

***Code Number and Title***

LRI-ECO28: Aquatic Community level assessment of chemical toxicity using ecological scenarios

***Background***

The diversity and abundance of species present in aquatic ecosystems is highly varied. Habitat characteristics, water quality, nutrients and latitude, amongst other factors, have a strong influence on assemblage structure and function. Prospective risk assessment of chemicals aims to determine thresholds of toxicity that are protective of these ecosystem assemblages. Predicted no-effect concentrations, PNECs, derived from the current regulatory guidance, e.g. REACH, are intended to account for any range or composition of species in any freshwater environment and, therefore, aim to protect all species in all fresh water environments, all the time. The PNEC is often based on a combination of empirical toxicity test data and application factors, AFs. AFs are, in part, applied to account for the differences in species composition (and sensitivity) that can influence assemblage responses to contaminants. The PNEC may, therefore, be over-protective at sites that, due to water quality, physical characteristics, etc, support species assemblages not including those towards the sensitive tail of the chemical SSD.

Improving on this conservative approach is limited by the lack of assessment of chemical impacts on ecological processes, life histories and species interactions. Functional characteristics of ecosystems are important and can represent specific protection goals such as those based on protecting regulating (e.g. water regulation and purification, natural hazard regulation) and/or supporting (e.g. primary production, provision of habitat, nutrient and water cycling) ecosystem services. These services can be provided by groups of species with the appropriate traits and so protecting all species may be a less relevant approach than protecting the desired structural and functional traits important for ecosystem service delivery.

Using knowledge about the potential effects of chemical stressors on ecological interactions to derive toxicity thresholds will increase the environmental realism of risk assessment. Ecological scenarios or models of different generic types of aquatic ecosystems need to be developed to provide predictions of impacts on assemblage structural and functional traits resulting from direct and indirect exposure to chemical stressors.

The main objective of this proposal will be to develop trait-based ecological models to determine how assemblages representative of natural communities, i.e. ecological scenarios, might respond to chemical stress and how the responses compare to conventional PNECs. The following objectives should be considered in the proposal:

**Objectives**

- Develop a range of trait-based or species assemblage models to represent major habitat/water quality typologies in the EU.
- Use ecological traits to describe structural and functional diversity.
- Explore the models to compare potential toxicity outcomes with conventional PNECs.
- Consider how ecological models could be adopted into chemical risk assessment policy.

**Scope**

- Assess how fresh water ecological assemblages can be represented by a range of scenarios/typologies, e.g. develop generalisations that can be made about species/traits composition that are likely to be associated with different types of habitat (e.g. shallow riffles, lowland deep rivers, shallow and deep lakes), water quality, nutrient status etc .
- Propose how assemblages could be modelled to assess impacts of chemical stress on assemblage structure and function.
- Obtain data sets of aquatic toxicity data for a range of well-studied chemicals to assess how the assemblage model predictions of toxicity in different ecological typologies compare to conventional PNECs derived from single species toxicity data and AFs. Consider filling data gaps for key structural or functional traits.

**Deliverables**

The final report shall contain an executive summary (2 pages max), a main part (max. 50 pages) and a detailed bibliography. It is expected that the findings will be developed into at least one peer reviewed publication, following postering(s) and presentation(s) at suitable scientific conference(s).

**Cost and Timing**

Start in 2015, duration 3 years  
Budget in the order of €300,000

**Partnering/Co-funding**

Applicants should provide an indication of additional partners and funding opportunities that can be appropriately leveraged as part of their proposal. Partners can include, but are not limited to industry, government/regulatory organizations, research institutes, etc. Statements from potential partners should be included in the proposal package.



**CEFIC Long-range Research Initiative  
Request for Proposals (RfP)**



***Fit with LRI objectives/Possible regulatory and policy impact involvements/  
Dissemination***

Applicants should provide information on the fit of their proposal with LRI objectives and an indication on how and where they could play a role in the regulatory and policy areas. Dissemination plans should also be laid down.

**DEADLINE FOR SUBMISSIONS: 31 January 2015**

Please visit [www.cefic-lri.org](http://www.cefic-lri.org) for general information about the LRI funding programme, guidelines for grant applications and links to application documents.

For further assistance do not hesitate to contact the LRI Secretariat by e-mail at [lri@cefic.be](mailto:lri@cefic.be) or by phone on 0032 (0)2 676 7368.