# Aberdeen Harbour Expansion Project

## Construction Environmental Management Document

11th May 2017

DRAGADOS

# Contents

# Chapter 8
# Fish Species Protection Plan

# Contents

# 8 Fish Species Protection Plan

## 8.1 Introduction

This Fish Species Protection Plan (FSPP) has been developed to monitor and mitigate impacts to fish during the construction phase of the Aberdeen Harbour Expansion Project (AHEP).

Atlantic salmon (*Salmo salar*) and sea trout are of environmental and economic value to the local area. Salmon, sea trout and other migratory species use the Nigg Bay area during their migrations, with salmon being one of the three species for which the River Dee Special Area of Conservation (SAC) is designated for. As well, the salmon fishery on the Dee alone provides 500 full time equivalent jobs and £15 million annually to the Deeside economy[1]. For these reasons, the FSPP has been produced.

The requirement to produce the FSPP is listed under the Marine Construction Licence Condition 3.2.4 and 3.2.7, the Marine Dredging and Disposal Licence Condition 3.2.4, as well as the Harbour Revision Order Schedule 2(d). This plan has been produced to fulfil these requirements.

## 8.2 Roles, Responsibilities and Cross- Referencing

The following individuals are responsible for ensuring that the requirements of this Fish Species Protection Plan are implemented at the AHEP site.

Table 8.1: Roles and Responsibilities

| Job Title | Name | Responsibilities |
|---|---|---|
| Environmental Clerk of Works (ECoW) | Emma Bias | If dead fish are reported, the ECoW will initiate an investigation in lines with the requirements outlined in Section 8.5.5. The ECoW is responsible for notifying the Environmental Manager or the Construction Manager the findings of this investigation. The ECoW will liaise and notify MS-LOT as outlined in Section 8.5.5 |
| Environmental Manager (EM) | TBC | The EM will work with the ECoW to ensure the mitigation and monitoring measures as outlined in the FSPP are undertaken. The EM will stop construction if fish mortality is found to be directly caused by construction activities (Section 8.5.5). The EM undertake the ECoW responsibilities if and when need be. |

[1] Radcliffe et al (2004). The Economic Impact of Game and Coarse Angling in Scotland. Prepared for Scottish Executive Environment and Rural Affairs Department.

### 8.2.1 Cross-Referencing

This FSPP should be read in conjunction with the following CEMDs:

- Marine Mammal Mitigation Plan;
- Dredging and Dredge Spoil Disposal Management and Monitoring Plan;
- Vessel Management Plan;
- Construction Lighting Management Plan; and
- Piling Management Plan.

## 8.3 Information Sources

The FSPP has been informed by information outlined in the following documents:

- Aberdeen Harbour Expansion Project Environmental Statement (ES)[2]; and
- ES Additional Environmental Information Report[3].

## 8.4 Legislation and Guidance

This FSPP has been developed in line with the Offshore Marine Conservation (Natural Habitats, &c) Regulations 2007[4] and the Conservation of Habitats and Species Regulations 2010[5].

The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended) transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and Council Directive 79/409/EEC on the conservation of wild birds (Wild Birds Directive) into national law. These regulations apply to the UK's offshore marine area which covers waters beyond 12 nautical miles, within British Fishery Limits and the seabed within the UK Continental Shelf Designated Area.

The Conservation (Natural Habitats etc.) Regulations 1994 (as amended in Scotland in 2007 and 2008) are the British response to the Habitats & Species Directive 1992 issued by the European Community (EC). They offer protection to a number of plant and animal species throughout the EC via the designation of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) in terrestrial areas of the UK and territorial waters out to 12 nautical miles. In the United Kingdom these regulations are implemented through the Wildlife and Countryside Act 1981 (as amended).

[2] Waterman and Fugro (2015), Environmental Statement
[3] Aberdeen Harbour Expansion Project (April 2016), Additional Environmental Information Report.
[4] The Offshore Marine Conservation (Natural Habitats, &c.) Regulations (2007). http://www.legislation.gov.uk/uksi/2007/1842/contents. Accessed 10/01/2017.
[5] The Conservation of Habitats and Species Regulations (2010). http://www.legislation.gov.uk/uksi/2010/490/contents/made. Accessed 10/01/2017

In relation to this report, the River Dee is designated as an SAC with Atlantic salmon as a qualifying interest. This ensures that any plan or project that may impact the integrity of the River Dee SAC is subject to a Habitats Regulations Appraisal (HRA)[6]. In the event that a plan or project is likely to have a significant effect (LSE) an Appropriate Assessment (AA)[7] must be undertaken.

