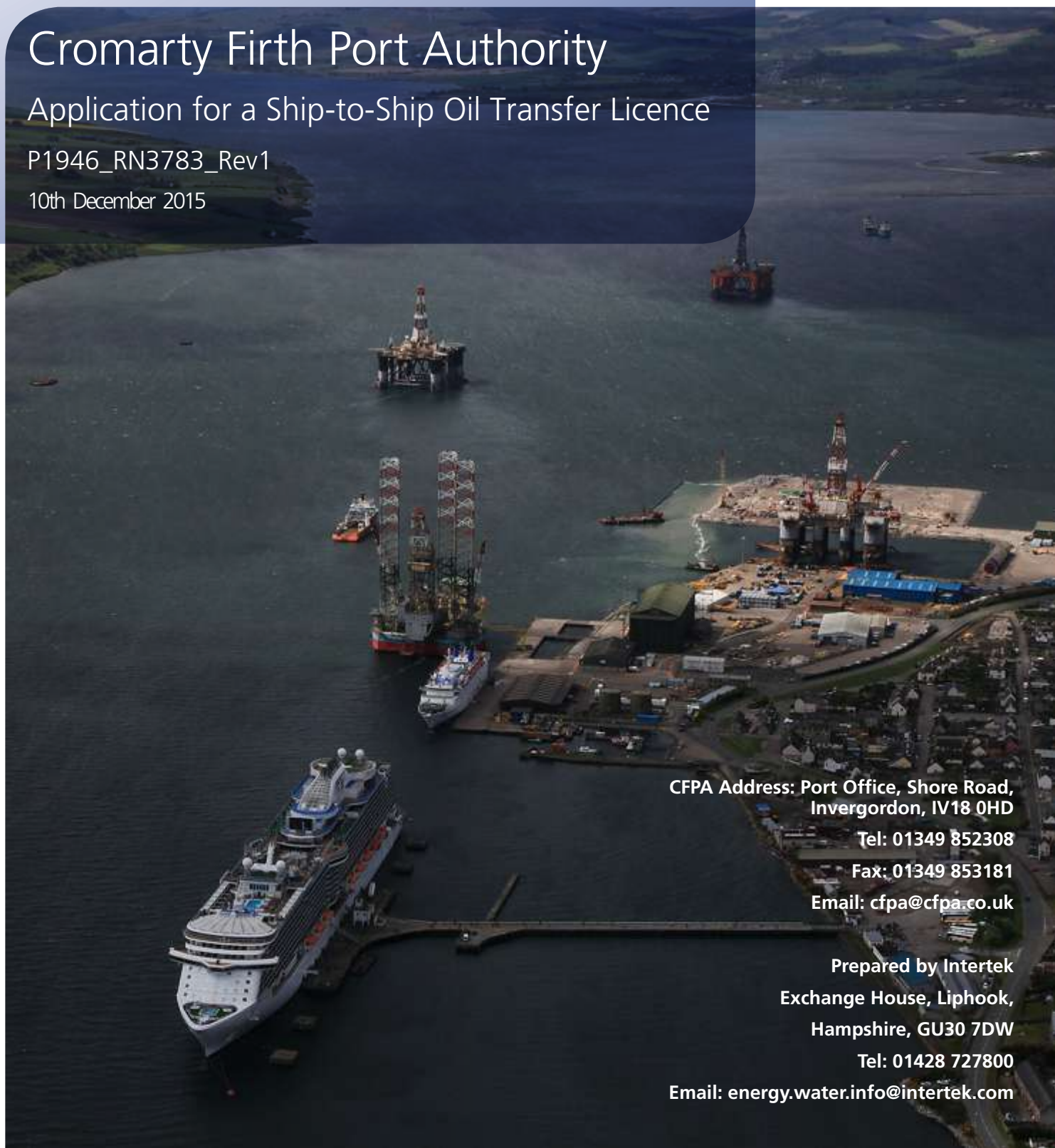
Cromarty Firth Port Authority

Application for a Ship-to-Ship Oil Transfer Licence

P1946_RN3783_Rev1

10th December 2015



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NON-TECHNICAL SUMMARY

INTRODUCTION

This document provides the application from Port of Cromarty Firth (PoCF) for an oil transfer licence (OTL) under the Merchant Shipping (Ship-to-Ship Transfers) Regulations 2010 and Merchant Shipping (Ship to Ship Transfers) (Amendment) 2012 amendments (here after referred to as “The Regulations”).

The licence is required for the transfer of oil from one ship (known as the mother vessel) to another ship (known as the daughter vessel) within Cromarty Firth Harbour Area.

TECHNICAL DESCRIPTION

Location of Proposed Cargo Transfers

The proposed cargo transfers will be undertaken at Ship-to-Ship (STS) locations, as shown in Figure 3-1. All designated sites considered in the assessment are shown in Figure 5-2. The designated sites closest to the STS locations are:

- Rosemarkie to Shandwick Coast Site of Special Scientific Interest (SSSI) – 1.2 km
- Cromarty Firth Special Protection Area (SPA) – 4 km.
- Cromarty Firth SSSI – 4 km.
- Cromarty Firth Ramsar – 4 km.

There are, on average, 650 vessel movements per annum within Cromarty Firth harbour waters. Therefore, 48 STS cargo transfers per annum (average of four per calendar month and 2 ships per operation) amount to 13% of ship movements within the Harbour.

Substances to be transferred

The substance to be transferred will be North Sea Crude Oil from various fields and other medium crude oils.

Maximum quantities

The maximum quantity to be transferred in a single operation is 180,000 tonnes. This equates to a maximum of 8,640,000 tonnes transferred per annum.

Frequencies

The frequency of the proposed cargo transfers is not expected to exceed an average of four per calendar month. Each proposed cargo transfer, on average, is likely to take up to 24 hours to complete.

Types of ships

Typical vessel sizes are approximately 62,395 gross tonnage (gt) or 115,605 dead weight tonnage (dwt). Size of vessel will vary dependant on the cargo, market conditions and availability of co-loads. The proposed cargo transfer is always conducted with the daughter vessel anchored at one of the designated STS locations.

Assessment Methods Employed

Environment Assessment

A combined qualitative and quantitative approach was used in the assessment of effects. The main environmental risks identified are likely to be from the following project activities:

- Movement and presence of ships.
- Accidental oil spill.
- Discharge of ballast water during transfer process.

A qualitative assessment was undertaken of the effects of the movement and presence of ships. A combined qualitative and quantitative approach was used in the assessment of effects on the environment from an accidental oil spill. This involved consideration of historic oil spills and scientific research into the severity of effects and recovery times for various receptors. This information was used to inform the assessment of significance. The potential environmental effects that may arise from an accidental oil spill were assessed against the environmental baseline to determine if they were likely to significantly affect the environment. The following were taken into account to assess this:

- The sensitivity or importance of the receiving environment or receptor.
- The likelihood of the effect occurring.
- The magnitude of the effect (incorporating scale, size and duration of the effect).

Numerical modelling was used to support the environmental assessment to help assess the impacts of accidental oil spill and discharge of ballast water. Oil spills were modelled at the STS locations for medium crude oil; for a variety of wind directions, and for a full spring-neap

tidal cycle. Ballast water discharge was modelled under calm conditions (i.e. no wind) conditions over repeating spring and neap tidal cycles for 60 days. The discharge of ballast water was modelled at each STS transfer location. The modelling provided a quantitative assessment of potential impacts across the area and provided context for the magnitude of the potential impacts, likelihood of the impacts and overall significance.

The available data was deemed adequate to undertake the assessment of potential effects.

Assessment of European Sites

The possible risks to designated sites posed by a STS transfer operation were identified. The designated sites were screened to determine whether a proposed cargo transfer either on its own or in-combination with other plans or projects is likely to cause any significant effects.

Numerical modelling was used to support the screening process to help assess the potential impacts on the designated sites. This provided a quantitative assessment of potential impacts and enabled the extent of an accidental oil spill and time to impact at designated sites to be established. The extent and concentration of the discharge of ballast water was also used to assess impacts at designated sites.

Likelihood of an interaction between the proposed transfer operations and receptor was determined using information for the qualifying interest features, such as foraging distances, and determining whether the interest features could be impacted by an oil spill or non-native species (NNS) introduction from ballast water discharge. The modelling results help to determine the magnitude and likelihood of a potential impact on designated sites and to determine if a significant effect is likely.

Potential Environmental Effects

This section assesses aspects of the environment likely to be affected by the proposed cargo transfers and concludes as to whether these are considered to be significant. The topics of soil and climate have been screened out of the assessment for the following reasons:

- Soil – The proposed cargo transfers will take place afloat in Cromarty Firth harbour waters and therefore will not have any significant impact on soils.
- Climate – Emissions of greenhouse gases from the proposed cargo transfer will be insignificant.

Human Beings

The proposed cargo transfers will not have any adverse effects on human health. The transfer procedures may lead to odour and fumes in the atmosphere. However, the transfer locations are located more than 2 km offshore, over this distance the fumes emissions and odour will be diluted and dispersed to insignificant levels and therefore will not cause a significant impact on human health.

In the unlikely event on an oil spill, seafood may become contaminated with oil. Following this, cultivation will be banned from human consumption. An oil spill would have indirect effects on income. Procedures are in place to prevent the accidental discharge of oil.

Fauna and Flora

Effects of disturbance of marine mammals and seabirds due to the proposed cargo transfer are considered to be insignificant, as the shipping industry and wildlife have co-existed for many years in the Moray Firth and Cromarty Firth. The low frequency of the proposed cargo transfers (not exceeding an average of four per calendar month) is not considered to have a significant impact on seabed disturbance. Emissions of noise from engines, generators and pumps causing disturbance to marine mammals and seabirds are not considered significant.

The release of ballast water associated with the proposed cargo transfers will not cause a significant impact on fauna and flora in the area, as application of the recommendations set out in the International Maritime Organisation Ballast Water Management (IMO BWM) Convention and minimising the volume of ballast water discharged will control and prevent the introduction of harmful or alien species to the marine environment from ballast water.

In the unlikely event of an oil spill, in the absence of any mitigation measures, significant impacts may occur on birds, marine mammals, fish and shellfish within the area. While the Cromarty Firth shorelines are generally sheltered and low energy, the area where the proposed transfer operations will occur is surrounded mainly by rocky cliffs, which are exposed to more wave action. Coasts exposed to wave action generally recover quickly from oil spill events. Therefore it is considered that the shorelines will not be significantly impacted by an accidental oil spill. Consequences of an oil spill on a number of receptors could be significant. However, procedures are in place to prevent the accidental discharge of oil and the risk of a significant impact is considered unlikely. Therefore, no residual effects are predicted. In the unlikely event of an oil spill, the Oil Spill Contingency Plan (OSCP) will be enacted to contain and remove pollutant. A copy of this can be found in Appendix D.

The potential impacts on the designated sites within 100 km of the proposed cargo transfer have been assessed and the findings are presented in the Habitats Regulation Appraisal (HRA) provided in Section 6.3.

Water

There will be operational releases of ballast water during the proposed cargo transfers. Application of the recommendations set out in the IMO BWM Convention and minimising the volume of ballast water discharged will control the impact of NNS introductions to ensure there are no significant effects on water quality. Procedures are also in place to prevent the accidental oil spill. In the unlikely event of an oil spill, the OSCP will be enacted to contain and remove the pollutant.

Air

The main releases to the air from the proposed cargo transfers will be combustion products from engines and generators, and gases/vapours arising from the stored products during transfer operations. The main emissions to the air will be of carbon dioxide (CO_2), sulphur oxides (SOx), nitrogen oxides (NOx) and particulate matter (PM). As of 2006, there was a requirement for all ships in a port area for more than 2 hours to transfer to using marine gas oil rather than heavy fuel oil, thereby reducing emissions. As of 2015, all ships entering the emissions control area are required to burn low sulphur marine gas oil, thereby reducing emissions even further.

The low frequency of proposed cargo transfers (not expected to exceed an average of four per calendar month) will ensure the scale of the effect is small and will only occur during the proposed transfer operation. When planning a proposed cargo transfer, operators should include consideration of emissions of volatile organic compounds (VOCs), should seek to mitigate against such emissions and should consider the use of VOC recovery systems where available. It is considered that, with the application of IMO guidelines for the control of VOC emissions during product transfer operations and other regulations in place to regulate air pollution, there will be no significant effects upon air quality.

Landscape

The proposed cargo transfers will take place afloat within Cromarty Firth harbour waters. The transfers will take place between ships operating within an existing operational port. The operations will be similar to other shipping operations which already occur in the area, therefore landscape impacts are considered to be insignificant.

Material Assets

There are no significant changes required to onshore infrastructure to support the proposed cargo transfers. The proposed cargo transfers may lead to a small increase in the waste levels, however there are procedures in place to ensure all waste material is correctly collected and disposed of.

In the unlikely event of an oil spill there may be negative effects on a number of industries including: fishing, aquaculture, tourism and recreation. Procedures are in place to prevent the accidental discharge of oil. In the unlikely event of an oil spill the OSCP will be enacted to contain and remove the pollutant. As a result, effects on material assets are considered to be insignificant.

Cultural Heritage

The proposed cargo transfers will take place afloat within Cromarty Firth harbour waters. In the unlikely event of an oil spill, it may lead to reduced access to cultural heritage wrecks within the area. The cultural heritage sites themselves will not be directly impacted by the proposed cargo transfers. Therefore, impacts on cultural heritage are considered to be insignificant.

Use of Natural Resources

There will be no significant use of natural resources associated with the proposed cargo transfers. There is no requirement for construction to support the operations. Fresh water will be supplied from the shore in the usual way.

Emissions of Pollutants

The main emissions from the proposed cargo transfers will comprise of:

- Emissions to the air of combustion products from engines, pumps and generators (SO_x, NO_x and PM).
- Emissions to the air of greenhouse gasses (CO_2).
- Emissions of noise from engines, generators and pumps.
- Discharge of ballast water.

All emissions will be minimised and controlled in accordance with current best practice. None of the emissions to the air result in a significant change from previous shipping operations in Cromarty Firth harbour waters.

Discharge of ballast water will follow the requirements set out in the BWM Convention. While the BWM Convention is yet to be formally ratified, PoCF suggest implementation of the recommendations set out in the BWM Convention when ballast water is released as part of the STS transfer process. This will ensure that, as a minimum, ballast water is exchanged with at least 95 % volumetric efficiency. The amount of ballast water discharged is recommended to be limited to the minimum essential quantity. Once the BWM Convention is formally ratified the Convention will be enforced within 12 months and all vessels will be required to meet the requirements of the Convention. This will ensure that concentrations of NNS and presence of chemicals and metals within the ballast water are reduced and removed.

In the unlikely event of an accidental oil spill, contingency plans will ensure the pollutant is controlled and that the spill is minimised in its scale to prevent widespread impacts.

Creation of Nuisances

The proposed cargo transfers will be similar to previous shipping operations within Cromarty Firth harbour waters. The proposed cargo transfers will not create significant impacts in terms of visual intrusion, noise, odour and other potential sources of nuisance.

Elimination of Waste

The proposed cargo transfers will not generate significant amounts of waste. Ships engaging in transfer operations will transfer their waste into skips and this waste will be delivered to Invergordon Service Base or Saltburn Pier for appropriate disposal. The application of the Waste Management Plan and best practice will ensure that the disposal of waste does not pose a significant impact.

In the event of an oil spill, waste oil which has been contained or recovered from the spill will be dealt with by approved contractors, Sureclean Ltd and M.S. Industrial Services Ltd. Oil collected on shores and beaches can be temporarily stored using Waste Management Exemption Notice No 41, which allows storage at the place of production. At present there are no licensed sites around the Cromarty Firth, however, Sureclean Ltd and M.S. Industrial Services Ltd is licensed to store significant quantities of solid material prior to final disposal (Appendix D). After temporary storage it will be sent to a suitable licensed disposal facility.

The Scottish Environment Protection Agency (SEPA) regulates and licences the storage, transportation and disposal of any waste products collected as a result of the oil spill recovery operations.

In-Combination and Cumulative Effects

Other projects in the area which could give rise to in-combination effects include:

- Nigg Oil Terminal.
- Nigg Oil Terminal oil pipeline from Beatrice hydrocarbon field.
- STS transfers at Nigg Oil Terminal jetty.
- Existing ballast water discharges within the Port.
- Housing and industrial developments.

It is not considered that potential effects from the proposed cargo transfer are likely to combine with effects from other local projects, existing or planned, to cause a significant effect on the environment.

ASSESSMENT OF EFFECTS ON EUROPEAN SITES

To determine whether the cargo transfers to be carried out are likely to have a significant effect on any European Site, either individually or in-combination with other plans or projects, a screening assessment was carried out.

The following sites were considered in the assessment:

- SPAs and Draft SPAs with marine components, or which are designated for seabirds within 100 km of the STS locations,
- Special Areas of Conservation (SACs) with marine components, or with a marine connection (freshwater SACs with anadromous, migratory fish e.g. Atlantic salmon and lamphrey) intersecting the coast with the Moray Firth and within 100 km of the STS locations,
- All Ramsar Sites within 100 km of the STS locations,
- Nature Conservation Marine Protected Areas (NCMPAs) and NCMPA Proposals which are within the Moray Firth and 100 km of the STS locations, and
- SSSIs which intersect or are close to the coast within the Moray Firth and 100 km of the STS locations.

Potential effects resulting from the presence of ships, airborne pollution and disturbance were considered not likely to have a significant effect on the designated sites. However, it was determined that the following may affect designated sites and qualifying species:

- Water based pollution as a result of an accidental oil spill, and
- Discharge of ballast water and the introduction of NNS and pathogens.

Designated sites within the area were assessed to determine if the proposed cargo transfers were likely to have a significant effect on them. The potential effect from a significant unmitigated oil spill (i.e. significantly more than 1,000 kg) was determined to be likely to have a significant impact on a number of designated sites within the area. However, the maximum oil spill possible as a result of a STS transfer operation is 1,000 kg. This is the mass that could be released from a fractured hose. Operational procedures are in place to prevent (or significantly reduce the likelihood of) such accidental discharge of oil during the STS operation. In the unlikely event of a spill occurring, the implementation of the OSCP demonstrates that the risk of a significant impact is considered unlikely. Therefore, no significant effects on designated sites are predicted.

It was concluded that the potential effects from the discharge of ballast water during a proposed cargo transfer would not cause a significant effect on designated sites.

The Screening determined that the proposed cargo transfers are not considered likely to have a significant effect on any European sites, either individually or in combination with other plans or projects, as required under Schedule 1 (1) of The Regulations.

MITIGATION MEASURES

Mitigation measures applied in order to determine that there is no significant effects on the environment include the following:

- Application of best practice in proposed cargo transfer activities
- Application of the OSCP
- Application of robust control procedures in place to minimise the likelihood and potential of an oil spill
- Transfer between ships undertaken using industry standard certified hoses
- Ships having trained and experienced crew to undertake transfer operations
- Use of a qualified STS Superintendent to oversee transfer operation
- Application of onsite spill response procedures and equipment being mobilised

- Positioning of fenders in a manner in which they create a barrier to contain any oil that may be spilt in the event of a hose failure
- Comprehensive stock of oil spill containment equipment held on site ready for deployment in case of an incident
- Support vessel on location to deploy booms to contain and recover oil
- Availability of well trained staff to respond to oil spill

Implementing the above mitigation measures will reduce the risk of proposed cargo transfers having a significant effect on the environment.

In the event of an oil spill the location of the pollutant, type of oil, source, cause, extent and direction of movement will be reported to the Oil Pollution Officer. Depending on the tier of the spill different response actions will be mobilised.

If an accidental oil spill was to take place then application of the OSCP would considerably reduce the environmental effects of a spill. It will minimise the scale and extent of an oil spill. Significant effects on the environment through marine pollution should be reduced to short-term manageable effects if the contingency plan can contain and minimise the scale of the spill and prevent any widespread impact.

CONTENTS

TABLES

FIGURES

ACRONYMS

AA	Appropriate Assessment
ALARP	As low as reasonably practicable
BAP	Biodiversity Action Plan
BWM	Ballast Water Management
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CFPA	Cromarty Firth Port Authority
CO_2	Carbon dioxide
Dwt	Dead weight tonnage
ECA	Emission Control Area
EPS	European Protected Species
Gt	Gross tonnage
HRA	Habitats Regulation Appraisal
HW	High water
IMO	International Maritime Organisation
Intertek	Intertek Energy & Water Consultancy Services
JNCC	Joint Nature Conservation Committee
kg	Kilograms
km	Kilometres
km^2	Square kilometres
m	Metres
m^3	Cubic metres
MCA	Maritime and Coastguard Agency
NAEI	National Atmospheric Emissions Inventory
NCMPA	Mature Conservation Marine Protection Area
NEC	National Emission Ceilings
NGO	Non-governmental organisations
nm	Nautical miles
NNR	National Nature Reserves
NNS	Non-Native Species
NO_x	Nitrogen oxides
OSCP	Oil Spill Contingency Plan
OTL	Oil Transfer Licence
PM	Particulate Matter
PoCF	Port of Cromarty Firth
PMF	Priority Marine Features
SO_x	Sulphur oxides
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage
SPA	Special Protection Area
STS	Ship-to-Ship
SSSI	Site of Special Scientific Interest
VOC	Volatile Organic Compounds
VTS	Vessel Traffic Services
WFD	Water Framework Directive

1 APPLICANT AND OPERATIONS DETAILS

1.1 INTRODUCTION

This document has been prepared by Intertek Energy & Water Consultancy Services (Intertek) and provides the application from Port of Cromarty Firth (PoCF) for an oil transfer licence (OTL) under the Merchant Shipping (Ship-to-Ship Transfers) Regulations 2010 and Merchant Shipping (Ship to Ship Transfers) (Amendment) 2011 and 2012 amendments (here after referred to as "The Regulations").

The licence is required for the transfer of oil from one ship (known as the mother vessel) to another ship (known as the daughter vessel) within Cromarty Firth Harbour Area.

