Dr Ian Maddock

Principal Lecturer (Physical Geography)

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Contact Details

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Dr Ian Maddock joined Worcester in 1993 and has teaching and research interests in River Science, Fluvial Geomorphology, Hydroecology, Ecohydraulics and Aquatic Habitat Modelling. The primary focus of his research is on the influence of riverbed morphology and river flow regulation on habitat availability for the instream ecology and the determination of environmental flows. Ian has international experience, having conducted research in Australia, Slovenia and the USA. He has provided research and scientific policy support to the government organisations (e.g. Environment Agency), research institutions (e.g. Centre for Ecology and Hydrology) and environmental consultancies (e.g. ENTEC UK, CDM Ireland) and has a range of publications in international refereed journals and edited book chapters. He has supervised several PhD students and Research Assistants in hydroecology, bank erosion, river habitat studies and was also a member of the European Union Aquatic Habitat modelling group (COST Action 626).

His University learning and teaching experience includes course leader for BSc Water and Environmental Management, and a tutor for BSc Geography and BSc Physical Geography, development of virtual fieldwork with Dr Des McDougall, enhancing undergraduate skills through the use of real-time telemetry of UW river monitoring sites, and short training courses for international water resource managers.

Qualifications
PhD ‘Instream Habitat Assessment: A Geomorphological Approach’ (Loughborough, 1994)
BSc (Hons) Geography (Loughborough, 1989)

Teaching & Research

Current Teaching
Courses:
BSc Geography
BSc Physical Geography
BSc Water and Environmental Management

Modules:
Earth Systems and Processes (GEOG1011)
River Processes (GEOG2013)
Mountain Geomorphology (GEOG2010)
Hydrological Monitoring (GEOG2017)
River Conservation and Management (GEOG3013)
Mountain Environments Field Course (GEOG3004)
Independent Study (GEOG3001/3002)

Research Interests
Hydroecology, ecohydraulics, and the impact of river management on physical habitat

Current PhD Supervision Students
Graham Hill: The relationship of benthic macroinvertebrate assemblages to water-surface flow types in British lowland rivers. External supervisors, Melanie Bickerton (University of Birmingham), Professor Geoff Petts (University of Westminster, formerly University of Birmingham).

Caroline Wallis: Defining the spatial and temporal dynamics of hydraulic river habitats. Internal supervisor, Dr Fleur Visser. External supervisor, Professor Mike Acreman (CEH Wallingford).

Martin Wilkes: Microscale dynamics of hydraulic river habitats. Internal supervisor, Dr Fleur Visser. External supervisor, Professor Mike Acreman (CEH Wallingford). The use of habitat mapping and habitat hydraulic classification to identify the spatial distribution and temporal dynamics of channel geomorphic units

Research & Consultancy

Research and Consultancy projects undertaken
2005-2006 Research into the spatial and temporal dynamics of aquatic habitats in response to river regulation, Soca River, Slovenia. Funded by the British Council

2006-2007 County Survey of the Fluvial Geomorphology of Worcestershire Rivers. Funded by Worcestershire County Council and the Earth Heritage Trust.

2006-2008 Assessing the viability of complex Electrical Impedance Tomography (EIT) with a spatially distributed sensor array for imaging of river bed morphology. Funded by NERC as part of the CONNECT A scheme.

2007-2009 External Consultant for CDM Ireland on the project 'Integrated Water Resource Management System for the Eastern River Basin District in Ireland'.

Research and Consultancy Reports
Maddock, I.P. & Hill, G. (2005) Rapid Assessment of Physical Habitat Sensitivity to Abstraction – Review of habitat mapping methods. Report undertaken for the Centre for Ecology and Hydrology (Wallingford).

Booker, D.J., Goodwin, T.G., Acreman, M.C., Dunbar, M.J., Rivas-Casado, M., Maddock I.P. and Hardy, T.B. (2006) Rapid Assessment of the Physical Habitat Sensitivity to Abstraction. Interim Technical Report. Report to the Environment Agency and the Centre for Ecology and Hydrology.

Maddock, I.P. & Hill, G. (2007) A Survey of the Fluvial Geomorphology of Worcestershire Rivers. Report to Worcestershire County Council and the Earth Heritage Trust.