An AA was completed by Marine Scotland on 11th October 2016, which concluded that the AHEP proposed works, alone or in-combination with other plans or projects, will not adversely affect the River Dee SAC with respect to Atlantic salmon, provided it is undertaken in strict accordance with the conditions in the marine licence.

## 8.5 Mitigation/Monitoring Measures

### 8.5.1 Marine Impact Piling

The residual effects of marine impact piling have been judged to be of minor adverse significance in the ES[2] as a result of predicted adverse noise levels on the sensitive and high value receptor, salmon. Marine impact piling is no longer proposed during the construction of the AHEP, so the potential for adverse effects on fish is reduced.

### 8.5.2 Blasting

Explosives will be used below the seabed to fracture rock to allow the dredgers to remove it for reuse. When blasting occurs the following conditions relevant to fish species will be adhered to:

a) Blasting is restricted to daylight hours unless during exceptional circumstances;

b) A process to record and report, in writing to the licensing authority, within 48 hours, instances where blasting has occurred, out with daylight hours, due to exceptional circumstances;

c) The minimum amount of blasting will be undertaken using the smallest practicable charges; and

d) All blasting will be shielded from open water by a bubble curtain (See section 8.5.3).

e) Soft Start - Dragados will explore the use of a soft start pre-blast procedure to see if there is a benefit to using a soft start to allow fish to move away from an area of under seabed blasting. If the use of a ‘soft start’ is deemed to be

[6] HRA is a rigorous assessment process undertaken by a competent authority intended to insure the qualifying interests of a Natura site (SAC/ SPA) are protected. More information can be found at: http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/natura-sites/habitats-regulations-and-hra/

[7] An AA is a detailed analysis of evidence focused on the qualifying interests of a Natura site. It is undertaken by a competent authority, with input from SNH to determine whether there will be an adverse effect on site integrity related to a proposed plan or development. More information can be found at: http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/natura-sites/hra-appropriate-assessment/

useful, Dragados will produce a blasting protocol outlining the methodology in consultation with MS-LOT, SNH and DDSFB.

### 8.5.3 Bubble Curtain

In order to further reduce the sound exposure to marine mammals and fish during blasting, a bubble curtain (BBC), will be deployed. JDN is planning on providing, installing and operating a double BBC during blasting operations of this project, with plans to move to one bubble curtain if it can be shown this reduces noise sufficiently.

A BBC consists of walls of bubbles rising from a nozzle or porous pipe that is secured to the seabed and connected to an air compressor. The compressors will be installed on shore or on a pontoon. The BBC will be installed so that there is no 'direct line of site' between the blasting area and open water.

An underwater noise specialist will design and implement an appropriate methodology to monitor the effectiveness of mitigation measures during the initial blasting activities. This will incorporate measuring the noise at certain distances from the source and may also include the use of high resolution acoustic cameras. Initial reports of the effectiveness of the bubble curtain following first blasting event will be provided to MS Lot and SNH.

Further details on methodology and deployment procedure please refer to the Marine Mammal Mitigation Plan, Chapter 11 of the CEMD.

### 8.5.4 Sedimentation Plume

As part of the Harbour Revision Order (HRO), Schedule Mitigation Measures 2d, the FSPP must outline methods for the investigation of the special extent and concentration of the sediment plume around the mouth of the River Dee, and, if necessary implement appropriate mitigation measures to reduce the potential for impacts on salmon smolts from increased predation.

The suspended sediment levels as presented in the ES show average background Suspended Sediment Concentrations (SSCs) in Nigg Bay ranging from 24 mg/l in the outer bay area to 144 mg/l in the inner bay area. Maximum SSCs of up to 529 mg/l and 899 mg/l have been recorded in the outer bay and inner bay areas during high energy wave events.

According to the model in the ES, the turbidity plume generated by the dredging works reaches the entrance of Aberdeen Harbour and the outer coastal area. The peak increases in SSC north of Girdle Ness are predicted to be no higher than 100 mg/l to 200 mg/l above background levels, and generally around 10-50 mg/l in front of the mouth of the River Dee, which is well within natural background variation. Therefore, the ES states that the expected increases in SSC as a result of dredging in the areas surrounding Nigg Bay will be within natural range.

