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Morlais Project

Additional Fish Ecology Responses to NRW comments

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1. INTRODUCTION

This document provides the Applicant’s responses to comments regarding ES Chapter 10 Fish and Shellfish Ecology within the following letters from Natural Resources Wales (NRW):

- Dated 5th June 2020; Subject: Marine Licence Application ORML1938 – Morlais Tidal Array Review of Further Information
- Dated 13th May 2020; Subject: Bwriad / Proposal: Morlais Demonstration Zone: Transport and Works Act Order Application (TWAO) – Further Environmental Information

2. MARINE LICENCE LETTER (5TH JUNE)

The letter from NRW states “*Within the relevant signposting document (MOR-RHDHV-DOC-0114) there does not appear to be any acknowledgement of several clarification points raised (Ref no. 143-145; 147-149 in MOR/RHDHV/DOC/0129). These points should be addressed.*”

The following table outlines NRW’s previous clarification points (Ref no. 143-145; 147-149) and Menter Môn’s response.

	NRW Comment	Menter Môn Response
143	Section 10.5.8, paragraph 104: NRW Advisory suggests examination of the results from the Celtic Seatrout Project, which discusses migration range of various natal streams.	<p>The findings of the Celtic Seatrout Project have now been referenced in Table 10-16 of Document MOR/RHDHV/DOC/0114. Text amended to read:</p> <p>"The Celtic Sea Trout project (CSTP, 2016) simulated the movements of sea trout smolts using particle track from 10 rivers in in the Irish and Celtic Seas. From this modelling, it was found that the simulated tracks of sea trout from Ireland, Northern Ireland, the Isle of Man, England and Scotland did not overlap the MDZ. Only smolts from the Welsh rivers, namely the River Dee, River Dyfi, and River Tywi overlapped, of which the River Dyfi had the greatest amount of overlap.</p> <p>CTSP (2016) also looked at the genetic markers of sea trout in the Irish Sea, to infer origin of individuals. Generally, sea trout in the Irish Sea originate from a large number of rivers and constitute a substantially mixed stock. The majority of fish occur in proximity of their natal rivers, however a notable proportion make large scale migrations across the Irish Sea. Some individuals undertake long range migrations up to 300 km. On Anglesey, specifically on the north and east coasts, there was sampling of adult sea trout individuals from the South Ireland, South East Ireland, North Ireland, Isle of Man, Solway/Morecambe, West Wales, and South Wales reporting groups. It is noted that there was no sampling of adult sea trout in the MDZ; the nearest sampling location was the southwest coast of Anglesey, from which one adult sampled, that belonged to the West Wales reporting group. "</p>

144	Section 10.5.8.1, paragraph 107: Recent changes to byelaws should be addressed here, i.e. compulsory catch and release of all salmon within Wales by both rod and net fisheries.	<p>An additional paragraph on the byelaws has been added in Document MOR/RHDHV/DOC/0114 under the title Commercial Importance of Migratory Fish Species. Text amended to read:</p> <p>" In addition to the measures of commercial importance detailed in Section 10.5.8.1, it is also acknowledged that NRW have introduced byelaws to further protect salmon and sea trout stocks in Wales. These byelaws have come into effect in January 2020, and will be in place for a period of 10 years. These are:</p> <ul style="list-style-type: none"> • Net Limitation Order • An all-Wales byelaw for net and rod fisheries; • Cross-border byelaws for the three rivers that cross English and Welsh borders. <p>Under these byelaws, there is statutory catch and release of salmon caught at all times and in all rivers in Wales. Statutory catch and release also applies to two of the three cross border rivers. This applies to both net and rod fishing for salmon. The byelaws specify a single consistent net fishing season for sea trout and salmon across the majority of all-Wales rivers. There is also statutory catch and release of sea trout caught by rod in rivers in the period when net fishing is also constrained."</p>
145	Section 10.5.8.2, paragraph 110: Without knowing the exact location of nursery grounds for <i>Salmo trutta</i> , NRW Advisory considers there is potential for these to overlap with the MDZ.	<p>Information from the Celtic Seatrout Project has been added into a table. Table text now includes:</p> <p>"Nursery grounds of sea trout are not well known. Young-of-the-year trout generally occupy habitat with a depth less than 20 35 cm, water velocities between 0 80 cms-1, and a substrate size between 50-70 mm (CTSP, 2016). Nursery areas typically occur in rivers and streams; some nursery areas are thought to be as low as down to the head of tide, whereas in others, trout juveniles are confined to headwaters and smaller tributaries (CTSP, 2016). It is acknowledged that catchment-specific nursery habitats are not fully identified, and identification of these is a recommendation from the CTSP (2016) report. It is considered unlikely that the MDZ would represent a nursery area for sea trout."</p>
147	Table 10-17: All the species listed are BAP species, but they are depicted as 'No' in the UK Biodiversity Action Plan column of the table. Clarification is required on this.	Document MOR/RHDHV/DOC/0114 now contains a copy of Table 10-17, with the column marked BAP amended to read "yes" for all species.
148	Section 10.6.5.5, paragraph 219 states that the nearest protected area for migratory fish species is	The statement about the nearest SAC being more than 50 km away is erroneous. Document MOR/RHDHV/DOC/0114 now reaffirms that the

