



SEVENTH FRAMEWORK PROGRAMME

THEME 6: Environment (including Climate Change)



Adaptive strategies to Mitigate the Impacts of Climate Change on European Freshwater Ecosystems

Collaborative Project (large-scale integrating project)

Grant Agreement 244121

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Lead contractor: **UCL**

Other contractors involved:

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Contributors: Martin Kernan

Estimated person months: 0.2

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Dissemination Level (add X to PU, PP, RE or CO)

PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Abstract

This deliverable is the second in a series of popular articles for stakeholder consumption to be published throughout the duration of the Project. The Parliament Magazine is a fortnightly EU politics magazine. Among others it is distributed to;

- European Parliament
 - All MEPs
 - All Secretaries-General and senior press
 - Officers of the nine political groups
- EU President and Presidency officials
 - Council of Ministers
 - Senior officials in the General Secretariat of the Council
- European Commission
 - All EU Commissioners, Chefs de Cabinet and Commission officials with responsibility for parliamentary relations
- Economic and Social Committee
 - All members in Brussels
- Committee of the Regions
 - Brussels secretariat

This article summarises REFRESH and highlights work undertaken at the REFRESH demonstration catchments and was published in The Parliament Magazine Issue 357, 29 October 2012.

REFRESH

(Adaptive strategies to Mitigate the Impacts of Climate Change on European Freshwater Ecosystems)

an EU Framework 7 integrated project

[\(http://www.refresh.ucl.ac.uk/\)](http://www.refresh.ucl.ac.uk/)



REFRESH lake mesocosm experiments

Greenhouse gas emissions are expected to rise until at least the middle of this century. Given the rate and magnitude of change projected, it is important to determine what steps can be taken to minimise the adverse effects of climate (and other global) changes on freshwater ecosystems over the next 50 years. REFRESH addresses the question 'How can the way we manage our freshwater ecosystems today be adapted so that future global changes (climate, land use, pollution and water demand) can be anticipated and incorporated into management strategies to protect our water resources and conserve freshwater biota?'

REFRESH is developing a management tool-kit that will help water managers design cost-effective restoration and management programmes for freshwater ecosystems that will account for the projected future impacts of these changes. In doing so, REFRESH will support efforts to achieve and maintain compliance with the Water Framework Directive (WFD) and Habitats Directive (HD). The Project considers how freshwater ecosystems in Europe will change over the next fifty years and it will generate the understanding and tools needed to implement an adaptive management approach, highlighting specific adaptive measures to minimise the deleterious impacts of global change.

REFRESH will increase our understanding of how freshwater ecosystems respond to changes in the environment brought about by global change (e.g. temperature, flow regime, nutrient loading). This will be done by bringing together results from field, laboratory and mesocosm experiments and analysis of existing databases.

The information generated by this work will feed into the development of the REFRESH modelling tool-kit, initially being developed in a number of case study catchments in the UK, Finland, Norway, Czech Republic and Greece. In each catchment REFRESH is;

- (i) generating scenarios of change over the next 50-60 years;
- (ii) assessing how projected change will affect the physical and chemical status of surface waters;
- (iii) identifying the ecological response driven by these changes;
- (iv) identifying where this is likely to cause problems reaching prescribed ecological targets (e.g. compliance with the WFD and HD);
- (v) modelling the response to management measures (in discussion with local stakeholders), adapted to accommodate future global change; and
- (vi) examining the cost effectiveness of the management response

Early results from the UK, Finland and the Czech Republic suggest that changes in land use will have far greater impacts on freshwaters (and thus the ecology) than climate alone. In the Thames catchment, for example, the modelling suggests;

1. there will be reduced summer flow as a result of climate change. This could lead to water shortages in drought periods unless some action is taken over the next 20 years (e.g. a new reservoir or reduced demand for water);
2. toxic cyanobacteria may occur more frequently, threatening water supply and recreational activities;
3. phosphorus (P) concentrations will increase in the future due to reduced dilution of agricultural and sewage treatment works (STW) discharges following reduced summer flows and increased fertiliser runoff due to more intensive arable production;
4. projected land use change has a very large effect on P concentrations;
5. a set of management measures are required to reduce phosphorus, with the most cost effective being a joint strategy of enhanced P removal at STWs plus reduced P fertiliser use (by 20%); and
6. measures currently in place will be insufficient to create good ecological status in the Thames in future.



Drought experiment, Arbuscies River, north-east Spain.



Livestock access to the river bank, upper Thames.



Contact details:
Martin Kernan (Co-ordinator)
 University College London
 Pearson Building
 Gower Street
 London WC1E6BT, UK

email: m.kernan@ucl.ac.uk
 tel: +44 (0)207 679 0523