Based on the source term numbers (expected release of fine material at the dredging site) and the production rates it is expected that the amount of fine sediment brought into suspension by all the different types of dredging will not exceed the values predicted in the ES.

The turbidity in the water will be monitored on a regular basis and compared with values as estimated in the ES. Dragados commit to undertaking one of the following in terms of monitoring turbidity. The exact detail will be agreed with MS-LOT prior to dredging commencing:

- A continuous monitoring system will be installed at a location agreed with MS-LOT capable of measuring turbidity and transmitting results via GPRS / GSM networks with results displayed real time on a website. A continuous monitoring buoy will allow real time alerts to (via SMS or email) if thresholds are breached or if data stops transmitting.

  or

- An independent third party will undertake water quality measurements daily during dredging operations from a survey vessel with a handheld measuring device during dredging and disposal activities. If this is not possible, and only with agreement of MS-LOT, the campaign will be undertaken by Dragados/JDN and verified by an independent third party. The survey team will note the time that samples are collected so that this can be cross-referenced to the dredging and disposal activity at that time. The turbidity will be measured approximately 2 meters under the water surface and 2 meters above the seabed. Turbidity will be measured in NTU values, which will be converted in mg/L after the determination of a correlation coefficient (see Appendix 3 for details on the methodology).

  At all proposed locations background measurements will be recorded before start-up of the project. Nevertheless, natural variability will not be captured during this one time baseline measurement, therefore background turbidity levels will be measured each time a monitoring campaign is done at locations not influenced by the dredging or disposal activities.

If suspended sediment concentrations are exceeded, these will be reported to MS-LOT immediately initially by a phone call to the Mike Bland or a member of the MS Projects Team on: 01224 295579 and by a follow up email (within 1 hour of the exceedance being detected) to ms.majorprojects@gov.scot and copied to Michael.Bland@gov.scot.

Further details of the monitoring associated with dredging can be found in the Chapter 7: Dredging and Dredge Spoil Disposal Management and Monitoring Plan.

### 8.5.5 Reporting and Management of Dead Fish

All on-site Dragados staff will be required to report any observations of dead or injured salmon or other fish during marine construction activities; this will form part of the environmental induction and toolbox talks.

All fish carcases which can be collected safely will be stored in an air tight container. The fish health inspectorate will be contacted immediately on

collection of a fish carcass to arrange uplift to the MS-Fish Pathology Unit in Aberdeen (Table 8.2). The carcass will be analysed following the wild fish sampling procedure to determine, where possible, the cause of death[8].

Table 8.2: Contact information for reporting dead fish

| **Contact** | **Contact Number** |
|---|---|
| During Working Hours: Fish Health Inspectorate | 01224 295525 |
| Evenings or Weekends: On-call Inspector | 01224 876544 |

In the event that five or more fish carcasses (or injured, or moribund fish) are reported during one 24 hour period within 50m of a construction zone, the ECoW will notify MS-LOT and the Environmental Manager via phone and email. Within 24 hours of the fifth reported carcass, consultation will be sought with the Environmental Manager and MS-LOT to determine any temporary mitigation requirements. If deemed necessary, temporary mitigation will be implemented as soon as it is safe to do so.

The ECoW will review all results from post mortem assessments. In the event that a post mortem report identifies construction activity as the primary cause of death, or that construction activity was likely to have been a contributing factor in the death, the ECoW will notify the Environmental Manager or Construction Manager. MS-LOT will also be notified by email (ms.majorprojects@gov.scot) within one working day of the information being received by the ECOW.

Dragados will explore the use of soft start, small charged blasts prior to the impulsive noise (blasting) to deter fish from the immediate area (Section 8.5.2). If dead, injured or moribund fish continue to be found, following discussions with MS and others if necessary, the ECoW and Environmental Manager will propose any additional mitigation measures that must be put in place to reduce the risk of fish mortality.

It should be noted that fish mortality caused by underwater noise is not predicted based on the findings of the underwater noise modelling carried out for the Environmental Statement[2] (see Chapter 13). In addition, the drilling, manoeuvring of vessels/plant and the deployment of the bubble curtain will generate a low level of disturbance within areas to be blasted, which is likely to have a similar effect to an acoustic deterrent device or a ‘soft start’ piling technique – i.e. deterring fish from the area in which they would suffer injury.

