Aberdeen Harbour Board: Deposit of Maintenance Dredged Material

Marine Licence Application for 2021: Continuation sheet

Question 6(h): Potential impacts the works may have (including details of areas of concern e.g designated conservation and shellfish harvesting areas) and proposed mitigation in response to potential impacts

1. Introduction

Maintenance dredging will take place within the River Dee Special Area of Conservation (SAC), which is designated for its populations of Atlantic salmon, freshwater pearl mussel and otter. The offshore deposit site Aberdeen CR110 is outwith any protected areas. Bottlenose dolphin population from the Moray Firth SAC occur regularly in and around Aberdeen Harbour.

Part of the maintenance dredging area is within 2 km of the Aberdeen Bathing Waters.

This document describes the dredging and deposit operation, the potential impacts of the operation on the above protected sites and species, and the mitigation measures that will be in place to minimise impacts.

2. Description of dredging and deposit activity

As described in the Dredging Method Statement submitted with the marine licence application, Aberdeen Harbour Board's (AHB) annual maintenance trailer suction hopper dredging (TSHD) campaign is usually carried out once a year; however, occasionally an additional campaign is required to remove excessive accretion in the navigation channel and River Dee caused by severe storms.

The annual maintenance TSHD campaign is typically carried out in spring each year, after any winter storms. The start date and duration of the TSHD campaign is dependent on several factors, including:

- Annual accretion of material within the harbour – this is monitored by monthly bathymetric surveys;
- Weather conditions – dredging vessels cannot operate or transit in poor wind/wave conditions. Operating conditions will vary by dredger size and design; and
- Availability of dredging plant – dredging equipment tends to be in high demand, particularly in the spring when many UK ports and harbours require dredging.

The dates of AHB's TSHD campaigns for the past seven years are listed in Table 1. Over this period, the start of the campaign has been brought forward in the year in consultation with Marine Scotland – Licensing Operations Team (MS-LOT), Scottish Natural Heritage (SNH) and the Dee District Salmon Fishery Board (DDSFB) due to concerns about the potential for dredging to affect smolt migration. This is discussed further in Section 3.

In recent years the duration of the maintenance dredging and deposit campaign has reduced, as shown in Table 1 and Table 2, predominantly due to an increase in the size of the dredging vessel.

The harbour must remain operational during dredging, so the dredging programme must be reactive to berth access requirements, internal vessel movements, and vessels entering and leaving the harbour.

Table 1 Dredging dates 2014-2020

Year	Start date	End date	Notes
2014	29th May	30th June	
2015	29th May	24th June	
2016	13th April	3rd May	Emergency dredging campaign took place 19th February – 5th March to remove material carried downstream during severe winter storms
2017	28th March	6th April	Dredging volume was significantly lower than previous years due to mild winter weather
2018	19th April	15th May	No dredging 9th – 12th May due to dredger breakdown and repair
2019	25th March	12th April	Dredging volume was significantly lower than previous years due to mild winter weather.
2020	16th March	12th April	Dredging volume was significantly lower than previous years due to mild winter weather. No dredging 19th - 21st and 23rd - 24th March and 1st April due to Covid-19 restrictions and poor weather.

The dredging process is not continuous: the average dredging time to fill the hopper is 1 hour 20 minutes, followed by 1 hour 10 minutes cycle time to the deposit site (30 minutes each way to motor to the site, and 10 minutes to discharge). Additional delays to avoid interactions with other vessels are common, e.g. it is common for the dredger returning from the deposit site to be instructed by Vessel Traffic Services to wait outside the harbour to allow other vessels to enter or leave. Table 2 shows the percentage of time spent dredging relative to the overall campaign duration for the past six years.

During the annual TSHD campaign, plough dredging is undertaken by the dredging contractor to move material into areas where it is accessible to the TSHD. In addition, small-scale plough dredging is carried out by AHB throughout the year using its own work boat with a plough bar attachment. This operation is carried out on a 'little and often' basis to level off high spots within berths and the navigation channel, and is essential to ensuring safe navigation within the harbour. It negates the need for more frequent dredging and sea deposit campaigns. The plough dredging is carried out during the crew day shift, except in an emergency where an obstruction is identified which must be removed urgently, which may be at night-time. Most of AHB's ploughing is, therefore, carried out during daylight hours, except for early mornings during the winter months when ploughing may commence in the 'day shift' but before daylight.