1.2 APPLICANT DETAILS

Applicant Name: Cromarty Firth Port Authority.
Applicant Address: Port of Cromarty Firth, Port Office, Shore Road, Invergordon, IV18 0HD.

Contact Details:
Captain Torquil Macleod – Harbour Master / Operations Manager
Office: 01349 852308
Mobile: 07880 493930
Email: TorquilMacleod@cfpa.co.uk

1.3 BACKGROUND TO THE APPLICATION

Port of Cromarty Firth (PoCF) is the trading name of the Cromarty Firth Port Authority (CFPA). Cromarty Firth Port Authority is constituted under the Cromarty Firth Port Authority Order Confirmation Act 1973 (as amended).

The Cromarty Firth is situated on the East Coast of the Scottish Highlands and provides a natural sheltered harbour, its associated port facilities play a key role in supporting activities in the North Sea and beyond. While operating in a variety of sectors, including cruise and renewables, PoCF is recognised for its long track record in the oil and gas industry.

Activities within the harbour waters are managed by PoCF. The Cromarty Firth is a marine inlet with a narrow entrance to the Moray Firth. The entrance is approximately 1,500 m wide between the headlands of the North and South Sutors and is approximately 50 m deep. The outer Cromarty Firth is over 6.5 km wide in places and consists of the extensive bays of Nigg, Udale and Cromarty. At Invergordon the Firth narrows to about 2 km and extends southwest round Alness Bay to Dingwall and the mouth of the River Conon. The Cromarty Firth is about 29 km in length from the Sutors to Dingwall. A geographical overview is shown in Figure 3-1.

Cromarty Firth is recognised as a safe operating area for marine operations. Nigg Oil Terminal on the Eastern edge of the Firth has been operated (by oil companies) since 1981. PoCF currently holds an OTL to undertake

Ship-to-Ship (STS) transfers alongside the jetty at the Nigg Oil Terminal. This licence was applied for in July 2012 and granted in September 2012.

Between 2009 and 2014 there have been over 85 STS transfer operations, with over 6.5 million tonnes of cargo transferred. Details on the number of STS operations and tonnage of cargo transferred per year are presented in Section 5.3.1.

PoCF now wishes to apply for a new OTL to undertake STS transfers at anchor within the outer Cromarty Firth Harbour Area. The proposed locations are outside the Cromarty Firth but within the harbour limits extending to the Moray Firth.

The Cromarty Firth is valued for the abundance of seabirds and marine wildlife that inhabit the area throughout the year. The area contains a number of protected sites including Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Sites of Special Scientific Interest (SSSIs).

1.4 GUIDANCE AND CONSULTATION

Guidance on the content and scope of this OTL application has been taken from consultation with the Maritime and Coastguard Agency (MCA).

Table 1-1 provides a summary of the pre-application consultation undertaken in support of the OTL.

Table 1-1: Record of pre-application consultation

Consultee	Date of Consultation	Summary
Maritime and Coastguard Agency (MCA)	28/10/2014	Intertek (Emma Langley/Chris Mooij/Fiona Bell) had a phone conversation with the MCA (Stan Woznicki) to determine the process for applying for a new OTL for STS transfers at anchorages within the Harbour Area. The MCA considers the addition of any new STS locations to the OTL as a "substantial change" and advised that risk assessments would be required for these anchorages. MCA advised that all anchorages to be applied for must be within the harbour jurisdictions; this must take into account the swinging circle of the vessels.
MCA	05/11/2014	Email received from MCA (Stan Woznicki) confirming that the OTL application must go out to consultation for the full 42 days, as required by the Regulations. MCA confirmed that the main consultees will be the Local Government Authority, Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) and the appropriate Wildlife non-governmental organisations (NGOs).
MCA	03/02/2015	Email received from MCA (Stan Woznicki) advising that supportive modelling would be an essential component of the OTL application.
MCA	15/05/2015	Intertek (Emma Langley/Paul Bowerman) had a phone conversation with the MCA (Stan Woznicki) to seek clarifications on the information the licence application requirements. MCA confirmed that they may require an Appropriate Assessment (AA) to be undertaken.

2 THE REQUIREMENT FOR AN OIL TRANSFER LICENCE

STS transfers have been carried out alongside the jetty at the Nigg Oil Terminal for many years. PoCF now wishes to undertake STS transfers at anchor at the locations specified that lie within the Cromarty Firth harbour limits but outside the Cromarty Firth. The Regulations require PoCF to apply for a new OTL in order to undertake future STS transfers of oil at these locations.

2.1 LEGISLATION

2.1.1 Merchant Shipping (Ship-to-Ship Transfers) Regulations 2010 (and amendments)

The Regulations entered into force on 31 March 2012 and prohibit within the UK Territorial Sea the transfer between ships of cargoes consisting wholly or mainly of oil.

In order to undertake STS transfers within their jurisdictions, harbour authorities must obtain an OTL. This requires an environmental assessment to be carried out and an Environmental Statement to be produced which will be used in support of the OTL application. The environmental assessment is required in order to assess the likely significant effects of the proposed cargo transfers on the environment.

Schedule 2 of The Regulations sets out the procedure for the application of an OTL. This includes what information must be included within the application, a description of the required content of the Environmental Statement and details of the consultation process.

The Regulations implement the Habitat Directive in respect of STS transfers. The Regulations put in place a legislative regime for assessing and licensing harbour authorities which propose to allow STS transfers in their waters. The Regulations also set out requirements to undertake environmental assessment (Schedule 2) and, where appropriate, an assessment of the impacts on European Sites (Schedule 1). These Regulations reinforce the Habitats Directive and ensure that appropriate environmental considerations are undertaken.

Before an OTL can be granted, harbour authorities must determine, in accordance with the procedure in Schedule 1 of The Regulations, whether the proposed cargo transfers to be authorised would be likely to have a significant effect on any European Sites, either individually or in combination with other plans or projects.

2.1.2 Habitats Directive

The Habitats Directive (Council Directive 92/43/EC) and Birds Directive (Council Directive 2009/147/EC) enable European Union member states to work together within the same legislative framework to protect Europe's most valuable species and habitats, irrespective of political or administrative boundaries. At the heart of these Directives is the creation of a network of Europe's most valuable species and habitat sites known as Natura 2000.

In the UK, the Habitat and Bird Directives are transposed into national legislation by the Conservation of Habitats and Species Regulations 2010 (Habitats Regulations), which covers the terrestrial environment and marine waters up to the 12 nautical miles (nm) limit. In Scotland, the Habitats Directive is transposed through a combination of the Habitats Regulations 2010 (in relation to reserved matters) and the 1994 Habitats Regulations. The Directives are transposed with regards to the offshore marine environment by the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007.

The three tests set out under regulation 48 of the 1994 Habitats Regulations (or regulation 61 of the 2010 Habitats Regulations) to determine if a proposal will affect a Natura site are:

1) Is the proposal directly connected with or necessary for site management for nature conservation?

2) Is the proposal likely to have a significant effect on the site? (*this is the Screening Stage).*

3) Can it be ascertained that the proposal will not adversely affect the integrity of the site? (*this is the appropriate assessment stage)* (SNH, 2010).

The tests are known as the Habitats Regulation Appraisal (HRA) process.

The aim of the Natura 2000 network is to ensure the long-term survival of European threatened species and habitats. The network comprises SACs designated under the Habitats Directive, and SPAs designated under the Birds Directive. SPAs and SACs are designated by the individual member states.

Within the UK, all offshore Natura 2000 sites are identified by the Joint Nature Conservation Committee (JNCC), and all marine SACs/SPAs within national waters, are identified by the national nature organisation, e.g. SNH.

The Convention on Wetlands (Ramsar, Iran, 1971), known as the "Ramsar Convention" is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories".

RAMSAR sites are also European Sites and where the interest features of RAMSAR sites overlap with those of European Sites, it is Scottish Government policy to afford them the same protection. Therefore, RAMSAR sites are included in the HRA screening.

Under the Habitat and Birds Directives, it is mandatory to undertake an Appropriate Assessment (AA) for any plan or project which individually, or in-combination with other plans/projects, are likely to have a significant effect on a Natura 2000 or RAMSAR site, (excluding the plans/projects which are directly connected with the conservation management of a Natura 2000 site).

Under Article 6(3) of the Habitats Directive an AA is "the process by which the potential effects of a plan/project upon a Natura 2000 site are assessed in the view of the site's conservation objectives in order to ascertain whether the plan/project will not adversely affect the integrity of the site". However, Article 6(3) states that if a plan or project is directly connected with the conservation management of a site then an AA is not required (European Communities, 2001).

3 LOCATIONS OF PROPOSED CARGO TRANSFERS

This Section of the application addresses the requirements of The Regulations – Schedule 2 – 1.(1)(a).

The proposed cargo transfers in Cromarty Firth Harbour waters will take place at one of five designated STS locations shown in Figure 3-1. The proposed STS transfer locations are located within the Moray Firth in water depths of between 13 m and 22 m. The proposed cargo transfer is undertaken once the mother vessel is securely anchored and the daughter vessel is moored alongside. Further information on the proposed cargo transfers is provided in this Section.

The STS locations are:

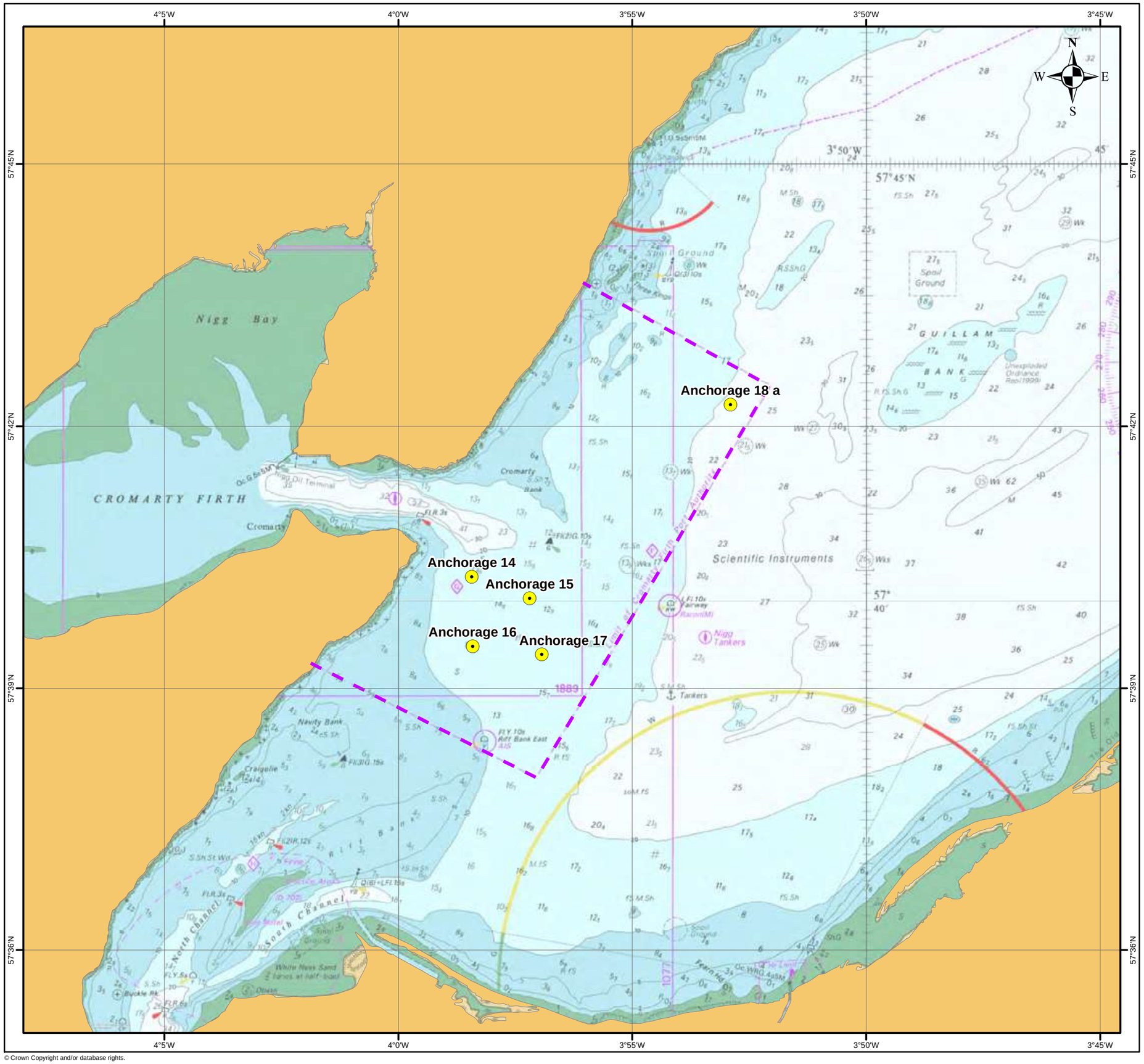
Anchorage 14	57° 40.281' N	003° 58.432' W
Anchorage 15	57° 40.034' N	003° 57.193' W
Anchorage 16	57° 39.484' N	003° 58.411' W
Anchorage 17	57° 39.388' N	003° 56.930' W
Anchorage 18a	57° 42.251' N	003° 52.902' W

The five STS locations are located within the Moray Firth SAC and the Moray Firth draft SPA. The other designated sites closest to the STS locations are:

- Rosemarkie to Shandwick Coast SSSI
- Cromarty Firth SPA
- Cromarty Firth SSSI
- Cromarty Firth Ramsar

Only one STS location will be used at any given time and the choice of STS location will depend on many factors, such as:

- Size of ships;
- Weather forecast; and
- Other expected shipping movements.



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CROMARTY FIRTH PORT AUTHORITY

Oil Transfer Licence Application

Figure 3-1: Ship-to-Ship Transfer Locations

Legend

- STS Locations
- Cromarty Firth Harbour Limit

NOTE: Not to be used for Navigation

Date	Thursday, May 21, 2015 12:38:28
Projection	WGS_1984_World_Mercator
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO, CFPA, OSOD
File Reference	J:\P1946\Mxd\Report\Application\ STS_Locations.mxd
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij

0 1 2 4 6 8 km

4 TECHNICAL DESCRIPTION

This section of the application addresses the requirements of The Regulations – Schedule 2 – 1.(1)(b) and provides a technical description of the operations to be carried out.

4.1 INTRODUCTION

The proposed cargo transfer to be authorised will entail the transfer of oil from one ship (known as the mother vessel) to another ship (known as the daughter vessel). This practice is known as “Ship-to-Ship transfer”.

STS transfer operations are undertaken by anchoring one vessel and berthing the other vessel alongside on completion of the anchoring. A transfer operation can involve more than one daughter vessel, but only one at any one time. The proposed cargo transfer is always conducted one vessel anchored at one of the designated STS locations.

The frequency of the proposed cargo transfers is not expected to exceed an average of four per calendar month. The Harbour Authority will only allow one transfer at any given time in Cromarty Firth harbour waters.

Each proposed cargo transfer will involve numerous parties, including the following:

- Harbour Authority;
- The two ships and their Masters;
- Ship agent;
- Ship broker/charterer;
- Ship owners;
- STS agent;
- Loading Master / Superintendent; and
- Tugs and Workboats.

4.1.1 Pre-Operations STS Transfer Meeting

Prior to a STS transfer operation all relevant parties are involved in a pre-Operations meeting to discuss and agree a cargo transfer plan. The meeting ensures all parties involved are fully briefed and in agreement on the following:

- Procedures relating to the operation;
- Indented sequence of events;
- Designated anchor position for the operation;
- Mooring configuration including fender positions;
- Tug deployment;
- Oil spill response;
- Notification to statutory bodies;
- Notification to national authority i.e. MCA, and

- Communication procedures.

For each STS transfer operation the Pre-Operations Meeting will take place at the Offices of Port of Cromarty Firth to verify procedures, environmental conditions, vessel specific procedures etc. The meeting to be attended by Loading Master, Pilots, Harbour Master, Tug Masters and possibly the Agent or Represnetitive from the Tanker Company.

Prior to the transfer taking place, the STS Superintendent (provided by the STS agent) must ensure briefings are provided for the Masters and crew of the mother and daughter vessels. The STS Superintendent will also ensure that a copy of the agreed procedures and cargo transfer plan is held on board each vessel. The cargo transfer plan will include transfer rates at various stages of the operation. The number of tugs to be used during the mooring and unmooring operations will be determined by PoCF in consultation with the Master and Pilot.

4.1.2 Transfer Process

Prior to the proposed cargo transfer, a risk assessment is undertaken by PoCF. The risk assessment considers weather conditions, ballast water quantity, wind and tide conditions and cargo load.

The PoCF STS Transfer Procedures assume that the daughter vessel (receiving vessel) will anchor first and the mother vessel (discharge vessel) will moor alongside it afterwards. Should this sequence be changed for scheduling purposes, the mooring and fendering arangement will be reversed.

A fire-fighting tug will be in attendance at all times when a vessel is carrying out a cargo transfer.

The transfer process is summarised as follows:

- Anchoring of Daughter vessel
    - Daughter vessel is securely anchored before the Mother vessel arrives.
- Fendering of vessels
    - Fenders are secured in place, along the parallel body of one of the ships, to absorb energy as the vessels berth alongside each other and to prevent contact between the two vessels.
- Manoeuvring of vessels
    - Mother vessel approaches daughter vessel and is moved into position by tugs. This is under the direction of the Master at PoCF Pilot's advice.
    - Daughter vessel can be held in place or manoeuvred (weather vaned etc.) at discretion of the Master with assistance from the authorised Pilot to ensure that the berthing operation is completed in a safe manner.
- Transfer of cargo
    - Once the vessels are securely moored the transfer hoses are connected. Each end of the hose is secured to a ship's

manifold using eight bolts. The connection is made in a catchment area so that any drips or minor spill arising during connection are collected onboard the ship and not released to the environment.

- During the transfer process tugs are on standby.
- Once transfer is complete hoses are drained and blown through to clear them out and are then disconnected.
- Each transfer operation, on average, is likely to take up to 24 hours to complete.

- Unmooring and Departure
  - Tugs assist with unmooring of vessels.
  - Tugs manoeuvre the vessels to ensure safe separation.
  - Tugs escort the vessels out of the harbour waters, as per harbour regulations.

4.1.3 Responsibilities

During the transfer process the STS Superintendent (sometimes referred to as the Marine Supervisor) is in charge of coordinating the transfer operation. Superintendents ensure that the operation is conducted in a safe and controlled manner. They will board both vessels to brief and instruct the Masters and Crew. They have the responsibility of ensuring the hoses are connected correctly and that safety devices are working properly. The STS Superintendent will supervise the deployment and securing of the fenders and with the chief officer jointly inspect the vessels. They will liaise with the PoCF and the Masters of the second ship during mooring and unmooring. During the transfer they will monitor the safety of the operations of both vessels.

The STS agent provides all the relevant STS equipment (including fenders and hoses). STS equipment (including hoses) must comply with regulations and guidelines and be declared fit for purpose prior to the transfer process. They are also inspected during the transfer and after the transfer is complete. All staff carrying out the operation will have adequate training to perform the operation.

Superintendents must ensure that the following safety checklists are completed at the appropriate times:

- Pre-fixture Information checklist;
- Pre-operations checklist;
- Pre-berthing checklist;
- Pre-transfer checklist;
- Pre-unmooring checklist; and
- Pre-transfer conference record.

Both ship' Masters retain their statutory responsibilities for the safety of their ship and the cargo. They remain in control and command of their own ships. The Master of the mother vessel will be responsible for the joint operation,

liaising closely with the Master of the daughter vessel on the transfer rates, mooring adjustments, trim and freeboard concerns.

PoCF will notify both vessels of the passage of any large vessels or mobile drilling units during the STS transfer operations. PoCF is responsible to advise of limiting weather conditions. PoCF states that transfer operations must be suspended if the following operational constraints are reached:

- Wind speeds of over 27 knots
- Sea / swell wave heights of over 2 metres
- If mean wind strength exceeds 35 knots, cargo transfer operations shall cease. All cargo hoses shall be disconnected, and consideration given to unmooring the mother and daughter vessels to separate anchorages until there is a moderation in the weather, when cargo operations can safely resume.

The procedures for mooring and transfer operations are subject to the approval of PoCF. The operation shall only take place if both Masters, the PoCF pilot and STS Superintendent are satisfied that conditions are suitable for mooring, cargo transfer and unmooring.

Either Master or the STS Superintendent may request cessation of the operations due to an unsafe condition and operations shall not resume until all three parties agree that it is safe to do so.

Throughout the STS transfer operation the crew of both vessels will maintain a vigilant watch for the possibility of the anchored vessel dragging its anchor. Particular attention will be paid during tide changes or during significant wind changes.

4.1.4 Types of substances to be transferred

This Section of the application addresses the requirements of The Regulations – Schedule 2 – 1.(1)(b)(i).

The substance to be transferred will be North Sea Crude Oil from various fields and other medium crude oils.

4.1.5 Maximum quantities of each substance to be transferred in any single operation and/or within any specified time period

This Section of the application addresses the requirements of The Regulations – Schedule 2 – 1.(1)(b)(ii).

The maximum quantity to be transferred in a single operation is 180,000 tonnes. This equates to a maximum of 8,640,000 tonnes transferred per annum.

4.1.6 The frequency of transfers

This Section of the application addresses the requirements of The Regulations – Schedule 2 – 1.(1)(b)(iii).

The frequency of the proposed cargo transfers is not expected to exceed an average of four per calendar month.

4.1.7 The types of ships to be used to carry out the proposed cargo transfers

This Section of the application addresses the requirements of The Regulations – Schedule 2 – 1.(1)(b)(iv).

Typical vessel sizes are approximately 62,395 gross tonnage (gt) or 115,605 dead weight tonnage (dwt). Size of vessel will vary dependant on the cargo, market conditions and availability of co-loads.

