BHS 2014

Session 6: Water Governance

ABSTRACTS

Oral presentations

6-1L: Governance, hydrology and catchment science – what's the connection?

G, Gooch[1]
Centre of Water Law, Policy and Science, University of Dundee, Nethergate, Dundee, DD1 4HN G.D.Gooch@dundee.ac.uk

This paper presents an examination of the interactions between law, policy, actors and institutions in the governance of water. The paper claims that law and policy each play important, complementary, yet sometimes competing, roles in water governance. The paper also looks at the role of governance in hydrology and catchment science, and asks the question – what's the connection, if any, between them?

The major challenge facing the governance of water is not in itself the quality or quantity of legislation or policy, perhaps not even the amount of data available; it is the implementation of laws and policies. Any approach wishing to understand the lack of success of water governance in many parts of the worlds must therefore begin by analysing the processes through which these are implemented. In this respect, while there are in principal differences in levels of potential enforcement between law and policy, in practice both of these forms of influencing behaviour are usually left in the hands of the same institutions and organisations. In many areas these are usually the government authorities, departments of the environment and state or county authorities. The complexities of modern political systems often result in decisions, both legal and policy-orientated, being moved along from the political sphere into the administrative sphere. There are a number of reasons for this, such as limited detailed knowledge of specific issues, the wish to de-fuse sensitive political conflicts by leaving their resolution to the implementation process etc. In all of these cases, data provided by hydrologist and catchment scientists is used in legal, policy and management; however, not always in the way that scientists expect. This paper looks at the science-policy interface in water governance, and claims that science plays a lesser role than may scientists believe.

6-2S: Investigating water allocation policies using hydro-economic models – Applications to English water abstraction licensing reform

Julien J. Harou[1], Tohid Erfani[2], Olga Binions[3]
[1] School of Mechanical, Aerospace and Civil Engineering, University of Manchester, Manchester, M13 9PL, UK. julien.harou@manchester.ac.uk
[2] Department of Civil, Environmental and Geomatic Engineering, University College London, London, WC1E 6BT, UK. t.erfani@ucl.ac.uk
[3] Department of Civil, Environmental and Geomatic Engineering, University College London, London, WC1E 6BT, UK. o.binions@ucl.ac.uk

One option to enable economically efficient and ecologically beneficial adaptation to growing water scarcity is to revise water management institutions such as water licensing to better protect both supply security and ecosystem services. Allocating more flow to the environment though can mean less abstraction for economic production or the inability to accommodate new abstractors. Modern licensing arrangements should both enhance environmental flows and protect water abstractors who depend on water. Making new licensing regimes compatible with tradable licences is an important aspect of English water licensing reform. Trading water rights can help decrease the societal cost of water scarcity whilst enforcing environmental and/or social protections. In this talk we introduce hydro-economic models as water resource system tools that enable integrated assessment of water policies. We use a hydro-economic model to simulate the Ouse catchment in Eastern England under the current licensing regime with and without abstraction licence trading to assess its impact. A water market under the current licensing system is compared to a

market simulated under scalable water license regime (using water 'shares') with dynamic environmental minimum flows. Shares allow adapting allocations to available water and dynamic environmental minimum flows can vary as a function of ecological requirements. Results show the proposed shares with dynamic environmental flow licensing system protects river flows more effectively than the current static minimum flow requirements during a dry historical year, but that the total opportunity cost to water abstractors of the environmental gains is a 10 to 15% loss in economic benefits.

6-3S: Challenges in assessing river flow requirements for juvenile Atlantic salmon

K. J. Millidine[1], I. A. Malcolm[2] & R Fryer[3]
[1] Marine Scotland Freshwater Laboratory, Faskally, Pitlochry, Perthshire, PH16 5LB, UK
Phone: +44 1224 294416 Email: k.millidine@marlab.ac.uk
[2] Marine Scotland Freshwater Laboratory, Faskally, Pitlochry, Perthshire, PH16 5LB, UK
Phone: +44 1224 294417 Email: I.A.Malcolm@marlab.ac.uk
[3] Marine Scotland Marine Laboratory, PO Box 101, 375, Victoria Road, Aberdeen, AB11 9DB
Phone: 44 1224 295502 Email: R.Fryer@marlab.ac.uk

