Nord Stream
The new gas supply route for Europe

Chapter 11

Transboundary Impacts

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11 Transboundary Impacts

11.1 Introduction

The key objective of an EIA in a transboundary context is the assessment and communication of transboundary impacts. The Espoo Convention defines a transboundary impact as:

"…any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party."

The Convention obliges signatory states to notify and consult one another on all projects in their territory that are likely to have significant adverse transboundary environmental impacts. The Convention defines the country in which the proposed activity takes place as the "Party of Origin" and the countries that are impacted as each an "Affected party".

For trans-national linear developments, such as trans-national pipelines, there will be more than one Party of Origin and countries that are Parties of Origin will also (where they experience impacts from a Project related activity or event occurring in another Party of Origin country) be Affected parties. In the case of the Nord Stream Project, the twin pipelines will pass through Russia, Finland, Sweden, Denmark and Germany, hence each of these countries is a Party of Origin under the terms of the Convention. Russia has signed but not ratified the Convention but for the purposes of the Espoo Report is designated as a Party of Origin. The other littoral countries of the Baltic Sea, i.e. Estonia, Latvia, Lithuania and Poland are each an Affected party, as are Russia, Finland, Sweden, Denmark and Germany since these five countries will each be subjected to impacts from Project related activities and events that are initiated in one or more of the other countries through which the pipelines will pass. Estonia, Latvia, Lithuania and Poland being Affected Parties but not Parties of Origin are, where it is wished to distinguish them as a group from the Party of Origin countries, referred to in the Espoo Report as "Only Affected Parties".

For purposes of the Espoo Report, the countries which are Parties of Origin with respect to the Nord Stream Project are referred to as "PoO countries", while the countries that are Affected Parties are referred to as "AP countries" and countries that are Only Affected Parties are referred to as the "OAP countries"(1).

(1) These designations of convenience are defined specifically for the purposes of this Espoo Report in an attempt to minimise repetition of similar or identical arguments, thereby facilitating the succinct and transparent presentation of findings of the transboundary impact assessment process.

Finland, Sweden, Denmark and Germany have equal status within the Convention. Russia has signed but not ratified the Convention. It is, however, participating in the Nord Stream Project Espoo consultation process as a Party of Origin to the extent possible under its legislation.

For purposes of this assessment of transboundary impacts related to implementation of the proposed Nord Stream Project, national jurisdictions are delimited by the Exclusive Economic Zone (EEZ) boundaries of the Baltic Sea countries. The PoO countries, AP countries and OAP countries, irrespective of whether they have ratified the Convention, are detailed in **Table 11.1** and depicted, together with their respective EEZs in **Figure 11.1**.

Table 11.1 Country designations

Designation used in this Report	Applicable Countries
PoO countries	Russia, Finland, Sweden, Denmark and Germany
AP countries	Estonia, Latvia, Lithuania, Poland, Russia, Finland, Sweden, Denmark and Germany
OAP countries	Estonia, Latvia, Lithuania and Poland

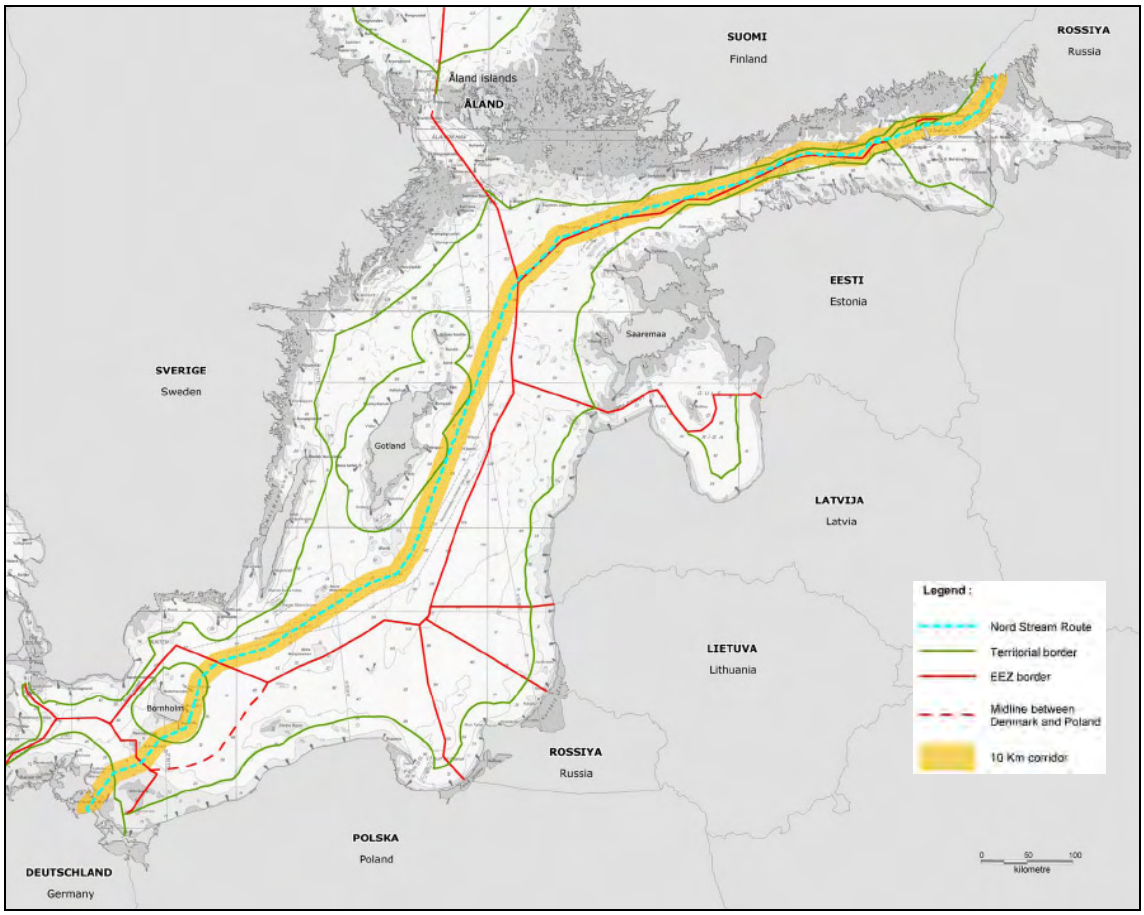


Figure 11.1 The Nord Stream Project together with the Exclusive Economic Zones (EEZs) of the PoO and OAP countries and a 10 km buffer on either side of the pipelines

11.2 Proximity of the Pipelines' Route to Country EEZ Boundaries

The pipelines' route together with a 10 km buffer on either side of the pipelines is presented in **Figure 11.1**. In order to enable a more accurate understanding of the proximity of the pipelines to country EEZ boundaries, the pipelines' route is further depicted diagrammatically in **Figure 11.2** and **Figure 11.3**. The pipelines' route has been placed on the X axis and thereafter the country EEZ boundaries have been plotted in relation to their distance from the pipelines' route. **Figure 11.2** indicates distances to EEZ boundaries (and country coastlines) along the entire pipelines' route while **Figure 11.3** focuses on the proximity of the pipeline to EEZ boundaries in the Gulf of Finland and also indicates the location of seabed intervention works (rock placement only in the Finnish EEZ), the hyperbaric tie-in location and the location of munitions that require clearance. Both figures serve to illustrate the distance from the pipelines' route to the country EEZ boundaries for the purposes of identifying potential transboundary impact areas. As can be seen from **Figure 11.2**, the pipelines' route is generally distant (>20 km) from the country EEZ boundaries and thus only impacts with a range that would extend beyond 20 km would be considered as potential transboundary in these sections. In the Finnish EEZ, however, the pipelines' route is to be laid in close proximity to the Estonian EEZ from KP 120 to KP 500 (**Figure 11.3**) and thus more transboundary impacts are expected along this section. For the most part, the pipelines' route in the Finnish EEZ is within 10km of the EEZ of Estonia but is rarely closer than 500 m. There are, however, two exceptions at KP ~261 and KP ~471 where the pipelines' route is a minimum of 390 and 190 m from the Estonian EEZ respectively.

These observations of the proximity of the pipelines to the EEZ boundaries of OAP countries have been material in determining the methodology that has been employed for identifying potential transboundary impacts as described further in **Section 11.4**.

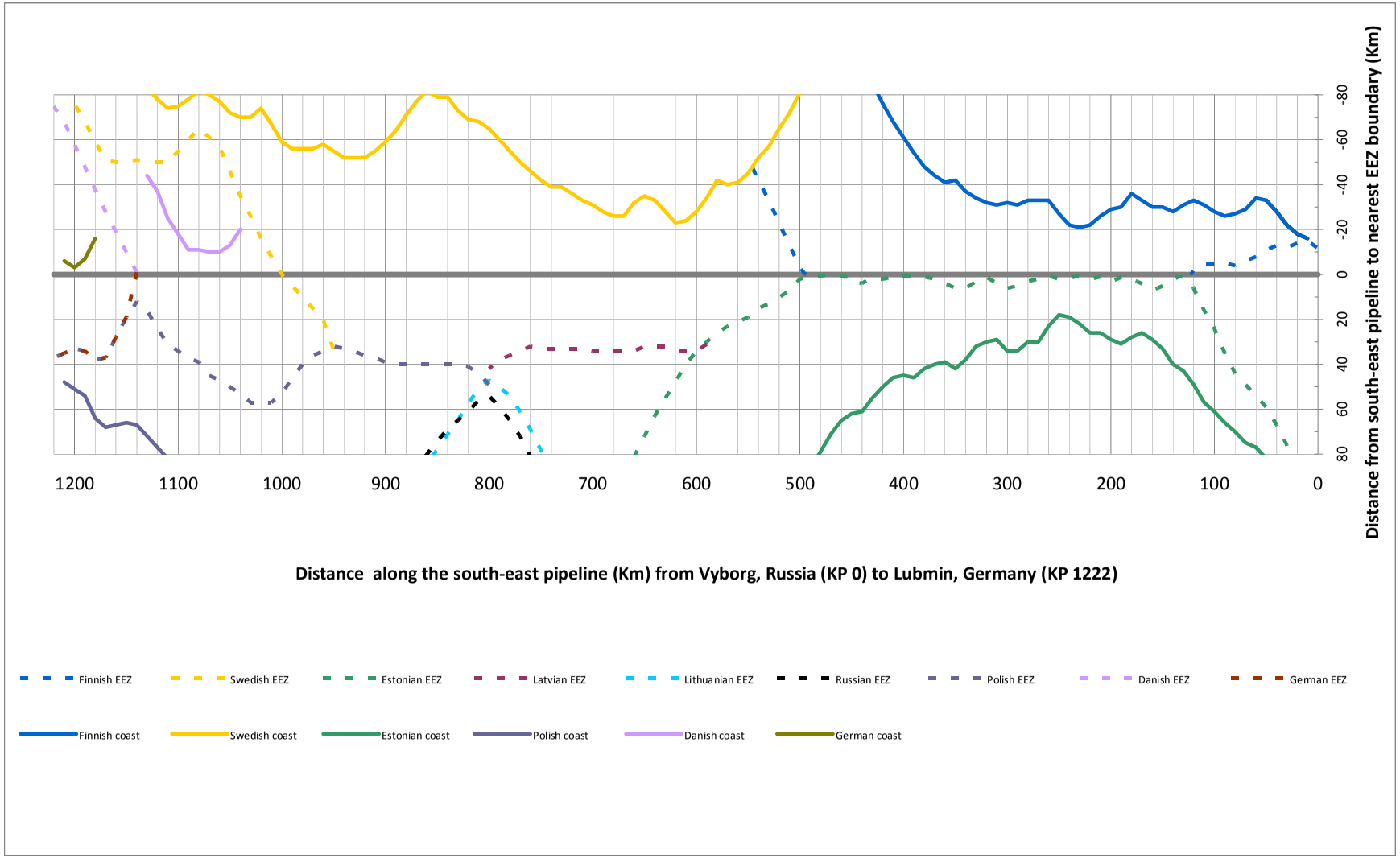


Figure 11.2 A diagrammatic representation of the pipelines' route in relation to the country EEZs

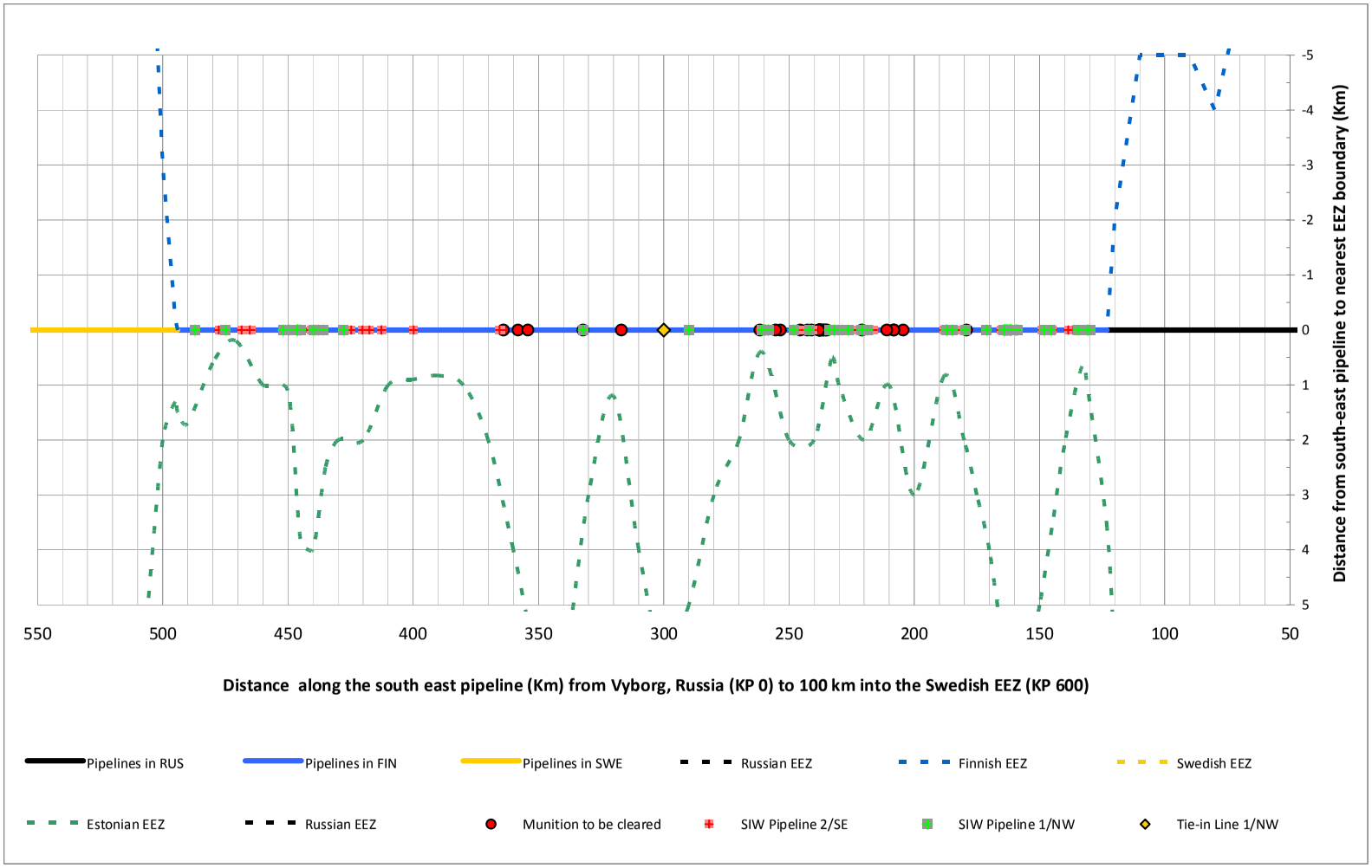


Figure 11.3 A diagrammatic representation of the pipelines' route in relation to the Estonian EEZ with a focus on KP ~261 and KP~471 (red circles) and seabed intervention works (rock placement only), the hyperbaric tie-in and munitions locations

11.3 Transboundary Impact Summary

11.3.1 Introduction

This section provides a summary of the transboundary impacts that are expected to be experienced by each of the Party of Origin countries as well as by the Only Affected Party countries. This transboundary impact summary is presented in two different ways. Firstly transboundary impacts are summarised in a tabular format in terms of their origin (PoO country) and AP country they affect. Separate tables are presented for each of the PoO countries. Each table itemises the impacts originating from the PoO country concerned and their impact on the AP countries.. Thereafter, the transboundary impacts that each AP country will experience are summarised (**Section 11.3.3** to **11.3.11**). Summarising transboundary impacts in this manner allows the reader to easily determine the origin of each transboundary impact, their significance and whether they will affect a specific AP country or not.

