



# Association of Salmon Fishery Boards

## Response to the marine licence application for the GSK tidal array project April 2012

### Introduction

The Association of Salmon Fishery Boards is the representative body for Scotland's 41 District Salmon Fishery Boards (DSFBs) including the River Tweed Commission (RTC), which have a statutory responsibility to protect and improve salmon and sea trout fisheries. The Association and Boards work to create the environment in which sustainable fisheries for salmon and sea trout can be enjoyed. Conservation of fish stocks, and the habitats on which they depend, is essential and many DSFB's operate riparian habitat enhancement schemes and have voluntarily adopted 'catch and release' practices, which in some cases are made mandatory by the introduction of Salmon Conservation Regulations. ASFB creates policies that seek where possible to protect wider biodiversity and our environment as well as enhancing the economic benefits for our rural economy that result from angling. An analysis completed in 2004 demonstrated that freshwater angling in Scotland results in the Scottish economy producing over £100 million worth of annual output, which supports around 2,800 jobs and generates nearly £50million in wages and self-employment into Scottish households, most of which are in rural areas.

We have significant concerns relating to the proposed development, particularly with regard to the uncertainty surrounding the potential negative effects on Atlantic salmon and sea trout and the integrity of the River South Esk Special Area of Conservation.

### Overarching Comments

#### 1. Designated Species

The River South Esk is designated as a Special Area of Conservation (SAC) and is part of the Natura 2000 network – a series of internationally important wildlife sites throughout the European Union. The qualifying interests for which the site is designated are Atlantic salmon and freshwater pearl mussel. The conservation objectives for the River South Esk SAC are set out below<sup>1</sup>.

*To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and*

*To ensure for the qualifying species that the following are maintained in the long term:*

- *Population of the species, including range of genetic types for salmon, as a viable component of the site*
- *Distribution of the species within site*
- *Distribution and extent of habitats supporting the species*
- *Structure, function and supporting processes of habitats supporting the species*
- *No significant disturbance of the species*
- *Distribution and viability of freshwater pearl mussel host species*
- *Structure, function and supporting processes of habitats*

The Habitats Directive (article 6) requires that *Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of this Directive.*

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<sup>1</sup> [http://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa\\_code=8364](http://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa_code=8364)

It also states: *In the light of the conclusions of the [appropriate] assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*

If this is not the case and there are no alternative solutions, the proposal can only be allowed to proceed if there are imperative reasons of overriding public interest. We do not believe that the proposed development is of overriding public interest, and therefore we would expect the developers to be able to demonstrate that the development will not adversely affect the integrity of the site concerned.

The conservation status of the qualifying interests for the River South Esk SAC (First Assessment Cycle) are as follows:

- Freshwater pearl mussel: unfavourable declining
- Atlantic salmon: unfavourable recovering

The second assessment cycle is nearing completion, and the results of this assessment must be taken into account in the licensing decision. We believe that the assessment is likely to show that the early running spring component of the South Esk Atlantic salmon population continues to deteriorate.

In addition, the Esk DSFB has a statutory obligation to protect sea trout, the population of which is in decline in the River South Esk. The marine phases of both Atlantic salmon and sea trout have also been included on the draft list of Priority Marine Features drawn together by SNH - the habitats and species of *greatest conservation importance* in inshore waters.

## **2. Climate Change Mitigation and Adaptation**

As for many other species, climate change has been identified as a threat to Atlantic salmon. The species' developmental rate is directly related to water temperature, and increasing temperature in freshwater may result in smolts developing more rapidly and entering the ocean at a suboptimal time in relation to their planktonic food sources.

In addition, as air temperatures warm, much of the snow that feeds the river systems is expected to melt earlier. This will lead to a reduction in the flow of many rivers in the spring and summer, which will increase water temperatures further and may reduce the overall optimal habitat available to the Atlantic salmon. It is also clear that survival of salmon and sea trout during their marine migration phase has fallen over the last 40 years. Some of this reduced survival can be explained by changes in sea surface temperature and subsequent contraction of feeding grounds.

