

ATLANTIC SALMON TRUST

MANAGING RIVER FLOWS FOR SALMONIDS

From Science to Guidance

Aims The aim of this two-stage process is to critically review historic and recent developments in the science of the flow requirements of salmonids in order to better inform river flow management, in the contexts of recent regulatory changes, including the Water Framework Directive, changing water uses and climate change.

The two stages will be an open, participatory symposium followed by a small workshop.

Objectives

1. To review and summarise scientific progress over last 20 years in the understanding of relationships between river flows (including related thermal regimes) and salmonids in rivers and the methods for setting flow objectives in the British Isles.
2. To develop evidence-based best practice on flow objectives setting and management for salmonids, including those necessary to maintain rivers at good ecological status under the Water Framework Directive.
3. To identify gaps in knowledge and priorities for future R&D.

The process will communicate this wide range of information across the scientific and management interests, facilitate constructive debate over contentious issues and prepare comprehensive background material based on sound science [outlined at the symposium] on which to develop best practice guidance [at the workshop]

Deliverables

Symposium publication:

- 1) Special edition of peer-reviewed journal (FME)
- 2) Abbreviated proceedings, including an overview of the debated issues and current consensus (or continuing disputed areas) and research needs (hard copy and AST website-based). This will update the Symposium delegate's handbook (that will have short versions of the delivered papers) and summarised poster presentations.

Workshop publication:

- 3) AST report – focussed on turning the science into management advice and best practice guidelines for practical applications.

Background

The last Atlantic Salmon Trust blue book (AST/Wessex Water) on this subject was in 1990, since when a lot of water has flowed under the bridge: environmental circumstances and legislation have changed, new or improved techniques have brought fresh data and information, and overall understanding has improved, probably. This AST initiative aims to test that assumption, to challenge current approaches to managing flows for fisheries protection and to explore protective measures and regulatory objectives based on progress since 1990. Reasons for proposing this initiative include:

- the threat of changing climate and consequences for flow and temperature regimes;
- proposals for low head hydropower as a renewable energy source and the continuing management requirements of rivers managed for their water resources;
- the increasing demands of abstraction;
- the Water Framework Directive, and the Environment Agency's Catchment Abstraction Management System (CAMS) and the water industry's investment programmes require better definition of protective water flow regime standards;
- the completion in recent years of various projects looking at flows and salmonid movements (some AST funded) in UK and abroad; and
- the review of consents on SAC rivers (Habitats Directive) for which salmon are a designated feature.

Rationale and Scope

River flows affect practically every function of aquatic ecosystems in rivers, estuaries and even coastal zones; from structure of channels to energy cycling, from species diversity to movements and abundance. The classic context in which flow standards are routinely set and applied is for the flows that influence upstream migration of adult salmonids (typically Atlantic salmon and sea trout). Flow needs for juvenile stages are less well-developed, but also are important components of ecosystem health in the context of the Water Framework Directive, forming essential parts of the "high ecological condition" criteria. For many decades it has been recognised that flow management needs to move beyond simple standards (e.g. some annual percentile) for a single life stage (e.g. adult upstream moving salmon) to integrated objectives reflecting flow regimes that consider responses over full life cycles, for many species, and which encompass dynamics of flow on daily to seasonal scales. Whilst this level of complexity is aspired to, because it better protects lifetime flow requirements, the knowledge base has been inadequate to deliver it.

The initiative proposed here aims to take forward integrated flow objectives (i.e. across key life cycle stages) for migratory salmonids, in the WFD context, but drawing in other species where appropriate. Therefore it is not attempting to derive flow objectives for all fish species, or necessarily the most sensitive ones. Its remit is "migratory salmonid", as a contribution to protecting that component of the aquatic resource, because of its socio-economic and conservation importance and its unique bio-indicator role presented by its ubiquity in British Isles waters and life-time dependency on freshwater, transitional and coastal habitats. Climate change is expected to affect flow and

temperature across all these environments and represents a big challenge to the optimal management of aquatic resources. Note that sea trout is a migratory form of *Salmo trutta* and so the non-migratory brown trout component also falls within the remit of the proposal. Flow standards set specifically to support angling have been a component of many river regulation schemes, with varying degrees of success and a review of this resource management objective is also merited, in addition to the stock conservation objectives.