This summary is presented prior to a detailed assessment of each transboundary impact so as to afford the reader a general overview as to the impacts that are expected in each country concerned.

This summary is followed with a detailed presentation of:

- **Section 11.4**: The methodology used in the identification of transboundary impacts drawing on the assessment of impacts in **Chapter 9**
- **Section 11.5**: The screening of potential transboundary impacts
- **Section 11.6**: The detailed assessment of the identified transboundary impacts during the construction, pre-commissioning and commissioning, and operational phases of the Project as a result of both planned activities and unplanned events
- **Section 11.7**: A conclusion together with summary tables for transboundary impacts from both planned activities and unplanned events

11.3.2 Party of Origin Country Transboundary Summary Tables

Transboundary impact summaries are presented for each of the PoO countries in **Table 11.2** to **Table 11.6**.

Table 11.2 Transboundary impacts originating in Russia

	Transboundary Impact / Activity	Resource / Receptor	Russia (PoO) → Transboundary Impact: Finland (PoO)	Sweden (PoO)	Denmark (PoO)	Germany (PoO)	Estonia (OAP)	Latvia (OAP)	Lithuania (OAP)	Poland (OAP)
Construction Phase	**Increase in turbidity:**									
	Munitions clearance	Water column	○							
		Marine benthos	○							
	Pipe-laying and anchor handling	Marine benthos	○							
	Release of contaminants:									
	Munitions clearance	Water column	○							
	Pipe-laying and anchor handling	Marine benthos	○							
	Noise and vibration:									
	Munitions clearance	Fish	○				○			
		Marine mammals	○				○			
	Pipeline presence	Fish	○							
	Emission of pollutant gases:									
	Construction	Atmosphere	○	○	○	○	○	○	○	○
	Physical alteration of the seabed:									
	Anchor handling	Seabed	○							
	Physical loss of seabed habitats:									
	Anchor handling	Marine benthos	○							
	Pipe-laying	Marine benthos	○							
	Smothering:									
	Pipe-laying	Marine benthos	○							
	Restriction on navigation for fishing vessels:									
	Munitions clearance and imposition of an exclusion zone	Fisheries	○	○	○	○	○	○	○	○
	Construction and support vessel movements and imposition of an exclusion zone	Fisheries	○	○	○	○	○	○	○	○
	Restriction on navigation for shipping vessels:									
	Munitions clearance and imposition and imposition of an exclusion zone	Shipping and navigation	◐	◐	◐	◐	◐	◐	◐	◐
	Construction and support vessel movements and imposition of an exclusion zone	Shipping and navigation	◐	◐	◐	◐	◐	◐	◐	◐

○ minor ◐ minor-moderate ● moderate

Russia (PoO)

Transboundary Impact

	Transboundary Impact / Activity	Resource / Receptor	Finland (PoO)	Sweden (PoO)	Denmark (PoO)	Germany (PoO)	Estonia (OAP)	Latvia (OAP)	Lithuania (OAP)	Poland (OAP)
Operational Phase	**Disruption of current fishing patterns:** Pipeline presence	Fisheries	◐	◐	◐	◐	◐	◐	◐	◐
	Damage to fishing equipment: Pipeline presence	Fisheries	○	○	○	○	○	○	○	○
	Introduction of secondary habitats: Pipeline presence	Fish	○							

	Transboundary Impact / Unplanned Event									
Unplanned events	**Fuel / oil spill**	Water column	○				○			
		Atmosphere	○				○			
		Plankton	○				○			
		Marine benthos	◐				◐			
		Fish	◐				◐			
		Sea Birds	◐				◐			
		Marine mammals	◐				◐			
		Conservation areas	◐				◐			
		Fisheries	●				●			
		Shipping and navigation	○				○			
		Tourism and recreation	○				○			
		Offshore industry	○				○			
	Disturbance of conventional munitions	Water column	○							
		Marine mammals	○							
	Smothering: Pipe-laying	Fish	○				○			
	Pipeline failure:	Atmosphere	○	○	○	○	○	○	○	○

○ minor ◐ minor-moderate ● moderate

Table 11.3 Transboundary impacts originating in Finland

Finland (PoO)

Transboundary Impact

Transboundary Impact / Activity	Resource / Receptor	Russia (PoO)	Sweden (PoO)	Denmark (PoO)	Germany (PoO)	Estonia (OAP)	Latvia (OAP)	Lithuania (OAP)	Poland (OAP)
Construction Phase									
Increase in turbidity:									
Munitions clearance	Water column					○			
	Marine benthos					○			
Seabed intervention works	Water column					○			
Pipe-laying and anchor handling	Marine benthos	○	○						
Release of contaminants:									
Munitions clearance	Water column					○			
Seabed intervention works	Water column					○			
Pipe-laying and anchor handling	Marine benthos	○	○						
Noise and vibration:									
Munitions clearance	Fish					◐			
	Marine mammals					●			
	Marine benthos					○			
Pipeline presence	Fish	○	○						
Emission of pollutant gases:									
Construction	Atmosphere	○	○	○	○	○	○	○	○
Physical alteration of the seabed:									
Anchor handling	Seabed	○	○						
Physical loss of seabed habitats:									
Anchor handling	Marine benthos	○	○						
Pipe-laying	Marine benthos	○	○						
Smothering:									
Pipe-laying	Marine benthos	○	○						
Restriction on navigation for fishing vessels:									
Munitions clearance and imposition and imposition of an exclusion zone	Fisheries	○	○	○	○	○	○	○	○
Construction and support vessel movements and imposition of an exclusion zone	Fisheries	○	○	○	○	○	○	○	○
Restriction on navigation for shipping vessels:									
Munitions clearance and imposition of an exclusion zone	Shipping and navigation	◐	◐	◐	◐	◐	◐	◐	◐
Construction and support vessel movements and imposition of an exclusion zone	Shipping and navigation	◐	◐	◐	◐	◐	◐	◐	◐

○ minor ◐ minor-moderate ● moderate

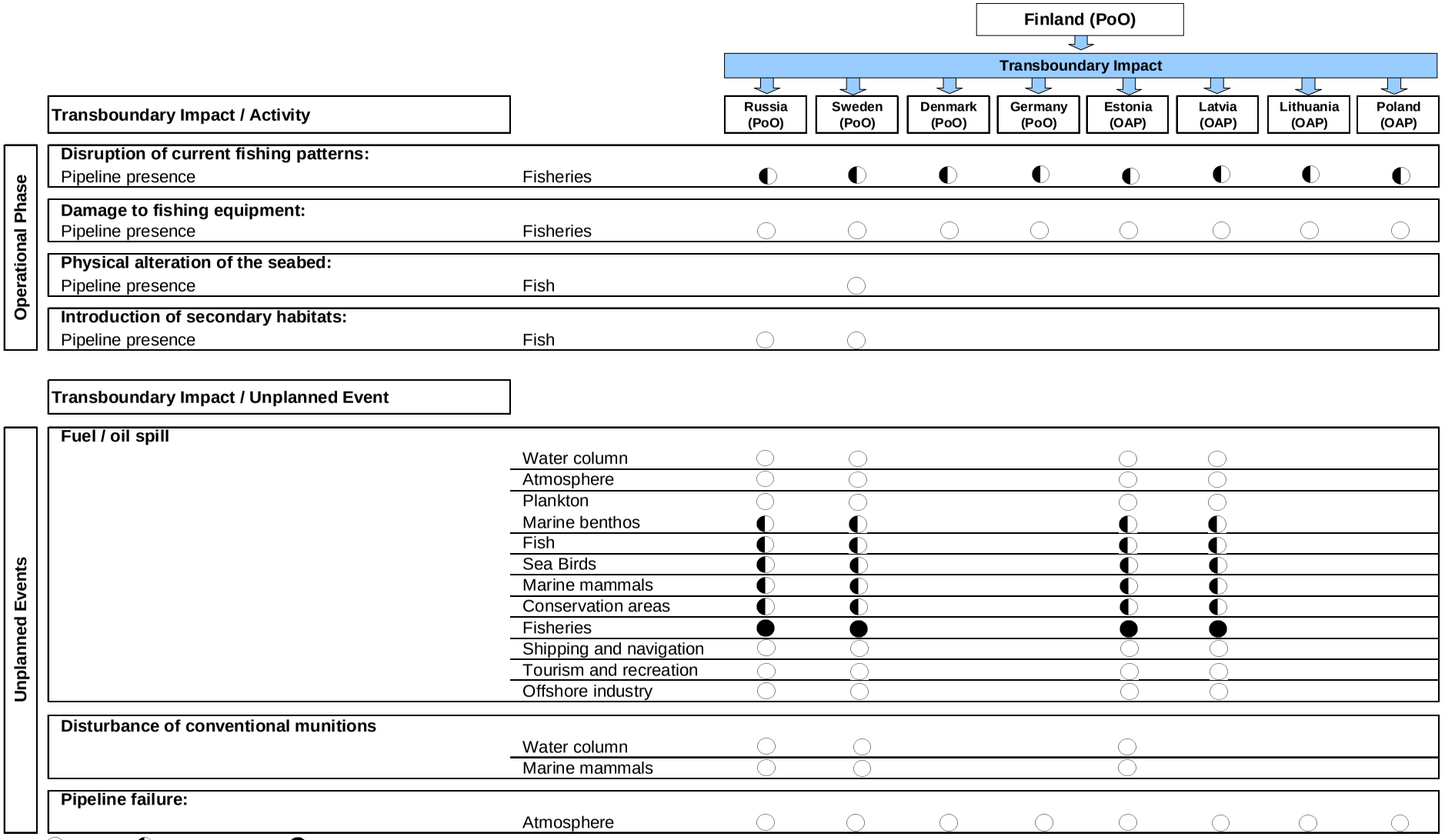

Finland (PoO)
Transboundary Impact
Russia (PoO)
Sweden (PoO)
Denmark (PoO)
Germany (PoO)
Estonia (OAP)
Latvia (OAP)
Lithuania (OAP)
Poland (OAP)
Transboundary Impact / Activity
Operational Phase
Disruption of current fishing patterns:
Pipeline presence
Fisheries
Damage to fishing equipment:
Pipeline presence
Fisheries
Physical alteration of the seabed:
Pipeline presence
Fish
Introduction of secondary habitats:
Pipeline presence
Fish
Transboundary Impact / Unplanned Event
Unplanned Events
Fuel / oil spill
Water column
Atmosphere
Plankton
Marine benthos
Fish
Sea Birds
Marine mammals
Conservation areas
Fisheries
Shipping and navigation
Tourism and recreation
Offshore industry
Disturbance of conventional munitions
Water column
Marine mammals
Pipeline failure:
Atmosphere
minor
minor-moderate
moderate

Table 11.4 Transboundary impacts originating in Sweden

	Transboundary Impact / Activity	Resource / Receptor	Sweden (PoO) → Transboundary Impact: Russia (PoO)	Finland (PoO)	Denmark (PoO)	Germany (PoO)	Estonia (OAP)	Latvia (OAP)	Lithuania (OAP)	Poland (OAP)
Construction Phase	**Increase in turbidity:**									
	Pipe-laying and anchor handling	Marine benthos		○	○					
	Release of contaminants:									
	Pipe-laying and anchor handling	Marine benthos		○	○					
	Noise and vibration:									
	Pipeline presence	Fish		○	○					
	Emission of pollutant gases:									
	Construction	Atmosphere	○	○	○	○	○	○	○	○
	Physical alteration of the seabed:									
	Anchor handling	Seabed		○	○					
	Physical loss of seabed habitats:									
	Anchor handling	Marine benthos		○	○					
	Pipe-laying	Marine benthos		○	○					
	Smothering:									
	Pipe-laying	Marine benthos		○	○					
	Restriction on navigation for fishing vessels:									
	Munitions clearance and imposition and imposition of an exclusion zone	Fisheries	○	○	○	○	○	○	○	○
	Construction and support vessel movements and imposition of an exclusion zone	Fisheries	○	○	○	○	○	○	○	○
	Restriction on navigation for shipping vessels:									
	Munitions clearance and imposition of an exclusion zone	Shipping and navigation	○	○	○	○	○	○	○	○
	Construction and support vessel movements and imposition of an exclusion zone	Shipping and navigation	○	○	○	○	○	○	○	○

○ minor ◐ minor-moderate ● moderate

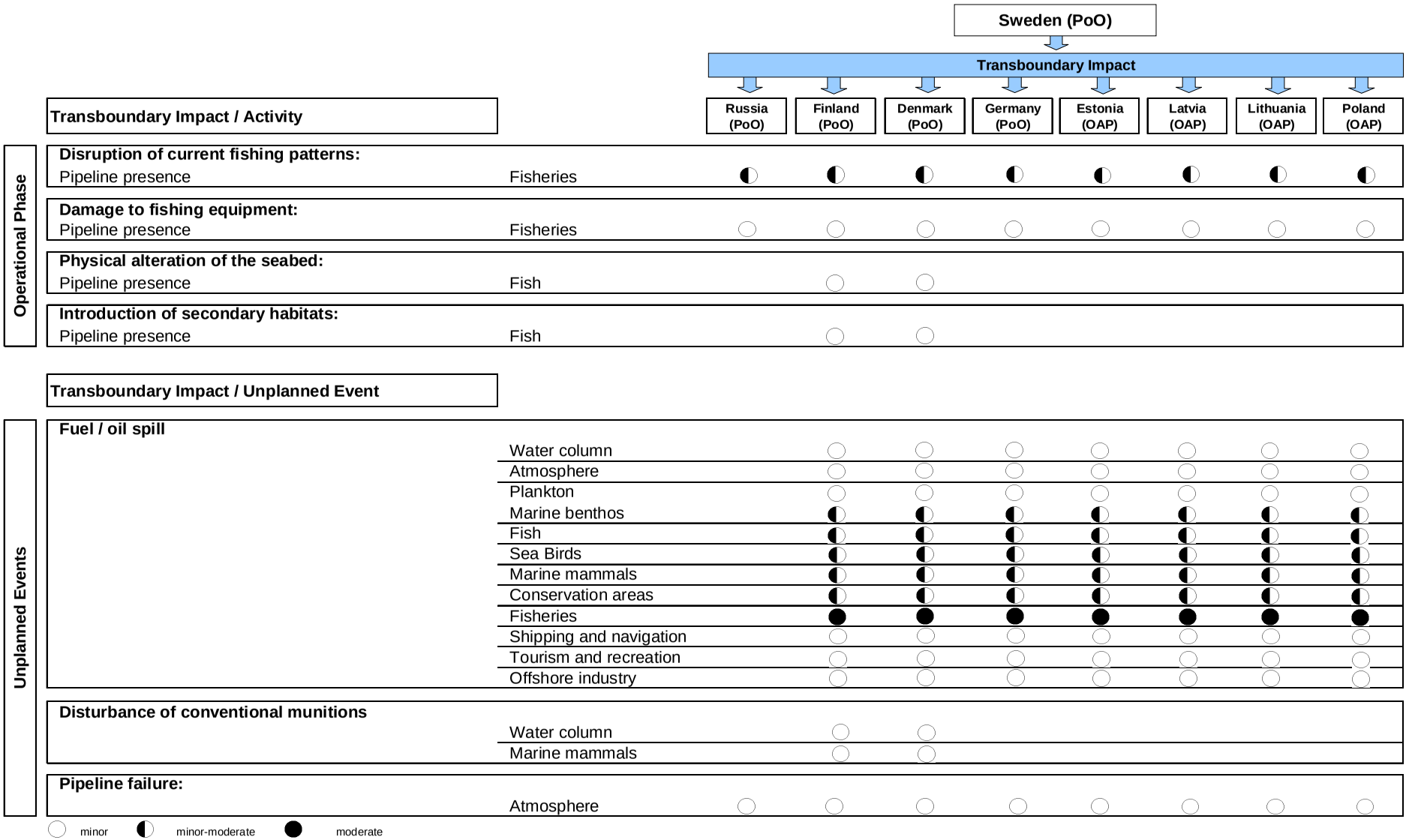
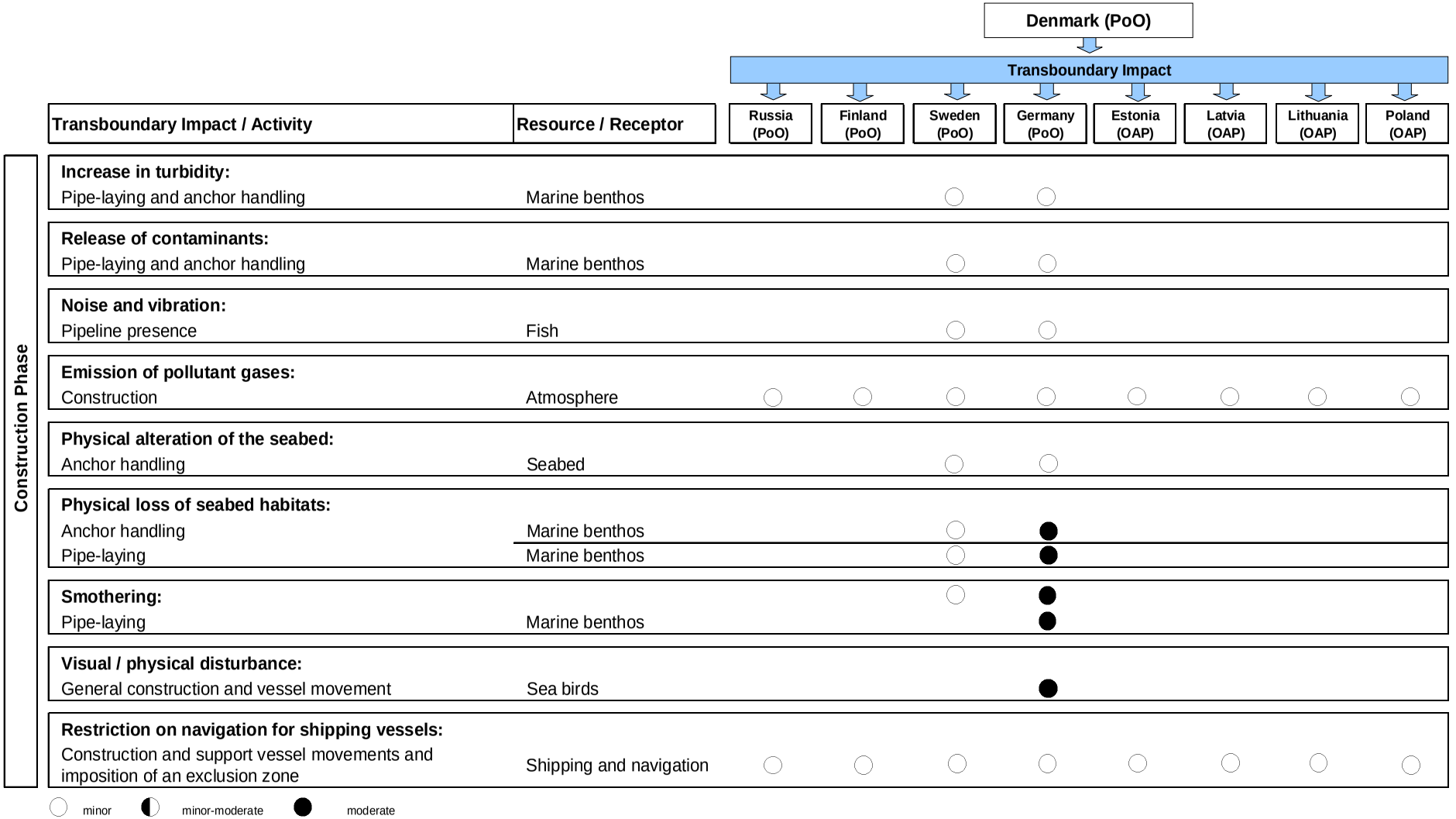

