

Deadline IV: Fish Legal comments on AEMP (submitted on 5 Aug. 2014), etc

1. Fish Legal has now listened to the transcript of the ‘adaptive management’ (AM) issue-specific hearing, where the ExA inspectors attempted to identify the origins of the AM methodology and procedures, and concluded that one useful source is an EC guidance document, “The Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones” (2011).

In fact the AM ‘method’ originated at the University of British Columbia in Canada (where the author of the present submission happens to have been a student), primarily through the work of ecologists Holling and Walters. The ‘philosophy’ behind the method was that in ecosystem science, uncertainty is typically pervasive: given the normally high levels of ecosystem complexity and interactions, we are likely to be faced with significant data gaps and limited knowledge of ecological processes, uncertainties compounded by high levels of natural variability. In those circumstances ‘surprises’ (completely unpredicted effects) are likely. The method is as much about accepting and addressing the uncertainties (‘learning’) as it is about adapting management (and monitoring) actions to the new information – thus the full title is Adaptive Environmental *Assessment* and Management (AEAM). Mere adaptation (following project implementation) is not appropriate where there is a risk of a (significant) irreversible impact.

The EC guidance document bears out many of these principles (emphasis added):

Guidelines for planning and decision-making based on ecosystem knowledge

Where uncertainties or lack of knowledge on physical, morphological or biological processes still exist, these should be minimized as far as possible by additional research; where uncertainty remains adaptive monitoring programmes should be foreseen. New evidence and scientific information should be fed back into the management plan and where necessary lead to an appropriate adaptation of the management measures and monitoring schemes. (p.18)

....

Following a thorough appropriate assessment that includes collecting all relevant data, and subject to the reversibility of actions, minor remaining uncertainties should however not block or restrain projects indefinitely. This needs to be judged on a case by case basis. In case of uncertainty on particular mechanisms of complex estuarine or coastal ecosystems port and waterway developers should assess the nature of the remaining uncertainties and manage them through targeted monitoring and adaptive strategies. Monitoring schemes should be designed in a way that they signal any unexpected developments at a stage where effective corrective measures can still be taken. (p.29)

3.4. Dealing with uncertainties: adaptive management

In carrying out appropriate assessments for plans or projects in the sense of Article 6(3) of the Habitats Directive, it may be necessary to take recourse to the precautionary principle.

The focus of the assessment should be on objectively demonstrating, with supporting evidence, including undertaking the necessary studies, and based on best available scientific knowledge, that there will be no adverse effects on the integrity of the Natura 2000 site. However adaptive management also helps to address situations when, because of science limits or uncertainty about the functioning of complex and dynamic

ecosystems, it is not possible for the competent authorities to fully ascertain the absence of adverse effects. (p.33).

2. In the light of the above, we have significant concerns about the applicant's 'adaptive environmental management plan' (AEMP) as it relates to migratory salmonids, including the following:

- (a) Inadequate baseline data. In our previous submission we quoted NRW's concerns that "the evidence base and options for verifying the modelling are limited as very few relevant tracking studies exist even for Atlantic salmon"; "the ES refers to [just] three studies to verify the modelling for salmon"; and "there is ... a range of behaviours known to occur in the Bay for which turbine encounters has not been modelled such as fish shoaling, attraction to the water flow and to turbulent turbine flow (e.g. bass) sea trout foraging in the Bay, migratory fish being delayed in the estuary...."

The applicant's response to these concerns about lack of evidence of how migratory salmonids behave in Swansea Bay, for instance in its response to Fish Legal's Deadline II submission, is dismissive:

- 1. TLSB does not agree that the baseline evidence is inadequate. In addition to the information gathered by [fish netting] survey, TLSB has also been able to draw upon [rod-catch] data from NRW, which relate to the Afan, Neath and Tawe and extend back to 2001.

...

- 4. These [fish netting] surveys were not designed to track migratory movements of salmon and sea trout through the Bay. These are better followed as fish enter or leave the rivers, through rod catch or fish trap or counter records. (p.3)

The applicant now says (Dr Turnpenny, issue-specific hearing on fish), "we have carried out now I think five quarterly surveys around the bay for fish, using a variety of techniques, and I think only in the last quarter survey that we carried out did we pick up a sea trout. And the gears that we were using would pick them up as well as, or at least one of the gears that we're using, the otter trawl, would be capable of picking them up. So we don't believe there is any kind of high density of sea trout milling around the bay...." This appears to be a claim that the quarterly netting surveys have sufficiently established the distribution of sea trout in Swansea Bay, even though the "surveys were not designed to track migratory movements of salmon and sea trout through the Bay" (see above) and the relatively small numbers of these fish mean that netting is accepted to be an inadequate sampling technique.