Table 2 Summary of maintenance dredging activity 2015 - 2020

Year	Dredger name and hopper size	Dredging time Hours *(Days)*	Campaign duration Hours *(Days)*	% time dredging relative to campaign
2015	UK Dredging Marlin 3,000 m^3	232 *(20)*	594 *(27)*	39
2016	Boskalis Shoalway 4,500 m^3	201 *(15)*	475 *(21)*	42
2017	Boskalis Shoalway 4,500 m^3	86 *(6)*	221 *(10)*	39
2018	UK Dredging Marlin 3,000 m^3	206 *(9)*	525 *(22)*	39
2019	UK Dredging Marlin 3,000 m^3	159 *(7)*	425 *(18)*	37
2020	UK Dredging Marlin 3,000 m^3	154 *(7)*	654 *(28)*	24

3. Atlantic salmon

Part of the maintenance dredging takes place within the River Dee SAC. Atlantic salmon migrate to and from the River Dee and surrounding east coast catchments as part of their life cycle. Adult salmon return to their native rivers to spawn; they may return to the River Dee throughout the year, with the lowest numbers thought to occur during the winter months (December – March inclusive) (DDSFB, 2015; AHB, 2015).

3.1. DDSFB smolt tracking study

The DDSFB have carried out smolt tracking work in the River Dee from 2016 – 2019, with vessel and crew support from AHB. A brief summary of the findings, as they relate to AHB maintenance dredging activities, is provided below.

3.1.1. Smolt losses in the harbour

Table 3 reports tagged smolt losses and is reproduced from DDSFB (2020).

Table 3 Tag loss 2016-2019 (excluding tags that were never recorded)

	River loss	Harbour loss	Total loss
2016	26%	0%	26%
2017	37%	11%	48%
2018	21%	28%	49%
2019	32%	0%	32%

(Reproduced from DDSFB, 2020)

The 2016-17 reports state that were no tagged smolt losses recorded in the harbour. The 2017 report concluded that predators were the cause of smolt mortality in the upper and lower river. In the 2016 and 2017 reports, tagged smolts were not classed as 'lost' in the harbour if erratic behaviour was observed that indicated predation; both reports concluded that there were no losses in the harbour, and described irregular movements of fish in the harbour that were suspected of predation.

The 2018 study reported 23 tagged smolts 'lost' in the harbour; however, in 2018 if a tagged fish was no longer showing normal behaviour and was not likely to be an actively migrating smolt (i.e. because it had been taken by a predator) it was classed as lost, which the DDSFB have accepted is a change in reporting approach to previous years. [This approach also appears to have been retrospectively applied to the 2017 data in Table 3.]

In 2016 and 2018, maintenance dredging was underway during the tagged smolt migration period. In 2017 and 2019, maintenance dredging was complete before the migration of tagged smolts. There is no apparent correlation between smolt losses and dredging activity in these years, if the change in the data reporting approach is taken into account.

Regarding the suggestion that the dredging activity may increase the likelihood of predation, as described in Section 3.2 there does not appear to be a mechanism for dredging to cause such an effect in a busy harbour and naturally turbid estuarine environment.

3.1.2. Smolt migration speed through the harbour

The tracking studies show that smolt migration through the harbour is rapid: in 2016, median journey time through the harbour was 35 minutes, and in 2017 was 1 hour and 17 minutes. Median journey time through the harbour was not included in the 2018 or 2019 reports. Migration speeds through the harbour were approximately 1.7 km/hour in 2016, 1.8 km/hour in 2017 and 2.3 km/hour in 2018. Migration speeds were not included in the 2019 report.

3.1.3. Smolt migration period

Over the four years of tracking studies, the main period when tagged smolts were present in the harbour was between mid-April and the end of May – see Figure 1, which shows a density plot of smolt presences in the harbour. DDSFB (2019) reports that the timing of smolt presence in the harbour is variable between years but limited to a relatively narrow time window of about a month in each year. This is likely influenced by the differences in river flows between the three years as well as tagging dates. The latter is also dependent on flow conditions, because tagged fish are caught in the traps when they are moving downstream.