Sweden (PoO)
Transboundary Impact
Russia (PoO)
Finland (PoO)
Denmark (PoO)
Germany (PoO)
Estonia (OAP)
Latvia (OAP)
Lithuania (OAP)
Poland (OAP)
Transboundary Impact / Activity
Operational Phase
Disruption of current fishing patterns:
Pipeline presence
Fisheries
Damage to fishing equipment:
Pipeline presence
Fisheries
Physical alteration of the seabed:
Pipeline presence
Fish
Introduction of secondary habitats:
Pipeline presence
Fish
Transboundary Impact / Unplanned Event
Unplanned Events
Fuel / oil spill
Water column
Atmosphere
Plankton
Marine benthos
Fish
Sea Birds
Marine mammals
Conservation areas
Fisheries
Shipping and navigation
Tourism and recreation
Offshore industry
Disturbance of conventional munitions
Water column
Marine mammals
Pipeline failure:
Atmosphere
minor
minor-moderate
moderate

Table 11.5 Transboundary impacts originating in Denmark



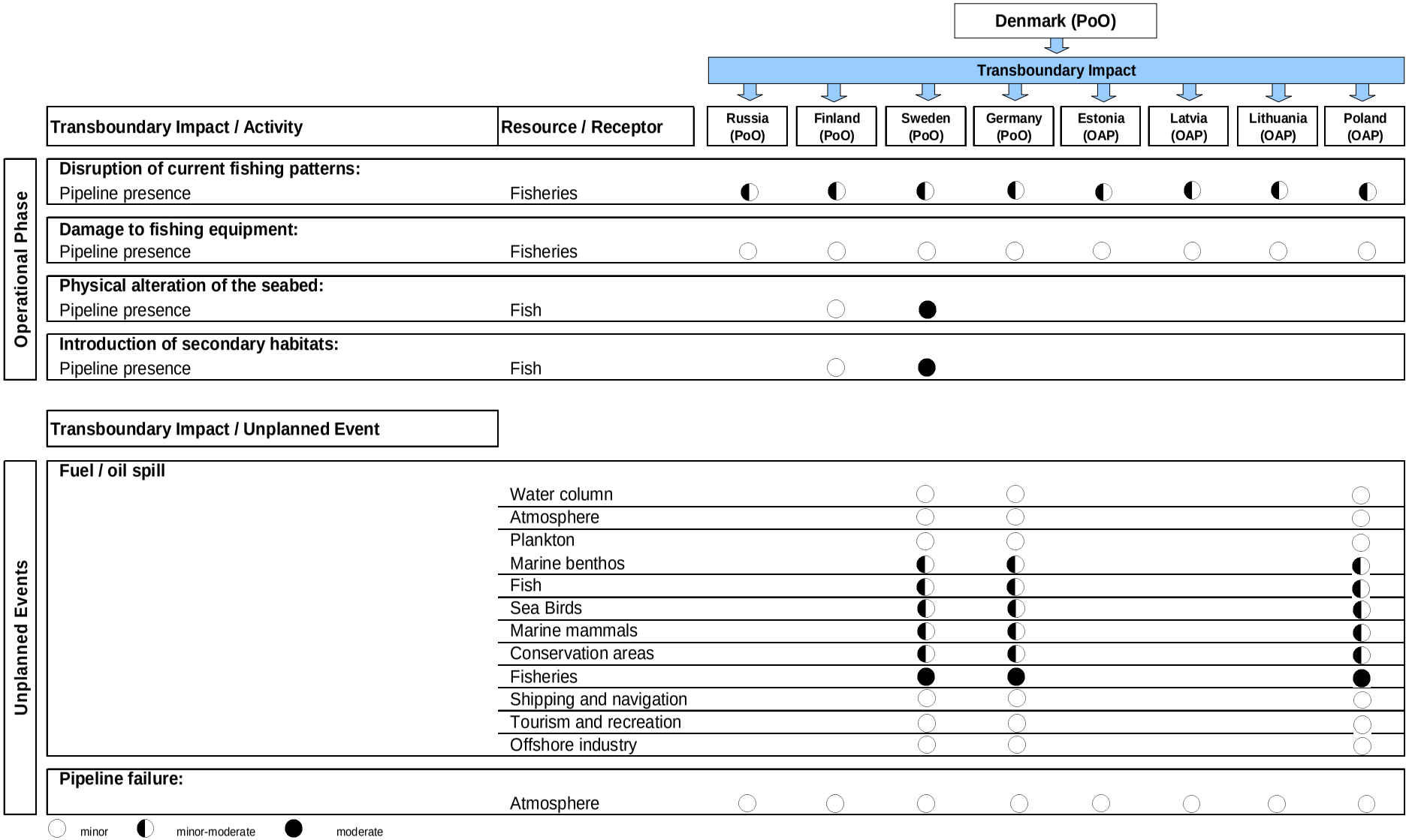
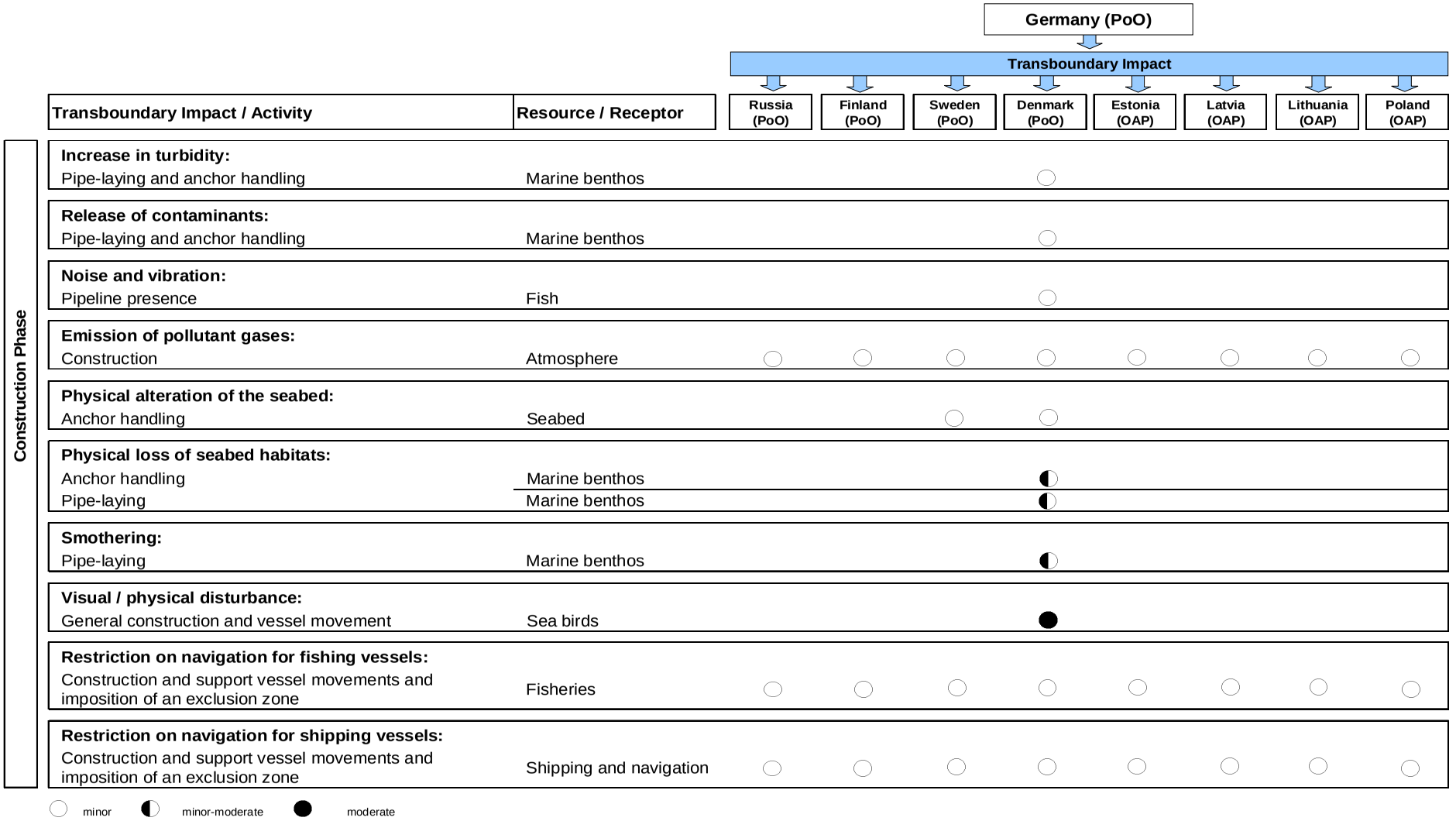
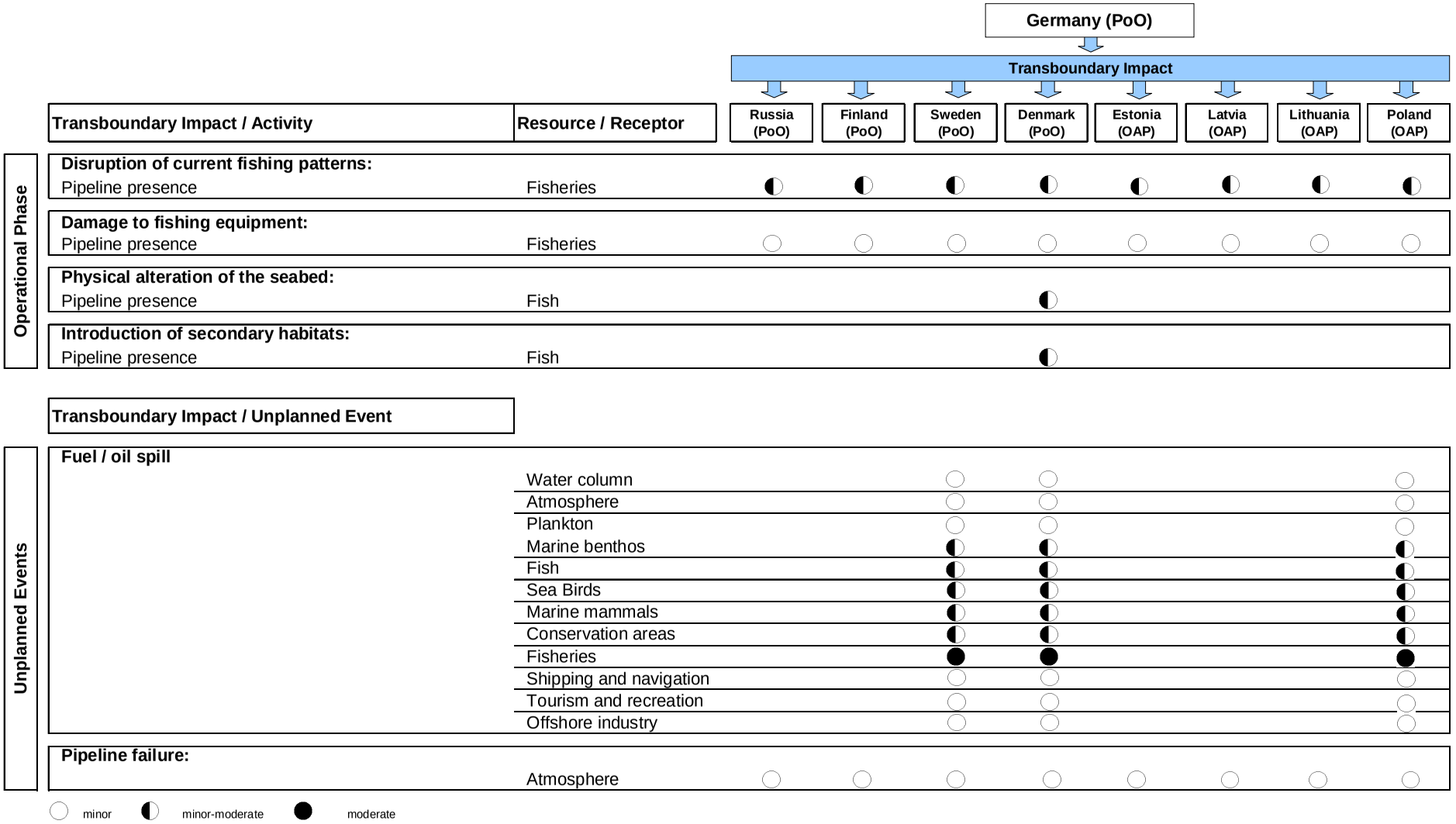

Denmark (PoO)
Transboundary Impact
Transboundary Impact / Activity
Resource / Receptor
Russia (PoO)
Finland (PoO)
Sweden (PoO)
Germany (PoO)
Estonia (OAP)
Latvia (OAP)
Lithuania (OAP)
Poland (OAP)
Operational Phase
Disruption of current fishing patterns:
Pipeline presence
Fisheries
Damage to fishing equipment:
Pipeline presence
Fisheries
Physical alteration of the seabed:
Pipeline presence
Fish
Introduction of secondary habitats:
Pipeline presence
Fish
Transboundary Impact / Unplanned Event
Unplanned Events
Fuel / oil spill
Water column
Atmosphere
Plankton
Marine benthos
Fish
Sea Birds
Marine mammals
Conservation areas
Fisheries
Shipping and navigation
Tourism and recreation
Offshore industry
Pipeline failure:
Atmosphere
minor
minor-moderate
moderate

Table 11.6 Transboundary impacts originating in Germany




Germany (PoO)
Transboundary Impact
Transboundary Impact / Activity
Resource / Receptor
Russia (PoO)
Finland (PoO)
Sweden (PoO)
Denmark (PoO)
Estonia (OAP)
Latvia (OAP)
Lithuania (OAP)
Poland (OAP)
Operational Phase
Disruption of current fishing patterns:
Pipeline presence
Fisheries
Damage to fishing equipment:
Pipeline presence
Fisheries
Physical alteration of the seabed:
Pipeline presence
Fish
Introduction of secondary habitats:
Pipeline presence
Fish
Transboundary Impact / Unplanned Event
Unplanned Events
Fuel / oil spill
Water column
Atmosphere
Plankton
Marine benthos
Fish
Sea Birds
Marine mammals
Conservation areas
Fisheries
Shipping and navigation
Tourism and recreation
Offshore industry
Pipeline failure:
Atmosphere
minor
minor-moderate
moderate

11.3.3 Russia

Transboundary impacts that will be experienced in the Russian EEZ as well as by fishing and shipping vessels originating from Russia during the construction phase are limited to the emission of pollutant gases, and their impact on the atmosphere, a restriction to fishing and shipping vessel navigation due to munitions clearance and pipe-laying exclusion zones and some back-to-back impacts where the pipelines cross the EEZ boundary into the Finnish EEZ. The emission of pollutant gases along the pipelines' route has been assessed to be of **minor** significance. A restriction on fishing and shipping vessel navigation in PoO countries due to exclusions zones is assessed to be of **minor** significance for most of the pipelines' route and of **minor** and **minor** to **moderate** significance in the Gulf of Finland (Finland). These impacts will be experienced by all the PoO countries and the OAP countries. The Russian EEZ will also experience some back-to-back impacts during the construction phase. Impacts of **minor** significance are expected on the seabed and marine benthos due to pipe-laying and anchor handling in the Finnish EEZ at, or within 500 meters of, the EEZ boundary crossing point. Identical back-to-back impacts originating in the Russian EEZ are expected to be experienced in the Finnish EEZ.