Following discussions within an organising group it has been agreed to proceed in two stages. A symposium will be used to present, discuss and disseminate latest scientific thinking and knowledge, at which contemporary methods will be critically reviewed. This will be an interactive event with the attendance expected to participate in discussion and debate. A later workshop will develop that knowledge into suggestions for improved approaches and protocols for flow management. The symposium/workshop overall aim is to make substantive progress in flow management in the areas where there is a history of knowledge and practice, where it is known there are improvements that can be made and where there is the legislative framework to apply new methodologies and standards. Therefore it is proposed that the scope covers the following.

- Salmonids (Atlantic salmon and sea/brown trout) in rivers that are classified as fisheries (e.g. recorded in the EA or other national annual rod catch statistics), or SAC rivers with salmon as a designating feature.
- Developing the multi-species context is important, especially through the Water Framework Directive and new passage regulations. Although the focus is on the salmonids, other species will be included as knowledge and contributions allow, and flow objectives derived for salmonids will be at no detriment to other species.
- Application set firmly in the British Isles regulatory and legislative contexts, but drawing on science and best management practice from overseas, where that informs the BI situation.
- All life stages, but likely to focus on migration, distribution, spawning, juvenile production
- Relationships between river flows and fishery performance.
- “Flow” is taken to mean any aspect of volume flow and associated hydraulic variables, including temperature, which might be reasonably incorporated into flow regulatory objectives.

SYMPOSIUM DURATION: 3 days: evening presentations on day 1, all day 2 and half of day 3,

SYMPOSIUM DATES: January 26-28th 2010

SYMPOSIUM VENUE: Marriott Hotel, York

MANAGING RIVER FLOWS FOR SALMONIDS
From Science to Guidance
Symposium Programme (V.13)

DATE/TIME	(Item ref) EVENT	WHO
26TH January DAY 1	Introduction to symposium	
1730-1745	Welcome:	AST, tbc
	(1) Introduction	Nigel Milner
Introduction: background, scope, process and aims of symposium and the workshop, outline questions for the symposium to be revisited on final day. e.g. <ul style="list-style-type: none"> • What should be the fisheries-based objectives of Q mgmt? • What role might salmonid “standards” play in ecosystem management, in WFD context? • What are the risks in managing flows in isolation from other environmental variables? • How can we improve flow management in light of the new knowledge? • How should we make best practice available? • What issues should the workshop and best practice guidelines address? • What further science is needed? 		
1745-1830 (40+10)	(2) Key note: Environmental Flows	Mike Acreman
1900	Posters, drinks reception and evening meal	
27TH January DAY 2	SESSION 1 SCIENTIFIC BASIS OF FLOW REQUIREMENTS AND IMPLICATIONS FOR MANAGING FLOWS	Chr: John Aldrick (EA)
<i>This session sets the scientific background by critically reviewing present day knowledge. Each paper will conclude with:</i> <ul style="list-style-type: none"> • <i>What is still useful, what is new, is it usable and summary of what this means for management?</i> • <i>What more do we need to know, to manage flows?</i> 		
0900-0925 (20+5)	(3) Migration into and through rivers	David Solomon, Nigel Milner, Gordon Smith
0925-0950 (20+5)	(4) Spawning to emergence	Iain Malcolm, Hamish Moir, et al
0950-1015 (20+5)	(5) Free-living juveniles, residents, smolting	Keith Nislow, John Armstrong+
1015-1045	Tea/Coffee (&Posters)	
1045-1110 (20+5)	(6) Flow requirements of non-salmonids	Ian Cowx et al
1110-1135 (20+5)	(7) Thermal requirements of salmonids	Andy Moore, Barry Bendall
1135-1215 (40mn)	Discussion of session 1 Facilitator: Dave Sear	Dave Sear
1215-1330	Lunch (& Posters)	
	SESSION 2 CHANGING ENVIRONMENTAL, LEGISLATIVE	Chr: Keith Hendry