5 ENVIRONMENTAL STATEMENT

This Section of the application addresses the requirements of The Regulations – Schedule 2-2.

5.1 ENVIRONMENTAL BASELINE

Baseline data were collected in order to identify and describe the existing environmental conditions of the area which could potentially be affected by the proposed cargo transfers.

Baseline data collected during the recent Invergordon Service Base Phase 3 Development Environmental Statement (Affric, 2013) and Nigg Development Masterplan Strategic Environmental Assessment (SEA) (Halcrow, 2009) were used where relevant and updated to ensure latest available data was considered. Further data were obtained where relevant to the OTL application.

The environmental baseline presents the current conditions of the environment. A review of relevant data and information was undertaken to establish a baseline and is included within Appendix A. This review covered aspects of the environment that could potentially be significantly affected by the proposed cargo transfers and included:

- European and Nationally Designated Sites
- Protected Species
- Benthic Ecology
- Littoral Habitats
- Water Quality
- Marine Pollution
- Air Quality
- Waste
- Wrecks

5.1.1 Environmental Context

In order to determine whether the environment could potentially be significantly affected by the proposed cargo transfers it is useful to consider the historical background and conditions in order to establish an environmental context for the assessment. Existing activities in the Cromarty Firth considered in this section include Nigg Oil Terminal and historic shipping operations.

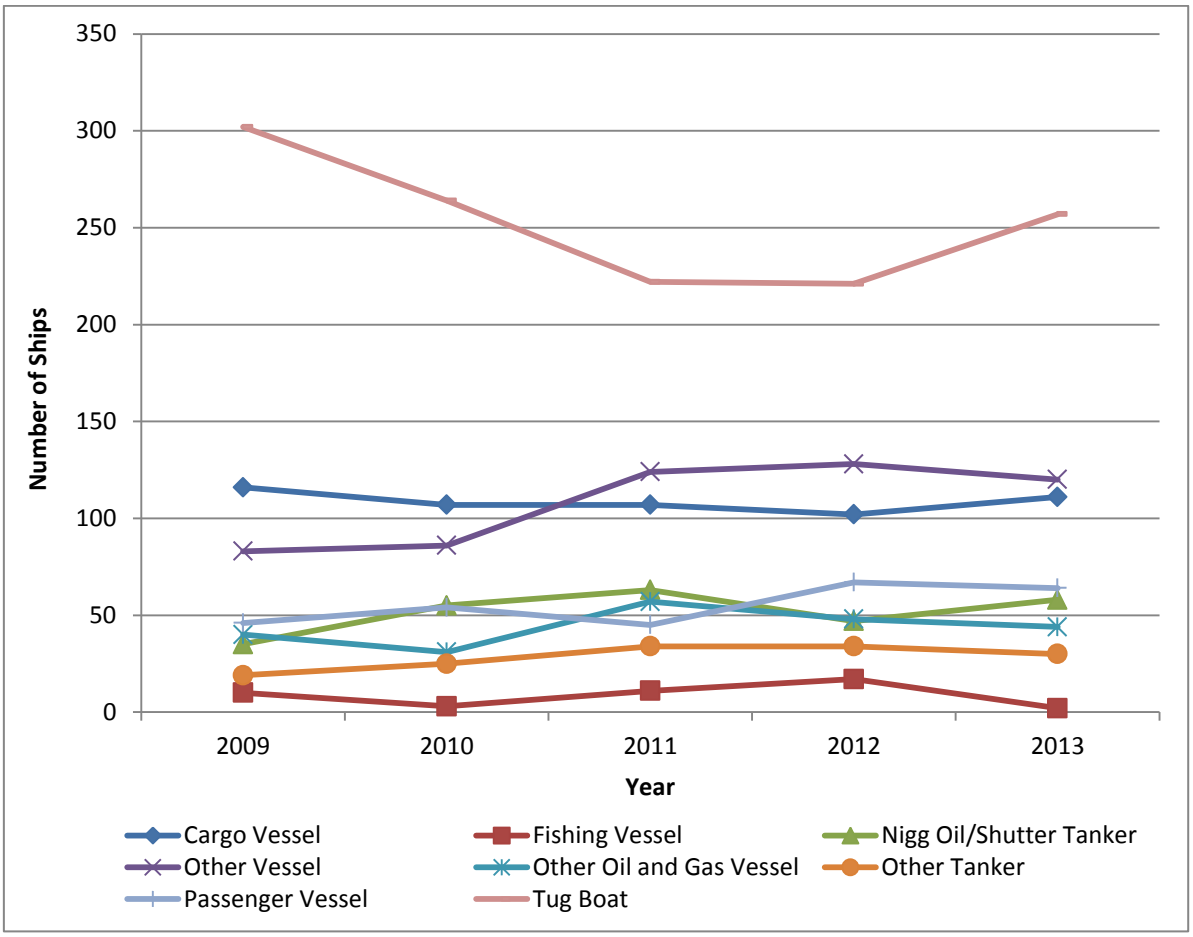
Nigg Oil Terminal has been operational since 1981. The Oil Terminal is currently operated by Talisman Energy and receives oil from the Beatrice hydrocarbon field via a pipeline. Oil stored at the terminal is exported to oil refineries via tankers. Ship-to-Ship transfers of oil also occur at the terminal's Jetty, these are normally crude oil from shuttle tankers (Talisman Energy, 2006).

Cromarty Firth harbour waters provide a sheltered deep water channel; as a result the Cromarty Firth has always been of considerable importance for shipping and trade. The main types of vessels operating within the harbour are

cargo vessels, diving support vessels, passenger vessels, platform supply vessels, coastal tankers and oil/shuttle tankers.

Figure 5-1 shows the number of ships that have used Cromarty Firth harbour waters between 2009 and 2013. Tug boats undertake the most shipping movements. Overall, there has been an increase in the number of shipping movements since 2010. The proposed STS cargo transfers will involve a small uplift from the recent numbers of shipping movements.

Figure 5-1: Shipping Statistics for Cromarty Firth 2009 – 2013



Details of the number of STS operations and tonnage of cargo transferred at Nigg Oil Terminal between 2009 and 2014 are shown in Table 5-1. The maximum number of STS operations occurred in 2011, with 22 STS operations carried out. The maximum volume transferred in any one year is 1,750,000 tonnes.

Table 5-1: Ship-to-Ship transfers at Nigg Oil Terminal 2009-2014 (PoCF, 2015a).

Year	Number of STS Transfers	Tonnes of Cargo Transferred
2009	14	1,120,000
2010	19	1,420,000
2011	22	1,750,000
2012*	6	450,000
2013	15	1,140,000
2014	10	670,000

* Statistics only available for January to June.

5.2 ASSESSMENT APPROACH

5.2.1 Introduction

The Regulations put in place a legislative regime for assessing and licensing harbour authorities which propose to allow STS transfer operations in their waters. The Regulations set out requirements to undertake environmental assessment (Schedule 2) and where appropriate an assessment of the impacts on European Sites (Schedule 1).

The purpose of the environmental assessment is to identify the potential significant effects that the proposed cargo transfers are likely to have on the environment.

The approach to the environmental assessment and determination of likely effects on European Sites are discussed below.

5.2.2 Approach to the Environmental Assessment

The environmental assessment steps for the proposed cargo transfers are as follows:

1) Prediction and assessment of potential environmental effects

2) Identification of mitigation measures

3) Assessment of residual environmental effects

The sections below provide further details on the steps used in the assessment

5.2.2.1 Prediction and assessment of Potential Environmental Effects

The potential unmitigated environmental effects that may arise from the proposed cargo transfers were predicted, including effects resulting from the following project aspects (listed in Schedule 2 (2 b) of The Regulations):

- The nature of the activities to be carried out and the manner in which they are carried out
- The use of natural resources
- The emissions of pollutants
- The creation of nuisances
- The elimination of waste

The environmental effects considered covered direct and in-direct effects, secondary effects, cumulative effects, short-term, medium-term or long term effects, permanent and temporary effects and both positive and negative effects. In-combination effects were also assessed.

The potential environmental effects that may arise from the proposed cargo transfers were assessed against the environmental baseline to determine if they were likely to significantly affect the environment. The following were taken into account to assess this:

- The sensitivity or importance of the receiving environment or receptor
- The likelihood of the effect occurring

- The magnitude of the effect (incorporating scale, size and duration of the effect)

Numerical Modelling

Numerical modelling was used to support the environmental assessment to help assess the impacts of accidental oil spill and discharge of ballast water.

Oil spills were modelled at the STS locations for medium crude oil; for the average yearly wind speed derived from the Met Office WAVEWATCH III™ wave model archive, for a variety of wind directions (including yearly predominant wind and blowing towards the nearest coastal sensitive sites) and for a full spring-neap tidal cycle. Details of the oil spill modelling are provided in Appendix B.

Ballast water discharge was modelled under calm conditions (i.e. no wind) conditions over repeating spring and neap tideal cycles for 60 days. The discharge of ballast water was modelled at each STS transfer location. In-combination impacts of ballast water discharge were assessed assuming discharge at STS locations in-combiantion with existing discharges of ballast water in the harbour waters. Details of the ballast water discharge modelling are provided in Appendix B.

The modelling provided a quantitative assessment of potential impacts across the area and provided context for the magnitude of the potential impacts, likelihood of the impacts and overall significance.

5.2.2.2 Identification of Mitigation Measures

Schedule 2 paragraph 2(d) of The Regulations requires the Environmental Statement to include a description of *"the measures envisaged to prevent or reduce, and where possible offset, any significant effects of the proposed cargo transfers on the environment, including, if appropriate, any changes proposed to the harbour authority's oil pollution emergency plan maintained in accordance with regulation 4 of the Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation) Regulations 1998(a)"*. These can be referred to as mitigation measures.

PoCF already has a variety of mitigation measures in place. Implementation of these measures will ensure that the adverse environmental effects of the proposed cargo transfers are minimised wherever possible to as low as reasonably practicable (ALARP).

5.2.2.3 Prediction of Residual Environmental Effects

Following the application of mitigation measures any remaining residual effects were predicted.

5.2.3 Approach to Habitats Regulation Appraisal

The Regulations require the harbour authority to determine in accordance with the procedure in Schedule 1 of The Regulations, whether the cargo transfers to be authorised would be likely to have a significant effect on any European Sites. Schedule 1 of The Regulations refers to the Habitats Directive.

To determine whether the cargo transfers to be carried out are likely to have a significant effect on any European Site, either individually or in-combination with other plans or projects, a screening assessment was carried out.

If it is determined that the proposed cargo transfers are likely to have a significant effect on any European Site then the Secretary of State will make an Appropriate Assessment (AA) of the implications of the proposed cargo transfers for the European Site, in view of the conservation objectives of the site, for the purposes of Article 5 of the Habitats Directive.

5.2.3.1 Screening

The HRA screening process applied the following steps as set out in SNH's HRA guidance document (Tyldesley, 2015):

1) Screen the project for likely significant effects on a European Site

2) Apply mitigation measures

3) Re-screen the plan after mitigation measures have been applied

4) Determine if impacts are likely to be significant

The possible risks to designated sites posed by a STS transfer operation were identified. The designated sites were screened to determine whether a proposed cargo transfers either on its own or in-combination with other plans or projects is likely to cause any significant effects.

The Regulations require SACs, SPAs and Ramsar sites to be considered in the assessment. However, SSSIs, Marine Protected Areas (MPAs) and Draft SPAs (dSPAs) were also included in the screening. Reasons for the inclusion of these designations in the assessment are set out below.

The relevant designations are summarised below:

- **Special Areas of Conservation (SACs)** are designated sites under the Habitats Directive (Council Directive 92/43/EC). SACs are selected for particular habitats listed on Annex I and for species listed on Annex II of the Habitats Directive.
- **Special Protection Areas (SPAs)** are classified under the Birds Directive (Council Directive 2009/147/EC). SPAs are selected for a number of rare, threatened or vulnerable bird species listed in Article 4 of the Birds Directive, and also for regularly occurring migratory species.
- **Ramsar sites** are designated under the Convention on Wetlands (Ramsar, Iran, 1971), known as the "Ramsar Convention" to protect wetlands of international importance. In Scotland all Ramsar sites are also either SACs or SPAs, and many are also SSSIs, although the boundaries of the different designations are not always exactly the same. Although there is no specific legal framework that safeguards Scottish Ramsar sites, they are afforded the same protection as the Natura sites they overlap.
- **Sites of Special Scientific Interest (SSSI)** are nationally important areas of land and water (above mean low water) in Great Britain. In Scotland SSSIs are designated by SNH under the Nature Conservation (Scotland) Act 2004. SSSI are protected by law and it is an offence for any person to intentionally or recklessly damage the protected natural features of a

SSSI. SSSIs in Scotland are those areas that SNH considers to best represent Scottish natural heritage for its diversity of plants, animals, habitats, geology, landforms or a combination of these natural features. Most of the terrestrial Natura sites in Scotland are also SSSIs.

- **Nature Conservation Marine Protected Areas (NC MPA)** are designated by Scottish Ministers under the Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009. These areas are designated to conserve a selection of marine biodiversity (species and habitats) and geodiversity (the variety of landforms and natural processes that underpin the marine landscapes). These NC MPAs have been identified to either protect a range of biodiversity or geodiversity features in their current state for the future, or to allow them to recover to the state in which they should be in order to remain healthy and productive. While these NC MPAs are not specifically referred to in The Regulations, we believe that the environmental assessment should also consider impacts on NC MPA as they play important role in delivering a healthy, productive and biologically diverse marine environment. Also considered in the assessment are **MPA Proposals**. These are areas recommended to Scottish Government for designation as NC MPAs. These areas are considered as if they were designated.
- **Draft SPAs (dSPAs)** are areas that are likely to be considered by the Scottish Government and that may be designated as SPAs under the Birds Directive. These are areas which are considered as hotspots of marine bird interests. No conservation objectives have been drafted for these sites yet; however each dSPA has specific qualifying bird species which the sites have been identified for.

Numerical modelling (as described in Section 5.2.2.1 and presented in Appendix B) was used to support the screening process to help assess the potential impacts on the designated sites. This provided a quantitative assessment of potential impacts and enabled the extent of accidental oil spill and ballast water discharge and timescales to impact at designated sites to be established.

Impacts of ballast water discharge on European Sites were evaluated against the D-2 Standard set out in the International Maritime Organisation (IMO) Ballast Water Management (BWM) Convention.

5.2.4 Sites considered in the assessment

The study area encompasses an area with a 100 km radius from the proposed transfer locations in Cromarty Firth harbour waters. However, not all designated sites within this area will interact with, or be impacted by the project e.g. sites without marine connections. Therefore, the sites considered within the assessment were based on the following criteria:

- SPAs and Draft SPAs with marine components, or which are designated for seabirds within 100 km of the STS locations.
- SACs with marine components, or with a marine connection (freshwater SACs with anadromous, migratory fish e.g. Atlantic salmon and lamphrey) intersecting the coast with the Moray Firth and within 100 km of the STS locations.
- All Ramsar Sites within 100 km of the STS locations.

- NC MPAs and NC MPA Proposals which are within the Moray Firth and 100 km of the STS locations.
- SSSIs which intersect or are close to the coast within the Moray Firth and 100 km of the STS locations.

SPAs with seabirds within a distance of 100 km of the proposed cargo transfer locations were considered because seabirds are known to forage outside of their SPAs and these seabirds may travel to the proposed transfer locations area and be impacted by an accidental oil spill.

Whilst it is acknowledged that seabirds may forage greater distances than 100 km, it is recognised that species from SPAs further away are less likely to travel to the proposed transfer locations area in high enough numbers for the population of qualifying species to be significantly impacted. It is anticipated that SPAs within 100 km of the proposed cargo transfer locations are more likely to be adversely impacted than those further away.

SACs with a marine connection (e.g. Atlantic salmon and lamphrey) within a distance of 100 km of the proposed cargo transfer locations were considered because these migratory fish may travel to the proposed transfer locations area and be impacted by an accidental oil spill.

The sites considered within the assessment are shown in Figure 5-2.

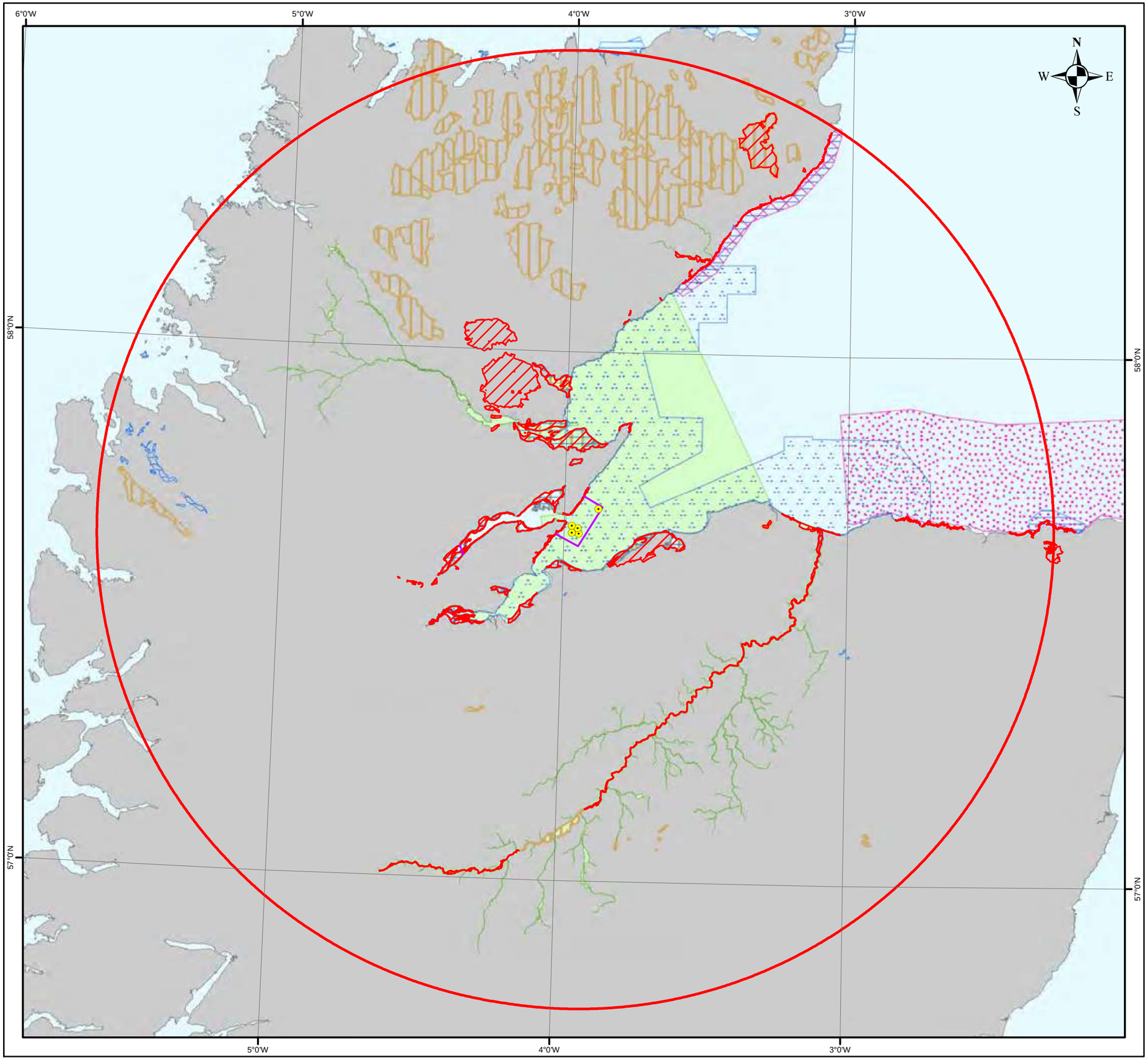


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Figure 5-2: Sites considered in the assessment

Legend

- STS Locations
- Cromarty Firth Harbour Limit
- Search Area (100 km)

Designated Sites

- SPA
- SAC
- Ramsar
- SSSI
- NC MPA
- NC MPA Proposal
- Draft SPA
- NNR

Date	Wednesday, June 3, 2015 15:38:38
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Data Source	CFPA, OSOD, SNH, JNCC, MS
File Reference	J:\P1946\Mxd\Report\Application\ Sites_Assessment.mxd
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij

PORT OF CROMARTY FIRTH

Intertek
Valued Quality. Delivered.

0 5 10 20 30 40 km

5.3 ASSESSMENT OF ENVIRONMENTAL EFFECTS

5.3.1 Potential Environmental Effects

This section addresses the requirements of The Regulations Schedule 2 – 2 (1) and (2).

The potential environmental effects that could arise during a proposed cargo transfer have been identified for the following environmental topic areas as required in Schedule 2 (2 a) of The Regulations:

- Human beings
- Fauna and flora
- Water
- Air
- Landscape
- Material assets
- Cultural heritage

The topics of soil and climate have been screened out of the assessment for the following reasons:

- **Soil** – The proposed cargo transfers will take place afloat in Cromarty Firth harbour waters and therefore will not have any significant impact on soils.
- **Climate** – Emissions of greenhouse gases from the proposed cargo transfer will be insignificant.

The main environmental risks identified are likely to be from the following project activities:

- Movement and presence of ships
- Accidental oil spill
- Discharge of ballast water during transfer process

The way in which these activities may impact the environment is discussed below.

5.3.1.1 Movement and presence of ships

Ships moving in and out of the area, and undertaking transfer operations, may lead to disturbance to birds and marine mammals in the area. Ships anchoring to undertake a cargo transfer may cause damage to the seabed.

It has been determined that there are, on average, 650 vessel movements per annum within Cromarty Firth harbour waters. Therefore, 48 STS cargo transfers per annum (average of four per calendar month and 2 ships per operation) amount to 13% of ship movements within the Harbour.

5.3.1.2 Accidental oil spill

Accidental oil spill could arise during a proposed cargo transfer or due to accidental fire or explosion onboard. The maximum mass of oil that could be spilt in the course of a transfer is 1,000 kg; this would be the quantity of oil spilled from a fractured hose.