	over 50km away, but it is stated earlier in the ES that the nearest SAC designated for migratory fish species (Afon Gwyrfaï a Llyn Cwellyn SAC) is 30km away. Clarification is therefore required on this.	nearest SAC is 30 km from the MDZ. Text reads: "...the nearest SAC designated for migratory fish, Afon Gwyrfaï a Llyn Cwellyn SAC, is 30 km from the MDZ..."
149	Section 10.6.5.5, Operational Impact 5 - Barrier Effects via Project Infrastructure: NRW Advisory does not agree with the conclusion of a 'minor' adverse impact. It is stated in paragraph 219 of Chapter 10, ES, Volume I that "limited information is present on the finescale migration of migratory fish species". The fact that the development is not at the mouth of a natal river is largely irrelevant, when fish from multiple other rivers could be using the area as a migration route, and a significant barrier effect could be created.	Although there is limited information on the finescale migration of migratory fish species, we maintain that the impact significance from collision risk is minor adverse, and have added justification in the text. The document has been amended to read: "Similarly, it is noted that there is limited information present on the finescale migration of migratory fish species at sea. Though the development is not a mouth of a natal river (the nearest SAC designated for migratory fish, Afon Gwyrfaï a Llyn Cwellyn SAC, is 30 km from the MDZ), the MDZ has the potential to be used by several different migratory species, either on a short-term or long-term scale. The presence of migratory fish species in the MDZ cannot be excluded. However, as above, it is argued that the proposed project will not create a permanent barrier to migration, the spatial extent of the MDZ is small in the context of certain species' migratory routes (e.g. sea trout, as determined by the Celtic Seatrout Project (CTSP, 2016)), and the majority of the water column in and around the MDZ will still be available for fish to move through unhindered. Therefore, an impact significance of minor adverse is considered appropriate for migratory fish species as a result of the development. It is noted that there is a level of uncertainty within this assessment given that, as noted above it is not currently possible to undertake collision risk modelling."

3. TRANSPORT AND WORKS ACT ORDER LETTER (13TH MAY), ANNEX 1

	NRW Comment	Menter Môn Response
A.25	For migration patterns Table 10-16 of the Fish Ecology Issues Responses to NRW comments document summarises information on some relevant life stages, temporal distributions and swimming depths and presents a conclusion as to the likely interaction with the MDZ. There are several minor errors and omissions in the table, as follows:	Noted, see below