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Russian fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark and some back-to-back impacts. Impacts on fishing fleets include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height). Some back-to-back impacts of **minor** significance are expected on fish in the Russian EEZ due to pipeline presence at the Russian/Finnish EEZ boundary crossing point.

Unplanned events that may impact upon the Russian EEZ are a major oil spill, the disturbance of conventional munitions and a gas release due to a pipeline rupture. Impacts due to a major oil spill depend on the initial source location (Finland), the size of the spill and its proximity to the Russian EEZ. The probability of such an event occurring has been assessed to be of **low** probability and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts from the disturbance and unplanned detonation of conventional munitions could result in a transboundary impact on the water column, due to an increase in turbidity, and on marine mammals, due to a sudden increase in noise and vibration, should the impact source be in the Finnish EEZ and in close proximity (<10 km) to the Russian EEZ. The probability of such an event occurring is **low** and overall significance is also **low**. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.4 Finland

Transboundary impacts that will be experienced in the Finnish EEZ during the construction phase include the sudden increase in noise and vibration due to munitions clearance and its impact on marine mammals and fish, the emission of pollutant gases and their impact on the atmosphere, an increase in turbidity and the release of contaminants and their impact on the water column and marine benthos and some back-to-back impacts where the pipelines cross the EEZ boundary from the Russian EEZ and where they cross into the Swedish EEZ. Impacts in terms of restrictions on navigation will also be experienced by fishing and shipping vessels originating from Finland due to the munitions clearance and pipe-laying exclusion zones. Munitions clearance in the Russian EEZ (when confirmed) near Gogland has the potential to impact on marine mammals (harbour porpoise) and fish in the Finnish EEZ. This impact has been assessed to be of **minor** significance for both receptors. No impacts will be experienced by the Eastern Gulf of Finland Archipelago and Waters Natura 2000 site. The impacts associated with the emission of pollutant gases along the pipelines' route will be experienced by all the PoO countries and the OAP countries and has been assessed to be of **minor** significance. Munitions that require clearance are not known in the Russian EEZ but the possibility exists that munitions clearance near the Finnish EEZ may result in impacts on the water column and marine benthos in Finland due to an increase in turbidity and the release of contaminants. These impacts have been assessed to be of **minor** significance. A restriction on Finnish fishing and shipping vessel navigation in the PoO countries due the exclusion zones is expected and has been assessed to be of **minor** significance for most of the pipelines' route. In the Gulf of Finland (Russia), however, the impact on fishing and shipping vessel navigation is expected to be of **minor** and **minor** to **moderate** significance respectively. The Finnish EEZ will experience some back-to-back impacts during the construction phase. Impacts of **minor** significance are expected on the seabed and marine benthos in the Finnish EEZ due to pipe-laying and anchor handling in the Russian and Swedish EEZs at, or within 500 meters of, the Russia/Finland and the Finland/Sweden EEZ boundary crossing points. Identical back-to-back impacts originating in the Finnish EEZ are expected in the Russian and Swedish EEZs.

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Finnish fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark and some back-to-back impacts. Impacts on fishing fleets include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height). Some back-to-back impacts of **minor** significance are expected on fish in the Finnish EEZ due to pipeline presence at the Russian/Finnish and Finnish/Swedish EEZ boundary crossing points.

Unplanned events that may impact upon the Finnish EEZ are a major oil spill, the disturbance of conventional munitions and a gas release due to a pipeline leak. Impacts due to a major oil spill

depend on the initial source location (Russia or Sweden), the size of the spill and its proximity to the Finnish EEZ. The probability of such an event occurring has been assessed to be of **low** probability and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts from the disturbance and unplanned detonation of conventional munitions could result in a transboundary impact on the water column, due to an increase in turbidity, and on marine mammals, due to a sudden increase in noise and vibration, should the impact source be in the Russian or Swedish EEZ and in close proximity (<10 km) to the Finnish EEZ. The probability of such an event occurring is **low** and overall significance is also **low**. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.5 Sweden

Transboundary impacts that will be experienced in the Swedish EEZ as well as by fishing and shipping vessels originating from Sweden during the construction phase are limited to the emission of pollutant gases, and their impact on the atmosphere, a restriction to fishing and shipping vessel navigation due to munitions clearance and pipe-laying exclusion zones and some back-to-back impacts where the pipelines cross the EEZ boundary from the Finnish EEZ and where they cross into the Danish EEZ. The emission of pollutant gases along the pipelines' route has been assessed to be of **minor** significance. A restriction on fishing and shipping vessel navigation in PoO countries due to exclusions zones is assessed to be of **minor** significance for most of the pipelines' route and of **minor** and **minor** to **moderate** significance in the Gulf of Finland (Russia and Finland). These impacts will be experienced by all the PoO countries and the OAP countries. The Swedish EEZ will experience some back-to-back impacts during the construction phase. Impacts of **minor** significance are expected on the seabed and marine benthos of Sweden due to pipe-laying and anchor handling in the Finnish and Danish EEZs at, or within 500 meters of, the Finland/Sweden and Sweden/Denmark EEZ boundary crossing points. Identical back-to-back impacts originating in the Swedish EEZs are expected in the Finnish and Danish EEZs.

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Swedish fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark and some back-to-back impacts. Impacts on fishing fleets include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height). Some back-to-back impacts of **minor** significance are expected on fish in the

Swedish EEZ due to the pipeline presence at the Finnish/Swedish and Swedish/Danish EEZ boundary crossing points.

Unplanned events that may impact upon the Swedish EEZ are a major oil spill, the disturbance of conventional munitions and a gas release due to a pipeline leak. Impacts due to a major oil spill depend on the initial source location (Finland, Denmark or Germany), the size of the spill and its proximity to the Swedish EEZ. The probability of such an event occurring has been assessed to be of **low** probability and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts from the disturbance and unplanned detonation of conventional munitions could result in a transboundary impact on the water column, due to an increase in turbidity, and on marine mammals, due to a sudden increase in noise and vibration, should the impact source be in the Finnish EEZ and in close proximity (<10 km) to the Swedish EEZ. The probability of such an event occurring is **low** and overall significance is also **low**. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.6 Denmark

Transboundary impacts that will be experienced in the Danish EEZ as well as by fishing and shipping vessels originating from Denmark during the construction phase are limited to the emission of pollutant gases, and their impact on the atmosphere, a restriction to fishing and shipping vessel navigation due to munitions clearance and pipe-laying exclusion zones and some back-to-back impacts where the pipelines cross the EEZ boundary from the Swedish EEZ and where they cross into the German EEZ. The emission of pollutant gases along the pipelines' route has been assessed to be of **minor** significance. A restriction on fishing and shipping vessel navigation in PoO countries due to exclusions zones is assessed to be of **minor** significance for most of the pipelines' route and of **minor** and **minor** to **moderate** significance in the Gulf of Finland (Russia and Finland). These impacts will be experienced by all the PoO countries and the OAP countries. The Danish EEZ will experience some back-to-back impacts during the construction phase. Impacts of **minor** significance are expected on the seabed and marine benthos of Denmark due to pipe-laying and anchor handling in the Swedish EEZ at, or within 500 meters of, the Swedish/Danish EEZ boundary. Identical back-to-back impacts are expected in the Swedish EEZ from identical activities undertaken in the Danish EEZ. Impacts of **minor** to **moderate** significance are expected on the seabed, marine benthos and sea birds in the Danish EEZ due to pipe-laying, anchor handling and general construction and vessel movement in the German EEZ at, or within 500 meters of, the Danish/German EEZ boundary. Identical back-to-back impacts are expected in the German EEZ from identical activities initiated in the Danish EEZ.

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Danish fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark and some back-to-back impacts. Impacts on fishing fleets include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height). Some back-to-back impacts of **minor** to **moderate** significance are expected on fish in the Danish EEZ due to pipeline presence at the Swedish/Danish and Danish/German EEZ boundary crossing points.

Unplanned events that may impact upon the Danish EEZ are a major oil spill, the disturbance of conventional munitions and a gas release due to a pipeline leak. Impacts due to a major oil spill depend on the initial source location (Germany or Sweden), the size of the spill and its proximity to the Danish EEZ. The probability of such an event occurring has been assessed to be of **low** probability and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts from the disturbance and unplanned detonation of conventional munitions could result in a transboundary impact on the water column, due to an increase in turbidity, and on marine mammals, due to a sudden increase in noise and vibration, should the impact source be in the Swedish EEZ and in close proximity (<10 km) to the Danish EEZ. The probability of such an event occurring is **low** and overall significance is also **low**. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.7 Germany

Transboundary impacts that will be experienced in the German EEZ as well as by fishing and shipping vessels originating from Germany during the construction phase are limited to the emission of pollutant gases, and their impact on the atmosphere, a restriction to fishing and shipping vessel navigation due to munitions clearance and pipe-laying exclusion zones and some back-to-back impacts where the pipelines cross the EEZ boundary from the Danish EEZ. The emission of pollutant gases along the pipelines' route has been assessed to be of **minor** significance. A restriction on fishing and shipping vessel navigation in PoO countries due to exclusions zones is assessed to be of **minor** significance for most of the pipelines' route and of **minor** and **minor** to **moderate** significance in the Gulf of Finland (Russia and Finland). These impacts will be experienced by all the PoO countries and the OAP countries. The German EEZ will experience some back-to-back impacts during the construction phase. Impacts of **minor** to **moderate** significance are expected on the seabed, marine benthos and sea birds in the German EEZ due to pipe-laying, anchor handling and general construction and vessel

movement in the Danish EEZ at, or within 500 meters of, the Danish/German EEZ EEZ boundary. Identical back-to-back impacts are expected in the Danish EEZ due to identical activities undertaken in the German EEZ.

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the German fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark and some back-to-back impacts. Impacts on fishing fleets include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height). Some back-to-back impacts of **minor** to **moderate** significance are expected on fish in the German EEZ due to pipeline presence in at the Danish/German EEZ boundary crossing point.

The only unplanned events that may impact upon the German EEZ are a major oil spill and a gas release due to a pipeline leak. Impacts due to a major oil spill depend on the initial source location (Denmark or Sweden), the size of the spill and its proximity to the German EEZ. The probability of such an event occurring has been assessed to be **low** and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.8 Estonia

Transboundary impacts that will be experienced in the Estonian EEZ during the construction phase include an increase in turbidity due to rock placement and munitions clearance, the release of contaminants due to rock placement and munitions clearance, the sudden increase in noise and vibration due to munitions clearance and the emission of pollutant gases. Impacts, in terms of restrictions on navigation, will also be experienced by fishing and shipping vessels originating from Estonia due to the munitions clearances and pipe-laying exclusion zones. An increase in turbidity due to rock placement and munitions clearance in the Finnish EEZ has the potential to impact the water column and marine benthos (only rock placement) in the Estonian EEZ. These impacts are expected to be of **minor** significance for both receptors. Rock placement and munitions clearance will also result in the release of contaminants from the seabed, which will impact upon the water column in the Estonian EEZ (only in certain areas). The impact on the water column is of **minor** significance. Munitions clearance in the Finnish and Russian EEZ has the potential to impact on marine mammals and fish in the Estonian EEZ. This impact has been assessed to be of **moderate** and **minor** to **moderate** significance for each

receptor due to munitions clearance in the Finnish EEZ. Munitions clearance in the Russian EEZ (when confirmed) will result in **minor** impacts on both receptors in Estonia. Marine benthos may be impacted by munitions clearance in the vicinity of KP ~261. This impact has been assessed to be of **minor** significance. The impacts associated with the emission of pollutant gases along the pipelines' route will be experienced by all the PoO countries and the OAP countries and has been assessed to be of **minor** significance. A restriction on Estonian fishing and shipping vessel navigation in PoO countries due to exclusion zones is expected and has been assessed to be of **minor** significance for most of the pipelines' route. In the Gulf of Finland (Russia and Finland), however, the impact on fishing and shipping vessel navigation is expected to be of **minor** to **moderate** significance respectively.

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Estonian fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark. These impacts include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height).

Unplanned events that may impact upon the Estonian EEZ are a major oil spill, the disturbance of conventional munitions and a gas release due to a pipeline leak. Impacts due to a major oil spill depend on the initial source location (Russia, Finland or Sweden), the size of the spill and its proximity to the Estonian EEZ. The probability of such an event occurring has been assessed to be of **low** probability and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts from the disturbance and unplanned detonation of conventional munitions could result in a transboundary impact on the water column, due to an increase in turbidity, and on marine mammals, due to a sudden increase in noise and vibration, should the impact source be in the Russian or Finnish EEZ and in close proximity (<10 km) to the Estonian EEZ. The probability of such an event occurring is **low** and overall significance is also **low**. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.9 Latvia

Transboundary impacts that will be experienced in the Latvian EEZ as well as by fishing and shipping vessels originating from Latvia during the construction phase are limited to the emission of pollutant gases, and their impact on the atmosphere, as well as a restriction to fishing and shipping vessel navigation due to munitions clearance and pipe-laying exclusion zones. These impacts will be experienced by all the PoO countries and the OAP countries. The

emission of pollutant gases along the pipelines' route has been assessed to be of **minor** significance. A restriction on fishing and shipping vessel navigation in PoO countries due to exclusions zones is assessed to be of **minor** significance for most of the pipelines' route and of **minor** and **minor** to **moderate** significance in the Gulf of Finland (Russia and Finland).

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Latvian fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark. These impacts include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height).

The only unplanned events that may impact upon the Latvian EEZ are a major oil spill and a gas release due to a pipeline leak. Impacts due to a major oil spill depend on the initial source location (Finland or Sweden), the size of the spill and its proximity to the Latvian EEZ. The probability of such an event occurring has been assessed to be **low** and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts due to a pipeline rupture would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.10 Lithuania

Transboundary impacts that will be experienced in the Lithuanian EEZ as well as by fishing and shipping vessels originating from Lithuania during the construction phase are limited to the emission of pollutant gases, and their impact on the atmosphere, as well as a restriction to fishing and shipping vessel navigation due to munitions clearance and pipe-laying exclusion zones. These impacts will be experienced by all the PoO countries and the OAP countries. The emission of pollutant gases along the pipelines' route has been assessed to be of **minor** significance. A restriction on fishing and shipping vessel navigation in PoO countries due to exclusions zones is assessed to be of **minor** significance for most of the pipelines' route and of **minor** and **minor** to **moderate** significance in the Gulf of Finland (Russia and Finland).

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Lithuanian fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark. These impacts include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height).