During a cargo transfer an oil spill could occur during:

- the approach manoeuvre to the STS locations;
- berthing;
- mooring;
- hose connection;
- the transfer operation itself;
- hose disconnection;
- unmooring; and
- separation manoeuvre

Accidental fire or explosion onboard could cause a tank to be breached.

Hydrocarbons being released into the sea on a large scale would be likely to result in a significant negative effect on the environment.

The severity of environmental damage caused by a particular oil spill depends on many factors, including the amount of the oil spilled, the type of oil, the location of the spill, the species of wildlife in the area, the timing or breeding cycles and seasonal migrations, and the prevailing weather during and immediately after the oil spill.

5.3.1.3 Discharge of Ballast Water

During a cargo transfer operation the receiving ship (daughter vessel) will need to release ballast water in order to maintain ship stability. This will occur during cargo transfer and will be conducted in accordance with the IMO International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention).

Ballast water is water that is held in, or discharged from, specially constructed and segregated tanks (i.e. meaning that ballast water cannot mix with other cargo, such as oil). Ballast water is used to provide stability and manoeuvrability during ship transit, especially when the ship is not carrying cargo. When ballast water is taken onboard it may contain organisms and chemicals from the source port. This water may contain non-native species (NNS). Ballast water is discharged to compensate for the weight of cargo taken onboard.

Some of the organisms within ballast water will have died during the voyage, some will die due to the change in environment after discharge, and some will die naturally following discharge. Others may survive. Depending on the origin, many of the organisms discharged may pose no environmental risk. Some NNS species can become invasive if they spread rapidly, establish themselves in the new environment and cause damage to native species. In addition to ballast water discharge, there are numerous other ways that NNS

could be introduced. These include attachment to ships hulls, aquaculture and natural migration.

The BWM Convention was introduced to prevent and reduce the introduction of harmful or alien species to the marine environment via ballast water. Latest information (December 2015) indicates that support for the BWM Convention is nearing the ratification target required to trigger its entry into force. Therefore in anticipation of the BWM Conventions ratification PoCF suggests implementation of the recommendations set out in the BWM Convention are followed when ballast water is released as part of the STS transfer process. The requirements of the BWM Convention include:

- An interim solution of ballast water exchange in accordance with Regulation D-1 of the BWM Convention (i.e. demonstrate that at least 95 per cent volumetric exchange is met).
- Ballast water treatment (to Regulation D-2 Standard) when available on vessels and required at a later date in accordance with the BWM Convention schedule.

The amount of ballast water discharged is recommended to be limited to the minimum essential quantity. If ship operators cannot demonstrate compliance with the BWM Convention, discharge may not be permitted. Once the BWM Convention is formally ratified the Convention will be enforced within 12 months and all vessels will be required to meet the requirements of the Convention. This could be as early as November 2016.

5.3.2 Impact Significance, Mitigation and Residual Effects

The significance of each potential environmental effect from the above activities was assessed in the context of the receiving environment. Numerical modelling was used for the assessment of accidental oil spill and the ballast water discharge during the transfer. The modelling results are presented in Appendix B and used here to provide context for the likelihood, magnitude and significance of the potential effects.

The effect was first assessed for the unmitigated situation and where potential effects were identified, appropriate mitigation measures were recommended. The impact significance was then re-assessed post mitigation, to determine residual effects.

Mitigation measures and residual effects are defined as follows:

- **Mitigation measures** are as specified in The Regulations “measures envisaged to prevent or reduce, and where possible offset, any significant effects of the proposed cargo transfers on the environment”.
- **Residual effects** are significant effects remaining after mitigation.

The assessment of potential environmental effects of the proposed cargo transfers from the three project activities likely to effect the environment are presented in Table 5-2.

Table 5-2: Assessment of potential significant effects of the proposed cargo transfers

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
Movement and presence of ships	Disturbance of marine mammals and seabirds	Adverse	Direct	Temporary	Short Tern	The Cromarty Firth and Moray Firth are important areas for marine mammals and seabirds. Disturbance could arise from propeller induced noise as well as noise propagating from the ship hull from onboard machinery e.g. pumps and generators. The likelihood of this effect causing significant disturbance is considered to be low, as the shipping industry has co-existed with wildlife for many years. The frequency of proposed cargo transfers (not exceeding an average of four per calendar month) will result in a small increase in shipping activities. The magnitude of the effect will be small in scale, duration and size. Disturbance of marine mammals and seabirds is not considered to be significant.	Ships to be under pilotage as per Competent Harbour Authority (CHA) directions within Cromarty Firth harbour waters and travelling at slow speeds such that disturbance will be minimised.	No residual impacts predicted.
	Seabed disturbance due to anchoring	Adverse	Direct	Temporary	Medium Term	Seabed disturbance could occur in the vicinity of the proposed cargo transfers from anchoring of ships. Anchors typically penetrate the seabed for a few meters in depth and may drag over some distance before holding. The seabed below the STS locations is sand and muddy sand. The diversity of benthic ecology is lower than within the Cromarty Firth. The extent of the effect is likely to be limited and the seabed will recover within one year. The frequency of operations (not exceeding an average of four per calendar month) is not expected to significantly impact the seabed. Therefore, seabed disturbance is not considered to be significant.	Transfer operations are restricted spatially to reduce the scale of seabed disturbance.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Emissions from ships engines and pumps during a transfer operation carbon dioxide (CO2), nitrogen oxides (NOx), sulphur oxides (SOx) and Particulate Matter (PM)	Adverse	Indirect	Temporary	Short Term	During a transfer operation there will be emissions to the atmosphere of CO2, SOx, NOx and PM from combustion productions from engines, pumps and generators. The area is located within the North Sea Emissions Control Area for SOx, therefore ships operators in the area will have to use fuel oil on board with a sulphur content of no more than 0.10% from 1 January 2015. This will help to ensure the emissions of SOx are significantly reduced. The frequency of proposed cargo transfers (not exceeding an average of four per calendar month) will result in a small increase in emissions. However, the scale of the effect is small and will only occur during the transfer operation. Therefore, the effect is not considered to be significant.	Application of IMO guidelines for control of emissions will ensure that there will be no significant effects. Use of low sulphur fuels.	No residual impacts predicted.
	Venting of hydrocarbons during transfer operations	Adverse	Indirect	Temporary	Short Term	During a transfer operation there will be venting of hydrocarbons into the atmosphere. The process creates VOC emissions from the oil tanks. The main compounds of interest with respect to air quality are benzene and toluene. Ships must comply with industry-standard control methods to reduce emissions of VOCs as far as practicable.	Operations should follow guidance from the IMO on minimisation of VOC emissions to the atmosphere. Including provision and maintenance of pressure control, relief systems and vapour recovery systems.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Impacts of coastal views and seascape	Adverse	Indirect	Temporary	Short Term	The presence of ships within Cromarty Firth harbour waters will be visible from the shore. The magnitude of the effect will be small in scale and duration. The Navy have had a presence within Cromarty Firth since the late 19th Century; in addition the area is of considerable importance for other types of shipping. As the proposed cargo transfers will be taking place within an existing operational port the impacts are considered to be insignificant.	N/A	No residual impacts predicted.
	Humans inhaling toxic fumes during a transfer operation	Adverse	Direct	Temporary	Short Term	The cargo transfer process can result in the release of VOCs associated with pungent odours. The designated transfer locations are located more than 2 km offshore. Emissions will be diluted and dispersed to insignificant levels over this distance and therefore will not cause a significant impact on human health.	Application of IMO guidelines for control of emissions will ensure that there will be no significant effects.	No residual impacts predicted.
	Impacts of odour	Adverse	Direct	Temporary	Short Term	The designated transfer locations are located more than 2 km offshore. The frequency of proposed cargo transfers (not exceeding an average of four per calendar month) may result in a minor increase in odour. Odour will be diluted and dispersed to insignificant levels over this distance and therefore will not be significant.	Application of IMO guidelines for control of emissions will ensure that there will be no significant effects.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Increased waste - bilge water, sludge, other waste	Adverse	Indirect	Temporary	Short Term	Waste levels may increase as a result of the proposed cargo transfers as a result in a small increase in shipping levels (not exceeding an average of four per calendar month), however the increase in waste will be minimal and there are adequate facilities at Invergordon Service Base or Saltburn Pier for waste reception. This is then delivered to the Waste Disposal Authority for disposal. The magnitude of this effect is considered to be small and it is considered to be insignificant.	Waste Management Plan.	Application of the Waste Management Plan will ensure all waste material is correctly collected and disposed of. No residual impacts predicted.
Accidental oil spill	Negative impacts on income	Adverse	Indirect	Temporary	Short Term	In the unlikely event of a significant oil spill a negative impact on income across a variety of industries might be experienced. Incomes affected by an oil spill would include those employed in fishing, aquaculture, tourism and recreation industries. The magnitude of this effect will depend on the size of the spill and environmental conditions at the time of the spill. The likelihood of such an oil spill occurring is considered to be very low. Therefore, the effect is not considered to be significant.	Application of best practice in proposed cargo transfer activities. Application of the Oil Spill Contingency Plan (OSCP).	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Consumption of contaminated seafood	Adverse	Indirect	Temporary	Short Term	The Moray Firth is an important area for aquaculture. Eating contaminated seafood following an oil spill can impact human health. Cromarty Firth and Dornoch Firth are harvested for shellfish and Cromarty Firth contains a number of fin fish farms. In the event of a significant oil spill these may become impacted by oil and become contaminated. The modelling results (Appendix B) indicate that oil has the potential to impact fin fish sites and the shellfish water in the Cromarty Firth. However this would only be possible under certain wind conditions which would carry the oil slick into the Cromarty Firth. The Shellfish water in Dornoch Firth is unlikely to be impacted by an oil spill. The likelihood of an oil spill occurring is considered to be very low. Therefore, the effect is not considered to be significant.	Cultivation of seafood should be banned from human consumption.	No residual impacts predicted.
	Marine pollution	Adverse	Direct/Indirect	Temporary	Medium Term	Oil spill into the marine environment will have a direct impact on water quality. Oil spill reduces oxygen absorption of water due to the surface slick, causes chemical contamination and reduces light penetration into the water column, limiting photosynthesis of marine plants and phytoplankton. A large oil spill will have a significant impact on the environment and lead to direct and indirect effects on a wide range of marine life from plankton to marine mammals. The likelihood of an oil spill occurring is very low but the consequences of this would be significant.	Application of best practice in proposed cargo transfer activities. Application of the OSCP.	Adoption of best practice methods will reduce the risks of oil spill. If a small spill occurs the spill will be minimised in scale and effects managed.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Negative impacts on birds	Adverse	Direct	Temporary	Medium Term	The inner Moray Firth is an important area for wildfowl, waders and seabirds. In winter the area, including the Cromarty Firth, supports large populations of waterfowl and waders. In the summer months the cliffs in the area are important for thousands of seabirds which come to nest and rear their young. The sea cliffs near to the proposed transfer locations provide an important breeding space for seabirds. Seabirds and shorebirds are highly sensitive to oiling. As the majority of the split oil will remain at the sea surface the most at risk are bird species which are found on the sea surface, this includes divers and waders. Birds can be impacted through ingestion or cause hypothermia by preventing them from waterproofing their feathers. Birds in the area are vulnerable to oil pollution throughout the year. Seabirds are most vulnerable when they are moulting, because they can become flightless. There is little evidence of long term impacts of oil spills on birds and local populations are likely to recover in the short to medium term (Moore, 2006). However, the magnitude of the impact is considered to be large. The modelling results (Appendix B) indicate that depending on the wind conditions an oil spill has the potential to impact the coastline anywhere in the Moray Firth. The likelihood of an oil spill occurring is very low but the consequences of this on birds would be significant.	Application of best practice in proposed cargo transfer activities. Application of the OSCP.	Adoption of best practice methods will reduce the risks of oil spill. If a small spill occurs the spill will be minimised in scale and effects managed.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Negative impacts on marine mammals	Adverse	Direct	Temporary	Medium Term	The Moray Firth is an important area for seals, cetaceans and otters. The Moray Firth contains the most important population of bottlenose dolphins in the North Sea (around 130 animals), with over 60% regularly found in and around the entrance to the Sutors. A number of other cetacean species also regularly occur within the Moray Firth. Dornoch Firth, to the North of the proposed transfer locations is designated for supporting a good population of otters and harbour seals. There are also a number of seal haul-out sites within the inner Moray Firth. Marine mammals such as otters and seals can be impacted by oil spill as the oil coats their fur and poisons them (National Oceanic and Atmospheric Administration (NOAA), 2015a). High concentrations of oil can lead to marine mammals dying from poisoning. As most oil floats, mammals most affected by oil are those found on the sea surface or on shorelines (NOAA, 2015a). Cetaceans can be affected by oil clogging their blow holes; however the likelihood of this occurring is low. Due to their ability to move away from an oil spill and their body mass marine mammals are not particularly sensitive to oiling. In the long term there has been evidence of oil materials entering marine mammals through water and food and causing an adverse effect on reproduction, growth and behaviour. Although the likelihood of this is considered low. The magnitude of the effect to marine mammals is considered to be small to moderate. The likelihood of an oil spill occurring is very low, however if an oil spill occurred it could have a moderately significant impact on marine mammals within the area.	Application of best practice in proposed cargo transfer activities. Application of the OSCP.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Negative impacts on fish	Adverse	Direct	Temporary	Short Term	There are also a number of active finfish sites within Cromarty Firth. The surrounding waters of the Moray Firth are also located in a spawning and nursery grounds for a number of commercially important fish species. Adult and juvenile populations are not usually significantly impacted by oil spill (NOAA, 2015b), with larval and spawning stages being most at risk. If an accidental oil spill occurs un-farmed fish are able to move away from impact, therefore the magnitude of the effect is considered to be small. Farmed fish will not be able to move away from the impact. The modelling results (Appendix B) indicate that oil has the potential to impact fin fish sites in the Cromarty Firth. However this would only be possible under certain wind conditions which would carry the oil slick into the Cromarty Firth. The likelihood of an oil spill occurring is considered to be very low, however the effect is considered to be significant.	Application of best practice in proposed cargo transfer activities. Application of the OSCP.	No residual impacts predicted.
	Shellfish contamination	Adverse	Indirect	Temporary	Medium Term	Dornoch Firth is a shellfish harvesting area, as is an area of Cromarty Firth. Nigg Bay is an extensive cockle resource. The Moray Firth is also fished for lobster, crabs, whelks, razorfish and mussels. Oil spill can contaminate shellfish stocks even when only exposed to pollutant for a very short time period. Shellfish are relatively immobile and therefore are not able to avoid exposure to oil (NOAA, 2015b). It is considered unlikely that an oil spill event would occur, therefore the likelihood of this impact is considered to be low. The significance of the effect is considered to be significant.	Application of best practice in proposed cargo transfer activities. Application of the OSCP. Cultivation of shellfish should be banned from human consumption.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Negative impacts on shorelines (Rocky, sandy, mudflats, saltmarsh and cliffs)	Adverse	Direct	Temporary	Short to Medium Term	The enclosed Cromarty Firth contains shorelines of tidal flats, sheltered sand and mud flats fringed with saltmarshes. These shorelines generally sheltered and low energy, therefore oil is likely to be more persistent. The coast from Rosemarkie to Shandwick to the west of the proposed transfer locations is mainly rocky cliffs, which are exposed to more wave action. To the south the shorelines are a mixture of rocky, sandy and cliffs. The significance of effects depends on the type of shoreline. Coasts exposed to wave action generally recover quickly. Oil trapped in sheltered sediment habitats can cause more long-term impacts through chemical toxicity (Moore, 2006). Rocky shores and sandy shores vary in their sensitivity to oiling (Dyrynda and Symberlist, 1998). However, oil can become incorporated in fine sands and persist for many years. Crevices in rocky shores can also trap oil. Muddy shorelines are sensitive to oiling and are often difficult to clean. Anaerobic conditions mean any oil in the mud takes a long time to breakdown. In sheltered locations mud can remain toxic for at least 20 years (Moore, 2006). Saltmarshes act as an oil trap and generally have slow rates of recovery (Teal et al. 1992). Littoral zone habitats and communities such as seagrass beds and invertebrate fauna may be impacted by oil spill. The modelling results (Appendix B) indicate that depending on the wind direction and spill location an oil spill could impact the shoreline between 80 minutes and 17 hours after an incident. Therefore, the magnitude of the effect of an oil spill on the shorelines around the proposed transfer locations is considered to be moderate. Although the likelihood of an oil spill occurring is considered to be very low, the effect of oil spill on shorelines is considered to be moderately significant.	Application of best practice in proposed cargo transfer activities. Application of the OSCP. Ensuring oil spill response equipment is mobilised to ensure spill does not reach the sensitive shorelines. Sheltered areas are vulnerable to oil spill, therefore preventing oil contamination of such area is the best way of minimising long-term environmental effects.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Seabed contamination	Adverse	Direct	Temporary	Long Term	Spilt oil can become incorporated into seabed sediments. Suspended oil can gain weight by bonding with materials and settle on the seabed. This oil can persist for a long period of time and can go onto impact the benthic community of the area. The magnitude of the effect is considered to be moderate, however the likelihood of an oil spill occurring is considered to be very low. Therefore, oil spill causing seabed contamination is considered to be not significant.	Application of best practice in proposed cargo transfer activities. Application of the OSCP.	No residual impacts predicted.
	Negative impacts on aquaculture	Adverse	Indirect	Temporary	Short Term	As discussed above an oil spill may impact aquaculture in the area. Caged fish are unable to move away from an oil spill. If fish farms are affected by oil spill then cultivation should be banned from human consumption to ensure contamination does not spread up the food chain. Impacts will be temporary and short term. The likelihood of an oil spill occurring is considered to be very low; therefore no significant effects are predicted.	Caged fish should be moved if possible. Application of the OSCP to contain spill as much as possible. Ensuring oil spill response equipment is mobilised to ensure spill does not reach the shore or vulnerable aquaculture sites.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Negative impacts on recreation and tourism	Adverse	Indirect	Temporary	Short Term	Cromarty Firth and the Moray Firth are important areas of recreation and tourism. Following an accidental oil spill indirect impacts could occur on recreation in the area, as bathing, diving, angling and boating are likely to be restricted. Impacts will be temporary and short term. Indirect impacts may also occur on tourism of the area following an accidental oil spill. This will also be temporary and short term. Therefore, the magnitude of the effects is considered to be small. As the likelihood of an oil spill occurring is considered to be low then the effects are predicted to be not significant.	Application of the OSCP to contain spill as much as possible.	No residual impacts predicted.
Release of ballast water	Introduction of NNS from ballast water release causing biological disturbance and pathogens causing diseases	Adverse	Indirect	Permanent	Long Term	If established, NNS may have the ability to potentially upset the balance of the existing ecosystem. Biological disturbance can occur due to displacement of native species, competition for food and space, smothering of species and fouling on structures. The modelling results (Appendix B) indicate that the ballast water discharge plume will remain within the vicinity of the PoCF harbour limits. The zooplankton concentrations are predicted to be more than 100 times below the IMO D-2 standard. The maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the IMO D-2 standard of less than 10 zooplankton per m^3). Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. The likelihood of an introduction and establishment of NNS occurring is considered to be low, however the magnitude is considered to be high, as any invasive NNS establishments would be difficult to eradicate. It is considered that the consequences of a NNS introduction would be significant.	Application of the recommendations set out in the IMO BWM Convention. Minimising the volume of ballast water discharged.	No residual impacts predicted.

Determination of Potential Effects		Pre-Mitigation Effects					Consideration of Mitigation Measures	
Project Activity	**Potential Environmental Effect**	**Adverse/ Beneficial**	**Direct/Indirect**	**Permanent/Temporary**	**Duration**	**Significance**	**Mitigation Measures**	**Residual Environmental Effects**
	Introduction of NNS impacting local economy	Adverse	Indirect	Temporary/Permanent	Long Term	Once established it can be extremely difficult to get rid of an invasive species in the marine environment. If NNS become established eradicating them is highly costly. Methods are often labour intensive. Therefore, the effect is considered to be significant.	Application of the recommendations set out in the IMO BWM Convention. Minimising the volume of ballast water discharged.	No residual impacts predicted.
	Introduction of NNS impacting water quality status under the Water Framework Directive (WFD)	Adverse	Indirect	Permanent	Long Term	Introduction of NNS may have impacts on the WFD status of the area. If one of the key species is found to be present and reproducing successfully then it could result in the water body failing to meet environmental objectives. Under the WFD the presence of any of the key NNS will mean that the highest classification of ecological status SEPA can assign can be "Good". The likelihood of this occurring is considered to be low, but the magnitude is considered to be high. Therefore, the effect is considered to be significant.	Application of the recommendations set out in the IMO BWM Convention. Minimising the volume of ballast water.	No residual impacts predicted.

5.3.3 Potential Effects Discussion

The table above (Table 5-2) assessed the significance of each potential environmental effect from the proposed cargo transfers. This section summarises the effects for each environmental topic required for consideration in Schedule 2 of The Regulations.

5.3.3.1 Human Beings

The proposed cargo transfers will not have any adverse effects on human health. The transfer procedures may lead to odour and fumes in the atmosphere. However, the transfer locations are located more than 2 km offshore, over this distance the fumes emissions and odour will be diluted and dispersed to insignificant levels and therefore will not cause a significant impact on human health.

In the unlikely event on an oil spill, seafood may become contaminated with oil. Following this, cultivation will be banned from human consumption. An oil spill would have indirect effects on income. Procedures are in place to prevent the accidental discharge of oil.

5.3.3.2 Fauna and Flora

Effects of disturbance of marine mammals and seabirds due to the proposed cargo transfer are considered to be insignificant, as the shipping industry and wildlife have co-existed for many years in the Moray Firth and Cromarty Firth. The low frequency of the proposed cargo transfers (not exceeding an average of four per calendar month) is not considered to have a significant impact on seabed disturbance. Emissions of noise from engines, generators and pumps causing disturbance to marine mammals and seabirds are not considered significant.

