Report on the Spring 2014 meeting of the Scottish Freshwater Group

The 92nd meeting of the Scottish Freshwater Group took place on 27th March 2014 at the University of Stirling.

The series of morning talks, chaired by Ronald Campbell (Tweed Foundation), brought together the fascinating story of Tweed sea trout through a complete life cycle from the freshwater phase, smolt migration out to sea and return to natal riverine spawning grounds. Although they are the same species as resident brown trout (*Salmo trutta*), an interaction of genetic and environmental factors predetermine whether a proportion of juveniles undergo the necessary bio-physical adaptations to prepare them for an imminent sea-bound journey. The River Tweed is a stronghold for sea trout populations in the UK, and also boasts some of the largest catches on record. Our first speaker, Kenny Gault (Tweed Foundation) delivered a synopsis of the extensive monitoring programme, involving a combination of electro-fishing, fish traps, scale reading and stable isotope analyses, aimed at understanding the spatial distribution, population structure and behaviour of fish communities in the Tweed catchment for managing stock sustainably in the future (http://www.tweedfoundation.org.uk/). On next, Niall Gauld (University of Durham) explained how acoustic telemetry has been used for uncovering the migratory response of sea trout to in-stream barriers (e.g. low head weirs). He discovered both intact and remnant structures significantly delayed sea trout migration, with fewest smolt losses observed in unobstructed rivers, and that fish behaviour during passage attempts was strongly influenced by prevailing flow conditions. He then described the return of sea trout to the Tweed as a stepwise progression up through the river system, and discovered that sea trout tend to move at a faster rate than salmon, which could help explain the low incidences of sea trout recapture reported amongst Tweed anglers. Ronald interjected that prior to Niall's work, he suspected anglers were simply too fond of the taste of sea trout but in fact it would seem that the fishermen are being evaded! Ronald then went on to summarise the life history of the sea trout and demonstrated netting in action from a video captured on the lower Tweed. The audience particularly enjoyed Ronald's "postcards from a Sea Trout's migration" comprising a picturesque tour of UK and European destinations where tagged Tweed smolts have 'holidayed' over the years. Ronald joked at the outset that one of his first ever talks was delivered at a Scottish Freshwater Group meeting and now, at the pinnacle of his career he is still presenting to us! We are extremely grateful to Ronald for sharing his lifetime of knowledge and research experience.

After some informal chats over lunch and posters, the 'fishy' theme continued into the afternoon session (chaired by Laurence Carvalho), with Rob Brackley (University of Glasgow) presenting some early results from his PhD field monitoring trial using Passive Integrated Transponder (PIT) tagging to determine the impact of small-scale hydroschemes on native fish populations (http://www.loughs-agency.org/ibis). At one sampling location 156 salmon and 20 trout were successfully PIT tagged, although only 8% were subsequently redetected in the turbine channel from observations made in autumn 2013. Future surveys will expand to other hydro scheme catchments and will aim to quantify external damage (e.g. scale loss, tissue injury) and stress (e.g. blood chemistry) incurred by fish species during passage attempts. Changing topic, Rick Battarbee (UCL) covered the fascinating history, science and policy behind the UK Upland Waters Monitoring Network (UWMN), superseding its predecessor the UK Acid Waters Monitoring Network (AWMN), to reflect the shifting focus from acid deposition towards widening our understanding of biological and chemical responses to a range