The only unplanned events that may impact upon the Lithuanian EEZ are a major oil spill and a gas release due to a pipeline leak. Impacts due to a major oil spill depend on the initial source location (Sweden), the size of the spill and its proximity to the Lithuanian EEZ. The probability of such an event occurring has been assessed to be **low** and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.3.11 Poland

Transboundary impacts that will be experienced in the Polish EEZ as well as by fishing and shipping vessels originating from Poland during the construction phase are limited to the emission of pollutant gases, and their impact on the atmosphere, as well as a restriction to fishing and shipping vessel navigation due to munitions clearance and pipe-laying exclusion zones. These impacts will be experienced by all the PoO countries and the OAP countries. The emission of pollutant gases along the pipelines' route has been assessed to be of **minor** significance. A restriction on fishing and shipping vessel navigation in PoO countries due to exclusions zones is assessed to be of **minor** significance for most of the pipelines' route and of **minor** and **minor** to **moderate** significance in the Gulf of Finland (Russia and Finland).

Transboundary impacts that will be experienced during the operational phase are limited to the impact of pipeline presence on the Polish fishing fleets, which operate in the EEZs of Russia, Finland, Sweden and Denmark. These impacts include the disruption of fishing patterns and the damage to fishing equipment as a result of pipeline presence. These impacts have been assessed to be of **minor** to **moderate** and **minor** significance respectively. The impact on fisheries will be more pronounced in free span areas (> 0.5 m in height).

The only unplanned events that may impact upon the Polish EEZ are a major oil spill and a gas release due to a pipeline leak. Impacts due to a major oil spill depend on the initial source location (Sweden, Denmark or Germany), the size of the spill and its proximity to the Polish EEZ. The probability of such an event occurring has been assessed to be **low** and of overall **low** to **moderate** significance on a number of resources/receptors including the water column, atmosphere, plankton, marine benthos, fish, sea birds, marine mammals, nature conservation areas, fisheries, shipping and navigation, tourism and recreation and the offshore industry. Impacts due to a pipeline leak would result in the release of gas which would affect all the PoO countries and the OAP countries no matter what the location. The probability of a pipeline leak is **low** and the overall significance is **low**.

11.4 Methodology for Identification of Transboundary Impacts

11.4.1 The systematic Identification of all Nord Stream Impacts

The assessment of transboundary impacts draws extensively upon the findings of the impact assessment presented in **Chapter 9,** which has been performed in line with the impact assessment methodology presented in **Chapter 7.**

All planned activities and potential unplanned (accidental) events related to the Project, along the entire offshore pipelines' length, during the construction, pre-commissioning and commissioning and operational phases, have been thoroughly examined for their potential to give rise to significant impacts. Impacts resulting from decommissioning activities have not been considered as explained in **Section 9.11**.

Impacts resulting from planned activities and unplanned events have been assessed as being either significant or insignificant in **Chapter 9**. Significant impacts arising from planned activities have been assessed to be of **minor** or **moderate** significance; while potential impacts that may arise from conceivable unplanned events are designated as being of **low** or **moderate** significance (the distinction being that the assessment of unplanned events has included the consideration of likelihood of occurrence (probability) in the designation of significance). No impacts have been assessed to be of **major** or **high** significance for planned impacts and unplanned events respectively. As identified in **Section 9.12.1**, the possibility that a number of insignificant impacts may give rise to a significant impact has been considered. No such impacts have been identified.

11.4.2 The Identification of Potential Transboundary Impacts

In order for an impact to be considered as a potential transboundary impact it must demonstrate two attributes:

- Firstly, it must have been assessed in **Chapter 9** to be significant, i.e. all impacts of significance have been considered as potential transboundary impacts. There is no evidence available to the Project that suggests that an impact which is classified as insignificant in the PoO country in which it originates would display greater significance should it extend into the EEZ of an AP country. As such, no impacts which have been assessed in **Chapter 9** to be insignificant have been considered as potential transboundary impacts

- Secondly, it must be of a scale that indicates that it could extend across a boundary into the territory of another country. As stated in **Section 11.1**, for the purposes of this assessment, it is the EEZ boundaries that define transboundary impacts

Transboundary impacts have been grouped into two categories, namely those that occur where each pipeline crosses the EEZ boundary between two PoO countries, termed back-to-back impacts and those that do not fall into this category (i.e. those that occur elsewhere along the pipelines' route due to their respective 'scale' and the proximity of the pipelines to EEZ boundaries).

Back-to-back impacts result from planned Project activities, such as anchor handling and pipe-laying, that are carried out at, or in the immediate vicinity (within 500m on either side) of, the point where each pipeline crosses the EEZ boundary between two PoO countries. These impacts, generally as a result of progressive works along the pipelines' route, or the physical presence of the pipelines across an EEZ boundary, are anticipated to be identical or very similar in each of the two bordering EEZs. For completeness, back-to-back impacts have been identified and detailed in **Table 11.7** but do not form the focus of this chapter, since these impacts have been adequately assessed in **Chapter 9** as well as in the National EIAs.

In the case of unplanned events (such as a fuel/oil spill, for example) or where planned activities in one PoO country are not matched by similar activities in the adjacent PoO country at or within 500 m of the EEZ boundary (such as munitions clearance, for example), then the impacts from such events and activities have been examined to ascertain whether transboundary impacts between the two PoO countries will occur (in which case the PoO country receiving the impact will be an Affected Party). Such impacts are not back-to-back impacts.

For the most part, the pipelines' route does not approach within 500 m of the EEZ of an OAP country. As a result, impacts along the pipelines' route that have been assessed in **Chapter 9** as being of **local** scale (i.e. those extending up to a maximum of 500 m from the source location) as per the methodology presented in **Chapter 7** are not considered as potential transboundary impacts as they would not extend across an EEZ boundary. All significant impacts assessed in **Chapter 9** to be of **regional** (extending 500 m to 10 km) or **national** (extending beyond 10 km) scale could, depending on their source location, be experienced within the EEZ of an AP country, and hence these impacts have all been considered as potential transboundary impacts. This reasoning is presented diagrammatically in **Figure 11.4**. The only exceptions to this rule are the impacts associated with activities that will take place in the vicinity of KP ~261 and KP ~471 in the Finnish EEZ where the pipelines are a minimum of 390 and 190 m from the Estonian EEZ respectively; at these two locations all significant impacts, irrespective of their scale, have been considered as potential transboundary impacts, with their specific scale being the factor determining their potential to extend into the Estonian EEZ.

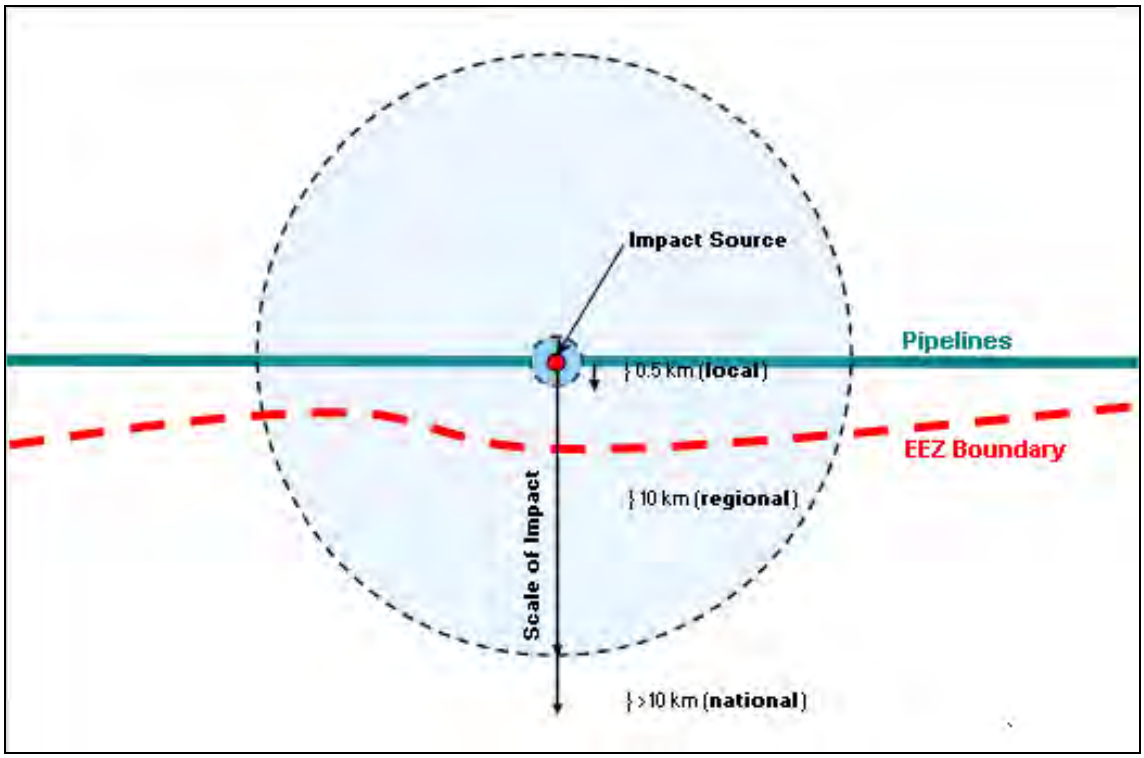


Figure 11.4 **The proximity of the pipelines to EEZ boundaries and the consideration of impacts on a local scale and those on a regional scale or greater (national)**

Box 11.1 Impacts on a local scale in Finland

It should be noted that the impact assessment methodology as presented in **Chapter 7**, which is regarded as conservative, differs in certain aspects of detail from those used in the national EIAs. For example, the Espoo Report defines an impact of **local** scale as an impact with a maximum range of 500 m from the impact source while the Finnish national EIA defines **local** as an impact that extends up to a distance of 5 km from the source. Despite these differences in methodological definition of scale, the overall significance of impacts determined in the Espoo Report are broadly consistent with those assessed in the national EIAs.

In terms of identifying potential transboundary impacts, however, the Finnish national EIA methodology would not enable all impacts assessed to be of **local** scale to be screened out as potential transboundary impacts since impacts assessed to be of **local** scale under the Finnish methodology have a range of up to 5km, whereas in the Gulf of Finland much of the pipeline length approaches to within 5 km of the Estonia EEZ boundary. It is the definition of **local** scale (<500 m) adopted for the Espoo Report, that facilitates the screening out of **local** impacts from consideration as potential transboundary impacts, hence the application of this screening methodology is restricted to the Espoo Report only and cannot be applied to the impacts assessed in the national EIAs.

11.4.3 The Role of "Scale" in the Nord Stream Espoo Assessment Process

The scale of an impact is the range or distance from the initiating activity over which the effects of the impact will be experienced. As indicated in **Section 7.4**, scale is an important factor in determining an impact's significance. It is normal under EIA practice to define three broad levels of scale, such as **local**, **regional** and **national**. These are the categories of scale that have been used in this assessment of transboundary impacts.

Scales of **local**, **regional**, **national** are not standard distances for all EIAs, but should be selected on a case by case basis to suit the type of project, environmental sensitivity and the nature of the impacts.

Experience from the assessment and operation of offshore pipelines has shown that most construction impacts are restricted to within 500 m, and very few exceed a range of 10 km from the initiating activity. It is useful to the decision maker to be able to distinguish between the many impacts that occur within 500 m and the few that do not (and the very few that exceed a range of 10 km). This allows decision makers to get a perspective of what the relative scale is of impacts associated with the different activities.

The definitions of scale used for assessing the significance of impacts in the Espoo Report have been set taking into consideration these observations. Hence **local** scale impacts are broadly defined as those with a range of 500 m from the initiating activity, **regional** scale impacts are

those with a range of between 500 m and 10 km of the initiating activity and **national** scale impacts are those with a range exceeding 10km.

This choice of definitions of scale has been very powerful in placing in context that while there will be impacts all along the pipelines' length, the scale of these impacts is in most cases very limited (i.e. within 500m) and that very few impacts associated with the construction, pre-commissioning and commissioning and operation of the Nord Stream project will have a range exceeding 10 km of the initiating activity or event.

The choice of scale for assessing the significance of impacts in **Chapter 9** has no direct relevance whatsoever to the screening criteria that have been selected for identifying potential transboundary impacts. However, as indicated in **Section 11.2,** the alignment of the Nord Stream pipelines is such that they run parallel and in varying proximity to the EEZ boundaries of Estonia, Latvia, Lithuania and Poland. For the most part the pipelines do not approach within 500 meters of an EEZ boundary of an OAP country and therefore **local** (<500 m) impacts would not have sufficient range to extend across such EEZ boundaries.

11.5 Screening of Potential Transboundary Impacts

Back-to-back impacts that occur at EEZ boundary crossing points are itemised in **Table 11.7**. All other impacts that have previously been assessed (see **Chapter 9**) to be significant on a **regional** scale or greater for the three main phases of the Project, as well as for unplanned events, are itemised in **Table 11.8** to **Table 11.11**. These impacts are not necessarily all transboundary impacts; rather, they comprise the set of previously assessed impacts that meet the stated criteria for having a potential significant transboundary effect and hence are identified for further screening according to the proximity of the impact source from the EEZ boundary of a neighbouring country. These impacts are sourced from the country specific impact summary tables (**Table 9.104** to **9.109**) as presented in **Section 9.12**.

Again, a conservative approach has been adopted in determining proximity. Even though most impacts assessed to be of **regional** (i.e. 500 m to 10 km) scale extend to distances of considerably less than 10km from source, for purposes of screening all significant impacts of **regional** scale that are associated with an activity planned to be undertaken within 10 km of the EEZ border of a neighbouring country have been classified as potential transboundary impacts. In the case of those few significant impacts of **national** scale (i.e. greater than 10km range of impact), the quantitative scale of the impact range (as determined in **Chapter 9**) has been the basis for selecting the maximum distance of the initiating activity or event from the EEZ boundary. **Table 11.8** to **Table 11.10** identify those impacts where the planned initiating activity could take place within 10 km of an EEZ boundary and, in such cases, the AP country (or countries) is identified. **Table 11.11** identifies those unplanned events that could take place at a

distance from an EEZ boundary such that the resulting impacts would extend across the boundary concerned.

Significant impacts (on a **local** scale only) that occur near KP ~261 and KP ~471 in the Finnish EEZ where the pipeline is within 500 m of the Estonian EEZ (i.e. an OAP EEZ) and which may be considered to be transboundary are summarised in **Table 11.12**. These impacts are limited to the construction phase.

Table 11.7 Significant back-to-back impacts that occur on both sides of EEZ boundary crossing points between PoO countries

Back-to-Back Impact	Activity	Receptors	Scale of Impact	Overall Significance	EEZ Boundaries and Affected Parties			
					Russia–Finland	Finland–Sweden	Sweden–Denmark	Denmark-Germany
Increase in turbidity	Pipe-laying and anchor handling	Marine benthos	Local	Minor	Minor			Minor
Release of contaminants	Pipe-laying and anchor handling	Marine benthos	Local	Minor	Minor	Minor	Minor	Minor
Noise and vibration	Pipeline presence	Fish	Local	Minor	Minor	Minor	Minor	Minor
Physical alteration of the seabed	Anchor handling	Seabed	Local	Minor	Minor	Minor	Minor	Minor
	Pipeline presence	Fish	Local	Minor - moderate			Minor	Moderate
Physical loss of seabed habitats	Anchor handling	Marine benthos	Local	Minor - moderate	Minor	Minor	Minor	Moderate
	Pipe-laying	Marine benthos	Local	Minor - moderate	Minor	Minor	Minor	Moderate
Smothering	Pipe-laying	Marine benthos	Local	Minor - moderate	Minor	Minor	Minor	Moderate
Introduction of secondary habitats	Pipeline presence	Fish	Local	Minor - moderate	Minor	Minor	Minor	Moderate
Visual/physical disturbance	General construction and vessel movement	Sea birds	Local - regional	Moderate				Moderate

Note: A blank entry indicates that the impact either does not occur or is insignificant and hence is not considered further in the assessment of transboundary impacts

Table 11.8 Significant impacts on a regional scale or greater during the construction phase

Impact	Activity	Resources/ Receptors	Scale of Impact	Significance	PoO country	Within 10 km of Affected Party EEZ?	AP country
Increase in turbidity	Munitions clearance, Seabed intervention works (dredging, trenching, rock placement and support structures)	Water column (all)	Regional	Minor	All	Yes	Estonia and Finland
		Marine benthos (dredging)	Regional	Minor	Russia	No	-
		Marine benthos (Munitions clearance, trenching, rock placement and support structures)	Regional	Minor (Moderate – Pomeranian Bay and Oderbank)	All	Yes	Estonia and Finland
		Sea birds (munitions clearance and dredging)	Regional	Minor - Moderate	Russia and Germany	No	-
		Nature conservation areas (munitions clearance and dredging)	Regional	Moderate	Germany	No	-
Release of contaminants	Munitions clearance, Seabed intervention works (rock placement)	Water column	Regional	Minor	All	Yes	Estonia

Impact	Activity	Resources/ Receptors	Scale of Impact	Significance	PoO country	Within 10 km of Affected Party EEZ?	AP country
	Seabed intervention works (dredging), anchor handling	Seabed	Regional	Minor	Germany	No	-
Noise and vibration	Munitions clearance	Fish	Regional	Minor - Moderate	Russia, Finland and Sweden	Yes	Estonia and Finland
		Marine mammals	Regional	Moderate	Russia, Finland and Sweden	Yes	Estonia and Finland
		Nature conservation areas	Regional	Moderate	Russia	No	-
	Seabed intervention works (dredging and trenching)	Fish (dredging and trenching)	Regional	Minor - Moderate	Russia, Sweden, Denmark and Germany	No	-
		Sea Birds (dredging and trenching)	Local - Regional	Minor - Moderate	Sweden and Germany	No	-
		Marine mammals (dredging and trenching)	Regional	Minor - Moderate	Russia, Sweden, Denmark and Germany	No	-
		Nature conservation areas (dredging)	Regional	Moderate	Germany	No	-

Impact	Activity	Resources/ Receptors	Scale of Impact	Significance	PoO country	Within 10 km of Affected Party EEZ?	AP country
	Construction and support vessel movement	Sea birds	Local - Regional	Minor - Moderate	Germany	No	-
Emissions of pollutant gases	Construction	Atmosphere	National	Minor	All	Yes	All
Physical alteration of the seabed	Seabed intervention works	Seabed	Local – regional	Minor	Russia, Sweden, Denmark and Germany	No	-
Visual/physical disturbance	Construction and support vessel movement	Sea Birds	Local - Regional	Minor - Moderate	Russia, Sweden, Denmark and Germany	No	-
		Nature conservation areas	Regional	Moderate	Germany	No	-
Ice breaking	Construction and support vessel movement	Marine mammals	No impact/ Regional	No impact/ Moderate	All	Yes	Estonia(1)

(1) As discussed **in Section 11.6**, icebreaking is not planned; however, limited icebreaking may be required in the event of a prolonged winter. In such an event, the listed transboundary may be realised.

