

Summit to Sea: The Values of Scotland's Mountains and Water in the 21st Century.

A meeting organised by the Centre for Mountain Studies, Perth College, UHI Millennium Institute in association with SEPA and SNH as a contribution to the International Year of Mountains 2002 and the International Year of Freshwater 2003. Battleby, near Perth, 20-21 January 2003.

It was fitting that at the start of the International Year of Freshwater, following on from the International Year of Mountains, a meeting addressed the water and the land of Scotland's mountain areas together. 60 participants from very diverse backgrounds met to discuss the current situation, trends, pressures and future directions of Scotland's upland waters. On the first day, 11 speakers covered a range of topics, reflecting the diverse nature of key factors which impact upon the upland water environment. These presentations provided a base for discussion on management issues within a workshop format on the second day.

Following an introduction by **Alastair Findlay** (formerly NoSWA), **Geoff Burns** (SEPA) led off with a presentation on Scotland's water resource and water supply, outlining **the current state of Scotland's water environment**. Currently, based on an annual classification of river water quality which integrates water chemistry, biology and aesthetics, of 24500km rivers classified, 87% are excellent, good or assumed good, whilst 3371km are fair, poor or seriously polluted. A five-yearly classification of loch water quality, based on water chemistry and a comparison with estimated quality prior to human impact, reveals that 75% of sampled lochs (all lochs > 1km², plus 27 small lochs) are classified as being of excellent or good status and 25% fair, poor or seriously polluted.

Moving on to **trends and pressures on the upland water environment**, eight speakers addressed topics ranging from land use, fisheries, water supply, energy, recreation and erosion. **Charles Warren** (St Andrews University) began with a presentation on the trends and pressures of upland land use, identifying shifts from: single purpose to multi-purpose land uses; sectoral to integrated approaches (eg the Water Framework Directive (WFD)); production to consumption; bipolar ownership to multiple ownership; and hard science to "soft emotions" (in terms of decision-making). Charles pointed out that

whilst there are many positive trends in this "age of consensus", great challenges remain, such as maintaining economic viability alongside environmental sustainability, actually delivering integrated management, defining objectives (what are the uplands for?), the future of agriculture, the mismatch of political versus environmental timescales and climate change

The impact of fisheries on upland waters was summarised in the next two presentations. The first, by **Colin Bean** (SNH), outlined the current status of aquaculture in Scotland and its impacts on freshwater. Fish farming is a significant, heavily regulated industry in the Highlands and Islands, particularly for Atlantic salmon, rainbow trout, brown and sea trout and to a lesser (but increasing) extent cod, Arctic charr and halibut. The main impacts on freshwater were identified as abstractions, discharge of waste, inorganic chemical compounds, fish escapes, loss of habitat and visual amenity. Colin concluded that the way forward for the industry was to increase collaboration, to improve in-house codes of practice and in the implementation of the WFD. In the second presentation on fisheries, **Ronald Campbell** (Tweed Foundation) put forward aspects of natural fisheries for the tourism and leisure industry. He emphasised that the key selling point of natural fisheries in Scotland is quality and that this should be preserved by observing the limit on catches, and he advocated, stocking only indigenous species in upland lochs. The latter may be in opposition to current angler demand and he concluded that much discussion between parties is required to maintain the quality of the natural fisheries in upland Scotland.

A planned presentation on water supply by Douglas Johns (Scottish Water) had to be cancelled with apologies at the last minute, however, a conference participant, **Jim Cockburn** (formerly NoSWA) kindly agreed to fill the gap by sharing his experience in water supply in the Scottish uplands. Key aspects regarding water quantity are the balance between increasing

demand, new resource development, conservation needs and efficiency of use, the impact of climate change on yield of and the impact of land use change in upland catchments. Regarding water quality, standards will continue to get tighter which will mean more treatment balanced against more catchment management.

The morning was rounded off by an informative and entertaining account of water as the raw material for the whisky industry by **Stephen Cribb** (independent consultant). Whisky is Scotland's largest tax generator and export, with 900 million litres produced a year. 100 malt distilleries each use their own water source which is distinct in terms of water chemistry and thus, it is thought, flavour! Following a detailed description of the production process, it was concluded that with approximately 4 litres of water required to produce 1 litre of whisky, the likely introduction of abstraction controls under the WFD is of great concern to distillers.

Following lunch, the theme of trends and pressures on upland catchments was concluded with three presentations on energy, recreation and erosion. **John Smith** (Babtie Group) began by reporting that trends of energy sources in Scotland had remained more or less constant over the last decade with hydro-electric supplying 10% and other renewables <1%. Government policies have set a target of 18% for renewable energy by 2010 with potentially 40% by 2020. John identified the impacts of renewable energy supply on freshwater and concluded that the inevitable growth of renewable energy will have impacts on the water regime, but that the balance can be delivered through the planning process with a greater emphasis on ecological protection through the Water Framework Directive.

Fran Pothecary (Scottish Canoe Association), noting the integral relationship between water, mountains and recreation, began by reporting the relatively small percentage of Scotland's 6,600 river systems that is actually used for whitewater recreation – just 215 runs on 195 rivers and burns,

whilst a SNH survey showed that 25% of people had visited freshwater shores in the previous month. Whilst threats are apparent - such as loss of recreational sites from, for example, the increase in proposals for small-scale hydro schemes - , there is also great potential for opportunities such as “freshet” releases, information about water levels on the internet, initiatives such as environmental river audits for the layman, and the delivery of cleaner river water through the WFD.