Atlantic salmon are a species of high economic and conservative value to Scotland, supported by multiple legislative drivers such as the Habitat Directive and Water Framework Directive (WFD). With water being a finite resource, environmental pressures on Scotland's salmon rivers have resulted in challenging trade-offs to be made between human and ecological demands for fresh water. Under WFD, hydrological regime is a supporting element of 'good ecological status (GES) or 'good ecological potential (GEP) in waterbodies that have physical modifications. However ca. 54% of salmon habitat is less than GES / GEP as a consequence of inadequate morphology and hydrology. Furthermore, electricity generation, water supply and agricultural abstraction cause impacts in more than 25% of water bodies containing salmon. Reaching a decision for setting appropriate environmental flow standards relies on good evidence base. A number of potential approaches, including use of long-term datasets, multiple spatial regression models, bio-energetic / foraging models, and hydraulic habitat models, offer opportunities, However, as yet, no 'perfect solution' currently exists. Recent research has focused on the use of hydraulic habitat models to understand the influence of hydraulic (Froude) and sedimentary conditions and cover on salmon abundance (fry) and the transferability of these relationships between sites. Models varied seasonally, with Froude being the most important predictor variable. Cover and substrate provided the biggest inter-site differences and were therefore less transferable between sites. Simpler (Froude only) models may therefore offer benefits in terms of inter-site transfer, but further investigations in predicting flow response changes are required.

Poster presentations

6-1P: Building trust with communities: where did the Environment Agency go wrong?

C. Clark, CHRS Shute Lane, Bruton, Somerset. BA10 0BJ

In 2004 the Environment Agency published a document with 12 core principles which should be applied in order to build trust with communities. Two case studies will be presented. The first relates to a proposed food waste lagoon at Hadspen in east Somerset. The second is based on a proposal to build about 30 houses downstream of four dams in the headwaters of the Stour in Dorset.

In the case of the Hadspen lagoon its history began the year before the Environment Agency came into being, but were present during the final stages of the lagoon's history. Concern over the lagoon was raised by the Parish Council, but a meeting with the agency and their consultant was refused. The agency classified one field as being suitable for the discharge of the food waste. But the following year 40 tonnes of soil were lost in one hour during a thunderstorm. The agency was not represented at the Planning Inquiry, nor did it contribute to the discussions at District Council meeting. To make matters worse, the fears of local residents were confirmed after the lagoon was constructed, and following a case in the County Court, the lagoon was closed down.

In the case of Bourton Mill the agency refused for over a year to meet with the consultant to the Parish Council; they failed to consider the findings from an adjacent river in which estimates of maximum rainfall were substantially higher; and they failed to provide suitable answers to questions regarding the Flood Risk Assessment for the site.

6-2P: Water governance challenges presented by nanotechnologies: tracking, identifying and quantifying nanomaterials in our waterways (the ultimate disperate source)

I. Lynch[1]
[1]School of Geography, Earth and Environmental Science, University of Birmingham, Birmingham, UK, B15 2TT
Phone: +44 121 4145532 Email: i.lynch@bham.ac.uk

Nanotechnologies are generally considered to be an enabling technology, in that they enhance the functioning of a wide range of products and processes, from stronger and lighter airplane wings to enhanced energy capture and storage, to improved delivery and efficacy of drugs. They are increasingly appearing in consumer products also, including suncreams, socks and outdoor paints (to name just a few), resulting in the potential for direct access of nannomaterials into the wastewater and the environment. As such, they could be considered as the ultimate disperate source, with multiple products and multiple routes into the environment. Thus, nanomaterials represent a significant governance and regulatory challenge, for a number of reasons, primarily related to their small size, which makes detection of them in environment challenging, especially against a background of naturally occurring nanoscale entities (clay and sediment particles etc.), and their large surface area and high surface energy which leads to very dynamic behaviour and a strong tendency to interact with (bind) anything them come into contact with, leading to multiple routes of environmental transformation. The fact that a significant route for nanomaterials into ground and surface water is via consumer products means that nano-enabled products fall under the remit of REACH (Registration, Evaluation, and Authorisation of Chemicals), as well as being of importance for those charged with implementing the Water Framework Directive and its subsidiaries on drinking water quality and wastewater. This poster highlights some initial considerations around a benign-by-design approach to nanotechnologies, which considers the potential for recovery or recycling of the nanomaterials already at the design

phase, thereby reducing the risk of unintentional accumulation of nanomaterials from a vast array of consumer products in our waterways.