Impact	Activity	Resources/ Receptors	Scale of Impact	Significance	PoO country	Within 10 km of Affected Party EEZ?	AP country
Restriction on navigation for fishing vessels	Munitions clearance and the imposition of an exclusion zone.	Fisheries	Regional	Minor	Russia, Finland and Sweden	Yes(1)	All
	Construction and support vessel movements and imposition of an exclusion zone	Fisheries	Regional	Minor	All	Yes(1)	All
Restriction on navigation for shipping vessels	Munitions clearance and the imposition of an exclusion zone.	Shipping and navigation	Regional	Minor/Minor – Moderate	Russia, Finland and Sweden	Yes(1)	All
	Construction and support vessel movements and imposition of an exclusion zone	Shipping and navigation	Regional	Minor/Minor – Moderate	All	Yes(1)	All

(1) In the context of fisheries, the mobile nature of the receptor (thus its ability to approach the source of impact) means that the distance criterion does not apply. With other shipping that is confined to defined lanes or routes, the criterion still applies

Table 11.9 Significant impacts on a regional scale or greater during the pre-commissioning and commissioning phase

Impact	Activity	Resources/ Receptors	Scale of Impact	Significance	PoO country	Within 10 km of Affected Party EEZ?	AP country
Change in water quality	Pressure-test water discharge	Water column	Regional	Minor	Russia	No	-
		Marine mammals	Regional	Minor – Moderate	Russia	No	-
Noise and vibration	Seawater intake and pressure-test water discharge	Marine mammals	Regional	Minor - Moderate	Russia	No	-

Table 11.10 Significant impacts on a regional scale or greater during the operational phase

Impact	Activity	Resources/ Receptors	Scale of Impact	Significance	PoO country	Within 10 km of Affected Party EEZ(1)	AP country
Disruption of current fishing patterns	Pipeline presence	Fisheries	Regional - National	Minor - Moderate	Russia, Finland, Sweden and Denmark	Yes	All
Damage to fishing equipment	Pipeline presence	Fisheries	Regional - National	Minor	Russia, Finland, Sweden and Denmark	Yes	All

(1) In the context of fisheries, the mobile nature of the receptor (thus its ability to approach the source of impact) means that the distance criterion does not apply.

Table 11.11 Unplanned events resulting in significant impacts on a regional scale or greater

Unplanned Event	Resources/ Receptors	Scale of Impact	Unplanned Significance	PoO country	Scale of Impact Affects Affected Party EEZ?	AP country
Fuel/oil spill	Water column	National	Low	All	Yes	All
	Atmosphere	National	Low	All	Yes	All
	Plankton	National	Low	All	Yes	All
	Marine Benthos	National	Low - Moderate	All	Yes	All
	Fish	National	Low - Moderate	All	Yes	All
	Sea Birds	National	Low - Moderate	All	Yes	All
	Marine mammals	National	Low - Moderate	All	Yes	All
	Conservation areas	National	Low - Moderate	All	Yes	All
	Fisheries	National	Moderate	All	Yes	All
	Shipping and navigation	National	Low	All	Yes	All
	Tourism and recreation	National	Low	All	Yes	All
	Offshore industry	National	Low	All	Yes	All
Disturbance of conventional munitions	Water column	Local - regional	Low	All	Yes	Russia, Finland, Estonia, Sweden and Denmark
	Marine mammals	Regional	Low	All	Yes	Russia, Finland, Estonia, Sweden and Denmark
	Conservation areas	Regional	Low	All	Yes	All
Pipeline Failure	Atmosphere	National	Low	All	Yes	All

Table 11.12 Significant impacts on a local scale that may extend into the Estonia EEZ in the area of KP ~261 and KP ~471

Impact	Activity	Resources/ Receptors	Scale of Impact	Significance	PoO country	Area Affected	AP country
Release of contaminants	Seabed intervention works (rock placement)	Marine benthos	100-200 m	Minor	Finland	KP ~261 and KP ~471.	Estonia
Noise and vibration	Munitions clearance	Marine benthos	≤500 m	Minor	Finland	KP ~261	Estonia

Note: Both these impacts occur during the construction phase.

11.6 Transboundary Impact Assessment

Significant back-to-back impacts are initiated and experienced in the EEZs of each adjacent country at each EEZ boundary crossing point and are generally on a **local** scale and of **minor** significance. **Moderate** back-to-back impacts only occur on either side of the Denmark-Germany EEZ boundary. All back-to-back impacts are itemised in **Table 11.7** but are not considered to be the focus of this chapter as they are regarded as a special case of transboundary impact which have been adequately covered in **Chapter 9** and the National EIAs as per **Section 11.4.2.** As a result, they are not discussed further in this section.

Following a review of all other (i.e. non back-to-back) impacts of significance, which have been assessed to be of a **regional** or **national** scale, as detailed in **Table 11.8** to **Table 11.12**, those impacts identified to be transboundary in terms of their proximity to a country EEZ have been identified. The transboundary impacts arising from planned activities are discussed below for each phase of the Project. This is followed by an equivalent discussion on transboundary impacts arising from potential unplanned events. For each transboundary impact the relevant PoO and AP countries are noted as bullet-points. It is observed that impacts assessed to be on a **local** scale in the region of KP ~261 and KP ~471 that are considered to be transboundary only occur during the construction phase (and hence are addressed in **Section 11.6.1** only).

11.6.1 Transboundary Impacts Occurring during the Construction Phase

Those impacts that have been identified as transboundary impacts during the construction phase (by virtue of their being of **regional** or **national** scale) are itemised in **Table 11.13**. Impacts that are on a local scale but are transboundary due to their proximity (within 500 m) to the Estonian EEZ at KP ~261 and KP ~471 are noted in italics where relevant.

Table 11.13 Transboundary impacts during the construction phase

Transboundary Impact	Activity	Resources/ Receptors	Scale of Impact	PoO country	AP country
Increase in turbidity	Munitions clearance, Seabed intervention works (rock placement)	Water column	Regional	Finland and Russia	Estonia and Finland
		Marine benthos	Regional	Finland and Russia	Estonia and Finland
Release of contaminants	Munitions clearance, Seabed intervention works (rock placement)	Water column	Regional	Finland and Russia	Estonia and Finland
		Marine benthos	*Local*	*Finland*	*Estonia*
Noise and vibration	Munitions clearance	Fish	Regional	Finland and Russia	Estonia and Finland
		Marine mammals	Regional	Finland and Russia	Estonia and Finland
		Marine benthos	*Local*	*Finland*	*Estonia*
Emission of pollutant gases	Construction	Atmosphere	National	All	All
Ice breaking	Construction and support vessel movement	Marine mammals	No impact/ Regional	All	Estonia
Restriction on navigation for fishing vessels	Munitions clearance and imposition of an exclusion zone	Fisheries	Regional	Russia, Finland and Sweden	All
	Construction and support vessel movements and imposition of an exclusion zone	Fisheries	Regional	All	All

Transboundary Impact	Activity	Resources/ Receptors	Scale of Impact	PoO country	AP country
Restriction on navigation for shipping vessels	Munitions clearance and imposition of an exclusion zone	Shipping and navigation	Regional	Russia, Finland and Sweden	All
	Construction and support vessel movements and imposition of an exclusion zone	Shipping and navigation	Regional	All	All

Each transboundary impact is discussed in turn below. In each case reference is made to the detailed assessment of impacts presented in **Chapter 9**.

Increase in Turbidity

Munitions clearance and seabed intervention works will disrupt the seabed, which will lead to the re-suspension and spreading of sediments. This will result in an increase in turbidity above background levels in the water column on a **regional** scale around disturbed areas. In some cases this increase may be experienced several kilometres from the disturbance location. Modelling[(1),(2)] of sediment spreading and sedimentation (**Chapter 9**) has indicated that most re-suspended sediment will settle rapidly and that an increase in turbidity will only be experienced for a **short-term** duration of up to a few days at most (usually within 24 hours). The main resources/receptors that will be affected by an increase in turbidity on a **regional** scale are the water column and marine benthos. The water column will be directly affected in that the concentration of suspended solids will increase for the duration of the impact. Marine benthos may be affected by an increase in turbidity in that the feeding organs of filter-feeding organisms may become clogged with suspended sediment thereby preventing feeding.

A total of 31 munitions that require clearing have been identified in the Finnish EEZ. All identified munitions are located in close proximity to the Estonian EEZ (**Figure 11.3**). Munitions surveys are ongoing in Russia and as a result the numbers and locations of munitions that require clearance in the Russian EEZ are currently not yet known. During munitions clearance the seabed will be disrupted resulting in an increase in turbidity, which would impact the water column and marine benthos on a **regional** scale. A modelled increase in turbidity is expected up to a distance of 1-2 km, and a maximum of 5 km at one location, from the clearance sites in the Finnish EEZ. No modelling has taken place in the Russian EEZ. However, it is expected that similar impacts will result at munitions clearance sites. The EEZ boundary between Russia and Finland is >5 km from the pipelines route and therefore even in a worst scenario an increase in turbidity due to munitions clearance in the Russian EEZ would not result in a transboundary impact on the Finnish EEZ and no impact on the Natura 2000 site, the Eastern Gulf of Finland archipelago and water areas (FI 0408001, SPA, SCI) located within the Finnish EEZ and to the north of the Russian EEZ (north of Gogland), would result. This would, however, not be applicable at the pipeline crossing point from Russia to Finland. Should munitions clearance be required at a location 1-2 km from the EEZ boundary then a transboundary impact would result. As per **Sections 9.3.3** and **9.3.7**, the increase in turbidity has been assessed to be of **minor** significance and of **short-term** duration on the water column and marine benthos and this also

(1) Nord Stream AG & Ramboll. 2008. Memo 4.3A-12 - Spreading of sediment and contaminants from clearing of munitions.

(2) Nord Stream AG & Ramboll. 2008. Memo 4.3A-5 - Spreading of sediment and contaminants during works in the seabed.

applies in the transboundary context. It should be reiterated that no munitions that require clearance have been confirmed in the Russian EEZ as yet.

- PoO country : Russia
- AP country : Finland

Munitions clearance in the Finnish EEZ will result in a **regional** increase in turbidity that would extend into the Estonian EEZ at some clearance sites and impact upon the water column and marine benthos. An increase in turbidity is expected to be of **short-term** duration and will return to background levels within a few days at most. As per **Sections 9.4.3** and **9.4.7**, the increase in turbidity due to munitions clearance has been assessed to be of **minor** significance on the water column and marine benthos. Transboundary impacts of **minor** significance on the water column and marine benthos will only be experienced at some locations where an increase in turbidity extends into the Estonia EEZ. An example of the sediment modelling results during normal weather in the Gulf of Finland is presented in **Figure 11.5**.

- PoO country : Finland
- AP country : Estonia

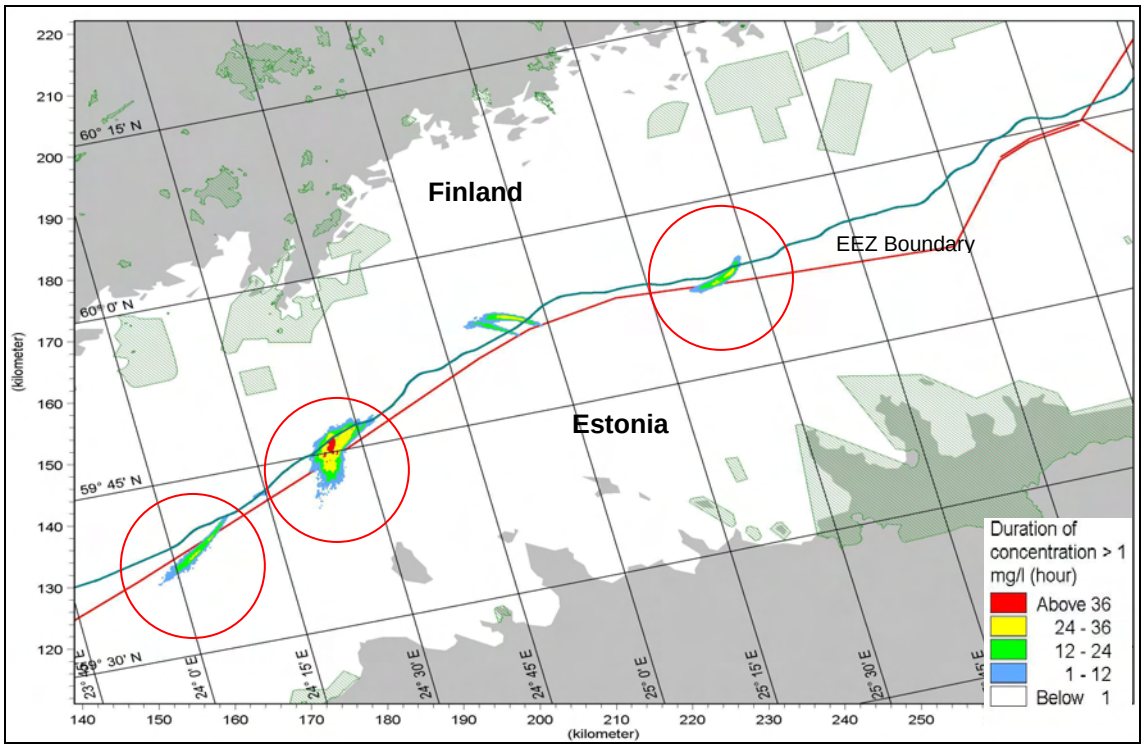


Figure 11.5 Modelled transboundary sediment plumes (red circles) in the Gulf of Finland from munitions clearance sites along the pipeline (blue line)

The water column and marine benthos in the Estonian EEZ are expected to experience transboundary impacts associated with an increase in turbidity due to seabed intervention works in the Finnish EEZ. No other countries will experience a transboundary impact in this context. Seabed intervention works, in particular rock placement, will take place within the Finnish EEZ. Some rock placement locations are within close proximity to the Estonian EEZ such that an increase in turbidity may be classified as transboundary. Modelled sediment spreading shows that in two areas, an increase in turbidity and associated sedimentation will be experienced within the Estonia EEZ. An increase in turbidity is expected to be of **short-term** duration and will return to background levels within a few days at most. Impacts upon the water column in Estonia will remain as being of **minor** significance as assessed in **Section 9.4.3.** The impact on marine benthos in the Estonian EEZ is expected to be less than that assessed in closer proximity to the source of impact (**minor**) and thus likely to be **insignificant** due to the limited scale of an increase in turbidity in the Estonian EEZ. An example of the sediment modelling results during normal weather in the Gulf of Finland is presented in **Figure 11.6**.