The first priority in mitigating these effects is to control atmospheric concentrations of greenhouse gases and we note that the Scottish Government has committed to meeting a stated target of 50% of Scotland's electricity demand from renewable sources by 2020. However, with further climate change inevitable in the short to medium term, attention is now focusing on the development of accommodation and adaptation strategies, through which adverse effects on species or ecosystems can be minimized. Some of the key needs with respect to developing adaptation strategies for rivers and their biodiversity were summarised by Ormerod (2009 – *Aquatic Conserv: Mar. Freshw. Ecosyst.* 19: 609–613). We would highlight the following key point in particular: *to minimize the adverse effects on river biodiversity of actions taken to mitigate climate change.*

## **3. Potential Negative Effects of Marine Renewable Devices**

Marine renewable developments have the potential to directly and indirectly impact anadromous fish such as Atlantic salmon and sea trout. We would therefore expect developers to assess the potential impacts of deployed devices on such fish during the deployment, operation and decommissioning phases. Such potential impacts have been highlighted by Marine Scotland Science and could include:

- Physical damage from the device (such as strike or cavitation effects);
- Avoidance (including exclusion from particular rivers and subsequent impacts on local populations);
- Disorientation effects that could potentially affect behaviour, susceptibility to predation or by-catch; and
- Impaired ability to locate normal feeding grounds or river of origin; and delayed migration

ASFB therefore recommend to our members that careful consideration should be given to the following activities:

1. *Subsea noise during construction*

A recent review commissioned by SNH<sup>2</sup> states that 'Marine renewable energy devices that require pile driving during construction appear to be the most relevant to consider, in addition to the time scale over which pile driving is carried out, for the species under investigation'.

2. *Subsea noise during operation*

3. *Electromagnetic fields (EMFs) arising from cabling*

The SNH-commissioned review (cited above) has shown that EMFs from subsea cables have the potential to interact with European eels and possibly salmonids if their migration or movement routes take them over the cables, particularly in shallow waters (<20m). Marine Scotland Science are currently undertaking a research programme which aims to investigate electro-magnetic force impacts on salmonids. We would hope to have some results from this work later in 2012. It is vital that all cables are appropriately shielded to ensure that EMF effects are below any threshold of effect for salmonids.

4. *EMFs arising from operation of devices*

It is important to ensure that such effects are quantified and assessed in the Environmental Statement.

5. *Disturbance or degradation of the benthic environment (including secondary effects on prey species)*

It is important to ensure that such effects are quantified and assessed in the Environmental Statement.

6. *Aggregation effects*

Whilst the aggregation of prey items around physical structures might be seen as a positive effect, possible negative effects might include the associated aggregation of predators.

7. *Strike or cavitation effects*

## Specific comments

Our specific comments relate to the potential effects highlighted in Section 3 above.

### 14.3.1.7 Pile Driving

We understand that the Esk Board has previously agreed conditions on the control of piling which they consider to be acceptable to migratory fish. ASFB would be content the overall impact during construction is likely to be low, provided that such conditions were agreed for the proposed development.

### 14.3.1.8 Impact of noise and vibration during operation

No evidence is provided to allow an assessment of the relevance of an adverse behavioural response to continuous turbine operation during the periods of active fish migration. The statement simply alludes to a ScottishPowerRenewables statement relating to the Sound of Islay environmental statement which "suggests that operational noise levels will be indistinguishable from background noise for humans, fish and marine mammals". We would seek further clarification on the evidence to suggest why this is the case and, what studies have been conducted to support this.

### 14.3.5 Impact of direct displacement

As stated above, we seek further information on the installed devices to increase the aggregation of predators or prey. Increased avian predation on smolts and seal predation on returning adults is a concern, particularly if the devices act as a barrier to upstream or downstream movement of migratory fish.

### 14.3.6 Indirect displacement during operation

We note that the document states "a significant amount of further detailed assessment is proposed to more accurately quantify the potential impact of the array's potential for altering the tidal and sedimentary flow". We

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<sup>2</sup> Literature review on the potential effects of electromagnetic fields and subsea noise from marine renewable energy developments on Atlantic salmon, sea trout and European eel. Available at: <http://www.asfb.org.uk/wp-content/uploads/2011/06/SNH-EMF-Report1.pdf>

also note the potential to limit operation during tidal periods which may be relevant to other potential impacts. However, until such information is provided, it is impossible to assess these potential negative effects.

