



# Association of Salmon Fishery Boards

## Response to the marine licence application for the Sea Generation (Kyle Rhea) tidal stream array project

March 2013

### 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.

Similar to other offshore wind projects in Scotland, 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 a number of Special Areas of Conservation for Atlantic salmon.

As stated above, DSFBs have a statutory duty to protect and improve salmon and sea trout *fisheries*. All salmon fishing rights in Scotland (freshwater and marine) are private heritable titles. As the environmental effects of offshore technologies are uncertain, we would expect that developers should be required to remedy any negative consequences of such developments on the heritable assets and the value of those assets (including employment within the fishery) of all fishery proprietors. We therefore believe that, as a condition of consent (should such consent be granted), there should be a requirement for a formal mitigation agreement between the developer and relevant DSFBs.

### Overarching Comments

#### **1. District Salmon Fishery Boards**

District Salmon Fishery Boards have a statutory obligation to protect Atlantic salmon and sea trout fisheries. The marine phases of both Atlantic salmon and sea trout have 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 2015. 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 Offshore Renewable Devices**

Offshore 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:

- 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:

*i. Subsea noise during construction*

A recent review commissioned by SNH<sup>1</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'.

*ii. Subsea noise during operation*

*iii. 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.

*iv. EMFs arising from operation of devices*

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

*v. 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.

*vi. 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.

### **4. General Comments on the Application**

Guidance issued by Marine Scotland Science relating to information requirements on diadromous fish of freshwater fisheries interest states that an Environmental Statement should provide information on the use of the development area by such fish and that if such information was lacking then a suitable monitoring strategy

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<sup>1</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>

should be devised. Indeed, Marine Scotland Science regard the monitoring undertaken at existing offshore developments such as Robin Rigg as being inadequate. We believe that the lack of meaningful monitoring in the present proposal is extremely disappointing and completely inadequate. We would emphasise that any monitoring strategies must include pre-construction monitoring in order that baseline information on salmon and sea trout movement, abundance, swimming depth, feeding behaviour etc. can be collected.

As with other applications for offshore renewable energy, the Rochdale Envelope approach is set out in the application. It must be emphasised that this approach makes it extremely difficult for stakeholders to assess the potential environmental risk as there is little detailed information on: the likely size of the scheme; the type of devices to be deployed; and the degree of confidence attached to the assessment of impacts. Our comments must therefore be viewed on that basis.

### **Suspended Sediments**

Given the risks associated with the increased sediment concentrations it is suggested that sensitive operations should be avoided during the annual smolt migration period. This would have the additional benefit of avoiding the migration period of returning early-running adult salmon which themselves have high value.

### **Electromagnetic fields**

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, or relate any potential EMFs arising from the proposed development to those magnetic fields likely to initiate a behavioural response in salmonids. Having responded to a number of proposed offshore developments it is clear that there is not a consensus between developers as to the appropriate depth to which cables should be buried. We believe that burial depth of cables should be based on research, but in the absence of definitive data we believe that **all** cables should be buried to a **minimum** depth of 1.5m, for **all** offshore renewable developments. Where cable burial is not possible due to hard substrates etc. we believe that all cables should be shielded to an equivalent depth by placing a suitable substrate on top of the cable or by some other means.

There is a clear need to assess the swimming depths of salmon and sea trout transiting the area of the wind farm in relation to the effects of EMFs from cabling. We note that the SALSEA project has shown that Atlantic salmon are capable of diving to considerable depths. In addition, Malcolm et al (2010) concluded based on research undertaken to date (Jakupsstovu, 1986; Holm et al, 2005; Starlaugsson, 1995) that in general terms salmon spend most of the time close to the surface although dives to greater depths of up to 280m have often been observed. Dives do not appear restricted to offshore areas, persisting late into the migration on the return to home waters. Early studies (Jakupsstovu, 1986) suggest an association between diving and feeding.

It is important to consider the foraging behaviour of sea trout, which we assume use the area in question. No information is presented as to the depths at which such fish forage. Sea trout are also more likely to be benthic feeders. Pemberton (1976) suggested a diel feeding pattern, with bottom feeding being greatest during the day and mid-water and surface feeding increasing between sunset and sunrise.