- PoO country : Finland
- AP country : Estonia

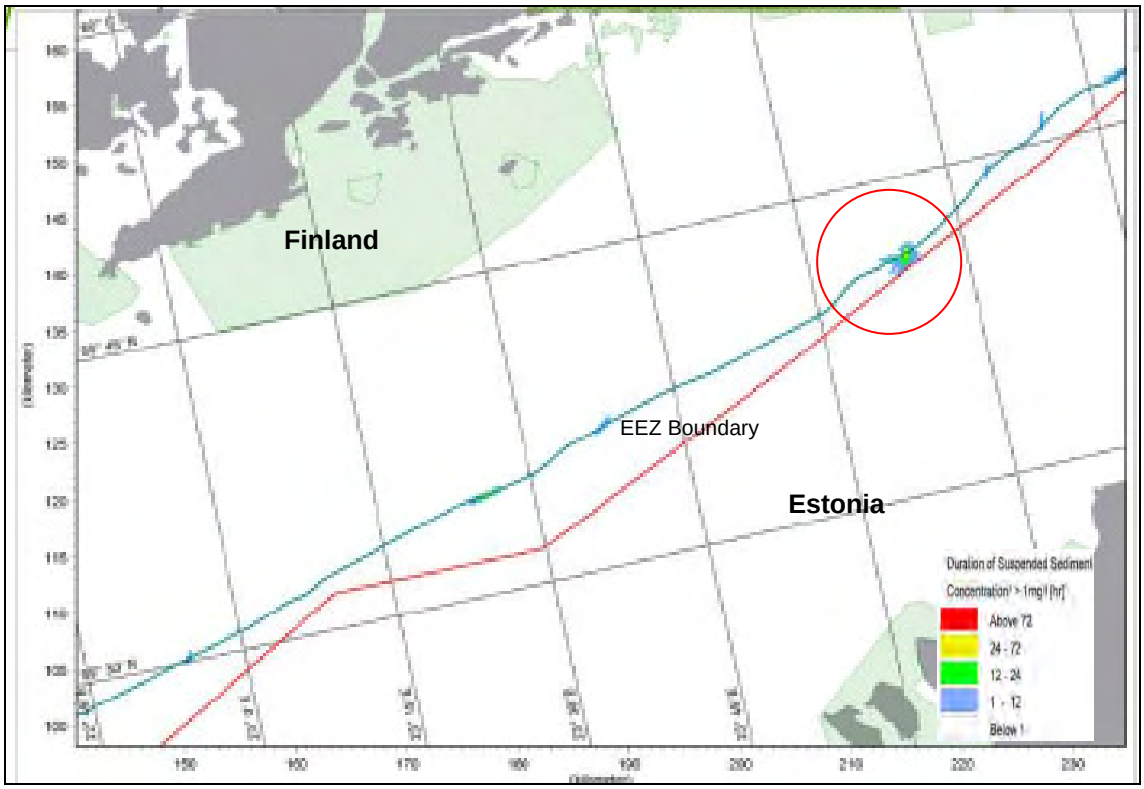


Figure 11.6 Modelled transboundary sediment plume (red circle) in the Gulf of Finland from rock placement along the pipeline (blue line)

Release of Contaminants

Munitions clearance and seabed intervention works will disrupt the seabed, which will lead to the re-suspension and spreading of sediments. Any contaminants (identified as cadmium, mercury, lead, zinc, copper, arsenic, chromium, nickel, Polycyclic Aromatic Hydrocarbons (PAH) and tributyltin) present within the sediment will also be re-suspended in the water column for a short duration before mostly settling on the seabed. Of these substances copper and 16 selected Polycyclic Aromatic Hydrocarbons (SUM16PAH) are seen as the most critical compounds in terms of toxicity. Contaminant modelling[(1),(2)] has been undertaken to predict the concentrations (Predicted Environmental Concentration – PEC) and scale (assessed to be **regional**) of impact for both copper and SUM16PAH around munitions clearance and rock placement sites. The relevant modelled PEC has been compared with the Predicted No Effect Concentration (PNEC) for each substance. Trenching and dredging areas have been excluded from contaminant modelling as these activities will take place in erosion zones with low levels of contaminants (see **Sections 9.3.3** to **9.7.3**). The modelling results show that the main resource that will be affected by the release of contaminants on a **regional** scale is the water column. The impacts on other receptors are only significant on the **local** scale and are thus not classified as being transboundary for most of the pipelines' route. The only exception is the impact of a release of contaminants due to rock placement on marine benthos at KP ~471 (Finnish EEZ). Marine benthos is expected to be impacted by a release of contaminants up to 100-200 m from the impact source (rock placement site) and thus will experience a transboundary impact at KP ~471 where the pipelines are a minimum of 190 m from the Estonian EEZ. Marine benthos will not experience a transboundary impact at KP ~261 (from either munitions clearance or rock placement) as it is at a minimum distance of 390 m from the Estonian EEZ.

As discussed above, a total of 31 munitions that require clearing have been identified in the Finnish EEZ, all of these are located in close proximity to the Estonian EEZ (**Figure 11.3**). As also mentioned, munitions surveys are ongoing in Russia and as a result the numbers, and locations, of munitions that require clearance in the Russian EEZ are currently not yet known. During munitions clearance the seabed will be disrupted resulting in an increase in turbidity and the release of contaminants, which will impact the water column on a regional scale. Modelled contaminant plumes for copper and SUM16PAH above the PNEC are expected up to a distance of 1-3.5 km from the clearance sites in the Finnish EEZ. No modelling has taken place in the Russian EEZ. However, it is expected that similar impacts will result at munitions clearance sites. The EEZ boundary between Russia and Finland is >5 km from the pipelines route and therefore, even in a worst scenario, the release of contaminants due to munitions clearance in the Russian EEZ would not result in a transboundary impact on the Finnish EEZ or on the

(1) Nord Stream AG & Ramboll. 2008. Memo 4.3A-12 - Spreading of sediment and contaminants from clearing of munitions.

(2) Nord Stream AG & Ramboll. 2008. Memo 4.3A-5 - Spreading of sediment and contaminants during works in the seabed.

Eastern Gulf of Finland archipelago and water areas Natura 2000 site. This would, however, not be applicable at the pipeline crossing point from Russia to Finland. Should munitions clearance be required at a location (within 1-3.5 km from the EEZ boundary) where a contaminant plume above the PNEC would extend into Finland then a transboundary impact would result. As per **Section 9.4.3** the release of contaminants due to munitions clearance has been assessed to be of **minor** significance and of **short-term** duration on the water column and would apply in the transboundary context. It should be reiterated that no munitions have been confirmed in the Russian EEZ as yet.

- PoO country : Russia
- AP country : Finland

Munitions clearance in the Finnish EEZ will result in contaminant plumes (above the PNEC for copper and SUM16PAH) on a **regional** scale that would extend into the Estonian EEZ at some clearance sites and impact upon the water column and marine benthos. The increase in contaminant concentration is expected to be of **short-term** duration and will return to background levels within a few days at most. As per **Section 9.4.3**, the release of contaminants due to munitions clearance has been assessed to be of **minor** significance on the water column. Transboundary impacts of **minor** significance on the water column will only be experienced at some locations where contaminant plumes that exceed the PNEC extend into the Estonia EEZ. An example of the contaminant modelling results during normal weather in the Gulf of Finland is presented in **Figure 11.7**. Areas where the PNEC is exceeded are coloured in red and yellow.

- PoO country : Finland
- AP country : Estonia

Seabed intervention works (rock placement) in the Russian EEZ near Gogland will result in the release of contaminants. However, the modelled contaminant plumes (on a **regional** scale) do not extend into the Finnish or Estonian EEZs and thus there is no resultant transboundary impact anticipated. Similarly rock placement will not impact the Eastern Gulf of Finland archipelago and water areas Natura 2000 site. An example of the contaminant modelling results near Gogland during normal weather is presented in **Figure 11.8**. Areas where the PEC exceeds the PNEC are highlighted in yellow. Green and blue areas show where the contaminants will be present in the water column but at a concentration below the PNEC.

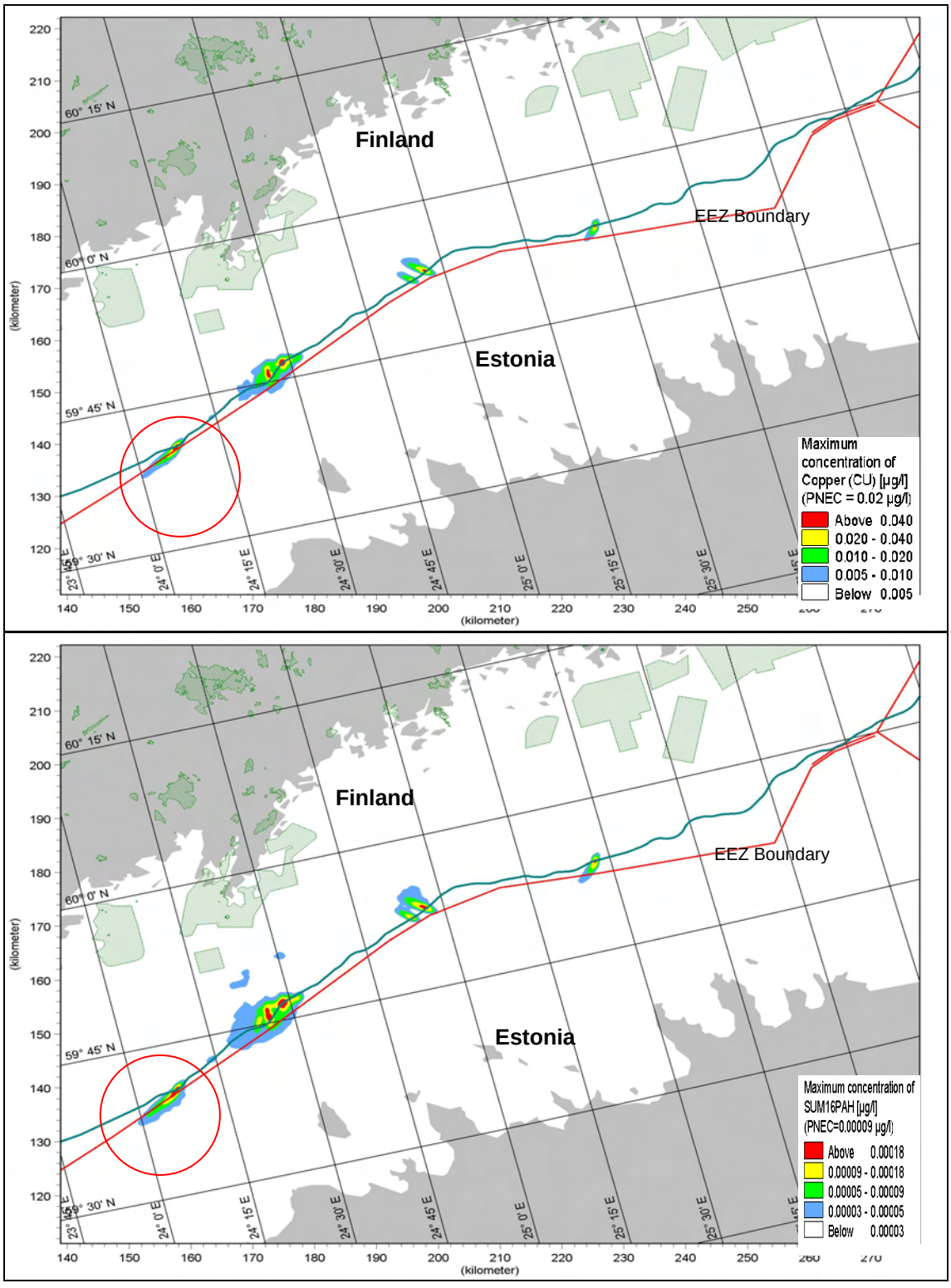


Figure 11.7 Modelled contaminant plumes for copper (1st map) and SUM16PAH in the Gulf of Finland from munitions clearance along the pipelines (blue line)

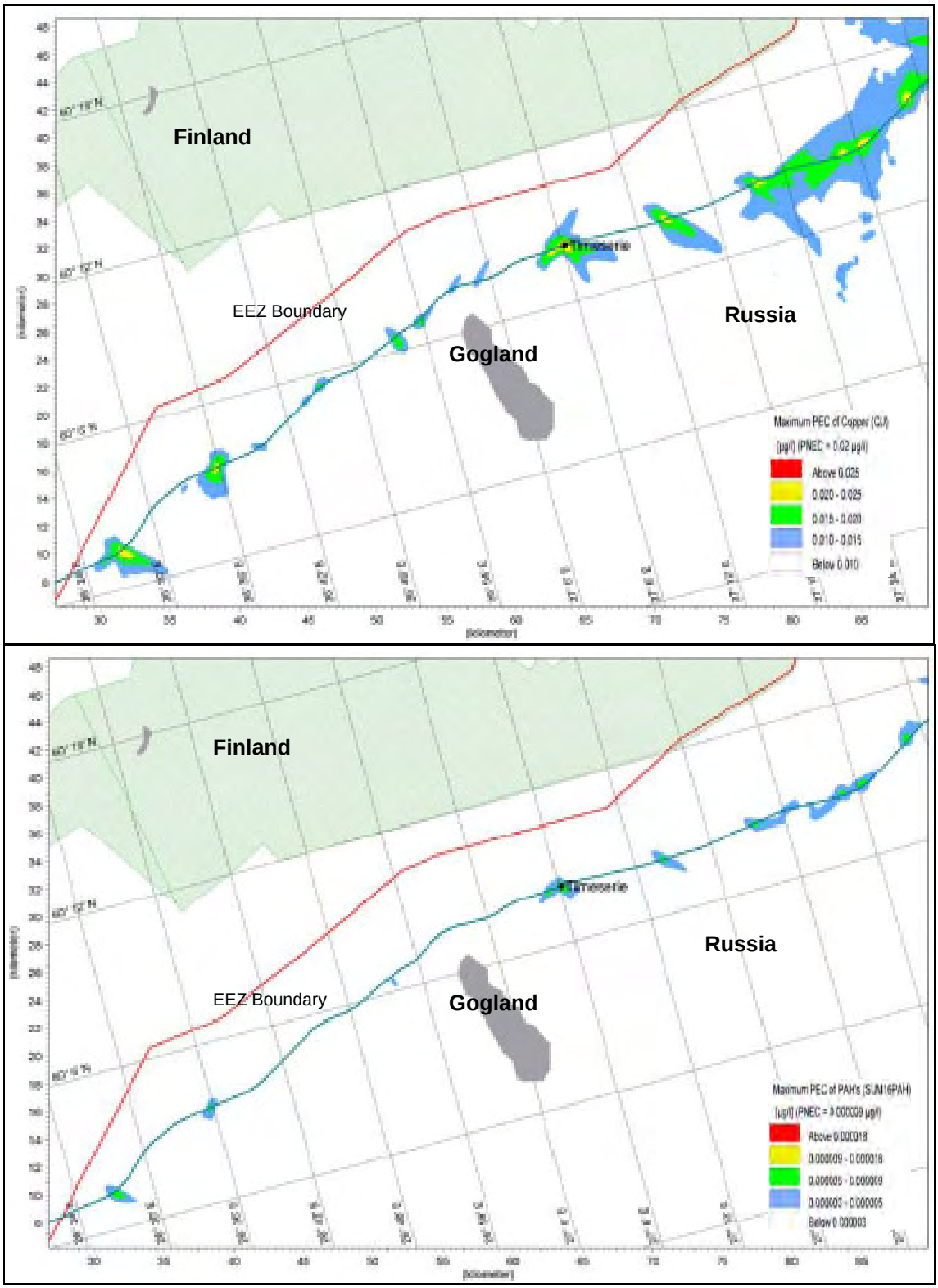


Figure 11.8 Modelled contaminant plumes for copper (1st map) and SUM16PAH (2nd map) near Gogland from rock placement along the pipelines (blue line)

Rock placement in the Finnish EEZ in the Gulf of Finland will result in the re-suspension and spreading of sediments and associated contaminants. Modelled plumes of contaminant concentrations above the PNEC (red and yellow) will extend from the Finnish EEZ into the Estonian EEZ near some rock placement sites. As assessed in **Chapter 9**, this impact is deemed to be of **minor** significance. In a transboundary context, the significance remains as **minor** where the PNEC is exceeded in the Estonian EEZ. Sample contaminant modelling results (normal weather) for an area where a transboundary impact will be experienced in the Estonian EEZ are presented in **Figure 11.9**. In most cases, however, the modelled contaminant plumes in the Finnish EEZ that extend into the Estonian EEZ have concentrations below the PNEC and thus the impact on the water column in these areas is **insignificant**. Sample contaminant modelling results (normal weather) for an area where a contaminant plume extends into the Estonian EEZ but has a concentration below the PNEC are presented in **Figure 11.10**.