	<ul style="list-style-type: none"> • Salmon: Juveniles spend 1-3 years in freshwater, rather than the 2-3 years stated. 	<p>Document MOR/RHDHV/DOC/0114 amended to read “1-3 years”.</p>
	<ul style="list-style-type: none"> • While the text acknowledges little is known about the potential use of the MDZ by migrating salmon, it still concludes that juveniles may use the area for feeding but not returning adults. In the absence of any evidence it should be assumed that both juvenile and adult salmon will migrate through the MDZ quite rapidly and may feed opportunistically while doing so. 	<p>Document MOR/RHDHV/DOC/0114 amended to read “The MDZ is shallow and therefore does not comprise a deep-water feeding ground for adult Atlantic salmon. ... Whilst adults and post smolts are rapidly transiting through the MDZ there is potential for them to feed opportunistically.”</p>
	<ul style="list-style-type: none"> • Sea trout: Juveniles may also spend 1-3 years in freshwater before becoming smolts. Only post-smolt sea trout appear to be considered in the table but sea trout are iteroparous[1] so both post-smolt and post-spawned adults should be considered. Little evidence is available for swimming depth and habitat use by sea trout, but some information is available in ‘Swimming depth of sea trout’ by Sturlaugsson (2016) and Kristensen et al (2019). This suggests that while most time is spent in the upper 5m, adults also perform repeated dives to more than 30m. Therefore, sea trout should be considered present in the MDZ and have potential to interact with devices irrespective of depth. 	<p>Document MOR/RHDHV/DOC/0114 amended to read “1-3 years”; “There is some information on post-smolt swimming depths. Tagging data from Iceland indicates that the fish spend up to 90% of their time at depths 0-5 m, up to 25% of time at 5-10 m, and ≤2% at water depths >10 m (Sturlaugsson, 2016). The aggregated annual mean depth recorded was 2.0-3.8 m (Sturlaugsson, 2016). This pattern of residency close to the surface, interspersed with a series of repetitive dives to deeper (>5 m depth, usually 10 40 m with a maximum of 80 m), was also reported for sea trout from Denmark by Kristensen et al. (2018).”; “During their time at sea, the post-smolts are likely to remain mostly in the upper water column, though due to their occasional deep diving behaviour there is potential to interact with devices deeper in the water column”</p> <p>References added: Kristensen, M.L., Righton, D., del Villar-Guerra, D., Baktoft, H. and Aarestrup, K. (2018). Temperature and depth preferences of adult sea trout <i>Salmo trutta</i> during the marine migration phase. <i>Marine Ecology Progress Series</i>, 599, pp.209-224.</p> <p>Sturlaugsson, J. (2017). The marine migration and swimming depth of sea trout (<i>Salmo trutta</i> L.) in Icelandic waters. In: <i>Sea Trout: Science and management</i>. (Graeme Harris. Ed.) Proceedings of the 2nd International Sea Trout Symposium, 20-22 October 2015, Dundalk, Ireland. Troubador, 328-338.</p>

	<ul style="list-style-type: none"> River lamprey: Although these spend most of their life in estuaries, they also frequent the coastal environment and thus should be considered in the same way as sea lamprey. 	<p>Document MOR/RHDHV/DOC/0114 amended to read “July to September to feed in estuaries and coastal environment”; “2 years spent in estuaries and coastal environment”; “Mature river lamprey, having spent one to two years mainly in estuaries and occasionally in coastal environments...”; “The marine distribution of river lamprey is restricted to primarily estuaries and, to a lesser extent, coastal environments. There is therefore potential for river lamprey to occur within the MDZ.”</p>
	<ul style="list-style-type: none"> European eel: Silver eel are considered to migrate from the rivers in autumn, see for instance Righton <i>et al.</i> (2016). 	<p>Document MOR/RHDHV/DOC/0114 amended to read “Between August and December (as silver eels)”; “Adult eels, known as silver eels, have recently been shown to begin their oceanic migration in autumn, between August and December (Righton <i>et al.</i>, 2016).”; “A peak in adult eels may be observed in August-December.”</p> <p>Reference added: Righton, D., Westerberg, H., Feunteun, E., Økland, F., Gargan, P., Amilhat, E., Metcalfe, J., Lobon-Cervia, J., Sjöberg, N., Simon, J. and Acou, A. (2016). Empirical observations of the spawning migration of European eels: the long and dangerous road to the Sargasso Sea. <i>Science Advances</i>, 2(10), p.e1501694.</p>
A.26	<p>The applicant considers that, as impacts to migratory salmonids are predicted to be ‘minor adverse’, impacts to Freshwater Peal Mussel (FWPM) will not exceed this. While we accept the logic of this it is unclear whether impacts to FWPM are also considered to be ‘minor adverse’ or are sufficiently low so as not to be considered further.</p>	<p>The impacts to freshwater pearl mussel are considered sufficiently low so as to not be considered further.</p> <p>Document MOR/RHDHV/DOC/0114 amended to read: “FWPM require an abundant supply of juvenile salmonids for sufficient survival of the juvenile stage. FWPM could be impacted if salmonids are lost from the population, either in the short-term (direct loss due to collision) or indirect loss through long-term population decrease. Direct loss of juvenile salmonids due to collision is predicted to be negligible in terms of the percentage of the population (e.g. <0.01% of salmonids when looking at the Pentland Firth data). Overall impacts to salmonids are predicted to be minor adverse, defined as “small change in receptor condition, which may be raised as local issues but are unlikely to be important at a regional population level.” There are no</p>

		<p>SACs for FWPM on Anglesey nor any record of the species based on the NBN Atlas. It can therefore be said that the spatial extent of the pathway of effect between the MDZ and FWPM occurs on a regional scale, rather than a local scale. As impacts to Atlantic salmon are unlikely to occur at a regional scale, it is considered that impacts to FWPM in the region are negligible.”</p>
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