



**NATURAL  
ENVIRONMENT  
RESEARCH COUNCIL**



Living With Environmental Change

**MACRONUTRIENT CYCLES KNOWLEDGE EXCHANGE, PUBLIC  
ENGAGEMENT & COMMUNICATIONS POLICY ( a living document )**

**Summary**

The aim of knowledge exchange (KE), public engagement (PE) and communication activities is to maximise the value and uptake of the science through the application of results whenever and wherever appropriate, in order to secure social, environmental and economic return for the UK. This document provides those involved in the Macronutrient Cycles programme with a framework to assist with KE, PE and communication activities which are built into projects as an integral part of the research effort. This document is a living document in that it will be updated at regular intervals as projects and the programme develops. (See details of the MC Programme at <http://macronutrient-cycles.ouce.ox.ac.uk>)

**1 Introduction**

One of the objectives in NERC's strategy *Next Generation Science for Planet Earth* is to "...ensure that NERC-funded research is fully used amongst scientists, across disciplines, through evidence-based policy, by commercialising research outputs and by providing data, services and training". To meet this objective, NERC seeks to ensure that users are involved in the planning, implementation and review of NERC science and knowledge exchange activities, and that communication is targeted appropriately to ensure that the key audiences are engaged with. There are several documents on the NERC web site that discuss the knowledge exchange strategy and applicants should consult these at <http://www.nerc.ac.uk/publications/corporate/documents/knowledge-exchange.pdf> <http://www.nerc.ac.uk/using/introduction/strategy.asp> <http://impacts.rcuk.ac.uk/default.htm>

## 2 Macronutrient Cycles Programme Knowledge Exchange

The science agenda in the MC programme is at the core of many Government responsibilities and industrial concerns, with the issues of nutrients featuring in either Government legislation (e.g. air pollution protocols) or EU directives (e.g. Water Framework Directive) or in industry, trying to meet EA air pollution or water quality discharge consent levels. Therefore the science being undertaken in the MC programme could be very influential in the areas of both policy and operational management of the environment. Also, air pollution, water quality, ecology and discharges to coasts are key areas of concern for the wider public, so it is easy to see how the research in the MC programme could be quite influential. The key requirement is to ensure that the programme provides sufficient high quality science to influence the debate and to provide stakeholders with genuinely useful information.

The MC programme has been accredited as part of the broader *Living with Environmental Change* partnership <http://www.lwec.org.uk/activities/accredited-activities/macronutrient-cycles>. Collaboration with LWEC partners to help with the delivery of the programme is welcome. DEFRA, the Environment Agency, the Welsh Government, the Government of Northern Ireland and the Scottish Government have expressed interest in collaborating with the MC Programme. There are significant synergies between the MC Programme and these stakeholders. A detailed summary of stakeholder interests are included in the stakeholder policy document that is available at <http://macronutrient-cycles.ouce.ox.ac.uk/downloads/>.

The programme will welcome project proposals that consider how they align and coordinate with other initiatives to deliver multiple benefits and ensure effective knowledge exchange. For example, the DEFRA EA Demonstration Test Catchment Programme is a 5-year programme to study the interaction between multiple diffuse pollutants to water and air, and the effectiveness of on-farm mitigations at catchment scale. A network of Demonstration Test Catchments has been established to cover a representative range of land uses, soils, geologies, climatic regions and river types. There is an excellent opportunity for projects under the MC programme to utilise the infrastructure, databases and partnerships provided by the Demonstration Test Catchments to facilitate and accelerate work. If however you would like to discuss collaboration with these programmes please contact: Demonstration Test Catchment Programme: Dan McGonigle [daniel.mcgonigle@defra.gsi.gov.uk](mailto:daniel.mcgonigle@defra.gsi.gov.uk)

There are also extensive collaboration opportunities available with other NERC Programmes including the Changing Water Cycles Programme, the Biodiversity and Ecosystem Service Sustainability Programme (BESS) and the Virtual Observatories Programme. In addition, NERC invests in National Capability through its Centres such as CEH which also include catchment studies at the scale of headwaters to estuaries. These links may also be useful.