The release of ballast water associated with the proposed cargo transfers will not cause a significant impact on fauna and flora in the area, as application of the recommendations set out in the IMO BWM Convention and minimising the volume of ballast water discharged will control and prevent the introduction of harmful or alien species to the marine environment from ballast water.

In the unlikely event of an oil spill, in the absence of any mitigation measures, significant impacts may occur on birds, marine mammals, fish and shellfish within the area. While the Cromarty Firth shorelines are generally sheltered and low energy, the area where the proposed transfer operations will occur is surrounded mainly by rocky cliffs, which are exposed to more wave action. Coasts exposed to wave action generally recover quickly from oil spill events. Therefore it is considered that the shorelines will not be significantly impacted by an accidental oil spill. Consequences of an oil spill on a number of receptors could be significant. However, procedures are in place to prevent the accidental discharge of oil and the risk of a significant impact is considered unlikely. Therefore, no residual effects are predicted. In the unlikely event of an oil spill, the Oil Spill Contingency Plan (OSCP) will be enacted to contain and remove pollutant. A copy of this can be found in Appendix D.

The potential impacts on the designated sites within 100 km of the proposed cargo transfer have been assessed and the findings are presented in the HRA provided in Section 6.3.

5.3.3.3 Water

There will be operational releases of ballast water during the proposed cargo transfers. Application of the recommendations set out in the IMO BWM Convention and minimising the volume of ballast water discharged will control the impact of NNS introductions to ensure there are no significant effects on water quality. Procedures are also in place to prevent the accidental oil spill. In the unlikely event of an oil spill, the OSCP will be enacted to contain and remove the pollutant.

5.3.3.4 Air

The main releases to the air from the proposed cargo transfers will be combustion products from engines and generators, and gases/vapours arising from the stored products during transfer operations. The main emissions to the air will be of CO_2, SO_x, NO_x and PM. As of 2006, there was a requirement for all ships in a port area for more than 2 hours to transfer to using marine gas oil rather than heavy fuel oil, thereby reducing emissions. As of 2015, all ships entering the emissions control area are required to burn low sulphur marine gas oil, thereby reducing emissions even further.

The low frequency of proposed cargo transfers (maximum of four per month) will ensure the scale of the effect is small and will only occur during the proposed transfer operation. When planning a proposed cargo transfer, operators should include consideration of emissions of VOCs, should seek to mitigate against such emissions and should consider the use of VOC recovery systems where available. It is considered that, with the application of IMO guidelines for the control of VOC emissions during product transfer operations and other regulations in place to regulate air pollution, there will be no significant effects upon air quality.

5.3.3.5 Landscape

The proposed cargo transfers will take place afloat within Cromarty Firth harbour waters. The transfers will take place between ships operating within an existing operational port. The operations will be similar to other shipping operations which already occur in the area, therefore landscape impacts are considered to be insignificant.

5.3.3.6 Material Assets

There are no significant changes required to onshore infrastructure to support the proposed cargo transfers. The proposed cargo transfers may lead to a small increase in the waste levels, however there are procedures in place to ensure all waste material is correctly collected and disposed of.

In the unlikely event of an oil spill there may be negative effects on a number of industries including: fishing, aquaculture, tourism and recreation. Procedures are in place to prevent the accidental discharge of oil. In the unlikely event of an oil spill the OSCP will be enacted to contain and remove the pollutant. As a result, effects on material assets are considered to be insignificant.

5.3.3.7 Cultural Heritage

The proposed cargo transfers will take place afloat within Cromarty Firth harbour waters. In the unlikely event of an oil spill, it may lead to reduced access to cultural heritage wrecks within the area. The cultural heritage sites themselves will not be directly impacted by the proposed cargo transfers. Therefore, impacts on cultural heritage are considered to be insignificant.

5.3.3.8 Use of Natural Resources

There will be no significant use of natural resources associated with the proposed cargo transfers. There is no requirement for construction to support the operations. Fresh water will be supplied from the shore in the usual way.

5.3.3.9 Emissions of Pollutants

The main emissions from the proposed cargo transfers will comprise of:

- Emissions to the air of combustion products from engines, pumps and generators (SO_x, NO_x and PM).
- Emissions to the air of greenhouse gasses (CO_2).
- Emissions of noise from engines, generators and pumps.
- Discharge of ballast water.

All emissions will be minimised and controlled in accordance with current best practice. None of the emissions to the air result in a significant change from previous shipping operations in Cromarty Firth harbour waters.

Discharge of ballast water will follow the requirements set out in the BWM Convention. While the BWM Convention is yet to be formally ratified, PoCF suggest implementation of the recommendations set out in the BWM Convention when ballast water is released as part of the STS transfer process. This will ensure that, as a minimum, ballast water is exchanged with at least 95 % volumetric efficiency. The amount of ballast water discharged is recommended to be limited to the minimum essential quantity. Once the BWM Convention is formally ratified the Convention will be enforced within 12 months and all vessels will be required to meet the requirements of the Convention. This will ensure that concentrations of NNS and presence of chemicals and metals within the ballast water are reduced and removed.

In the unlikely event of an accidental oil spill, contingency plans will ensure the pollutant is controlled and that the spill is minimised in its scale to prevent widespread impacts.

5.3.3.10 Creation of Nuisances

The proposed cargo transfers will be similar to previous shipping operations within Cromarty Firth harbour waters. The proposed cargo transfers will not create significant impacts in terms of visual intrusion, noise, odour and other potential sources of nuisance.

5.3.3.11 Elimination of Waste

The proposed cargo transfers will not generate significant amounts of waste. Ships engaging in transfer operations will transfer their waste into skips and this waste will be delivered to Invergordon Service Base or Saltburn Pier for appropriate disposal. The application of the Waste Management Plan and best practice will ensure that the disposal of waste does not pose a significant impact.

In the event of an oil spill, waste oil which has been contained or recovered from the spill will be dealt with by approved contractors, Sureclean Ltd and M.S. Industrial Services Ltd. Oil collected on shores and beaches can be temporarily stored using Waste Management Exemption Notice No 41, which allows storage at the place of production. At present there are no licensed sites around the Cromarty Firth, however, Sureclean Ltd and M.S. Industrial Services Ltd is licensed to store significant quantities of solid material prior to final disposal (Appendix D). After temporary storage it will be sent to a suitable licensed disposal facility.

SEPA regulate and licence the storage, transportation and disposal of any waste products collected as a result of the oil spill recovery operations.

5.3.3.12 In-Combination and Cumulative Effects

Other projects in the area which could give rise to in-combination effects include:

- Nigg Oil Terminal
- Nigg Oil Terminal oil pipeline from Beatrice hydrocarbon field
- STS transfers at Nigg Oil Terminal jetty
- Existing ballast water discharges within the Port
- Housing and industrial developments

Any housing and industrial developments in the area are anticipated to have mitigation measures incorporated during construction of these new developments to avoid or reduce pollution events during their construction phase and no significant effects are predicted. In-combination effects on air quality may also arise from the emissions from Nigg Oil Terminal. However, the emissions from Nigg are strictly monitored and controlled by SEPA. Therefore, no significant effects on air quality are predicted.

In-combination effects may occur with a combined risk of oil spill during a proposed cargo transfer and an oil spill from Nigg Oil Terminal. There is also a potential for in-combination effects from an oil spill from Nigg Oil Terminal's oil pipeline, which comes onshore south of Balintore. However, the likelihood of an oil spill from one of these sources is considered to be very low. Combined with the very low likelihood of an oil spill during a cargo transfer it can be concluded that no in-combination effects from oil spill are predicted.

There is some risk of collision with other marine traffic and this would possibly result in a rupture of cargo and/or fuel tanks, resulting in a large spill. This risk, however, is controlled by Vessel Traffic Services (VTS) and procedures in place for the movement of ships within Harbour jurisdictions, restrictions on speed, the use of experienced ship Masters, PoCF authorised Pilot onboard and

structural integrity of ships. Therefore, the risk of collision is not considered to cause a significant effect.

There are existing ballast water discharges into the harbour waters from the vessels operating at the Nigg Oil Terminal and other berths. At Nigg Oil Terminal ballast water is tested at the Nigg Oil Terminal laboratory and the oil concentration must be less than 5 parts per million (PPM) for permission to discharge into the Cromarty Firth at the Nigg Oil Terminal Jetty. A typical quantity of ballast water discharged from oil tankers at the Nigg Oil Terminal is 35,000 metric tonnes. In 2012 there were 18 discharges of ballast water, in 2013 there were 22 discharges, in 2014 there were 11 discharges, and in 2015 there were no such operations at the Oil Terminal. The frequency of STS operations at the Nigg Oil Terminal (in 2015) is on average, less than two per year. Other discharges of ballast water are from vessels exporting oil from the Oil Terminal from the Beatrice and Athena fields. In the last three years this has averaged less than three per month. All discharges of ballast water are recorded and submitted to the PoCF.

Cruise ships, coastal tankers and cargo carriers also discharge ballast water to maintain stability and trim. This occurs at Invergordon Service Base, Admiralty Pier, Queens Dock, Phase 3 Berth and Saltburn Pier. In most cases, ballast water is discharged when loading cargo to compensate for the changes in vessel stability and trim. In the period 2009 to 2013 there has been an average of 55 cruise ships, 28 coastal tankers, 8 dry cargo and 98 general cargo ship visits, each year, in PoCF harbour waters. The maximum quantity of ballast water discharged by these vessels into Cromarty Firth is estimated to be 3,000 metric tonnes. Smaller quantities of ballast water may be discharged by vessels approaching the shallow waters to reduce draught, for example cruise ships.

Modelling results presented in Appendix B show that the in-combination ballast water discharge plume (from the six piers within the harbour area, Invergordon Service Base, Admiralty Pier, Queens Dock, Phase 3 Berth and Saltburn Pier; Nigg Oil Terminal and at Anchorage 16) will have a larger footprint than the release of exchanged ballast water at the STS Locations. The zooplankton concentrations are predicted to be compliant with the IMO D-2 standard, with the maximum zooplankton concentration predicted as 1.5 zooplankton per m^3 (compared to the IMO D-2 standard of less than 10 zooplankton per m^3). Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Simultaneous discharge at all these locations in the harbour is unlikely to occur in reality, but results indicate the worst case in-combination scenario. This demonstrates that the discharge of ballast water during STS transfers at the STS Locations will not contribute significantly to the existing concentrations. Once the IMO BWM Convention enters into force all ships will be required to exchange ballast water as an interim solution and eventually will be required to treat ballast water before discharge reducing concnetrations further.

In summary it is not considered that potential effects from the proposed cargo transfer are likely to combine with effects from other local projects, existing or planned, to cause a significant effect on the environment.

5.3.4 Mitigation

This section provides a description of the measures that will be implemented to prevent significant environmental effects from the proposed cargo transfers.

5.3.4.1 Operational Techniques

The application of best practice in STS transfer activities, including STS operation manuals and MARPOL Annex I Chapter 8 (on the prevention of pollution during the transfer of oil cargo between oil tankers at sea) will ensure the risk of an oil spill is minimised.

STS transfers are to comply with the ICS/OCIMF STS Transfer Guide (Petroleum) Chemicals and Liquefied Gases) (1st Edition) and the approved STS agent's check list and procedures. Only those STS agents approved by PoCF are permitted to supervise STS operations.

A STS Superintendent will be in overall control of the transfer operation. In addition the mother and daughter vessels will carry crew trained and certified in the transfer of oil cargos.

All ships transiting to and from STS locations will carry a certified and authorised Pilot whose duty is to advise the ships' Master on navigational issues and provide expert local knowledge.

Hoses and fenders will be certified for use and inspected regularly.

PoCF is located within an Emission Control Area (ECA). From 2006, ships must use marine gas oil rather than heavy fuel oil when in port for more than two hours. As of 2015, to comply with new regulations, ship operators must use fuel in engines and boilers with a sulphur content that is within the limits set down by the regulators. These have been put into European law by the European directive 2012/32/EC.

Slowing down vessel steaming can also refduce emissions. Regulations in place to regulate air pollution in ports and harbours include the following:

- The European Directive 2012/33/EC as regards the sulphur content of marine fuels, limiting the sulphur content of marine fuels in ports to 0.1 % (when at berth for two or more hours).
- The European Ambient Air Quality Directive (2008/50/EC) defines limit values for pollutants that are valid from 2012 onward.
- The European NEC Directive (2001/81/EC), which defines National Emission Ceilings (NEC). Member states of the European Union have to adopt programs to comply with these ceilings.

Proposed cargo transfers will not occur outside of the operational constraints (e.g. adverse weather conditions). In accordance with the Standard Operating Procedures, all hoses will be disconnected and consideration given to unmooring the ships to separate anchorages until there is a moderation in the weather and operations can safely resume.

Application of the recommendations set out in the IMO BWM Convention and minimising the volume of ballast water discharged to the minimum essential quantity will reduce risks from NNS introductions.

5.3.4.2 Oil Spill Response

If an accidental oil spill was to take place then application of the OSCP would considerably reduce the environmental effects of a spill. It will minimise the scale and extent of an oil spill. Significant effects on the environment through

marine pollution should be reduced to short-term manageable effects if the contingency plan can contain and minimise the scale of the spill and prevent any widespread impact.

In the case of an oil spill the following response strategies are to be actioned:

1) Mechanical Containment and Recovery

2) Protection of Sensitive Areas

3) Shoreline Clean-up

Containment and recovery of oil is the primary strategy for clean-up within the Cromarty Firth. Every effort will be made to contain and recover spilled oil close to the source before spreading and thinning has taken place. Deployment of the booms will ensure the oil spill is contained locally. Skimmers are then used to recover the oil, with a variety of skimmers available depending on the type of oil spilled.

The use of chemical dispersants within the Cromarty Firth is controlled. Each incident will be assessed on a case by case basis after consultation between the Marine Scotland.

It is very likely that in the event of a spill, oil will come ashore. Detailed clean-up guidelines have been developed by Talisman Energy on behalf of PoCF and Highland Council in conjunction with SNH, and SEPA. In many areas within the Cromarty Firth, these require the oil to be left to degrade naturally, as aggressive clean-up may cause more damage than the spilled oil. This is due to the fact that aggressive physical clean-up actions may cause more environmental damage than the oil itself (Moore, 2006). For example, heavy machinery on shores can damage the physical structure of fragile habitats e.g. saltmarshes.

Oil spill response equipment available in the event of a spill includes the following:

- Tier 1 response equipment at the Nigg Oil Terminal, with capability of dealing with up to 10 tonnes of crude oil:
    - 1 x 8x6 trailer
    - 10 x 10m Vikoma Sentinal Boom
    - 5 x 10m Vikoma Beach Guardian
    - 1 x 12K Komara Skimmer, Powerpack and Hoses
    - 1 x 3" Spate Pump and Hoses
    - 1 x Fastank 2000 Gallon Capacity
    - 1 x Stihl Backpack Air Blower and Fittings
    - 6 x M50 Sorbent Boom (Bales)
    - 4 x M75 Pads (Boxes)
    - 4 x Danforth Anchors
    - Various Ropes

- PPE (Oilskins, Gloves, etc)

- Tier 1 equipment also available at Invergordon, for the use of Port of Cromarty Firth and its Tier 1/2 appointed contractor.

Equipment is on standby and can be mobilised within 30 minutes of the spill.

- Tier 1 Contracted Equipment available and operated by Briggs Environmental, Aberdeen, with capability of dealing with up to 6 tonnes of marine gasoil:
  - 6 x 20m. Sea Sentinal 600 booms
  - 2 x 10m. Shore Guardian booms
  - 1 x Rope mop (skimmer)
  - 1 Fastank
  - Sorbent booms and pads.

The booms will allow a small spill to be completely contained or a leaking vessel or rig to be boomed rapidly on the down tide side, before additional resources can be mobilised. The boom and skimmer may be deployed by one of the marine contractors in the Firth. These will be deployed no later than 1 hour after a spill.

In the event of an oil spill, Briggs Environmental Limited will mobilise and Tier 1 equipment, supplemented by the Nigg Oil Terminal equipment will be used to mitigate the spill. Additional Tier 2 backup resources are available from Briggs Environmental Limited.

In the event of an oil spill, the location of the pollutant, type of oil, source, cause, extent and direction of movement will be reported to the Oil Pollution Officer. Depending on the tier of the spill, different response actions will be mobilised. Oil spills will be reported to various agencies, as per the OSCP.

Implementing the above mitigation measures will reduce risk of proposed cargo transfers having a significant effect on the environment.

5.3.5 Residual Impacts

Following the application of a pre-STS meeting and the above mitigation measures, it is unlikely that the proposed cargo transfers will have any residual effects on the environment. This is due to the following reasons:

- The track record of the harbour and oil terminal and associated environmental monitoring evidence
- The location of the proposed cargo transfers
- The experience and application of best practice procedures during transfer operations
- The existence of mitigation measures including the OSCP

The likelihood of an accidental oil spill occurring is very low and in the unlikely event of it taking place, comprehensive OSCPs are in place to ensure a spill is contained and minimise the risk of significant impacts on the environment. The OSCP can be found in Appendix D.

6 SCREENING OF EUROPEAN SITES

This Section of the application addresses the requirements of The Regulations – Schedule 1.

6.1 INTRODUCTION

The assessment of environment effects in Section 5.3 above has determined that there may be risks to European designated sites by the proposed cargo transfers. Given the proximity between the proposed STS locations and designated sites and the receptors of designated sites, protected species and key habitats may be at risk of significant effects. This section focuses on establishing which of the sites in the vicinity of the project could be impacted by the proposed cargo transfers and whether the sites are likely to be significantly impacted. This is undertaken through a screening process.

The screening process aims to examine the likely effects of the proposed cargo transfers, alone and in-combination with other plans or projects upon designated sites and considers whether it can be objectively concluded that these effects will not be significant.

A likely effect is defined as one that cannot be ruled out on the basis of objective information. The test is a 'likelihood' of effects rather than a 'certainty' of effects. Where a project is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on the site. The assessment of that risk must be made in the light, amongst other things, of the characteristics and specific environmental conditions of the site concerned.

Appendix A, Section A.2 presents an environmental baseline review of the designated sites and relevant European Protected Species (EPS) to be considered in the assessment.

6.2 POTENTIAL EFFECTS ON DESIGNATED SITES

The following potential significant effects on designated sites have been identified:

- Presence and movement of ships
- Accidental oil spill
- Discharge of ballast water during the transfer process

The potential impacts on designated sites from the proposed cargo transfers are listed in Table 6-1.

Table 6-1: Potential impacts on designated sites

Project Activity	Potential Impact
Presence and movement of Ships	• Emissions to air from ships engines/hydrocarbon venting during transfer operations • Disturbance to marine species

Accidental oil spill	• Smothering of habitat or species causing damage or destruction
	  • Fragmentation of habitat
	  • Prevention of natural processes due to presence of oil
	• Chemical contamination of water

Discharge of ballast water	• Biological disturbance through introduction of NNS, heavy metals and discolouration of water.

Each of the potential sources of impacts is considered further below.

6.2.1 Presence and movement of ships

Presence and movement of ships undertaking transfer operations could lead to airborne pollution affecting qualifying species. Presence of ships could also lead to visual and noise disturbance of qualifying bird species in the area.

Airborne pollution – Within the assessment above on impacts on air quality it was established that the levels of proposed cargo transfers will result in a minor increase in emissions. These releases will be no different in nature to releases from other operations in the area. The low frequency of proposed cargo transfers will ensure the scale of the effect is small and will only occur during the transfer operation. Therefore, the levels of emissions are not likely to have a significant effect on qualifying species. With the application of IMO guidelines for control of emissions there will be no significant effects upon air quality. Therefore, the impact is not considered further.

Disturbance – It is recognised that some bird species can have large foraging distances (Thaxter *et al.,* 2012) and therefore some birds from SPAs within a considerably large radius of the project area could potentially be present during the proposed cargo transfers. However, the main impact to these individuals would be disturbance and potential displacement from the feeding ground. Marine mammals may be disturbed by the proposed cargo transfers, including cetaceans, otters and seals. The proposed STS transfer locations are located within the Moray Firth SAC designated for bottlenose dolphin. Dornoch Firth and Morrich More SAC (26 km) is designated for common seals and otters. The movements and mooring of ships are considered to be part of the normal port operations and there will be no significant increase above previous levels (not exceeding an average of four per calendar month) in port operations or shipping traffic as a result of the proposed cargo transfers. It is not considered that noise from engines, generators and pumps would disturb marine mammals and seabirds. The potential for the proposed cargo transfers to cause disturbance above what exists at present is considered negligible and a significant effect on designated sites and protected species is not likely. Therefore, this impact is not considered further.

6.2.2 Accidental Oil Spill

Water based pollution as a result of an accidental oil spill may affect qualifying species either directly or indirectly through damage to habitats and potential effects on prey species. An oil spill could directly impact qualifying bird species by birds ingesting oil or by their feathers becoming oiled. Many birds use the

area to forage and feed, therefore an oil spill incident in the area could cause significant impacts on designated sites and birds using the area. Other protected species could also be impacted. An oil spill could also directly impact designated sites by smothering habitats and causing contamination. The impact of accidental oil spill is considered further.

6.2.3 Discharge of Ballast Water

The discharge of ballast water within Cromarty Firth harbour waters during a proposed cargo transfer may have an impact on designated sites. Designated sites may be impacted from biological disturbance through introduction of NNS and pathogens. The impact of discharge of ballast water is considered further.

6.2.4 Possible In-Combination Effects

The relevant projects considered for the potential of in-combination effects on designated sites are listed in Section 5.3.3.12 above. The identified projects within the area are not predicted to cause a significant impact. Modelling results presented in Appendix B indicate that the in-combination ballast water discharge plume (from the six piers within the harbour area at Invergordon Service Base, Admiralty Pier, Queens Dock, Phase 3 Berth and Saltburn Pier; Nigg Oil Terminal and at Anchorage 16) may reach designated sites. Therefore the impact of in-combination discharge of ballast water is considered further.