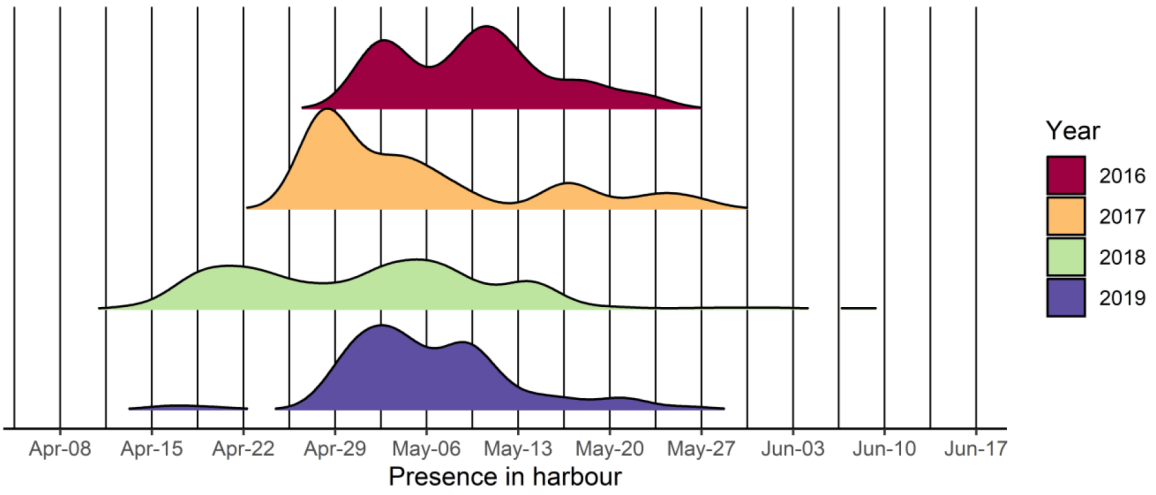

Figure 1 Density plots of smolts present in Aberdeen Harbour in years 2016 - 2019. A higher presence of smolts is indicated by peaks.

(Reproduced from DDSFB, 2020)

3.2. Potential effects of dredging and deposition on Atlantic salmon

3.2.1. Underwater noise

During the dredging process, underwater noise is generated by the dredging vessel's engines and suction pump. The areas to be dredged are busy operational berths and navigation channels that are subject to 24/7 vessel movements. The underwater noise generated by one additional vessel is negligible. At the offshore deposit site, the discharge of material through bottom-opening doors does not generate significant levels of underwater noise. Any temporary increase in underwater noise levels within the operational harbour is not predicted to have a significant effect on Atlantic salmon.

3.2.2. Water quality

<u>Increased suspended sediment concentration</u>

The TSHD and plough dredger inevitably disturb silts and sands on the riverbed at the location of the draghead. The strong pumps of the TSHD ensure that the majority of material is sucked into the pipe: by minimising the loss of material at the source, dredging efficiency is maximised. The plough dredger slowly drags material within the dredge areas from shallower 'high spots' to deeper water to allow it to be dredged by the TSHD. The suspension of sediments during the dredging process is no worse than the localised disturbance created by vessels manoeuvring within the harbour on a daily basis. As described in Section 2, there are significant breaks between dredging activity during the TSHD campaign. A localised and non-continuous increase in suspended sediment concentration is not anticipated to affect the rapid migration of adult salmon or smolts through the naturally turbid river/estuarine environment of the lower River Dee.

Chemical water quality

In October 2020, 10 surface grab samples were collected from the areas to be dredged, as agreed with MS-LOT. Sediment samples were analysed for the Marine Scotland suite of parameters. A summary of the results is presented in this section and the full results are provided in the Best Practicable Environmental Option Assessment Report submitted with the marine licence application.