of environmental pressures (e.g. eutrophication, climate change). The network currently comprises 12 lakes and 15 streams, geographically distributed across the UK. Most locations have been routinely monitored since 1988, although new sites (e.g. high alkalinity) are gradually being added to further expand UWMN coverage. Rick presented clear evidence of ecological recovery responding to reductions in acid deposition, as illustrated by changes in the community composition of fossil diatom assemblages: Fig 1. Despite some improvement, currently none of the UWMN lakes have attained WFD requirements of "Good Ecological Status". This is probably because concentrations of NO_x emissions and non-marine sulphates remain quite high, and are limiting recovery but perhaps also that climate change is modifying the physico-chemical properties and biological constituents of freshwater ecosystems, which may hinder restoration to reference conditions. Full details are provided on the UWMN website (http://uwmn.defra.gov.uk/) for those eager to find out more. Next, Chris Mellor (SNH) talked us through a desk-based study endeavouring to unmask the monetary value of ecosystem service enhancements delivered by river restoration projects at selected sites across Scotland. One of his case studies examined restoration work undertaken on the Rottal Burn, a tributary situated in the upper reaches of the South Esk catchment. This once canalised river was re-meandered and extended for improving habitat conditions for juvenile salmon. He valued the beneficial change in this particular ES provision (salmon productivity) to be in the region of £200,000 gained over 25 years: take a look at Chris' poster (http://therrc.co.uk/2014_Conference/Posters/Mellor_Mellor_Value_of_Ecosyst_Services.pdf).
Wrapping up the day's proceedings, Steve Addy (James Hutton Institute) discussed the effectiveness of natural flood management measures in two Scottish upland demonstration catchments. In 2012 engineered "log jams", replicating the natural geomorphic components of wooded rivers, were implemented in the Bowmont Water (Tweed catchment) aimed at reducing flood risk which caused extensive damage during 2008–09. The Logie Burn (Dee catchment) is being re-meandered to restore the natural channel morphology and deliver multiple benefits that include flood mitigation, as well as dampening phosphorus and fine sediment contributions into Loch Davan. The research project is currently about half-way through but anticipates scaling-up the local benefits delivered by natural flood management measures for predicting wider catchment effects.

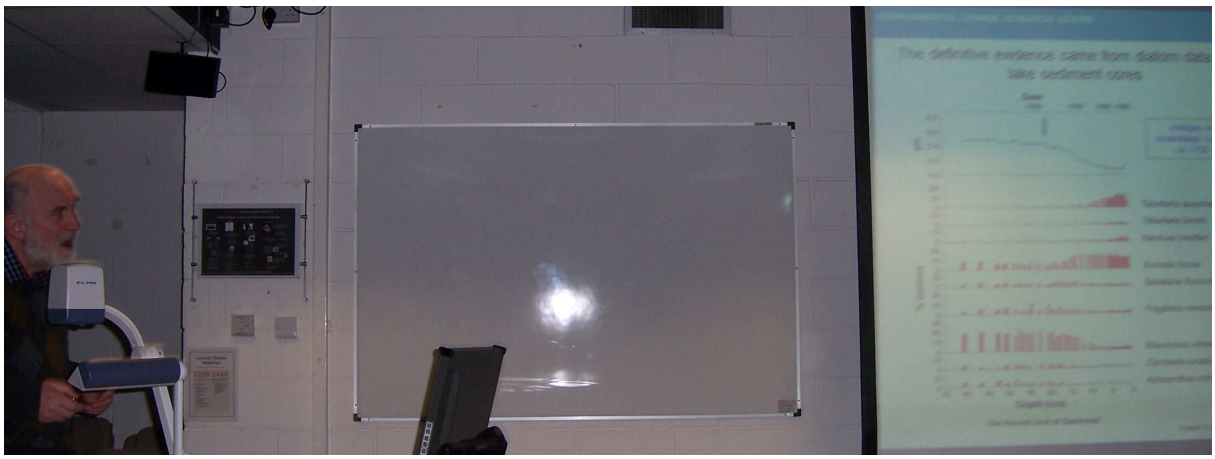

Figure 1. Rick Battarbee discussing paleolimnological data collected from the Round Loch of Glenhead, as part of UK Upland Waters Monitoring Network [photo credit – Pauline Lang]

The next SFG meeting will be held on Thursday 30th October 2014 with a half-day theme on Scotland's flagship natural flood management project at Eddlestone Water. If you would like to

receive further details please email Laurence Carvalho (laca@ceh.ac.uk) or visit the SFG homepage (http://www.ceh.ac.uk/sci_programmes/water/ScottishFreshwaterGroup.html). It is now also possible to receive SFG notifications via Facebook (Scottish Freshwater Group) or follow us on Twitter @Scottish_FwGrp.

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