Maddock, I.P., Visser, F., Hill, G., Holliday, R. & Wynn, D. (2007) Assessing the viability of complex Electrical Impedance Tomography (EIT) with a spatially distributed sensor array for imaging of river bed morphology: a proof of concept study. Report to NERC as part of the Connect A scheme. Project Code: NE/E522559/1

Publications

Gosselin, M.P., Maddock, I.P. & Petts, G.E. (in press) Mesohabitat use by brown trout (Salmo trutta) in a small groundwater-dominated stream. River Research and Applications. Accepted.

Wallis, C., Maddock, I.P., Visser, F. & Acreman, M. (in press) A framework for evaluating the spatial configuration and temporal dynamics of hydraulic patches. River Research and Applications. Accepted.

Gosselin, M.P., Petts, G.E. & Maddock, I.P. (2010) Mesohabitat use by bullhead (Cottus gobio). Hydrobiologia. 652, 299-310.

Klaar, M.J., Maddock, I.P., Milner, A.M. (2009) The development of hydraulic and geomorphic complexity in recently formed streams in Glacier Bay National Park, Alaska. River Research and Applications. 25, 1331-1338.

Maddock, I.P., Smolar-Žvanut, N. & Hill, G. (2008) The effect of flow regulation on the distribution and dynamics of channel geomorphic units (CGUs) and implications for Marble Trout (Salmo marmoratus) spawning habitat in the Soca River, Slovenia. Institute of Physical Conference Series, Earth and Environmental Science, 4, 012026 doi:10.1088/1755-1307/4/1/012026.

Smolar-Žvanut, N., Maddock, I.P. & Vrhovšek, D. (2008) Evaluation and application of environmental flow regimes of running waters in Slovenia. International Journal of Water Resources Development. 24, 609-619.

Maddock, I.P., Smolar-Žvanut, N. & Hill, G. (2007) A comparison of the channel geomorphic unit (CGU) composition of regulated and unregulated reaches in the Soca River, Slovenia. Revija Za Geografijo. 1-2, 23-38.

Maddock, I.P., Hill, G. and Smolar-Žvanut, N. (2005) The effect of flow regulation on channel geomorphic unit (CGU) composition in the Soca River, Slovenia. In, Harby et al (eds.) Proceedings of the 7th meeting of the EU COST Action 626 in Aquatic Habitat Modelling, Silkeborg, Denmark, May 2005. pp.205-216.

University Roles & External Responsibilities

University Roles
Course Leader for BSc (Hons) Water and Environmental Management
ISE Board Member
ISE Research and Knowledge Transfer Committee Member
Graduate Research School Steering Group Member

External Responsibilities
Consultancy and research links with:

Research and consultancy with Centre for Ecology and Hydrology, Wallingford: Rapid assessment of physical habitat for sensitivity to abstraction.
Research and consultancy for the Environment Agency (various regions): evaluating the effect of flow regulation and abstraction on instream habitat availability, and determining environmental flows.
Consultant for CDM Ireland (Environmental Consultancy): Development of tools for setting Instream Flows, Eastern River Basin District, Ireland.
Research with the Earth Heritage Trust - Baseline survey of Worcestershire Rivers.
Research with Q-par Angus Ltd. funded by NERC: Assessing the viability of complex Electrical Impedance Tomography (EIT) for imaging river bed morphology.
Research with Dr Sarah Yarnell, University of California at Davis: the influence of flow regulation and bar morphology on hydraulic habitat. Research with Professor Sandy Milner, University of Birmingham: the evolution of aquatic ecosystems and predicting how successional processes interact with landscape geomorphology, Glacier Bay, Alaska, USA.
Research with Dr Smolar-Žvanut, Limnos Water Ecology Group, Slovenia: the effect of flow regulation on the spatial and temporal dynamics of hydraulic river habitat in the Soca River, Slovenia.
Research with Associate Professor Martin Thoms, University of Canberra: environmental flow setting to protect habitat for native fish species, Cotter River, Australia.

External MRes, MPhil and PhD examiner:
Loughborough University
University of Stirling
University of Durham
University of Canberra
University of Melbourne

Membership of Professional Bodies
Royal Geographical Society
British Hydrological Society
River Restoration Society