The results have been compared to the Marine Scotland Revised Action Levels, which are used to determine the contaminant loading of the material and its suitability for deposition at sea. Levels of some heavy metals (cadmium, chromium, copper, and nickel) were elevated above Marine Scotland Revised Action Level 1 in up to five of the samples analysed. In all cases the levels were well below Action Level 2. Levels of polychlorinated biphenyls and tributyl tin were below Action Level 1 in all samples.

Levels of polycyclic aromatic hydrocarbons (PAHs) were elevated above Action Level 1 in seven of the samples analysed; however, levels did not exceed the PAH levels observed in the samples collected for previous marine licence applications for deposition (2015 – 2019). PAH levels are within those expected from the Aberdeen Harbour area.

Based on the results of the sediment sampling, the material to be dredged is considered to be suitable for deposit at sea. The effects on Atlantic salmon resulting from contaminants in the water column are negligible.

3.2.3. Illumination

The dredging vessel(s) will be lit according to legal requirements. Light spillage into the river/marine environment will be minimal. Disturbance to salmon due to lighting is not expected.

3.2.4. Habitat loss

There will be no permanent habitat loss, as the dredging will maintain depths within existing berths and navigation channels.

3.3. Mitigation measures to protect Atlantic salmon

The Dredging Approval Letter issued by MS-LOT for the 2020 TSHD campaign contained the following conditions for the protection of Atlantic salmon. These conditions are based on the findings of the Appropriate Assessment (AA) (MS-LOT, 2020).

- Condition 4: Plough dredging must only be carried out during daylight hours. If plough dredging is required outwith daylight hours, it must not take place without further written consent of the licensing authority.
- Condition 5: TSHD must not take place between 13th April 2020 and 24th May 2020 inclusive.
- Condition 6: By 8th April 2020 AHB must provide the licensing authority with a written update on progress of the TSHD campaign and whether further dredging is required after 12th April 2020.

Condition 5 (timing restrictions) is based on advice from Marine Scotland Science (MSS) and SNH, as summarised below:

- Section 5.1.5 of the AA states that '*MSS advised that in the light of the preliminary data from DDSFB and MSS smolt migration monitoring data from 2018, the trailer suction hopper dredging should stop on 13 April 2019 to avoid harming smolts that could be migrating through the harbour.*'
- Section 5.2.1 of the AA states that '*SNH advised that their response provided on 10 January 2019 for the 2019-2020 licence application still stands for the 2020-2021 licence application on 24 February 2020*.' In relation to the timing restrictions on dredging and deposition, SNH advised that dredging should be completed before 18th April.

Considering the information presented in Section 3.1.1 of this document, AHB requests that the advice from MSS is revisited now that the DDSFB's 2019 smolt tracking report is available and the data can be fully considered. The four years of DDSFB smolt tracking studies do not appear to indicate that maintenance dredging is a contributing factor to smolt mortality, or that estuarine smolt mortality is outwith the natural range. AHB has not had the opportunity to review any additional data collected by MSS relating to smolt migration in the River Dee; if/when this data becomes publicly available it will be used to inform this assessment.

AHB recognises the need for a precautionary approach to protect Atlantic salmon, and has repeatedly brought forward its maintenance dredging operations in recent years to accommodate requests from SNH and the DDSFB. The annual dredging campaign must be carried out in the spring to remove sediment brought in by winter storms, so commencing dredging any earlier than late March would be futile, and may result in the need for an additional dredging campaign shortly afterwards in the event of further storms. Delaying dredging until the end of May could compromise navigational safety and significantly restrict harbour operations.

In 2019 and 2020, AHB was able to complete dredging by 12th April in accordance with the Dredging Approval Letters; this was due to the early availability of the dredging vessel and mild late-winter weather; in previous years poor weather has prevented dredging in the outer channel and/or transit to the sea deposit site for prolonged periods.

It is requested that the previously proposed end date of 18th April is applied to the 2021 dredging and deposit campaign, and the reinstatement of the condition that if dredging cannot be completed by 18th April, it will not continue beyond that date until a revised schedule has been agreed with MS-LOT to sufficiently mitigate impacts to salmon. With these conditions in place, AHB faces a highly restrictive period in which it can dredge, and any additional restriction is very difficult to achieve.