#### 14.3.7 Impact of magnetic fields

The Statement suggests that the relative effect from magnetic fields will be low with the overall impact is assessed as minor. This is based on a number of scenarios relating to modelling on existing seabed cables in the area. As stated above, we are aware that Marine Scotland Science are currently undertaking a research programme which aims to investigate electro-magnetic force impacts on salmonids. Until this work is completed, we are unable to assess the relative magnitude of this impact, and we would caution against relying on theoretical modelling to suggest that effects at the site will be inconsequential.

#### 14.3.8 Impact of collision risk

14.211: The applicability of the wind farm model is questionable in view of the fact that the tidal array is placed directly in the path of migrating fish. We would suggest that the risk window is more concentrated in the case of the array proposed when compared to the wind farm situation.

The risks from collision are detailed in the work of Dadswell & Rulifson (1994)<sup>3</sup> who made the following conclusion:

Fish passage studies utilizing the Annapolis estuary low-head tidal turbine on the Bay of Fundy have shown that turbine related mortality of 20-80% per passage occurs depending on fish species, fish size and the efficiency or turbine operation.

The authors suggest that the introduction of tidal turbines into open ocean current systems will cause widespread impact on marine populations resulting in significant declines in abundance.

The statement recognises that most of the species present at the site have high sensitivity to collision (European eel is 'medium'), with overall impact from collision risk ranging from minor-moderate-major. Of particular concern is the major risk ascribed to adult salmon in the estuary which is stated as nearly 6%, and 4.67% for sea trout (figure 14-17) with a theoretical collision rate for smolts of 17.55% shown in figure 14-18. We are therefore concerned about the implications of this data in terms of what it may suggest in terms of collision with upstream and downstream migration, and potential injury and mortality.

14.214: This section recognises that there are data gaps that are required for final implementation of the wind farm model and proposes pre-installation acoustic imaging and tagging data for a year. Should this development be licensed, we would also expect to see significant post-installation monitoring with a clear feedback loop to limitation on operation during tidal periods relevant to monitored impacts, or even decommissioning, should monitored impacts adversely affect the integrity of the River South Esk SAC.

14.3.8.3 - 14.3.8.5: We would question some of the assumptions concerning fish movements here. As the Esk DSFB have clarified:

- Salmon can ascend up stream for some kilometres and then descending again to the marine environment. The data from the Logie Counter on the neighbouring North Esk indicates about 20% of the recorded upstream count descend each month
- It is likely that sea trout move in and out of Montrose Basin with the tide thus being exposed to the array on a regular basis
- The fact that smolts tend to drift downstream tail first would render them highly susceptible to collision with the turbines

#### 14.3.9 Impact of barriers to movement

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<sup>3</sup> Dadswell, M. J. and Rulifson, R.A. (1994), Macrotidal estuaries: a region of collision between migratory marine animals and tidal power development. *Biological Journal of the Linnean Society*, **51**:93-113

It is acknowledged that the impact of such barrier effects are unknown and it is proposed to research these during a staged deployment. We do not believe that this approach is compatible with the requirements of the Habitats Directive.

*14.3.10 Impact of water pressure changes*

We accept that there seems to be a negligible overall risk

*14.3.11 Impact of cavitation effects*

Whilst we accept that there would appear to be a negligible overall risk, we would suggest that comparisons should be drawn with the measured effects on fish passing through turbines in terrestrial hydro-electric developments.

*14.3.12 Impact to fish movements from changes to coastal currents and tidal flows*

We accept that there would appear to be a negligible overall risk

**Conclusion**

As stated above, ASFB recognises the importance of marine renewable energy. However, the environmental impact assessment has failed to demonstrate that the development will not adversely affect the integrity of the site concerned. Where a Natura site is involved, the onus is on the developer to demonstrate no impact and in the absence of that the precautionary principle will apply. Under these circumstances, we do not believe that the proposed staged implementation is compatible with the requirements of the Habitats Directive. On that basis, we have no alternative but to formally object to the proposed development.

**For further information please contact:**

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