AND REGULATORY CONTEXTS		
<p><i>This session sets out the environmental and policy contexts in which river flows are managed, starting with the climate change as dominant driver, Each paper will conclude with:</i></p> <ul style="list-style-type: none"> • <i>what are the principal operational questions?</i> • <i>What are principal constraints on delivery of protective flows?</i> • <i>What principal scientific questions remain and the benefits of answering them?</i> 		
1330-1400 (25+5)	(8) Water Resource Management now and future implications of Climate change	John Aldrick et al
1400-1420 (15+5)	(9) Water Resource Management III (<u>Utilities view</u>)	Fiona Bowles, Paul Henderson
1420-1440 (15+5)	(10) Water Resource Management IV (<u>Conservation Agency View</u>)	Chris Mainstone, Rhian Thomas et al
1440 - 1515	Tea/Coffee	
1515-1535 (15+5)	(11) Water Resource Management II (<u>Hydropower generators' view</u>)	Stuart Clough, Alastair Stephen et al
1535-1555 (15+5)	(12) Developing best practice guidelines for Managing fisheries flows impacted by hydropower schemes	John Aldrick
1555-1615 (15+5)	(13) Impacts of HEP schemes in Scotland	David Summers
1615-1635 (15+5)	(14) Impacts of run of river HEP schemes	Alan Butterworth
1635-1715 (40 min)	Discussion of Session 2 Facilitator: Malcolm Newson	Malcolm Newson
1730-1800	Conveners' review meeting	
1930	Symposium Dinner	
28th Jan DAY 3	SESSION 3: SETTING and APPLYING PROTECTIVE STANDARDS AND MANAGING FLOWS	Chr: David Solomon
<p><i>This session addresses current practice in setting flow standards and the potential to improve flow standards or management practice, including case studies as appropriate. Each paper will conclude with</i></p> <ul style="list-style-type: none"> • <i>What are the methods' principal strengths and weaknesses?</i> • <i>What is new and what is its application?</i> 		
0900-0920 (15+5)	(15) Methods for developing and using flow standards for salmonids in Swedish rivers	Kjell Leonardsson et al.
0920-0940 (15+5)	(16) CAMS: SWALP - RAMS methodologies	Kath Tanner et al
0940-1000 (15+5)	(17) Hydraulic modeling (e.g. PHABSIM/MESOHABSIM): applications to salmonids	Knut Alfredsen, Atle Harby, Mike Dunbar
1000-1020 (15+5)	(18) Conceptual, process-based models - examples	John Armstrong et al
1020-1050	Coffee/Tea	
1050-1135	Discussion of Session 3	Ian Cowx

	Facilitator: Ian Cowx	
	SESSION 4 RECENT ADVANCES IN METHODS AND ANALYSIS	Chr: Keith Nislow
1135-1155 (15+5)	(19) Fluvial geomorphological approaches to managing flows for salmonids	Malcolm Newson, Chris Soulsby, David Sear
1155-1215 (15+5)	(20) Modeling river flow effects on fish passage and fishery performance using counts and angling data	John Gregory et al
1215-1225 (15+5)	(21) Spatially explicit modeling of flow effects on fish habitat using aerial surveys	Keith Hendry et al
1225-1245 (15+5)	(22) Modeling migration flow and thermal habitat needs using <u>telemetry</u> data	Barry Bendall, Andy Moore et al
1245-1345	Lunch	
1345-1430 (45mn)	Facilitated discussion of Session 4 Facilitator: David Solomon	David Solomon
<i>Addresses recent developments in methods in the study and monitoring and development of flow-fish-habitat relationships. Identifying strengths, weaknesses and applications. Each paper will conclude with</i> <ul style="list-style-type: none"> • <i>What are the methods' principal strengths and weaknesses?</i> • <i>What is new and what is its application?</i> 		
1430-1450	Tea / Coffee	
1450-1535 (45 mn)	Review, and Conclusions of Symposium through facilitated discussion Facilitator: Nigel Milner	Nigel Milner
	Depart	

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26/27/28 Jan 2010 – Marriott Hotel, York

BOOKING DETAILS

The Venue/Accommodation: The Conference is being held at the Marriott Hotel, Tadcaster Road, York, YO24 1QQ. Book your accommodation [online here](#) to qualify for the guaranteed rate of £89.00 B&B. There are a limited number of rooms available in the Marriott Hotel, however, there is the Holiday Inn, York on Tadcaster Road. Closer to the city centre, there are the Hotel du Vin and Ibis York Centre Hotels, both on The Mount.

Conference fee: £210

Post-graduate student rate (Full time) £ 125

Conference dinner (27th January 2010) £40

No VAT is being charged on the conference fee

Conditions:

- Payment may be by cheque, BACS, credit card

- Cheques made payable to 'CMS' should be sent to: **CMS, Candle Cottage, Kempley, Glos GL18 2BU**
- For BACS payments please **return the booking form first** for an invoice to be raised
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- Refunds (less £20 administration charge) will only be issued for cancellation more than ten working days before the meeting; substitutes are permitted

Further details from Bob Earll: Phone / Fax 01531 890415 Joining details – maps, directions and hotels – programme are on the CMS website: www.coastms.co.uk or Email: bob.earll@coastms.co.uk

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Name _____ Organisation _____

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It is essential for pre and post-conference (outputs) communication to have delegates email address

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