6.3 SCREENING OF DESIGNATED SITES

The sites considered within the assessment are shown above in Section 5.3. These sites were screened to determine whether they are likely to be effected by the proposed cargo transfers and one of the following:

- an accidental oil spill, or
- ballast water discharge and introduction of NNS and pathogens

Screening involved consideration of the qualifying interests of the designated sites to determine if they were likely to be significantly affected by an accidental oil spill or introduction of NNS.

Modelling of an oil spill from the various STS locations under different wind conditions indicated that, depending on the wind conditions an oil spill event has the potential to impact the coastline anywhere in the Moray Firth. The oil slick has the potential to be carried into the Cromarty Firth; however due to the narror entrance of the Cromarty Firth this would only be possible under certain wind conditions. Therefore the likely zone of impact would be restricted to an area within the Moray Firth (see Appendix B). Mobile species outside of this area, such as seabirds from designated sites outside the likely zone of impact, may travel into Moray Forth and therefore may also be affected. Marine mammals and migrating fish may also travel into the impact area and be affected. For sites designated for seabirds foraging distances were assessed to determine if these species could forage within the zone of impact and potentially be impacted by an oil spill. Foraging ranges for seabirds during the breeding season were extracted from Thaxter *et al.* (2012) to establish which SPAs, Ramsars and SSSIs had the potential for connectivity to the zone of impact within Moray Forth. It is also recognised that during the non-breeding season species tend to range more widely and establishing connectivity with sites is more complex.

Modelling of a ballast water release from the various STS locations indicated that the likely zone of impact would be an area of the lower Moray Forth (see Appendix B). Designated sites within the area could be impacted by an introduction of NNS or pathogens. Habitats could be affected by an introduction and establishment of NNS changing community composition, disrupting food webs and altering ecological functions. Mobile species from designated sites outside the likely zone of impact could be impacted by pathogens in ballast water causing diseases in migrating and marine mammals.

Screening was undertaken using the following two steps:

1) Assessment of the likelihood of an interaction between the oil spill/ballast water release and receptor.

2) Assessment of the potential for significant effects.

Appendix C presents the results of the screening of designated sites. The qualifying interests were recorded for each site, as well as the minimum distance to the proposed cargo transfer locations. A qualifying interest of a site is the habitat or species which a site has been classified or designated for.

6.3.1 Likelihood of an Interaction

For the proposed transfers to affect a designated site there must be a link or connection between the qualifying interest of the site and the changes that the proposed transfers may make. As the proposed cargo transfers are to be undertaken on the water designated sites with a marine connector or sites which are designated for features which may travel to the area in which the proposed cargo transfers will occur are included in the screening assessment.

Likelihood of an interaction between the proposed cargo transfers (via an oil spill and ballast water discharge) and receptor was determined using information on the qualifying interest features.

For an oil spill this included information on seabirds foraging distances and determining whether the interest features of a site could be impacted by an oil spill. For sites with marine connections the likelihood of a site being directly impacted by an oil slick was assessed. Sites without marine connections (i.e. above the high tide mark) were considered to have no interaction.

The likelihood of an interaction between the ballast water discharge and receptor was determined using information on the qualifying interest features, and determining whether the interest features could be impacted by an introduction of NNS or pathogens. Sites with no hydrodynamic connection with the marine environment were determined to not have the potential for significant effects, as their site integrity cannot be affected by NNS and pathogens released in ballast water. SPAs were considered not to have the potential for significant effects as their conservation objectives for their qualifying interests would not be directly affected by NNS and pathogens released in ballast water.

6.3.2 Potential for Significant Effects

Following the assessment of the likelihood of an interaction between the proposed cargo transfers and a receptor the following criteria was used to determine the potential for significant effects:

- Designated sites determined to have a **likely** interaction were concluded to have the potential for significant effects.
- Designated sites with a **possible** interaction were concluded to not have the potential for significant effects. While it is considered possible for an interaction between the receptor and the potential impact, it is considered unlikely for a significant impact to occur on the qualifying interests. Therefore, it is concluded to be unlikely that a significant effect will occur on these designated sites.
- Designated sites determined to be **unlikely or not to** have an interaction were concluded to not have the potential for significant effects.

The assessment of significance was made taking into account the characteristics and specific environmental conditions of the sites concerned.

Table 6-2 and Table 6-3 below show the findings of the screening process. Table 6-2 lists the sites that could potentially be significantly affected by an oil spill from a proposed cargo transfer. Table 6-3 lists the sites that could potentially be significantly affected by a biological disturbance through introduction of NNS from a ballast water discharge. The sites are also shown in Figure 6-1 and Figure 6-2.

Table 6-2: Sites that could potentially be significantly affected by an accidental oil spill

Designation	Site Name	Designating features and comments
SSSI	Beauly Firth	Qualifying features: • Birds - aggregations of non-breeding birds: Greylag goose (Anser anser), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (Mergus serrator), non-breeding • Birds - aggregations of non-breeding birds: Goosander (Mergus merganser), non-breeding • Littoral sediment (Coast): Saltmarsh • Vascular plants: Vascular plant assemblage
SAC	Berriedale and Langwell Waters	Annex II species that are a primary reason for selection of this site: • Atlantic salmon (*Salmo salar*)
Ramsar	Cromarty Firth	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Littoral sediment (Marine) Intertidal mudflats and sandflats

Designation	Site Name	Designating features and comments
SPA	Cromarty Firth	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season: • Common Tern (*Sterna hirundo)*, 294 pairs representing at least 2.4% of the breeding population in Great Britain • Osprey (*Pandion haliaetus)*, 1 pairs representing at least 1.0% of the breeding population in Great Britain Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter: • Bar-tailed Godwit (*Limosa lapponica)*, 1,420 individuals representing at least 2.7% of the wintering population in Great Britain • Whooper Swan (*Cygnus cygnus)*, 55 individuals representing at least 1.0% of the wintering population in Great Britain Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter: • Greylag Goose (*Anser anser)*, 1,777 individuals representing at least 1.8% of the wintering Iceland/UK/Ireland population Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance: Over winter, the area regularly supports 34,847 individual waterfowl including: Redshank (*Tringa totanus)*, Curlew (*Numenius arquata)*, Dunlin (*Calidris alpina alpina)*, Knot (*Calidris canutus)*, Oystercatcher (*Haematopus ostralegus)*, Red-breasted Merganser (*Mergus serrator)*, Scaup (*Aythya marila)*, Pintail (*Anas acuta)*, Wigeon (*Anas penelope*), Greylag Goose (*Anser anser)*, Bar-tailed Godwit (*Limosa lapponica)*, Whooper Swan (*Cygnus cygnus)*.
SSSI	Cromarty Firth	Qualifying features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Whooper swan (*Cygnus cygnus*), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (*Mergus serrator),* non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Mudflats • Littoral sediment (Marine): Sandflats
SAC	Culbin Bar	Annex I habitats that are a primary reason for selection of this site: • Perennial vegetation of stony banks Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Embryonic shifting dunes
SSSI	Culbin Sands, Culbin Forest and Findhorn Bay	Qualifying features: • Fen, marsh and swamp (Wetland): Hydromorphological mire range • Fungi: Fungi assemblage • Geomorphology: Coastal Geomorphology of Scotland • Lichen: Lichen assemblage • Littoral sediment (Coast): Saltmarsh • Other invertebrates: Invertebrate assemblage • Standing open water and canals: Mesotrophic loch • Supralittoral sediment (Coast): Shingle • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage

Designation	Site Name	Designating features and comments
SSSI	Dornoch Firth	Qualifying features: • Birds - aggregations of non-breeding birds: Whooper swan (*Cygnus cygnus*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Eelgrass beds • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage
Ramsar	Dornoch Firth and Loch Fleet	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Broad-leaved, mixed and yew woodland: Wet woodland • Littoral rock (Marine): Reefs • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Intertidal mudflats and sandflats • Supralittoral sediment (Coast): Sand dune
SPA	Dornoch Firth and Loch Fleet	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season: • Osprey (*Pandion haliaetus)*, 10 pairs representing at least 10.0% of the breeding population in Great Britain Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter: • Bar-tailed Godwit (*Limosa lapponica)*, 1,300 individuals representing at least 2.5% of the wintering population in Great Britain Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter: • Greylag Goose (*Anser anser)*, 2,079 individuals representing at least 2.1% of the wintering Iceland/UK/Ireland population • Wigeon Anas penelope, 15,304 individuals representing at least 1.2% of the wintering Western Siberia/Northwestern/Northeastern Europe population Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance: Over winter, the area regularly supports 34,837 individual waterfowl including: Curlew (*Numenius arquata)*, Dunlin (*Calidris alpina alpina)*, Oystercatcher (*Haematopus ostralegus)*, Teal (*Anas crecca)*, Wigeon (*Anas penelope)*, Greylag Goose (*Anser anser)*, Bar-tailed Godwit (*Limosa lapponica)*.

Designation	Site Name	Designating features and comments
SAC	Dornoch Firth and Morrich More	Annex I Habitats that are a primary reason for selection of this site: • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Salicornia and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Embryonic shifting dunes • "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")" • "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature • Decalcified fixed dunes with *Empetrum nigrum* * Priority feature • Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) * Priority feature • Humid dune slacks • Coastal dunes with *Juniperus* spp. * Priority feature Annex I Habitats present as a qualifying feature but not a primary reason for site selection: • Sandbanks which are slightly covered by sea water all the time • Reefs Annex II species that are a primary reason for selection of this site: • Otter *Lutra lutra* • Harbour seal *Phoca vitulina*
Ramsar	Inner Moray Firth	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (*Mergus serrator*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Intertidal mudflats and sandflats • Supralittoral sediment (Coast): Sand dune • Supralittoral sediment (Coast): Shingle

Designation	Site Name	Designating features and comments
SPA	Inner Moray Firth	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season: • Common Tern (*Sterna hirundo)*, 310 pairs representing at least 2.5% of the breeding population in Great Britain • Osprey (*Pandion haliaetus)*, 4 pairs representing at least 4.0% of the breeding population in Great Britain Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter: • Bar-tailed Godwit (*Limosa lapponica)*, 1,155 individuals representing at least 2.2% of the wintering population in Great Britain Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter: • Greylag Goose (*Anser anser)*, 1,731 individuals representing at least 1.7% of the wintering Iceland/UK/Ireland population • Red-breasted Merganser (*Mergus serrator)*, 1,731 individuals representing at least 1.4% of the wintering Northwestern/Central Europe population • Redshank (*Tringa totanus)*, 1,811 individuals representing at least 1.2% of the wintering Eastern Atlantic - wintering population • Scaup (*Aythya marila)*, 97 individuals representing <0.1% of the wintering Northern/Western Europe population Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance. Over winter, the area regularly supports 33,148 individual waterfowl including: Scaup (*Aythya marila)*, Curlew (*Numenius arquata)*, Oystercatcher (*Haematopus ostralegus)*, Goosander (*Mergus merganser)*, Goldeneye (*Bucephala clangula)*, Teal (*Anas crecca)*, Wigeon (*Anas penelope)*, Cormorant (*Phalacrocorax carbo)*, Redshank (*Tringa totanus)*, Red-breasted Merganser (*Mergus serrator)*, Greylag Goose (*Anser anser)*, Bar-tailed Godwit (*Limosa lapponica)*.
Ramsar	Loch Eye	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Whooper swan (*Cygnus cygnus*), non-breeding
SPA	Loch Eye	Article 4.1 qualification of Directive (79/409/EEC) supporting populations over winter: • Whooper Swan (*Cygnus Cygnus*), 213 individuals representing at least 3.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species, over winter: • Greylag Goose (*Anser anser*,) 11,321 individuals representing at least 11.3% of the wintering Iceland/UK/Ireland population (5 year peak mean 1991/2 - 1995/6)
SSSI	Loch Eye	Qualifying features: • Birds - aggregations of non-breeding birds: Whooper swan (*Cygnus cygnus*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Standing open water and canals: Eutrophic loch
SSSI	Loch Fleet	Qualifying features: • Birds - aggregations of non-breeding birds: Eider (*Somateria mollissima*), non-breeding • Birds - assemblages of breeding birds: Breeding bird assemblage • Coniferous woodland: Native pinewood • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Eelgrass beds • Littoral sediment (Marine): Sandflats • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage
SPA	Loch Flemington	Article 4.1 of Directive (79/409/EEC) supporting populations of European importance during the breeding season: • Slavonian Grebe (*Podiceps auritus*), 5 pairs representing at least 7.1% of the breeding population in Great Britain (5 year mean, 1991-1995).

Designation	Site Name	Designating features and comments
SSSI	Longman and Castle Stuart Bays	Qualifying features: • Birds - aggregations of non-breeding birds: Goldeneye (*Bucephala clangula*), non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Cormorant (*Phalacrocorax carbo*), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (*Mergus serrator*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Eelgrass beds • Littoral sediment (Marine): Mudflats
SSSI	Lower River Conon	Qualifying features: • Broad-leaved, mixed and yew woodland: Wet woodland • Fen, marsh and swamp (Wetland): Open water transition fen • Littoral sediment (Coast): Saltmarsh
SPA	Moray and Nairn Coast	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season: • Osprey Pandion haliaetus, 7 pairs representing at least 7.0% of the breeding population in Great Britain Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter: • Bar-tailed Godwit (*Limosa lapponica)*, 1,156 individuals representing at least 2.2% of the wintering population in Great Britain Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter: • Greylag Goose (*Anser anser)*, 2,679 individuals representing at least 2.7% of the wintering Iceland/UK/Ireland population • Pink-footed Goose (*Anser brachyrhynchus)*, 139 individuals representing <0.1% of the wintering Eastern Greenland/Iceland/UK population • Redshank (*Tringa totanus)*, 1,690 individuals representing at least 1.1% of the wintering Eastern Atlantic - wintering population Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance Over winter, the area regularly supports 20,250 individual waterfowl including: Pink-footed Goose (*Anser brachyrhynchus)*, Dunlin (*Calidris alpina alpina)*, Oystercatcher (*Haematopus ostralegus)*, Red-breasted Merganser (*Mergus serrator)*, Velvet Scoter (*Melanitta fusca)*, Common Scoter (*Melanitta nigra)*, Long-tailed duck (*Clangula hyemalis)*, Wigeon (*Anas penelope)*, Redshank (*Tringa totanus)*, Greylag Goose (*Anser anser)*, Bar-tailed Godwit (*Limosa lapponica)*.
Ramsar	Moray and Nairn Coast	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Pink-footed goose (*Anser brachyrhynchus*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Broad-leaved, mixed and yew woodland: Wet woodland • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Intertidal mudflats and sandflats • Supralittoral sediment (Coast): Sand dune • Supralittoral sediment (Coast): Shingle

Designation	Site Name	Designating features and comments
Draft SPA	Moray Firth	Qualifying bird species in the Moray Firth marine dSPA. Annex 1 species: • Great northern diver • Red-throated diver • Slavonian grebe Migratory species: • Scaup • Common eider • Long-tailed duck • Common scoter • Velvet scoter • Common goldeneye • Red-breasted merganser • European shag
SAC	Moray Firth	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Sandbanks which are slightly covered by sea water all the time Annex II species that are a primary reason for selection of this site: • Bottlenose dolphin (*Tursiops truncates)*
SSSI	Morrich More	Qualifying features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Teal (*Anas crecca*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Curlew (*Numenius arquata*), non-breeding • Birds - assemblages of breeding birds: Breeding bird assemblage • Geomorphology: Coastal Geomorphology of Scotland • Littoral sediment (Coast): Saltmarsh • Other invertebrates: Invertebrate assemblage • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage
SSSI	Mound Alderwoods	Qualifying features: • Birds - assemblages of breeding birds: Breeding bird assemblage • Broad-leaved, mixed and yew woodland: Wet woodland • Inshore sublittoral sediment (Marine): Saline lagoon
SSSI	Munlochy Bay	Qualifying features: • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Mudflats
SAC	River Oykel	Annex II species that are a primary reason for selection of this site: • Freshwater pearl mussel (*Margaritifera margaritifera*) Annex II species present as a qualifying feature, but not a primary reason for selection of this site: • Atlantic Salmon (*Salmo salar*)
SAC	River Spey	Annex II species that are a primary reason for selection of this site: • Fish: Sea lamprey (*Petromyzon marinus*) • Fish: Atlantic salmon (*Salmo salar*) • Mammals: Otter (*Lutra lutra*) • Other invertebrates: Freshwater pearl mussel (*Margaritifera margaritifera*)
SSSI	River Spey	Qualifying features: • Fish: Sea lamprey (*Petromyzon marinus*) • Fish: Atlantic salmon (*Salmo salar*) • Mammals: Otter (*Lutra lutra*) • Other invertebrates: Freshwater pearl mussel (*Margaritifera margaritifera*)

Designation	Site Name	Designating features and comments
SSSI	Rosemarkie to Shandwick Coast	Qualifying features: • Birds - aggregations of breeding birds: Cormorant (*Phalacrocorax carbo*), breeding • Broad-leaved, mixed and yew woodland: Upland birch woodland • Palaeontology: Mesozoic Palaeobotany • Stratigraphy: Callovian • Structural and metamorphic geology: Moine • Supralittoral rock (Coast): Maritime cliff • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Purple oxytropis (*Oxytropis halleri*)
NC MPA Proposal	Southern Trench	Southern Trench NC MPA proposal has been proposed for the following Biodiversity features: • Burrowed mud • Fronts • Minke whale • Shelf deeps
SSSI	Spey Bay	Qualifying features: • Broad-leaved, mixed and yew woodland: Wet woodland • Butterflies: Small blue (*Cupido minimus*) • Butterflies: Dingy skipper (*Erynnis tages*) • Fen, marsh and swamp (Wetland): Hydromorphological mire range • Geomorphology: Coastal Geomorphology of Scotland • Littoral sediment: (Coast) Saltmarsh • Supralittoral sediment (Coast): Shingle • Vascular plants: Vascular plant assemblage
SSSI	Whiteness Head	Qualifying features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Knot (*Calidris canutus*), non-breeding • Geomorphology: Coastal Geomorphology of Scotland • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Sandflats • Supralittoral sediment (Coast): Sand dunes • Supralittoral sediment (Coast): Shingle

Table 6-3: Sites that could potentially be significantly affected by discharge of ballast water

Designation	Site Name	Designating features and comments
SSSI	Beauly Firth	Qualifying features: • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (*Mergus serrator*), non-breeding • Birds - aggregations of non-breeding birds: Goosander (*Mergus merganser*), non-breeding • Littoral sediment (Coast): Saltmarsh • Vascular plants: Vascular plant assemblage
SAC	Berriedale and Langwell Waters	Annex II species that are a primary reason for selection of this site: • Atlantic salmon (*Salmo salar*)
Ramsar	Cromarty Firth	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Littoral sediment (Marine) Intertidal mudflats and sandflats
SSSI	Cromarty Firth	Qualifying features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Whooper swan (*Cygnus cygnus*), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (*Mergus serrator),* non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Mudflats • Littoral sediment (Marine): Sandflats
SAC	Culbin Bar	Annex I habitats that are a primary reason for selection of this site: • Perennial vegetation of stony banks Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Embryonic shifting dunes
SSSI	Culbin Sands, Culbin Forest and Findhorn Bay	Qualifying features: • Fen, marsh and swamp (Wetland): Hydromorphological mire range • Fungi: Fungi assemblage • Geomorphology: Coastal Geomorphology of Scotland • Lichen: Lichen assemblage • Littoral sediment (Coast): Saltmarsh • Other invertebrates: Invertebrate assemblage • Standing open water and canals: Mesotrophic loch • Supralittoral sediment (Coast): Shingle • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage

Designation	Site Name	Designating features and comments
SSSI	Dornoch Firth	Qualifying features: • Birds - aggregations of non-breeding birds: Whooper swan (*Cygnus cygnus*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Eelgrass beds • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage
Ramsar	Dornoch Firth and Loch Fleet	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Broad-leaved, mixed and yew woodland: Wet woodland • Littoral rock (Marine): Reefs • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Intertidal mudflats and sandflats • Supralittoral sediment (Coast): Sand dune
SAC	Dornoch Firth and Morrich More	Annex I Habitats that are a primary reason for selection of this site: • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Salicornia and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Embryonic shifting dunes • "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")" • "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature • Decalcified fixed dunes with *Empetrum nigrum* * Priority feature • Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) * Priority feature • Humid dune slacks • Coastal dunes with *Juniperus* spp. * Priority feature Annex I Habitats present as a qualifying feature but not a primary reason for site selection: • Sandbanks which are slightly covered by sea water all the time • Reefs Annex II species that are a primary reason for selection of this site: • Otter *Lutra lutra* • Harbour seal *Phoca vitulina*
Ramsar	Inner Moray Firth	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (*Mergus serrator*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Intertidal mudflats and sandflats • Supralittoral sediment (Coast): Sand dune • Supralittoral sediment (Coast): Shingle