Finally, **Kath Leys** (SNH) reviewed the spatial and temporal trends in upland erosion and sedimentation and the implications for freshwater. Quoting a national survey which sampled 20% of the Scottish uplands and found 12% affected by soil erosion, Kath reported increasing erosion rates tempered by a reduction in the impact of forestry following the introduction of forest and water guidelines. Trends in slope processes indicate intermittent debris flow activity particularly after 1700AD, whilst very generally it can be said that rivers, alluvial fans and wandering gravel bed rivers have become rare in the last 200 years. The implications of these trends on freshwater range from blocking gravel in salmon redds, to isolation of sediment supply in managed rivers leading to exhaustion effects and coarsening of the bed.

In the final session of the meeting, 3 speakers addressed future directions for water management in Scotland, specifically in terms of flooding, river engineering and the Water Framework Directive. **Andrew Black** (Dundee University) began with a presentation on the management of flood hazard. Andrew emphasized that the management of flood hazard is complicated by the wide distribution of responsibilities ranging from riparian owners, different departments of local authorities, SEPA and the police. Noticeably absent from this list are developers and upland land managers. Recent research by Werritty et al reported that climate change in Scotland could result in future reductions from today's 1:50 return period floods on some Scottish rivers eg the Don and the Clyde whilst others remain relatively unchanged (eg the Carron). Andrew went on to present many options which could be implemented to manage such changes in flood hazard, ranging in scale and scope from better information for individuals, more structural defences,

more wetland flood attenuation, development control, multi-functional reservoir management, more upland flood control reservoirs, changes in upland management, to emissions control. Specifically, upland options such as land-use management involves issues concerning the effects of drainage, grazing pressure and afforestation for which more research is needed, whilst reservoir management, which may be technically feasible, may also be costly.

Trevor Hoey (Glasgow University), then addressed river engineering in Scotland's upland waters, reporting results from the River Habitat Survey (1998) which identified 47% of upland river channels (from a sample of 181) as being in pristine condition and 12% as obviously or severely modified. Scotland has a long history of small-scale river engineering that affects river stability and ecology and it was noted that whilst traditional, ‘hard’ river engineering has a place, alternative approaches are increasingly being considered where possible. Thus while environmentally-based river engineering can contribute to the sustainable management of river systems, evaluation of costs and benefits requires using a whole-system approach. Finally river restoration and rehabilitation are increasingly on the agenda, and all environmental disciplines need to contribute to the debate.

At the end of the day, and with many of the speakers having referred to the WFD, the final presentation was by **Roger Owen** (SEPA) on the WFD and its potential for integrating at the basin scale. Starting with the scope and purpose of the WFD - to prevent deterioration and enhance status of aquatic ecosystems, promote sustainable water use, reduce pollution and to contribute to the mitigation of floods and droughts - the tight timetable of the Directive was highlighted. Key milestones are by 2004, the river basin characteristics have to be described; by 2006 monitoring commenced; by 2009 the river basin management plans have to be finalised; by 2012 the programme of measures has to be operational; and by 2015 the objectives achieved. It is recognised that this is an immense task. Scotland will be represented as a single river basin district (RBD), with the Borders forming part of an adjacent cross-border district. River basin district advisory groups will be set up

which will incorporate stakeholder consultation and river basin management plans (RBMPs) designed. The success of the WFD will depend on an integrated approach with other planning authorities and forums, and the participation of all interested parties. In conclusion, it was recognised that challenges lie ahead both for SEPA and for planning in delivering the considerable aims of the WFD.

Inevitably discussions during the day focussed on the implications of the WFD – particularly on methods of public participation, methods of management and implementation and its success. This formed the basis of workshop subgroup discussions the following day on the 5 themes identified by participants in an “open space” format. The five themes were:

1. hydro power compensation and other abstraction issues
2. overcoming barriers to integration between upland management and water management
3. science and facilitating participation
4. public participation in river basin planning
5. implementation of basin plans.

Their main conclusions, which inevitably overlapped, identified several requirements to facilitate success of the WFD and the management of upland waters:

- Early and wide consultation with improved communication via openness, feedback, appropriate presentation of scientific methods and possibly a single source of public service information and advice for landowners/managers.
- Knowledge of how current strategic management processes are to be integrated, together with a streamlining of current impact assessment processes.
- Hydrological and ecological monitoring to be better combined with the setting of ecological objectives which are transparent and based on risk assessment.
- A participatory approach is essential for successful implementation. River basin plans should be relevant to local people and pilot studies of how best to engage local stakeholders at the community level could be viable. Methods should utilise past

successes of best practice and additional sources.

- Means and methods of implementation should be identified, eg., “who has power to make it happen?”, how are cumulative effects are to be dealt with, how to separate WFD requirements (compliance) from options requiring consensus, potential of scenario modelling.
- Resources are needed to ensure that adequate skills and resources for a participatory approach are in place and to facilitate participation of interested parties.

In closing the conference, Drennan Watson reiterated that when discussing changing the management of a resource, it is important to remember that it is changes in people's practices that are being addressed. In an open summary, the conference participants concluded that there is a great enthusiasm for the opportunities that WFD offers, that WFD has enormous hunger for resources and more integrated working is required. The diversity of views and expertise present at the conference had been very informative and apt in provoking debate and identifying ways forward with regard to upland water management, however, it was noted that there is a need to reach a wider audience such as landowners, and farmers, who were absent from the conference.