### **Noise**

The assessment of noise impacts carries high uncertainty. It must be recognised that the significance of behavioural avoidance is dependent on the behaviour disrupted. For example, avoidance may be significant if it causes a migratory species to be held up or prevented from reaching areas of biological importance, e.g., spawning and feeding areas. We believe that the predicted area which salmon would avoid is significant and has the potential to at least delay smolt migration. As no information is available on smolt migration routes, we must assume that such a delay could, for example, make smolts more susceptible to predation. It must also be noted that salmonid smolts are physiologically stressed in adapting to the environmental challenge of movement between freshwater and seawater. Simultaneous challenge from noise, EMFs etc. during this transition will constitute a significant additional stressor. Stress leads to increased plasma levels of the stress hormone cortisol. Corticosteroids cause a range of secondary effects, including hydromineral imbalance and changes in

intermediary metabolism (Wendelaar Bonga, 1997)<sup>2</sup>. In addition, tertiary responses extend to a reduction in the immune response and reduced capacity to tolerate subsequent or additional stressors (Wendelaar Bonga, 1997).

We stress the need for information on migratory routes and habitat usage for salmonids. In the absence of such data, ASFB and DSFBs, in assessing the risks of the development to migratory fish, have no alternative but to assume that the entire run of each river will use the area under development. We note that Marine Scotland Science have previously commented that *'it needs to be categorically established which species are present on the site, and where, before the application is considered for consent'*.

### **Introduction of New Substrates**

We are concerned that the potential for the structures to act as fish aggregation devices (FADs) could potentially be negative in the case of wild salmonids. However, if the structures do act as FADs we would be concerned that such areas may in fact represent new 'pinch points' for predation of migrating smolts and returning adults. This possibility does not appear to be considered in the application.

### **Monitoring and mitigation measures**

As with other offshore developments, we are disappointed at the lack of salmonid-specific monitoring. We are keen to work with the developers and Marine Scotland to identify appropriate monitoring programmes. We would emphasise that any monitoring strategies must include pre-construction monitoring in order that baseline information on salmon and sea trout movement, abundance, swimming depth, feeding behaviour etc. can be collected. We are very disappointed to see that no mitigation measures are proposed. As stated above, we believe that **all** inter-array cabling should be buried to a minimum depth of 1.5m or have a suitable shielding material placed over them. We do not believe that there should be any exceptions to this, irrespective of the technical difficulties involved.

### **Conclusion**

As stated above, ASFB recognises the importance of offshore renewable energy. However, the environmental statement has failed to demonstrate that the development will not adversely affect salmon and sea trout fisheries. On that basis, we have no alternative but to formally object to the proposed development, until adequate monitoring and mitigation strategies have been put in place.

It should be emphasised that we have no wish to prevent or delay the proposed development unnecessarily and we remain keen to work constructively with the developers and Marine Scotland to identify appropriate monitoring programmes which will allow us to be able to assess the acknowledged risks of this development, and other proposed developments more appropriately. We stated in our introduction that we believe that a formal mitigation agreement should be a condition of consent. In addition, there is a clear and urgent need to fund, plan and start strategic research on the movement, abundance, swimming depth, feeding behaviour etc. of salmon and sea trout in the area. Such research would clearly feed into the potential mitigation measures that might be deemed appropriate, and the conditions under which such mitigation should be enacted. Developers should be encouraged to work together to fund strategic monitoring in order to allow more certainty for all involved.

The scale of proposed offshore developments in Scottish waters represents a step-change in the exposure of marine animals of high cultural and economic significance to attendant risks. In many cases, understanding of the risks is insufficient to support proposals for mitigation even at this late stage when substantial developments are being submitted for licensing. The cumulative impact of this proposal alongside those developments already submitted or likely to follow in the near future is potentially even greater. We would therefore recommend that an expert group is set up to rapidly consider the best way forward to plug the considerable knowledge gaps that remain. It is important that the best scientific and biological talent is made available to find practicable ways to address the unresolved issues. ASFB would be very keen to constructively engage with such a group.

### **For further information please contact:**

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<sup>2</sup> Wendelaar Bonga, S. E. (1997). The stress response in fish. *Physiol. Rev.* 77, 591-625.