Designation	Site Name	Designating features and comments
SSSI	Loch Fleet	Qualifying features: • Birds - aggregations of non-breeding birds: Eider (*Somateria mollissima*), non-breeding • Birds - assemblages of breeding birds: Breeding bird assemblage • Coniferous woodland: Native pinewood • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Eelgrass beds • Littoral sediment (Marine): Sandflats • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage
SSSI	Longman and Castle Stuart Bays	Qualifying features: • Birds - aggregations of non-breeding birds: Goldeneye (*Bucephala clangula*), non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Cormorant (*Phalacrocorax carbo*), non-breeding • Birds - aggregations of non-breeding birds: Red-breasted merganser (*Mergus serrator*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Eelgrass beds • Littoral sediment (Marine): Mudflats
SSSI	Lower River Conon	Qualifying features: • Broad-leaved, mixed and yew woodland: Wet woodland • Fen, marsh and swamp (Wetland): Open water transition fen • Littoral sediment (Coast): Saltmarsh
Ramsar	Moray and Nairn Coast	Ramsar Site Qualifying Feature category and Features: • Birds - aggregations of non-breeding birds: Pink-footed goose (*Anser brachyrhynchus*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding • Birds - aggregations of non-breeding birds: Redshank (*Tringa totanus*), non-breeding • Broad-leaved, mixed and yew woodland: Wet woodland • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Intertidal mudflats and sandflats • Supralittoral sediment (Coast): Sand dune • Supralittoral sediment (Coast): Shingle
SAC	Moray Firth	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Sandbanks which are slightly covered by sea water all the time Annex II species that are a primary reason for selection of this site: • Bottlenose dolphin (*Tursiops truncates)*
SSSI	Morrich More	Qualifying features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Teal (*Anas crecca*), non-breeding • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Curlew (*Numenius arquata*), non-breeding • Birds - assemblages of breeding birds: Breeding bird assemblage • Geomorphology: Coastal Geomorphology of Scotland • Littoral sediment (Coast): Saltmarsh • Other invertebrates: Invertebrate assemblage • Supralittoral sediment (Coast): Sand dunes • Vascular plants: Vascular plant assemblage

Designation	Site Name	Designating features and comments
SSSI	Mound Alderwoods	Qualifying features: • Birds - assemblages of breeding birds: Breeding bird assemblage • Broad-leaved, mixed and yew woodland: Wet woodland • Inshore sublittoral sediment (Marine): Saline lagoon
SSSI	Munlochy Bay	Qualifying features: • Birds - aggregations of non-breeding birds: Wigeon (*Anas penelope*), non-breeding • Birds - aggregations of non-breeding birds: Greylag goose (*Anser anser*), non-breeding • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Mudflats
SAC	River Oykel	Annex II species that are a primary reason for selection of this site: • Freshwater pearl mussel (*Margaritifera margaritifera*) Annex II species present as a qualifying feature, but not a primary reason for selection of this site: • Atlantic Salmon (*Salmo salar*)
SAC	River Spey	Annex II species that are a primary reason for selection of this site: • Fish: Sea lamprey (*Petromyzon marinus*) • Fish: Atlantic salmon (*Salmo salar*) • Mammals: Otter (*Lutra lutra*) • Other invertebrates: Freshwater pearl mussel (*Margaritifera margaritifera*)
SSSI	River Spey	Qualifying features: • Fish: Sea lamprey (*Petromyzon marinus*) • Fish: Atlantic salmon (*Salmo salar*) • Mammals: Otter (*Lutra lutra*) • Other invertebrates: Freshwater pearl mussel (*Margaritifera margaritifera*)
NC MPA Proposal	Southern Trench	Southern Trench NC MPA proposal has been proposed for the following Biodiversity features: • Burrowed mud • Fronts • Minke whale • Shelf deeps
SSSI	Spey Bay	Qualifying features: • Broad-leaved, mixed and yew woodland: Wet woodland • Butterflies: Small blue (*Cupido minimus*) • Butterflies: Dingy skipper (*Erynnis tages*) • Fen, marsh and swamp (Wetland): Hydromorphological mire range • Geomorphology: Coastal Geomorphology of Scotland • Littoral sediment: (Coast) Saltmarsh • Supralittoral sediment (Coast): Shingle • Vascular plants: Vascular plant assemblage
SSSI	Whiteness Head	Qualifying features: • Birds - aggregations of non-breeding birds: Bar-tailed godwit (*Limosa lapponica*), non-breeding • Birds - aggregations of non-breeding birds: Knot (*Calidris canutus*), non-breeding • Geomorphology: Coastal Geomorphology of Scotland • Littoral sediment (Coast): Saltmarsh • Littoral sediment (Marine): Sandflats • Supralittoral sediment (Coast): Sand dunes • Supralittoral sediment (Coast): Shingle

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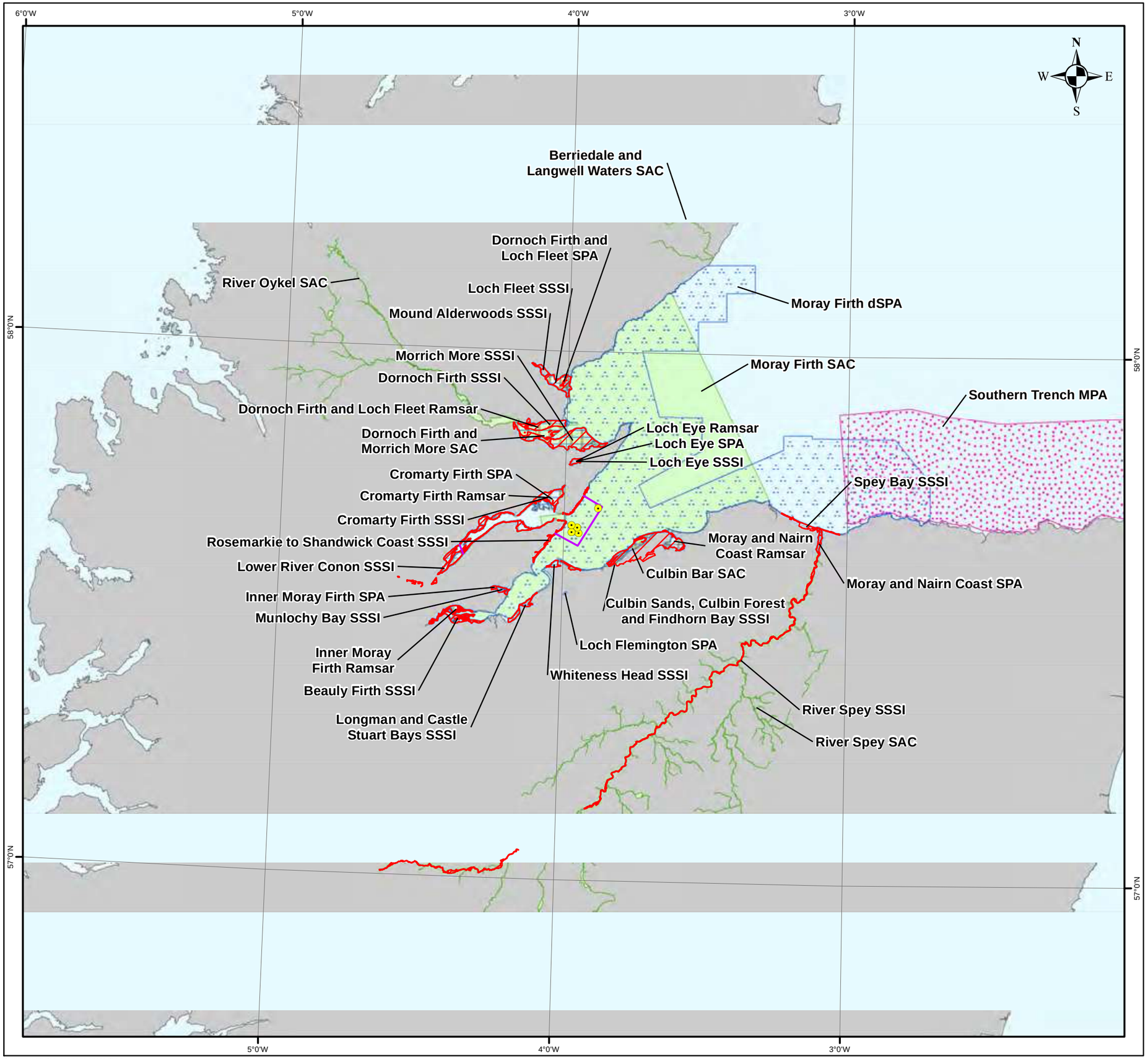
Figure 6-1: Sites that could potentially be significantly affected by an accidental oil spill



Legend

- STS Locations
- Cromarty Firth Harbour Limit

Designated Sites

- SPA
- SAC
- Ramsar
- SSSI
- NC MPA Proposal
- Draft SPA

Date	Thursday, August 13, 2015 12:23:11
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	CFPA, OSOD, SNH, JNCC, MS
File Reference	J:\P1946\Mxd\Report\Application\.mxd Oil_spill_assessment
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij

PORT OF CROMARTY FIRTH

Intertek
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0 5 10 20 30 40 km

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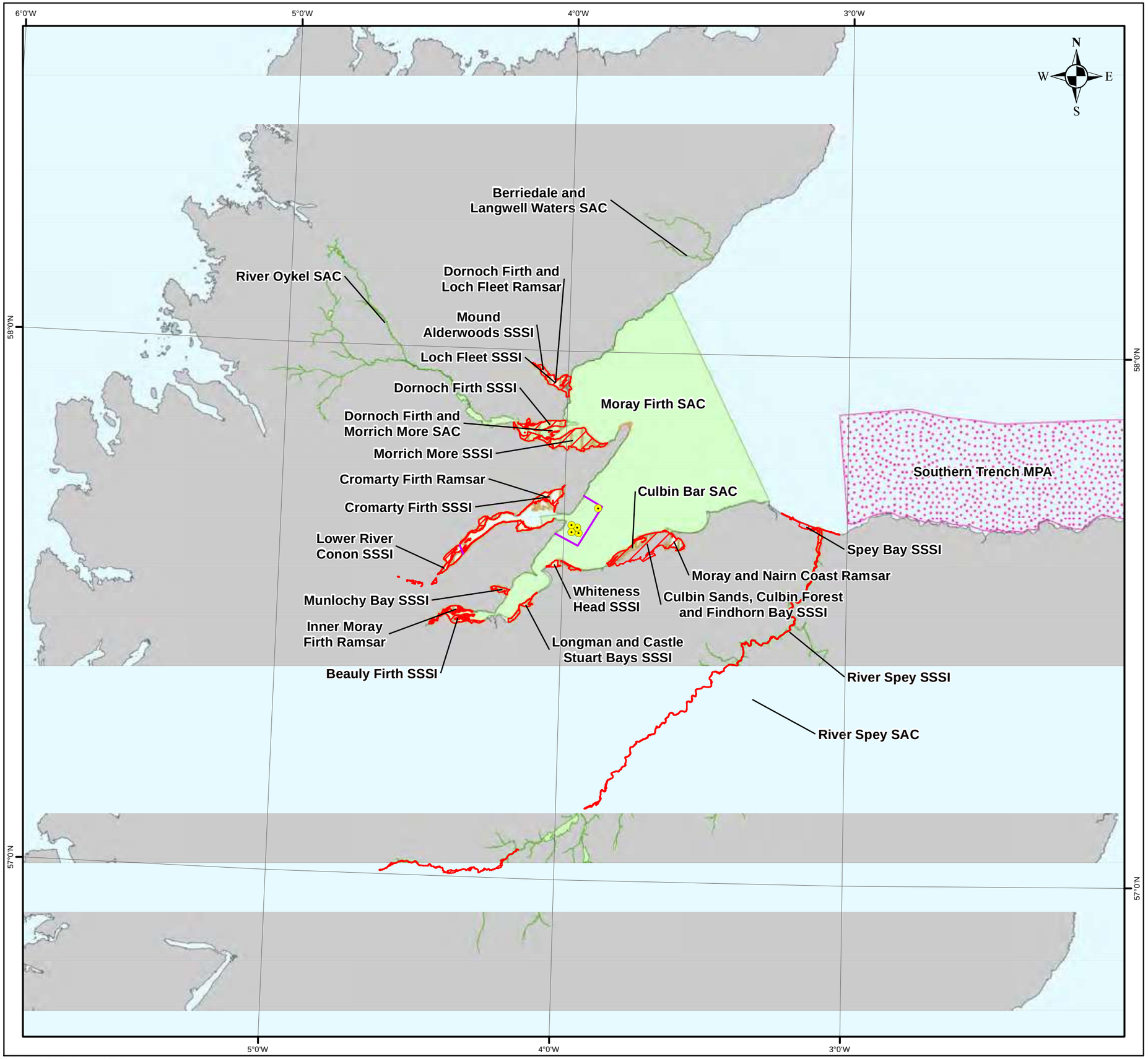
Figure 6-2: Sites that could potentially be significantly affected by discharge of ballast



Legend

- STS Locations
- Cromarty Firth Harbour Limit

Designated Sites

- SAC
- Ramsar
- SSSI
- NC MPA Proposal

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Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	CFPA, OSOD, SNH, JNCC,
File Reference	J:\P1946\Mxd\Report\Application\.mxd Ballast_water_assessment
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij

0 5 10 20 30 40 km

6.4 MITIGATION MEASURES

As concluded in Section 6.2 the only aspects of the proposed cargo transfers considered likely to have the potential to cause a significant effect on a designated site are an accidental oil spill or biological disturbance through introduction of NNS from a ballast water discharge.

Mitigation measures have been identified for the remaining aspects of the plan, so that likelihood of the incident having a significant effect on a designated site can be minimised and discounted.

The mitigation measures that will be applied are listed in Table 6-4.

Table 6-4: Mitigation measures

Potential effect	Mitigation measures applied
Accidental oil spill	Application of best practice in proposed cargo transfer activities
	Application of the OSCP
	Application of robust control procedures in place to minimise the likelihood and potential of an oil spill
	Transfer between ships undertaken using industry standard certified hoses
	Ships having trained and experienced crew to undertake transfer operations
	Use of a qualified STS Superintendent to oversee transfer operation
	Application of onsite spill response procedures and equipment being mobilised
	Positioning of fenders in a manner in which they create a barrier to contain any oil that may be spilt in the event of a hose failure
	Comprehensive stock of oil spill containment equipment held on site ready for deployment in case of an incident
	Support vessel on location to deploy booms to contain and recover oil
	Availability of well trained staff to respond to oil spill
Ballast water discharge	Application of the recommendations set out in the IMO BWM Convention.
	Minimising the volume of ballast water discharged to the minimum essential quantity.

6.5 ASSESSMENT OF POTENTIAL IMPACT SIGNIFICANCE

Having taken into account all mitigation measures in Table 6-4, the sites considered to have the potential for a significant effect from the proposed installation works (listed in Table 6-2 and Table 6-3), were re-screened.

This assessment is presented in Table 6-5.

Table 6-5: Assessment to determine if proposed cargo transfers are likely to have a significant effect on any European site

Site	Qualifying Interests	Possible impacts on site		Likely to have a significant effect?	Possible In-combination Effects	Mitigation Measures	Significant Residual Effect
Beauly Firth SSSI	Non-breeding Greylag goose Non-breeding Red-breasted merganser Non-breeding Goosander Saltmarsh Vascular plant assemblage	Ballast Water	• Introduction of NNS changing community composition, disrupting food webs and altering ecological functions of saltmarsh.	No, this site is located 26.2 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Wildfowl and waders directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarsh contaminated with oil.	Yes, this site is located within the inner Moray Firth. Due to the geography of the inner Moray Firth it is considered very unlikely that an accidential oil spill would reach Beauly Firth SSSI, as it is likely that any oil which passes Whiteness Head will beach before it reaches the Beauly Firth. Therefore the saltmarsh habitat will not be impacted by oil spill. Waterfowl and waders from this site using the intertidal areas of the inner Moray Firth could be impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Berriedale and Langwell Waters SAC	Atlantic salmon	**Ballast Water**	• Pathogens in ballast water causing diseases in migrating Atlantic salmon.	No, migrating Atlantic salmon from this site may travel across the area of the ballast water discharge plume however the modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 100 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore migrating Atlantic salmon will not be affected by pathogens in ballast water.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Migrating Atlantic salmon contaminated by oil spill.	No, it is determined to be unlikely for an accidential oil spill to have a significant effect on migrating Atlantic salmon. It is unlikely that these migratory species will travel to the oil spill area in high enough numbers for the population of qualifying species to be significantly impacted.	None.	Not required.	No.

Cromarty Firth Ramsar	Non-breeding Greylag goose Non-breeding Bar-tailed godwit Non-breeding waterfowl assemblage Intertidal mudflats and sandflats	**Ballast Water**	• Introduction of NNS causing biological disturbance to intertidal mudflats and sandflats.	No, this site is located 4 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0048 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 2,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.4 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Geese and waders directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range. • Mudflats and sandflats contaminated with oil.	Yes, if significant oil spill occurred. The modelling results (Appendix B) indicate that an oil slick has the potential to be carried into the Cromarty Firth, however due to the narrow entrance of the Cromarty Firth this would only be possible under certain wind conditions. A south-easterly wind could impact the coastline at the entrance to the Cromarty Firth after 80 minutes. Birds within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Cromarty Firth SPA	Common Tern Osprey Bar-tailed Godwit Whooper Swan Greylag Goose Waterfowl assemblage of international importance	**Oil Spill**	• Common Tern, Osprey, Bar-tailed Godwit, Whooper Swan and Greylag Goose directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range.	Yes, if significant oil spill occurred. The modelling results (Appendix B) indicate that an oil slick has the potential to be carried into the Cromarty Firth, however due to the narrow entrance of the Cromarty Firth this would only be possible under certain wind conditions. A south-easterly wind could impact the coastline at the entrance to the Cromarty Firth after 80 minutes. Birds within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Cromarty Firth SSSI	Non-breeding Bar-tailed godwit Non-breeding Redshank Non-breeding Wigeon Non-breeding Whooper swan Non-breeding Red-breasted merganser Saltmarsh Mudflats Sandflats	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh, mudflats and sandflats.	No, this site is located 4 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0048 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 2,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.3 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.

		Oil Spill	• Geese and waders directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarsh, mudflats and sandflats contaminated with oil.	Yes, if significant oil spill occurred. The modelling results (Appendix B) indicate that an oil slick has the potential to be carried into the Cromarty Firth, however due to the narror entrance of the Cromarty Firth this would only be possible under certain wind conditions. A south-easterly wind could impact the coastline at the entrance to the Cromarty Firth after 80 minutes. Birds within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Culbin Bar SAC	Perennial vegetation of stony banks Atlantic salt meadows Embryonic shifting dunes	**Ballast Water**	• Introduction of NNS causing biological disturbance to Atlantic salt meadows.	No, this site is located 8.5 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0003 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 33,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.004 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Perennial vegetation of stony banks contaminatd with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that a north westerly wind could move the oil slick towards Culbin Bar SAC. This will impact the coastline of Culbin Bar after approximately 5 hours.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Culbin Sands, Culbin Forest and Findhorn Bay SSSI	Hydromorphological mire range Fungi assemblage Coastal Geomorphology of Scotland Lichen assemblage Saltmarsh Invertebrate assemblage Mesotrophic loch Shingle Sand dunes Vascular plant assemblage	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh.	No, this site is located 8.6 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0003 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 33,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.004 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Saltmarsh contaminated with oil. • Lichen contaminated with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that a north westerly wind could move the oil slick towards Culbin Sands, Culbin Forest and Findhorn Bay SSSI. This will impact the coastline of Culbin Bar after approximately 5 hours.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Dornoch Firth SSSI	Non-breeding Whooper swan Non-breeding Wigeon Non-breeding Bar-tailed godwit Saltmarsh Eelgrass beds Sand dunes Vascular plant assemblage	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh and eelgrass beds.	No, this site is located 16 km (measured over land) away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.

		Oil Spill	• Geese and waders directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarshes and eelgrass beds contaminatd with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. This oil slick could move towards the Dornoch Firth SSSI. Birds feeding within this area are likely to be significantly impacted by the oil spill. Saltmarshes are sensitive to oil spill and have slow rates of recovery, any contact with oil is likely to have a significant effect.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Dornoch Firth and Loch Fleet Ramsar	Non-breeding Bar-tailed godwit Non-breeding Greylag goose Non-breeding Waterfowl assemblage Non-breeding Wigeon Wet woodland Reefs Saltmarsh Intertidal mudflats and sandflats Sand dune	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh, intertidal mudflats and sandflats and reefs.	No, this site is located 12.4 km away (measured overland) from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Waterfowl directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range. • Reefs, saltmarsh and Intertidal mudflats and sandflats contaminatd with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. Waterbirds feeding in the area could be directly impacted by an oil spill. The habitats within this site could be directly impacted by an oil slick.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Dornoch Firth and Loch Fleet SPA	Osprey Bar-tailed Godwit Greylag Goose Wigeon Waterfowl assemblage of international importance	**Oil Spill**	• Osprey, Bar-tailed Godwit, Greylag Goose and Wigeon directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. Waterbirds feeding in the area could be directly impacted by an oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Dornoch Firth and Morrich More SAC	Estuaries Mudflats and sandflats not covered by seawater at low tide Salicornia and other annuals colonizing mud and sand Atlantic salt meadows Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"") Fixed coastal dunes with herbaceous vegetation (""grey dunes"") Decalcified fixed dunes with *Empetrum nigrum* Atlantic decalcified fixed dunes Humid dune slacks Coastal dunes with *Juniperus* spp. Sandbanks which are slightly covered by sea water all the	**Ballast Watr**	• Pathogens in ballast water causing diseases in otters and seals. • Introduction of NNS causing biological disturbance to estuaries, mudflats and sandflats not covered by seawater at low tide, salicornia and other annuals colonizing mud and sand, atlantic salt meadows, sandbanks which are slightly covered by sea water all the time and reef habitats.	No, otters and seals from this site may travel across the area of the ballast water discharge plume, however the modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 100 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore otters and harbour seals will not be affected by pathogens in ballast water. This site is located 12.4 km away (measured overland) from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore the habitats at this site will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.

	time Reefs Otter Harbour seal	**Oil Spill**	• Otters directly impacted by oil spill. • Harbour seals directly impacted by oil spill. • Estuaries, mudflats and sandflats not covered by seawater at low tide, salicornia and other annuals colonizing mud and sand, atlantic salt meadows, sandbanks which are slightly covered by sea water all the time and reef habitats contaminated with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. The habitats within this site could be directly impacted by an oil slick. Harbour seals and otters from this site may travel across the oil slick and be impacted, by oil coating their fur which poisons them (National Oceanic and Atmospheric Administration (NOAA), 2015a).	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Inner Moray Firth Ramsar	Non-breeding waterfowl assemblage Non-breeding Bar-tailed godwit Non-breeding Redshank Non-breeding Greylag goose Non-breeding Red-breasted merganser Saltmarsh Intertidal mudflats and sandflats Sand dune Shingle	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh and Intertidal mudflats and sandflats	No, this site is located within the Inner Moray Firth, 6.1 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0005 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is 20,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.