Similarly inadequate baseline information has been obtained, in our opinion, in relation to adult salmonids approaching the mouth of the R. Tawe and being delayed there particularly by the Tawe

Barrage, as examined in a study by Mee et al. in the mid-1990s. The applicant's position as presented at the issue-specific hearing was as follows:

Mr Gibbs, ExA: At the moment we're not so much talking about the collision with the turbine, but the extent to which they're managing to find the mouths of the river. So are you saying it would affect their chances of finding the mouth of the river?

Dr Turnpenny for TLSB: No, we don't believe it would, no.

Mr Bassford for TLSB: I think you are saying that if it was in that position it's perhaps not going to find it anyway, and if it moved out it would be at the same risk as it would have been if it wasn't out migrating.

Dr Turnpenny for TLSB: Yes, yes. What we're saying is that if they've got themselves into that position at the mouth of the river where they're frustrated they're no worse off than they would be without the lagoon, basically.

Mr Bassford for TLSB: And then furthermore, if that isn't right, and they move back out again, the model shows how an out migrating fish would be affected, and so therefore that is assessed also, and that can be understood with confidence and be ascribed a reasonable impact.

These comments appear to ignore much of the detail of the Mee et al. paper, which concluded that fish moving into the Tawe estuary made on average four approaches – rather than just leaving the bay after one approach as has apparently been modelled for a limited number of 'stray' fish – and were probably disoriented and subjected to other stress impacts as a result of the delays caused by the barrage, impacts which could easily be mirrored by the effects of the lagoon.

Fish Legal's conclusions from the above are that there are indeed major 'data gaps' about salmonid behaviour in Swansea Bay, which means that significant risks may not have been addressed; and that the only way of assessing these risks appears to be careful tagging studies, as undertaken by Mee et al. in the 1990s. Such studies are not proposed in the present version of the AEMP.

- (b) Lack of power analysis. A further concern that we raised (quoting NRW) in our Deadline III representation was that the monitoring programme for salmonids proposed in the AEMP, which proposes to rely (for the R. Tawe) only on tributary (Panteg) trap data and rod catch data, is insufficiently precise or targeted to detect stock impacts caused by the project:

H1.136 Predicting impacts on fish populations are fraught with difficulties as natural variations makes it very difficult to detect impacts and link them to a cause with any certainty. It would therefore to be expected that the ES should examine at the outset, using power analysis, the range and type of data to be collected to develop a fit for purpose monitoring programme with the best chance of detecting changes.

H1.137 This approach was recommended in the Marine Scotland review of the potential influence of Robin Rigg wind farm on abundance of adult and juvenile salmon (Thorley, 2013). The review used power analysis to examine traditional methods, such as trapping data, rod catches and juvenile surveys and found that the power to detect change was so limited that there was a 1 in 5 chance that the wind

farm could be decreasing Atlantic salmon abundance by as much as 40% without being detected.

In our opinion a 'power analysis' should be done in the present case, and we believe that the likely result is a finding that the present monitoring proposals (above) are inadequate to determine cause-and-effect impacts and as the basis eg. of compensation assessments, and that only fish counting facilities near the mouth of the river will be adequate to achieve this.

(c) Assessing compensation. The EC guidance referenced above provides helpful information:

Compensatory measures must be feasible and operational in protecting the overall coherence of the Natura 2000 network. The estimated timescale and any maintenance action required to enhance performance should be specified as early as possible in the project. Once the compensation scheme is agreed, the permits granted and a monitoring programme in place, unforeseen uncertainties should in principle not significantly hamper the core of a plan or project. Such possible new uncertainties should, however, trigger targeted investigations and if necessary extended monitoring and adaptive or corrective measures.

Environmental damage/ environmental benefit from compensation ratio should be assessed: there is wide acknowledgement that compensation/ damage ratios should be generally well above 1:1. Thus, compensation ratios of 1:1 or below should only be considered when it is demonstrated that such measures will be 100% effective in restoring good structure and functionality within a short period of time. (p.30)

An adaptive approach for the implementation of a plan or project or a compensation scheme may be particularly useful to address cases where, due to uncertainty associated with different contributory factors (location, confidence, unexpected delays), it is impossible to define all the effects of the plan or project or of a compensation scheme in sufficient details and if such uncertainty cannot be factored in through increased ratios. (p.34)

This principle, that the scale of compensatory measures (offsetting, etc) should be related to the degree of uncertainty and risk in the project, was in fact brought up in Fish Legal's Deadline II submission:

"The actual quantity of offsetting / compensation required should be calculated as for the Cardiff Bay Barrage¹. Given that, as in that case, existing year-to-year natural variability of salmon & sea trout stocks is likely to be in the region of 30%, so that impacts from the lagoon up to this level would not be detectable (except perhaps as a long-term trend or via direct observation of mortalities), offset compensation should be set at this 30% level on a default basis...."

We therefore suggest that the Cardiff Bay Barrage experience has relevance (in relation to offsetting/compensation) to the present project, even though it is rejected as not being sufficiently comparable by the applicant.

Fish Legal
7 October 2014

¹ A relevant excerpt from "The impact of barrages on fisheries" by G.W. Mawle (1993) was provided with that submission.