Electronic copies of all post mortem reports will be retained for the duration of works. These will be reviewed on a monthly basis by the ECoW in combination with reports of injured or moribund fish to determine whether there are any

[8] This was the best course of action agreed with the MS-Laboratory in Aberdeen. During office hours the fish health inspectorate can be contacted on 01224 295525. During evenings or weekends the on call inspector should be contacted on 01224 876544

patterns indicative of indirect impacts. A summary of this fish carcass assessment will be included in the ECoWs monthly report to SNH and MS-LOT.

### 8.5.6 Salmon Monitoring

Condition 3.2.7 of the Construction Marine Licence requires a monitoring programme to be developed to track adult salmon in the vicinity of the AHEP site and entering the River Dee.

AHB will commence adult salmon monitoring as soon as possible in 2017. Fish will be netted and tagged south of Nigg Bay. 'Gates' of receivers will be installed at the headlands north and south of Nigg Bay, and in the entrance to the River Dee. The monitoring will be carried out during drilling and blasting, breakwater construction and dredging activities. There will be periods of time during the monitoring when no significant marine activities are taking place: underwater blasting is restricted to two blasts per day during daylight hours only; placement of stone for breakwater construction will take place intermittently 7 days per week; and there will be regular breaks in dredging activity whilst the equipment manoeuvres.

The tagging data will seek to demonstrate whether there is any evidence of fish mortality, and how salmon migrate past the development to the River Dee. This data will be analysed alongside records of marine activities to determine whether there is clear evidence that any fish mortality or behaviour coincides with particular construction activities. Additional 'control' monitoring in 2019 or later is not proposed: it would not serve as a control condition as construction activities will still be on-going in 2019, and by 2020 the bay will be an operational harbour.

At the end of 2017, the receivers will be lifted and the data analysed. At this time, AHB will liaise with MS-LOT to discuss the success of the monitoring programme, the interpretation of the results and the potential to continue monitoring.

AHB will liaise with MS-LOT and the Dee District Salmon Fishery Board to agree the detailed design within four weeks of the approval of the CEMD.

AHB will use underwater noise monitoring data for adaptive management purposes: hydrophones will be deployed in/around Nigg Bay to record underwater sound levels during construction activities, as described in the following section and in the Marine Mammal Mitigation Plan, Chapter 11 of the CEMD. The underwater noise mitigation strategy will be reviewed and updated regularly to ensure that it is fit for purpose, i.e. that the measured underwater sound levels are consistent with those assessed in the ES, which did not predict significant adverse effects on fish.

### 8.5.7 Underwater Noise Measurements

Underwater noise measurements will be undertaken at AHEP for a range of activities including:

- Drilling of holes into the seabed to set explosive charges

- Blasting
- Marine rotary piling
- Breakwater construction

Noise measurements during the blasting and drilling associated with the dredging operation will be undertaken at AHEP following a separate Noise Measuring Procedure which will be agreed with MS-LOT, SNH and WDC and appended to the Marine Mammal Mitigation Plan. Methods will be consistent and aligned across the suite of construction operations to ensure data is useful and comparable. Dragados will manage the measurements with input from JDN.

### 8.5.8 Noise Monitoring Standards

Underwater noise measurements will be undertaken following the 'Good Practice Guide for Underwater Noise Measurement[9]' including following best practice for in-situ measurement of underwater sound, for processing the data, and for reporting the measurements using appropriate metrics.

Prior to noisy activities commencing a detailed Noise Measuring Procedure will be produced. The procedure(s) will include but not be limited to:

- How the measuring system performance will be checked to ensure it is fit for purpose prior to use including the sensitivity, frequency response, directivity, system self-noise and dynamic range.
- Calibration procedures (both in the lab and in-situ) and how validation of 'off-the-shelf' systems will be completed
- For deployments, the procedure will ensure deployment configuration is appropriate for measurement requirements with hydrophones deployed at appropriate depths
- How ambient noise measurements will be taken alongside with measurements of anthropogenic noise
- Steps that will be taken to protect recorders and data from loss
- Assessment that the objectives of the measurements are clear and that the measurement configuration is appropriate for those objectives

Crucial to being able to usefully use the noise measurement data, including assessing if mitigation such as a BBC is effective, will be the collection of ancillary data such as sediment type, bathymetry and other activities ongoing on site.

Further details of the noise monitoring campaign are provided within the Marine Mammal Mitigation Plan.

[9] National Measurement Office, Marine Scotland, The Crown Estate, Robinson, S.P., Lepper, P. A. and Hazelwood, R.A., NPL Good Practice Guide No. 133, ISSN: 1368-6550, 2014.