		Oil Spill	• Waterfowl directly impacted by oil. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarsh and Intertidal mudflats and sandflats contaminated wih oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that an oil spill event has the potential to impact the coastline anywhere in the Moray Firth. A northerly wind could carry the oil slick towards Inner Moray Firth Ramsar. The oil slick could beach on Whiteness Head and directly impact the site. Habitats would be contaiminated with oil and birds feeding within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Inner Moray Firth SPA	Common Tern Osprey Bar-tailed Godwit Greylag Goose Red-breasted Merganser Redshank Scaup Waterfowl assemblage of international importance	**Oil Spill**	• Common tern, Osprey, Bar-tailed Godwit, Greylag Goose, Red-breasted Merganser, Redshank and Scaup directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that an oil spill event has the potential to impact the coastline anywhere in the Moray Firth. A northerly wind could carry the oil slick towards Inner Moray Firth SPA. The oil slick could beach on Whiteness Head and directly impact the site. Birds feeding within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Loch Eye Ramsar	Non-breeding Greylag goose Non-breeding Whooper swan	**Oil Spill**	• Greylag Goose and Whooper swan directly impacted by oil spill.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the coastline of the Moray Firth will be impacted by an accidential oil spill. Greylag Goose and Whooper swan feeding in these areas could be directly impacted by an oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Loch Eye SPA	Whooper Swan Greylag Goose	**Oil Spill**	• Greylag Goose and Whooper swan directly impacted by oil spill.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the coastline of the Moray Firth will be impacted by an accidential oil spill. Greylag Goose and Whooper swan feeding in these areas could be directly impacted by an oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Loch Eye SSSI	Non-breeding Whooper swan Non-breeding Greylag goose Eutrophic loch	**Oil Spill**	• Greylag Goose and Whooper swan directly impacted by oil spill.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the coastline of the Moray Firth will be impacted by an accidential oil spill. Greylag Goose and Whooper swan feeding in these areas could be directly impacted by an oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Loch Fleet SSSI	Non-breeding Eider Breeding bird assemblage Native pinewood Saltmarsh Eelgrass beds Sandflats Sand dunes Vascular plant assemblage	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh, eelgrass beds and sandflats.	No, this site is located 24.3 km (measured over land) away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Breeding bird assemblage directly impacted by oil. • Eider directly impacted by oil. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarsh, eelgrass beds and sandflats contaminatd with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. However it is unlikely that the oil slick will enter Loch Fleet and impact the SSSI. Birds feeding within the Moray Firth area are likely to be significantly impacted by the oil spill. Habitats on the seaward side of the SSSI could be directly impacted by an oil slick.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Loch Flemington SPA	Slavonian Grebe	**Oil Spill**	• Slavonian Grebe directly impacted by oil spill.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the coastline of the Moray Firth will be impacted by an accidential oil spill. Slavonian Grebe feeding in these areas could be directly impacted by an oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Longman and Castle Stuart Bays SSSI	Non-breeding Goldeneye Non-breeding Redshank Non-breeding Wigeon Non-breeding Cormorant Non-breeding Red-breasted merganser Saltmarsh Eelgrass beds Mudflats	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh, eelgrass beds and mudflats.	No, this site is located 14.7 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0001 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is 100,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.001 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Wildfowl and waders directly impacted by oil. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarsh, eelgrass beds and mudflats contaminated wih oil.	Yes, this site is located within the inner Moray Firth. Due to the geography of the inner Moray Firth it is considered very unlikely that an accidential oil spill would reach the Longman and Castle Stuart Bays SSSI, as it is likely that any oil which passes Whiteness Head will beach before it reaches the site. Therefore the saltmarsh, eelgrass beds and mudflats habitats will not be impacted by oil spill. Waterfowl and waders from this site using the intertidal areas of the inner Moray Firth could be impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Lower River Conon SSSI	Wet woodland Open water transition fen Saltmarsh	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh.	No, this site is located 26.4 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.002 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Saltmarsh contaminated with oil.	No, this site is located within the inner Cromarty Firth. The modelling results (Appendix B) indicate that an oil slick has the potential to be carried into the Cromarty Firth, however due to the narrow entrance of the Cromarty Firth this would only be possible under certain wind conditions. It is considered very unlikely that an accidential oil spill would reach the Lower River Conon SSSI, as it is likely that any oil which enters the Cromarty Firth will beach before it reaches the site.	None.	Not required.	No.

Moray and Nairn Coast Ramsar	Non-breeding Pink-footed goose Non-breeding Greylag goose Non-breeding waterfowl assemblage Non-breeding Redshank Saltmarsh Intertidal mudflats and sandflats Sand dune Shingle	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh and Intertidal mudflats and sandflats	No, this site is located 8.5 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0003 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 33,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.004 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Wildfowl and wades directly impacted by oil. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarsh and Intertidal mudflats and sandflats contaminated with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that a north westerly wind could move the oil slick towards Moray and Nairn Coast Ramsar. This will impact the coastline of Culbin Bar after approximately 5 hours. Wildfowl and wades within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Moray and Nairn Coast SPA	Osprey Bar-tailed Godwit Greylag Goose Pink-footed Goose Redshank Waterfowl assemblage of international importance	**Oil Spill**	• Osprey, Bar-tailed Godwit, Greylag Goose, Pink-footed Goose and Redshank directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that a north westerly wind could move the oil slick towards Moray and Nairn Coast SPA. This will impact the coastline of Culbin Bar after approximately 5 hours. Birds feeding within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Moray Firth Draft SPA	Great northern diver Red-throated diver Slavonian grebe Scaup Common eider Long-tailed duck Common scoter Velvet scoter Common goldeneye Red-breasted merganser European shag	**Oil Spill**	• Great northern diver, Red-throated diver, Slavonian grebe, Scaup, Common eider, Long-tailed duck, Common scoter, Velvet scoter, Common goldeneye, Red-breasted merganser and European shag directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. Birds feeding in the area could be directly impacted by an oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Moray Firth SAC	Sandbanks which are slightly covered by sea water all the time Bottlenose dolphin	**Ballast Water**	• Pathogens in ballast water causing diseases in bottlenose dolphin. • Introduction of NNS causing biological disturbance to sandbanks.	No, modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 100 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore bottlenose dolphins will not be affected by pathogens in ballast water and the habitats will not be affected by introduction of NNS causing biological disturbance.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.25 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.

		Oil Spill	• Bottlenose dolphin directly impacted by oil spill. • Sandbanks contaimated wih oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. Bottlenose dolphins in the area could be directly impacted by an oil spill, byoil clogging their blow holes. Due to their ability to move away from an oil spill and their body mass bottlenose dolphins are not particularly sensitive to oiling. Sandbanks could be directly impacted by oil.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Morrich More SSSI	Non-breeding Bar-tailed godwit Non-breeding Teal Non-breeding Wigeon Non-breeding Curlew Breeding bird assemblage Coastal Geomorphology of Scotland Saltmarsh Invertebrate assemblage Sand dunes Vascular plant assemblage	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh.	No, this site is located 12.4 km (measured over land) away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Breeding bird assemblage directly impacted by oil. • Contamination and loss of coastal feeding sites, limiting foraging range. • Bar-tailed godwit, Teal, Wigeon and Curlew directly impacted by oil. • Saltmarsh contaminated with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. This oil slick could move towards Morrich More SSSI. Birds feeding within this area are likely to be significantly impacted by the oil spill. Saltmarshes are sensitive to oil spill and have slow rates of recovery, any contact with oil is likely to have a significant effect.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Mound Alderwoods SSSI	Breeding bird assemblage Wet woodland Saline lagoon	**Ballast Water**	• Introduction of NNS causing biological disturbance to saline lagoon.	No, this site is located 29.9 km (measured over land) away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Breading bird assemblage directly impacted by oil. • Contamination and loss of coastal feeding sites, limiting foraging range.	Yes, if significant oil spill occurred. Modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. However it is unlikely that the oil slick will enter Loch Fleet and impact Mound Alderwoods SSSI. Birds feeding within the Moray Firth area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

Munlochy Bay SSSI	Non-breeding Wigeon Non-breeding Greylag goose Saltmarsh Mudflats	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh and mudflats.	No, this site is located 17.7 km (measured over land) away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0001 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is 100,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.001 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Wigeon and Greylag goose directly impacted by oil. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarsh and mudflats contaminated with oil.	Yes, this site is located within the inner Moray Firth. Due to the geography of the inner Moray Firth it is considered very unlikely that an accidential oil spill would reach the Munlochy Bay SSSI, as it is likely that any oil which passes Whiteness Head will beach before it reaches the site. Therefore the saltmarsh and mudflats habitats will not be impacted by oil spill. Waterfowl and waders from this site using the intertidal areas of the inner Moray Firth could be impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

River Oykel SAC	Freshwater pearl mussel Atlantic Salmon	**Ballast Water**	• Pathogens in ballast water causing diseases in migrating Atlantic salmon.	No, migrating Atlantic salmon from this site may travel across the area of the ballast water discharge plume however the modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 100 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species. Therefore migrating Atlantic salmon will not be affected by pathogens in ballast water.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Migrating Atlantic salmon contaminated by oil spill.	No, it is determined to by unlikely for an accidential oil spill to have a significant effect on migrating Atlantic salmon. It is unlikely that these migratory species will travel to the oil spill area in high enough numbers for the population of qualifying species to be significantly impacted.	None.	Not required.	No.
River Spey SAC	Sea lamprey Atlantic salmon Otter Freshwater pearl mussel	**Ballast Water**	• Pathogens in ballast water causing diseases in migrating Atlantic salmon and sea lamprey. • Pathogens in ballast water causing diseases in otters.	No, migrating Atlantic salmon and sea lamprey from this site may travel across the area of the ballast water discharge plume however the modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 100 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore migrating Atlantic salmon and sea lamprey will not be affected by pathogens in ballast water. Otters may also travel acorss the ballast water discharge plume but will not be affected by pathogens.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.

		Oil Spill	• Migrating Atlantic salmon and sea lamprey contaminated by oil spill. • Otters directly impacted by oil spill.	No, it is determined to by unlikely for an accidential oil spill to have a significant effect on migrating Atlantic salmon and sea lamprey. It is unlikely that these migratory species and otters will travel to the oil spill area in high enough numbers for the population of qualifying species to be significantly impacted.	None.	Not required.	No.
River Spey SSSI	Sea lamprey Atlantic salmon Otter Freshwater pearl mussel	**Ballast Water**	• Pathogens in ballast water causing diseases in migrating Atlantic salmon and sea lamprey. • Pathogens in ballast water causing diseases in otters.	No, migrating Atlantic salmon and sea lamprey from this site may travel across the area of the ballast water discharge plume however the modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 100 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore migrating Atlantic salmon and sea lamprey will not be affected by pathogens in ballast water. Otters may also travel acorss the ballast water discharge plume but will not be affected by pathogens.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Migrating Atlantic salmon and sea lamprey contaminated by oil spill. • Otters directly impacted by oil spill.	No, it is determined to by unlikely for an accidential oil spill to have a significant effect on migrating Atlantic salmon and sea lamprey. It is unlikely that these migratory species and otters will travel to the oil spill area in high enough numbers for the population of qualifying species to be significantly impacted.	None.	Not required.	No.

Rosemarkie to Shandwick Coast SSSI	Breeding Cormorant Upland birch woodland Callovian Moine Maritime cliff Sand dunes Purple oxytropis	**Oil Spill**	• Cormorant directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that a south easterly wind could move the oil slick towards Rosemarkie to Shandwick Coast SSSI. This will impact the coastline of Rosemarkie to Shandwick after approximately 80 minutes. Cormorants feeding within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.
Southern Trench NC MPA Proposal	Burrowed mud Fronts Minke whale Shelf deeps	**Ballast Water**	• Pathogens in ballast water causing diseases in minke whale. • Introduction of NNS causing alteration to nutrient and plankton concentrations in fronts.	No, minke whale from this site may travel across the area of the ballast water discharge plume however the modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted is 0.0815 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is over 100 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore minke whale will not be affected by pathogens in ballast water. Fronts, which are essentially boundaries between water masses of differing temperature or salinity, can concentrate nutrients and plankton and are often associated with pelagic biodiversity hotspots. This habitat will not be impacted by ballast water discharges due to the low predicted concentrations of zooplanktonin the discharge plume (Appendix B).	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.

		Oil Spill	• Minke whale directly impacted by oil spill.	No, modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. Minke whale using the area could be directly impacted by an oil spill, by oil clogging their blow holes. However, due to their ability to move away from an oil spill and their body mass marine mammals are not particularly sensitive to oiling.	None.	Not required.	No.
Spey Bay SSSI	Wet woodland Small blue (*Cupido minimus*) Dingy skipper (*Erynnis tages*) Hydromorphological mire range Coastal Geomorphology of Scotland Saltmarsh Shingle Vascular plant assemblage	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh.	No, this site is located 38.6 km (measured over land) away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the discharge plume will not reach the site.	Not required.	No.
		Oil Spill	• Saltmarshes contaminatd with oil.	No, modelling results (Appendix B) indicate that the Moray Firth will be impacted by an accidential oil spill. This site is located 38.6 km away from the proposed transfer locations, therefore it is unlikely that the oil slick will persist and impact the saltmarsh habitat within this site. Modelling indicated that a west south westerly wind could carry the oil slick towards this site but the currents will break down the oil mass considerably before it reaches the vicinity of the site.	None.	Not required.	No.

Whiteness Head SSSI	Non-breeding Bar-tailed godwit Non-breeding Knot Coastal Geomorphology of Scotland Saltmarsh Sandflats Sand dunes Shingle	**Ballast Water**	• Introduction of NNS causing biological disturbance to saltmarsh and sandflats.	No, this site is located within the Inner Moray Firth, 6.3 km away from the nearest cargo transfer location. The modelling results (Appendix B) indicate that the extent of the discharge plume will not reach the site. The maximum zooplankton concentration predicted to reach the site is 0.0005 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). This is 20,000 times better than the IMO D-2 Regulation. Species mortality on uptake, voyage and discharge would reduce risks further, by amounts that are species dependent. Therefore habitats will not be affected by ballast water discharge.	No, the in-combination modelling results (Appendix B) indicate that the maximum zooplankton concentration predicted to reach the site is 0.004 zooplankton per m^3 (compared to the highest IMO D-2 standard of 10 zooplankton per m^3). Therefore habitats will not be affected by ballast water discharge.	Not required.	No.
		Oil Spill	• Waders directly impacted by oil spill. • Contamination and loss of coastal feeding sites, limiting foraging range. • Saltmarshes and sandflats contaminatd with oil.	Yes, if significant oil spill occurred. Modelling results (Appendix B) show that an oil spill event has the potential to impact the coastline anywhere in the Moray Firth. A northerly wind could carry the oil slick towards Whiteness Head SSSI. The oil slick could beach on Whiteness Head and directly impact the site. Birds feeding within this area are likely to be significantly impacted by the oil spill.	None.	Application of the measures listed in Table 6-4.	None likely. Application of the mitigation measures will reduce the risk of an oil spill occurring.

6.6 SCREENING DETERMINATION

The proposed cargo transfers are not considered likely to have a significant effect on any European sites, either individually or in-combination with other plans or projects, as required under Schedule 1 (1) of the Regulations.

Potential effects resulting from the presence of ships (airborne pollution and disturbance) were considered not likely to have a significant effect on the designated sites. Therefore, these effects were not considered any further in this screening assessment.

Following an initial screening to determine the likelihood of an interaction between the impact (oil spill and ballast water discharge) and receptor, it was determined that there was the potential for significant effects from the following for a number of designated sites:

- an accidental oil spill, or
- ballast water discharge and introduction of NNS and pathogens

The potential effects from an unmitigated oil spill was determined to be likely to have a significant impact on a number of designated sites within the area. However, procedures are in place to significantly reduce the likelihood of the accidental discharge of oil. After applying these mitigation measures it can be concluded that the risk of a significant impact is considered unlikely. Therefore, no significant effects on designated sites are predicted.

The potential effects from the discharge of ballast water during a proposed cargo transfer was determined to be not likely to have a significant effect on the designated sites.

The discharge of ballast water at STS locations, in-combination with discharge of ballast water at other piers within the harbour area and at Nigg Oil Terminal was determined to be not likely to have a significant combined effect on protected sites. The assessment demonstrated that the discharge of ballast water during STS transfers at the STS Locations will not contribute significantly to the existing concentrations. Once the IMO BWM Convention enters into force all ships will be required to exchange ballast water and eventually treat ballast water before discharge. This will further reduce concentrations.

7 CONCLUSIONS

7.1 INTRODUCTION

This section presents a summary of the key findings on the environmental assessment of the proposed cargo transfers. It identifies the significant effects that the proposed cargo transfers are likely to have on the environment and determines whether the cargo transfers to be authorised would be likely to have a significant effect on any European Sites.

Mitigation measures are then identified for the potential effects to prevent or reduce, and where possible offset, any significant effects of the proposed cargo transfers on the environment and residual effects identified.

7.2 KEY POTENTIAL ENVIRONMENTAL EFFECTS

The potential unmitigated environmental effects that may arise from the proposed cargo transfers were predicted to arise from the following activities:

- Movement and presence of ships
- Accidental oil spill
- Discharge of ballast water during transfer process

Movement and presence of ships were concluded to not have any significant effects on the environment.

In the unlikely event of an oil spill, in the absence of any mitigation measures, significant impacts may occur on birds, marine mammals, fish and shellfish within the area. Due to the geography of the Moray Firth it is considered that the shorelines may be adversely impacted by an accidental oil spill. Consequences of an oil spill on a number of receptors could be significant. However, procedures are in place to prevent the accidental discharge of oil and the risk of a significant impact is considered unlikely.

The routine process of discharging ballast water during the transfer process was concluded to not have any significant effects on the environment, as application of the recommendations set out in the IMO BWM Convention and minimising the volume of ballast water discharged will control and prevent the introduction of harmful or alien species to the marine environment from ballast water.

7.3 EFFECTS ON DESIGNATED SITES

To determine whether the cargo transfers to be carried out are likely to have a significant effect on any European site, either individually or in-combination with other plans or projects, a screening assessment was carried out.

The following sites were considered in the assessment:

- SPAs and Draft SPAs with marine components, or which are designated for seabirds within 100 km of the STS locations,
- SACs with marine components, or with a marine connection (freshwater SACs with anadromous, migratory fish e.g. Atlantic salmon and lamphrey)

intersecting the coast with the Moray Firth and within 100 km of the STS locations,

- All Ramsar Sites within 100 km of the STS locations,
- NC MPAs and NC MPA Proposals which are within the Moray Firth and 100 km of the STS locations, and
- SSSIs which intersect or are close to the coast within the Moray Firth and 100 km of the STS locations.

Potential effects resulting from the presence of ships, airborne pollution and disturbance were considered not likely to have a significant effect on the designated sites. However, it was determined that the following may affect designated sites and qualifying species:

- water based pollution as a result of an accidental oil spill, and
- discharge of ballast water and the introduction of NNS and pathogens.

Designated sites within the area were assessed to determine if the proposed cargo transfers were likely to have a significant effect on them. It was concluded that if a significant oil spill occurred then it would be likely to have a significant effect on a number of designated sites. However, procedures are in place to prevent the accidental discharge of oil and the risk of a significant impact is considered unlikely. It was concluded that the potential effects from the discharge of ballast water during a proposed cargo transfer would not cause a significant effect on designated sites.

The Screening determined that the proposed cargo transfers are not considered likely to have a significant effect on any European sites, either individually or in-combination with other plans or projects, as required under Schedule 1 (1) of The Regulations.

7.4 MITIGATION

Mitigation measures applied in order to determine that there is no significant effects on the environment include the following:

- Application of best practice in proposed cargo transfer activities
- Application of the OSCP
- Application of robust control procedures in place to minimise the likelihood and potential of an oil spill
- Transfer between ships undertaken using industry standard certified hoses
- Ships having trained and experienced crew to undertake transfer operations
- Use of a qualified STS Superintendent to oversee transfer operation
- Application of onsite spill response procedures and equipment being mobilised
- Positioning of fenders in a manner in which they create a barrier to contain any oil that may be spilt in the event of a hose failure
- Comprehensive stock of oil spill containment equipment held on site ready for deployment in case of an incident

- Support vessel on location to deploy booms to contain and recover oil
- Availability of well trained staff to respond to oil spill

Implementing the above mitigation measures will reduce the risk of proposed cargo transfers having a significant effect on the environment.

In the event of an oil spill the location of the pollutant, type of oil, source, cause, extent and direction of movement will be reported to the Oil Pollution Officer. Depending on the tier of the spill different response actions will be mobilised.

If an accidental oil spill was to take place then application of the OSCP would considerably reduce the environmental effects of a spill. It will minimise the scale and extent of an oil spill. Significant effects on the environment through marine pollution should be reduced to short-term manageable effects if the contingency plan can contain and minimise the scale of the spill and prevent any widespread impact.

7.5 RESIDUAL EFFECTS

Following the application of mitigation measures it is unlikely that the proposed cargo transfers will have any residual effects on the environment. This is due to the following reasons:

- Every proposed cargo transfer is well planned and a pre-STS meeting is undertaken prior to the operation
- The track record of the harbour and oil terminal
- The location of the proposed cargo transfers
- The experience and application of best practice procedures during transfer operations
- The existence of mitigation measures including the OSCP

The likelihood of an accidental oil spill occurring is very low and in the unlikely event of it taking place, comprehensive OSCPs are in place to ensure a spill is contained and minimise the risk of significant impacts on the environment.

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