<http://www.nerc.ac.uk/research/funded/programmes/cwc/>

<http://www.nerc.ac.uk/research/funded/programmes/bess/>

<http://www.nerc.ac.uk/research/funded/programmes/virtualobservatory/>

The Programme executive Board will primarily comprise stakeholders and it is intended to liaise closely with the Environmental Sustainability Knowledge Transfer Network (ESKTN) at Oxford University Begbroke Science Park (<https://ktn.innovateuk.org/web/sustainabilityktn/overview>) to create a joint programme with

industry and stakeholders. There will also be a public engagement aspect of the programme whereby links to local NGOs are encouraged. The potential for these links and ESKTN initiatives are a key part of the MC programme and should be addressed in project Pathways to Impact statements. Rather than just potential benefits at some distant time in the future, projects should identify specific programmes, applications and interactions that will contribute to knowledge exchange during the life time of the project (e.g. contributing to the IGBP Programmes, or the Gothenburg Multi-Pollutant, Multi-Effect Protocol Negotiations, or some specific aspect of policy in the Scottish Government or the Welsh Assembly Government). This will demonstrate the direct and immediate relevance of the MC Programme Research.

## **2.1 A Knowledge Exchange Workshop on Macronutrient Cycles**

An initiative in 2013 for knowledge exchange will be a workshop in summer 2013 for stakeholders to identify their particular interests in macronutrient cycles. There are many key stakeholders that have a direct interest, including the water industry, who discharge nutrients to rivers and estuaries and also have to treat water to control water quality for public water supply. Also, food manufacturers have a large role in nutrient delivery as a high percentage of nutrients are derived from food, drinks or cleaning products. From an air pollution point of view, many components of industry and the transport infrastructure are involved in releasing nutrients into the atmosphere. This is in addition to the farming community, releasing diffuse sources of nutrients into catchments. Government departments such as DEFRA, EA, DECC and BIS are all key stakeholders as they all play a significant role in managing, controlling or influencing nutrients.

The Programme Directorate plans to hold a Knowledge Exchange Workshop in summer 2013 and this will be organised by Kerry Thomas and colleagues at the Environmental Sustainability KTN (<https://ktn.innovateuk.org/web/sustainabilityktn/overview>). Details of this workshop will be announced at a later date.

## **3 PUBLIC ENGAGEMENT AND COMMUNICATION**

Projects are encouraged to become engaged with public bodies, so that their research is seen to be relevant to a wide range of people. This might be by educational initiatives such as open days, public events, and educational visits, via their project web sites, or by providing useful information to the MC Directorate in Oxford, who could produce documents for the public or add news to the public part of the web site.

It is important to communicate results of the research as widely as possible, so projects are encouraged to publish papers on their science and results as soon as possible. This is a key requirement of the MC Programme to maximise the value to the academic community. It is intended to produce special issues of leading journals as part of the programme.

### **3.1 Special Issue of *Science of the Total Environment***

It has already been agreed that as part of this process a special issue of this journal will be produced, entitled:-

## **Climate change and macronutrient cycling along the atmospheric, terrestrial, freshwater and estuarine continuum**

This issue will form a backdrop to the Macronutrient Cycles programme, with the aim of reviewing current understanding of how natural and anthropogenically-disturbed ecosystems are dependent on macronutrient cycles, and how this may be affected by climate change. Key aspects that the issue will explore include the integration and linkages between N, P and C cycling at a range of scales; quantification and prediction of flux exchanges and transport processes at the air-land-freshwater-estuarine interfaces; the impacts of macronutrient fluxes on resilience of nutrient attenuation and capacity to sequester CO<sub>2</sub>; and implications for productivity and eutrophication.

The special issue will have separate sections covering atmospheric, terrestrial, freshwater and estuarine systems. It will include invited 'state-of-the-art' review papers and additional contributions will be solicited which explore the macronutrient cycles in these environments and particularly the linkages across these systems, and the linkages to climate change and wider aspects of global change pressures. There will also be a final synthesis paper which will examine current understanding of the integration and linkages between N, P and C cycling along the air-land-freshwater-estuarine continuum and identify future research priorities.

### **4 Conclusions**

Knowledge exchange, public engagement and communication are key elements of the MC programme. Projects are encouraged to build in these elements from the start and to be innovative in this area to maximise their outputs across a spectrum of activities. This living document will be updated at regular intervals and posted on the web site at <http://macronutrient-cycles.ouce.ox.ac.uk>