

Deadline III: Fish Legal comments on Deadline II representations

1. Fish Legal concurs with the Deadline II comments made by NRW in relation to the applicant's Environmental Statement (ES) analyses of migratory salmonids impacts, mitigation and monitoring, in particular:

- (i) (NRW written representation Annex A, H1 – Fish) “We consider that the ES and supporting Appendices presented do not provide adequate information and evidence to support the level of confidence ascribed. As a result we believe there remains a high degree of uncertainty regarding the impacts and consequently a high risk that the associated mitigation and monitoring proposed is inadequate”.

- (ii) Inadequacy of evidence on migratory salmonid behaviour (all Annex H1):

H1.14 The evidence base and options for verifying the modelling are limited as very few relevant tracking studies exist even for Atlantic salmon, which is one of the most studied migratory fish species. The lack of studies on the inshore migratory behaviour of salmon, sea trout and eels is identified as a knowledge gap

H1.42 ... The ES refers to three studies to verify the modelling for salmon; one from Alta fjord in Northern Norway for returning adult salmon and two studies of one individual smolt's outward migration from Southampton and Swansea Bay respectively. For sea trout, one reference to a study of adult sea trout kelts in SW England has been used as verification.... NRW recognises that the evidence which can be used to verify the IBM modelling is limited but does not consider that this is reflected sufficiently in the confidence placed upon the assessment results.

H1.61 NRW, however, is concerned that there are large uncertainties and risks associated with the assessment approach and considers that the ES fails to discuss these and their potential implications to a satisfactory degree....

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 or impacts to resident river lamprey or eels etc.

H1.98 NRW believes that the level of uncertainties surrounding the information presented on baseline populations of fish within Swansea Bay are such that it is not possible to ascertain what significant mortality levels could be attributed to these fish species. Furthermore, the assessment criteria of <1% to >10% only takes into account impacts from the turbines; overall population changes and mortalities taking into account the turbines, increases in predation, adverse changes in supporting habitats for spawning and foraging etc. should also be included to account for all potential impacts arising from the presence of the Lagoon.

H1.18.... Migratory fish range over large distances and stray into several estuaries before homing to their natal river, leading to a high degree of mixing of several river stocks in the Bristol Channel. There is a good evidence base for this....

H1.119 Please see ES para 9.5.3.120 - It is not clear how possible delays to fish movements associated with the Tawe barrage been taken into account in the assessment.... There is therefore still the potential for a delay at the entrance of the barrage fish pass and these fish could be subject to further entrainment into the Lagoon.

(iii) Lack of examination of confidence in the modelling:

H1.15 Given uncertainties in the evidence base, NRW is unable to support the high level of confidence placed in the predicted scales and magnitude of impact (Tables 9.28 – 9.38). NRW believes that Appendix 9.3, on IBM modelling and Appendix 9.5 entitled 'Accuracy and limitations' contain insufficient data to ascertain if and how the model has been sensitivity tested, how worst case has been applied and that insufficient details are presented on each model run for each species.

H1.16 NRW is of the opinion that the ES should have included a section which clearly sets out for each fish species how the parameters have been chosen, how worst case scenario had been modelled and subjected to sensitivity testing and the level of expert opinion used in the assessment.

H1.69 This demonstrates the large degree of uncertainty around the modelling which NRW is concerned about but as mentioned above, it is not clear how this statement has shaped the confidence levels and results presented in the ES. This reinforces the need for solid monitoring to validate the predictions of the models and investigate likely impacts that may have arisen due to unknown factors not inbuilt into the model. If monitoring shows that impacts are higher than predicted in the ES then provisions should be made to mitigate for the additional impacts.

(iv) Inadequate development of monitoring and mitigation plans:

H1.135 The monitoring programme currently proposed is not considered to be comprehensive or detailed enough to be deemed satisfactory. There are no clear pathways between predicted impacts identified in the ES and targeted monitoring. Although TLSB state that Cefas guidance is used which "states that monitoring must be hypothesis driven with measurable outputs", there is no indication of hypothesis led monitoring in subsequent proposals nor is there any assessment on the suitability of surveys in terms of providing meaningful, measurable results with the statistical power to attribute potential impacts to the Lagoon.

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.

2. Responses to these issues in TLSB's Answers to the ExA's Questions (1):

Q's 7.2 & 7.6 (re NRW's concerns over evidence gaps and lack of assessment of confidence limits): TLSB relies on having met and discussed these issues with NRW and APEM Ltd (without describing what the results of these meetings were). It is notable that TLSB have utilised a study 'brought to their attention' by APEM (a 1997 study of salmon smolts by Moore et al.), but have not addressed the issue of adult salmonid 'out-migration' from the R.Tawe mouth analysed in a paper by Mee et al. (199..)¹, nor the issue of delays to adult migration into rivers from estuaries assessed in a paper by Solomon and Sambrook (2004)², although these papers had also been brought to TLSB's attention by Fish Legal. In our opinion the evidence gaps, and lack of analysis by TLSB, in these areas in particular remain very significant, and the modelling and predictions cannot genuinely be 'worst-case', as claimed, when this evidence has not been included.

Q 7.10: TLSB have assembled no baseline data on salmonid behaviour in Swansea Bay (with the belated exception of the Moore et al. study above). The fish surveys have not and apparently will not redress this lack of information. As NRW says (above), it will be very difficult to assess precise impacts on migratory salmonids, and what changes the project would cause to their existing behaviour – such as harmful increased delays to migration, or disruption of foraging – without this baseline knowledge.

Q's 7.3, 7.13 and 7.14 (does the ES address the requirements for on-going monitoring, review and mitigation?): as TLSB says, only a brief outline monitoring strategy is provided in the ES (the outline AEMP in Appx 23), but it promises that a much more detailed version will be produced at Deadline III.

3. Do the 'answers' above adequately address the concerns in Fish Legal's Deadline II representation?

¹ Mee, D., A. Kirkpatrick and R. Stonehewer (undated). Post impoundment fishery investigations on the Tawe Barrage, South Wales. Report for Environment Agency (Welsh Region).

² Solomon, D and H. Sambrook (2004). Effects of hot dry summers on the loss of Atlantic salmon, *Salmo salar*, from estuaries in South West England. *Fisheries Management and Ecology*, 2004, **11**, 353-363.

Few if any of the 'late assessments' we asked to be completed (point (i), (a) to (e) in our Deadline II representation) have been provided to date, with the result that what we assessed as 'areas of greatest risk' (point (iii), (a) to (f)) have not been adequately addressed.

Neither has any detail on monitoring arrangements (our point (iv)) or offsetting (point (v)) yet been provided.

We believe that both these things should have been provided in the Environmental Statement, submitted in February. The 'late assessments' are needed in order to be adequately definitive about the project's impacts, and in order to be able to design the monitoring and mitigation programmes. Monitoring, offsetting (and mitigation) are all matters that require a good deal of time for consultation, scoping, costing, etc – yet (particularly as regards offsetting) they are presently not far beyond the scoping stage and therefore yet at the feasibility stage.

These are all matters that are clearly within Schedule 4 of the EIA Regulations³, and should therefore have been covered in the Environmental Statement, and been consulted on as part of the EIA process. We accordingly refer the Examining Authority to regulation 17 as to the "further information" requirements where the ES is inadequate, as we believe it is here.

Fish Legal

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³ Infrastructure Planning (Environmental Impact Assessment) Regulations 2009