3 Freshwater pearl

Salmon populations in the River Dee share a close relationship with the Dee freshwater pearl mussel and act as host during the mussel's larval stages in upstream river environments. As significant effects on the salmon population are not anticipated, indirect effects on the freshwater pearl mussel populations are not expected, and no mitigation measures are proposed.

4 Marine mammals

Bottlenose dolphins of the Moray Firth SAC occur regularly in and around Aberdeen Harbour. The AA for last year's marine licence application (MS-LOT, 2020) concluded that the maintenance dredging and deposit operations will not adversely affect the integrity of the SAC provided the following conditions are included in the marine licence:

- A dedicated watch will be kept by a trained Marine Mammal Observer (MMO) or someone else following the general guidance for and acting in the role of a MMO. No offshore deposit should take place if marine mammals are observed within 200 m of the deposit site in the 20 minutes prior to deposition. If marine mammals are observed within this area then deposition will be stopped until the area has been clear for at least 20 minutes.
- A formal log will be maintained whether or not marine mammals are sighted and the completed logs will be returned to Marine Scotland.

There have been no changes to the maintenance dredging and deposition campaign since the previous application that would affect the findings of the AA, so it is concluded that impacts on marine mammals will be minimal and that maintenance dredging and deposit operations will not adversely affect the integrity of the Moray Firth SAC.

5 Bathing Waters

Part of the maintenance dredging area is within 2 km of the Aberdeen Bathing Waters. In their response to the 2019 marine licence application, the Scottish Environment Protection Agency (SEPA) highlighted Section 3.9 of its standing advice for the Department for Business, Energy and Industrial Strategy and Marine Scotland on marine consultations: '*Any dredging/sea disposal operations should be cross checked to see if the proposed site is located in or adjacent to a designated bathing water (within 2 km). If so, ideally all physical operations should be done outwith the Bathing Water Season (1 June to 15 September).*'

Due to the timing of the annual maintenance dredging and deposition campaign (as described in Section 2), it is very unlikely that the TSHD campaign would be carried out during the Bathing Water season. Should this become necessary, SEPA requested that they are notified in advance by AHB so that they can consider whether to take additional precautionary measures. SEPA also requested that AHB keep records of plough dredging undertaken within 2 km of the Aberdeen Bathing Water during the Bathing Water season, in the event that they need to rule out dredging operations from unexplained high sample results at the bathing water. It is considered very unlikely that small-scale plough dredging within Aberdeen Harbour has the potential to affect the quality of the Aberdeen Bathing Water.

Based on the advice received from SEPA, effects on Bathing Waters are not expected.

6 Cumulative impacts

6.1 Aberdeen Harbour Expansion Project

The maintenance dredging and deposit campaign will be on-going at the same time as the construction of the Aberdeen Harbour Expansion Project (AHEP) in Nigg Bay south of the existing harbour. There will, therefore, be a temporal overall between the two projects.

As the annual maintenance dredging and deposition has been on-going for many years, the Environmental Statement for the AHEP considered the cumulative effects in the relevant chapters, including Chapters 10 (Nature Conservation), 13 (Fish and Shellfish), 15 (Marine Mammals) and Volume 4 (Habitats Regulations Assessment). The cumulative effects were deemed to be acceptable and a marine licence was granted for the AHEP.

7 Conclusion

There are no significant impacts predicted during the proposed maintenance dredging and offshore deposition, either alone or in combination with other projects, subject to the mitigation measures proposed in sections 3.3, 4 and 5 of this document.

8 References

AHB (2015). Aberdeen Harbour Expansion Project Environmental Statement.

DDSFB (2020) Smolt migration through the River Dee and Aberdeen Harbour. February 2019[1].

DDSFB (2019). Smolt Migration Through the River Dee and Harbour. March 2019.

DDSFB (2015). Letter to Marine Scotland dated 17th December 2015. Consultation response to the Aberdeen Harbour Expansion Project Environmental Statement.

MS-LOT (2020) Appropriate Assessment for Aberdeen Harbour Board, Maintenance Dredging and Sea Deposit. 04/03/2020.

[1] This is understood to be a referencing error and it is assumed that the report should be dated February 2020.