shall be made.

Payment of the balance:

Following approval of indexes and a final technical report, payment of the balance corresponding to the relevant invoices and equal to 20% of the total amount shall be made.

11. Contractual terms and guarantees

In drawing up his bid the tenderer should bear in mind the provisions of the standard contract attached to this invitation to tender

12. Criteria

Exclusion criteria

Tenderers shall be excluded from participation in a procurement procedure if:

(a) they are bankrupt or being wound up, are having their affairs administered by the courts, have entered into an arrangement with creditors, have suspended business activities, are the subject of proceedings concerning those matters, or are in any analogous situation arising from a similar procedure provided for in national legislation or regulations;

(b) they have been convicted of an offence concerning their professional conduct by a judgment which has the force of res judicata;

(c) they have been guilty of grave professional misconduct proven by any means which the contracting authority can justify;

(d) they have not fulfilled obligations relating to the payment of social security contributions or the payment of taxes in accordance with the legal provisions of the country in which they are established or with those of the country of the contracting authority or those of the country where the contract is to be performed;

(e) they have been the subject of a judgment which has the force of res judicata for fraud, corruption, involvement in a criminal organisation or any other illegal activity detrimental to the Communities' financial interests;

(f) they have been convicted for an environmental offence in the exercise of the profession;

(g) following another procurement procedure or grant award procedure financed by the Community budget, they have been declared to be in serious breach of contract for failure to comply with their contractual obligations.

Tenderers must certify that they are not in one of the situations listed in paragraph 1. The tenderer shall provide an auto-declaration, preferably made on oath before a judicial or administrative authority, a notary or a competent professional or trade body by a person competent to do so on behalf of the tenderer, which states that none of the grounds for exclusion apply to the tenderer (See Annex 1).

Potential contractors might be requested, at a later stage, to certify that they are not in one of the situations listed above by providing:

i) For points (a), (b) and (e) a recent extract from the judicial record, or failing that, a recent equivalent document issued by a judicial or administrative authority in the country of origin or provenance showing that those requirements are satisfied must be provided.

ii) For point (d) a recent certificate issued by the competent authority of the State concerned must be provided. Where no such certificate is issued in the country concerned, it may be replaced by a sworn or, failing that, a solemn statement made by the interested party before a judicial or administrative authority, a notary or a qualified professional body in his country of origin or provenance.

Contracts may not be awarded to tenderers who, during the procurement procedure:

(a) are subject to a conflict of interest;

(b) are guilty of misrepresentation in supplying the information required by the contracting authority as a condition of participation in the contract procedure or fail to supply this information.

Selection criteria

Legal Capacity

Any tenderer must prove that he is authorised to perform the contract under national law, as evidenced by inclusion in a trade or professional register, or a sworn declaration or certificate, membership of a specific organisation, express authorisation, or entry in the VAT register.

The tenderer should provide an identification sheet (Annex 2) duly filled out and signed, a copy of inscription in a trade register, where applicable, and a copy of inscription in VAT registers.

Economic and Financial capacity

Proof of economic and financial capacity may be furnished by (one or more of) the following documents:

(a) appropriate statements from banks or evidence of professional risk indemnity insurance;

(b) the presentation of balance sheets or extracts from balance sheets for at least the last two years for which accounts have been closed, where publication of the balance sheet is required under the company law of the country in which the economic operator is established;

(c) a statement of overall turnover during a period which may be no more than the last three financial years.

If, for some exceptional reason, which the contracting authority considers, justified, the tenderer is unable to provide the references requested by the contracting authority, he may prove his economic and financial capacity by any other means which the contracting authority considers appropriate.

An economic operator may, where appropriate and for a particular contract, rely on the capacities of other entities, regardless of the legal nature of the links, which it has with them. It must in that case prove to the contracting authority that it will have at its disposal the resources necessary for performance of the contract, for example by producing an undertaking on the part of those entities to place those resources at its disposal.

Technical and professional capacity

Evidence of technical and professional capacity should be furnished on the basis of the following documents:

(a) the educational and professional qualifications of the contractor and/or those of the firm's managerial staff and, in particular, those of the person or persons responsible for providing the services;
(b) a list of the principal services provided in the past three years, with the sums, dates and recipients, public or private;
(c) a description of the technical equipment and tools to be employed by the firm for performing the service contract;
(d) a description of the measures employed to ensure the quality of supplies and services, and a description of the firm's study and research facilities;
(e) an indication of the technicians or technical bodies involved, whether or not belonging directly to the firm, especially those responsible for quality control
(f) a statement of the average annual manpower and the number of managerial staff of the contractor in the last three years;
(g) an indication of the proportion of the contract which the service provider may intend to subcontract.

Award criteria

The contract will be awarded to the tenderer whose offer is the economically most advantageous taking into account quality and price.

Regarding quality, a minimum number of 70 points should be achieved under the following criteria (with the weighing between brackets):

− understanding of the objectives of the contract and the work to be carried out (25 points);

− efficiency and effectiveness of data-processing methods and relevance of results (25 points);

− quality and relevance of the methodology set out in the tender (20 points);

− efficiency, quality and usefulness of the proposed product and solution (15 points);

− match between work programme and completion schedule (10 points);

− environment policy of the company (5 points).

Only tenders with scores of at least 70 points will be considered for further evaluation. Of these tenders, the best technical offer will be awarded 100 points. The others receive points calculated using the following formula:

Technical Score = (final score of the technical offer in question / final score of the best technical offer) x 100

For the financial offer, points will be awarded using the following formula:
Financial Score = (lowest price / price of the tender being considered) x 100

The most economically advantageous tender is established by weighting technical quality against price on a 70/30 basis, as following:

Final score = Score Technical Offer * 0.70 + Score Financial Offer * 0.30

13. Tenders

The tender must comprise:

• A technical offer containing a description of the proposed activities considered necessary to achieve the contract objectives, timing sequence and duration;

• A financial offer containing an estimation of the number of hours needed to complete the tasks as well as daily rates for project staff, and a breakdown of other project costs, including travel costs;

• Declaration on Exclusion Criteria

- Documents proving the Legal Status

- Documents proving the Financial and Technical Capacity

If the tenderer intends to subcontract part of the work, an indication of the proportion of the contract intended to be subcontracted must be included in the tender;

Tenders from consortiums of firms or groups of service providers must specify the role, qualifications and experience of each of the members or of the consortium and supply declarations that there are no conflicts of interest, and documents on exclusion and selection criteria, by each member of the consortium;

The technical offer and financial offer must be submitted separately and must contain one original and two copies;

Tenders should be preferably drafted in English.

14. Environmental considerations

The EEA runs a certified environmental management system (EMAS) and aims to minimise the environmental impact of all its activities, including those carried out under contract. The successful tenderer will, therefore, be requested to consider the EEA environmental management guidelines in their work, in particular those relating to business travel, paper and energy consumption. Further information on the EMAS system can be found on the EEA homepage: http://org.eea.europa.eu/documents/emas

Moreover, we strongly recommend the tenderers to submit the tenders in an environmentally friendly way, as following:

- Only material mentioned in the technical specifications attached (no additional material);
- Printed on both sides of paper;
- Without plastic folders or binders;
- With consecutive page numbering and with a list of contents.