Owing to the distance of the pipelines' route from EEZ boundaries, no transboundary impacts attributable to a release of contaminants are expected along the pipelines' route through Sweden, Denmark and Germany.

- PoO country : Finland
- AP country : Estonia

At KP ~471 the pipelines are located a minimum of 190 m from the Estonian EEZ. Rock placement in this area will result in the release of contaminants, which will impact upon marine benthos within close proximity (100-200 m) of the rock placement point (see **Section 9.4.7**). This impact on marine benthos may extend into the Estonian EEZ but it is expected that the impact will be lower than at the source point and thus this impact is considered to be **insignificant** in the transboundary context.

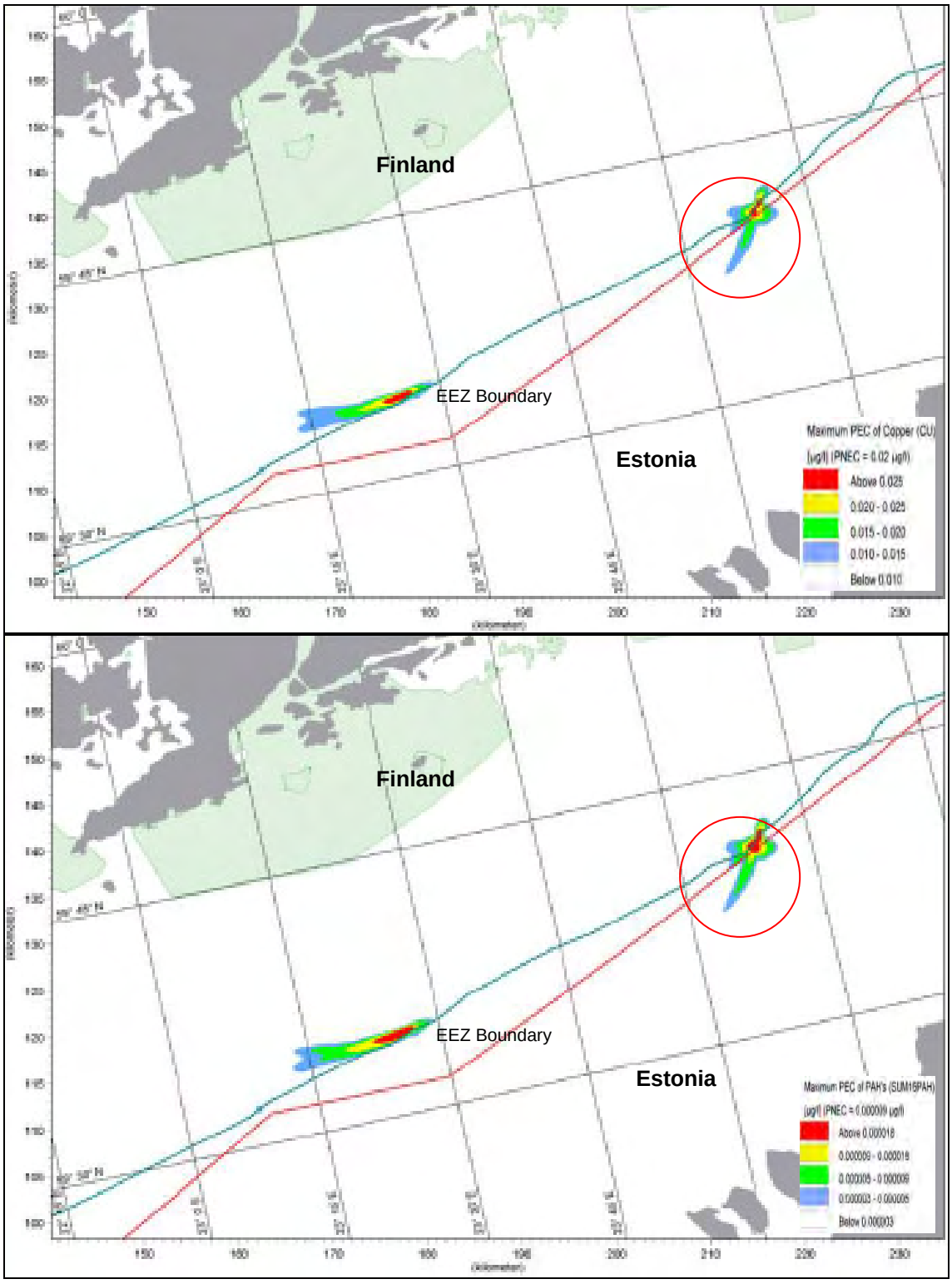


Figure 11.9 **Modelled transboundary contaminant plumes (red circle) for copper (1st map) and SUM16PAH (2nd map) in the Gulf of Finland from rock placement along the pipeline (blue line)**

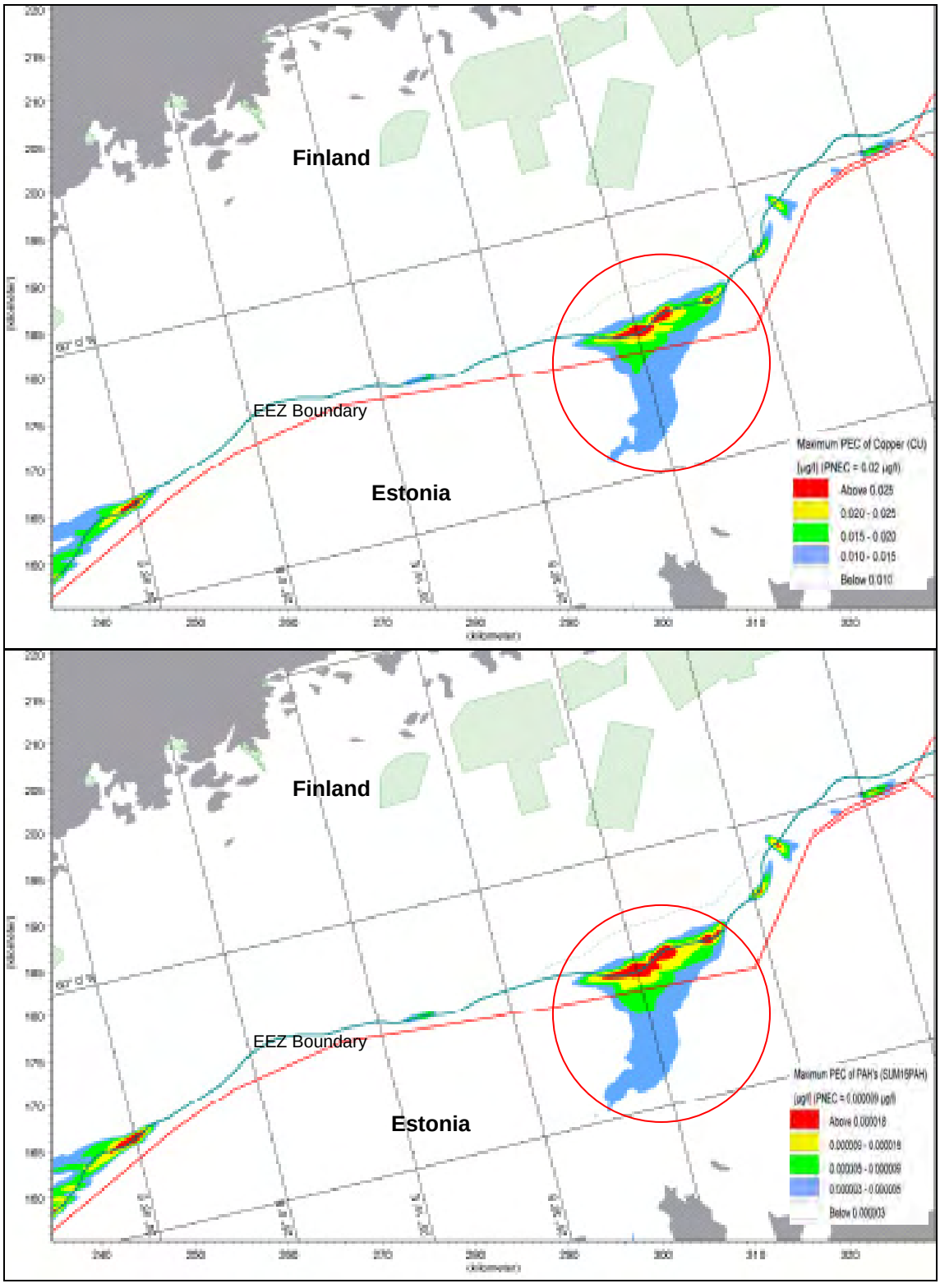


Figure 11.10 Modelled contaminant plumes (red circle) for copper (1st map) and SUM16PAH (2nd map), from rock placement along the pipeline (blue line), that extend into Estonian EEZ but with concentrations below the PNEC

Noise and Vibration

Noise and vibration deemed to be of significance on a **regional** scale and transboundary in effect will be generated by munitions clearance. Munitions clearance will take place in the Russian, Finnish and Swedish EEZs. Russian surveys are currently ongoing and thus no confirmation is available on the number and location of munitions that require clearing in the Russian EEZ. Seabed intervention works that will generate noise above background levels and which have been assessed to be significant, such as dredging and trenching, will be located sufficiently far enough away (> 10 km) from EEZ boundaries such that the associated noise and vibration will not impact upon resources/receptors other than in the source country. Rock placement will generate noise and vibration that is not above background levels.

Munitions clearance will generate noise and vibration in the form of a pulse that will transmit through the water column. This may impact marine mammals, such as seals and the harbour porpoise, up to a distance of 2-3 and 10 km respectively. Some fish, such as the Baltic herring and sprat, would be instantly killed within 1.5 km of the clearance area but may respond to the noise at a greater distance. It may also impact some marine benthos on the **local** scale. This impact is only considered to be transboundary for munitions clearance at KP ~261 in the Finnish EEZ (there are no munitions at KP~471).

Munitions surveys are currently ongoing in the Russian EEZ. As the Russian EEZ forms part of the Gulf of Finland where a number of munitions have been identified already, it is likely that munitions will need to be cleared in Russia. In the vicinity of Gogland, the pipelines' route is within 5-10 km of the Finnish EEZ to the north and within 5 km of the Estonian EEZ to the southwest. It is reasonable to anticipate that munitions may need to be cleared in this area. The only receptors, which are expected to be impacted within the Finnish and Estonian EEZs are marine mammals and fish, specifically the harbour porpoise, within 10 km of the impact source. Seals are only expected to be impacted up to a distance of 2-3 km from the clearance site and therefore the impact is not considered to be transboundary. Fish in Finland and Estonia may respond to munitions clearance at a distance greater than 1.5 km and thus this impact is considered to be transboundary. The relevant assessments in **Chapter 9** have concluded that the significance of these impacts on marine mammals and fish will be **moderate** and **minor** to **moderate** respectively. Due to the distance of the EEZ boundary from the pipelines route (minimum of 5 km) the level of significance is expected to be lower than that in the Russian EEZ. Therefore, the impact of munitions clearance, in terms of noise and vibration, on marine mammals (harbour porpoise) and fish in the Finnish and Estonian EEZs is expected to be of **minor** significance. It must be emphasised that as yet the locations of munitions to be cleared in the Russian EEZ have not been confirmed and thus this assessment has taken the conservative approach. Munitions clearance will not impact the Eastern Gulf of Finland archipelago and water areas Natura 2000 site Since this area is not designated for marine mammals or fish.

The 31 munitions that will be cleared in the Finnish EEZ are all located within close proximity (generally not less than 500 m) of the Estonian EEZ such that the effects of munitions clearance

(noise and vibration) will extend into the Estonian EEZ. This may impact marine mammals (seals and the harbour porpoise) and fish within Estonia. No seal colonies or sanctuaries are located within 10 km of where munitions clearance will take place and thus transboundary impacts are expected to be on the individual (rather than colony) level. The relevant assessments in **Chapter 9** have concluded that the significance of these impacts on marine mammals and fish will be of **moderate** and **minor** to **moderate** significance respectively; this level of significance would also be expected in the Estonian EEZ. Some marine benthos can be impacted by the noise and vibration generated by munitions clearance on the **local** scale. This impact is considered to be transboundary at KP ~261 where the pipelines are a minimum of 390 m from the Estonian EEZ. There are no munitions that require clearance at KP~471. As per **Section 9.4.7** the impact on marine benthos is assessed to be of **minor** significance. The significance in a transboundary context would remain as **minor**.

One munition will be cleared within the Swedish EEZ. This munition is located to the north east of Gotland. The precise location is currently classified as confidential; nevertheless, the munition is not located within 10 km of an EEZ border and hence no transboundary impacts will be experienced by the countries adjoining Sweden.

- PoO country : Finland and Russia
- AP country : Estonia and Finland

Emission of Pollutant Gases

As described in **Section 9.3.5**, construction phase activities across the entire pipeline length (for the entire construction period) are predicted to collectively contribute 1.9, 1.4 and 0.4 % to the annual emissions of CO_2, NO_x and SO_2 respectively for all activities (mainly shipping traffic) in the Baltic Sea. These construction emissions will contribute to the transboundary and wider global processes of acidification, eutrophication and global warming (described in more detail in **Section 9.3.5**). The atmosphere is a shared global resource and all Baltic Sea littoral countries will be impacted. The impact will act over the **long-term**. Due to the small contribution of emissions from the Project relative to activities in the Baltic Sea as a whole, and relative to wider global emissions, impact intensity is considered to be **low**. The overall transboundary significance of emissions to the atmosphere is **minor**.

Pre-commissioning and commissioning, and construction phase activities are expected to contribute very little in terms of emissions and have been assessed to have an insignificant impact on the atmosphere. Emission data are summarised in **Table 11.14**.

Table 11.14 Predicted emissions of key atmospheric pollutants during all Project phases

	Country	Predicted Emissions (tonnes)			Predicted Emissions Relative to Annual Emissions from the Baltic Sea (%)		
Phase		**CO_2**	**NO_x**	**SO_2**	**CO_2**	**NO_x**	**SO_2**
Construction phase	All	770 000	13000	3100	1.9	1.4	0.4
Pre-commissioning and commissioning phase	Russia	30	0.05	<0.01	<0.1	<0.1	<0.1
	Germany	9900.	190	6.2	<0.1	<0.1	<0.1
	Total	10000	190	6.2	<0.1	<0.1	<0.1
Operational phase	All	53000	140	110	0.1	<0.1	<0.1
Total for all phases		**830 000**	**13000**	**3200**	**2.0**	**1.4**	**0.5**

Note: Values are to two significant figures.

- PoO countries : Russia, Finland, Sweden, Denmark and Germany
- AP countries : Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

Ice Breaking

The Gulf of Finland has typical ice coverage of 90-100 % during normal and even mild winters in its eastern section. No construction is scheduled to take place along this section of the pipelines during this period but in the highly unlikely event that construction does take place it is expected that some ice breaking will be required. This may result in impacts on seals (mainly the grey seal) that breed offshore on the ice. Ice breaking would extend up to 2 km (anchor spread) on either side of the pipelines' route but the impact on seals may be experienced at even greater distance. In certain sections of the Finnish EEZ, the pipelines' route is within 3-4km of the Estonian EEZ and thus should construction take place during winter, and if ice breaking is required, there is the potential for a transboundary impact on seals (**Figure 11.2**). This impact has been assessed in **Chapter 9** to be of **moderate** significance to seals and this significance would be displayed in the Estonian EEZ. However, construction is not planned for the Gulf of Finland during periods of ice cover and thus there will **no impact** in either country's EEZ.

Restriction on Navigation for Fishing Vessels

Project construction activities, including pre-lay surveys, munitions clearance, seabed interventions works, pipe-laying and hyperbaric tie-ins, will result in increased vessel movements along the pipelines route. These Project vessels may potentially hamper the normal passage of fishing trawlers and other fishing vessels as they travel to and from their target stocks. To minimise potential vessel interactions and to ensure safe construction, exclusion zones will be established around Project activities. Munitions clearance, which will take place before construction commences, will have an exclusion zone extending 3.5 km (approximately 2 nautical miles) from the clearance location while normal construction activities will have an exclusions zone typically extending 2-3 km from the pipe-laying barge. Unauthorised ship traffic, including fishing vessels, will not be permitted to enter these zones. These exclusion zones might therefore further hamper the passage of fishing vessels navigating to and from their target fishing grounds. These navigational impacts on fishing fleets are characterised as being transboundary as the fleets from any of the Baltic Sea countries may be affected. At certain locations in the Gulf of Finland these exclusion zones will extend into the Estonian EEZ.

Exclusion zones around munitions clearance sites will only be imposed in Russia, Finland and Sweden and will extend 3.5 km. An individual zone will only be in effect for a few hours until munitions clearance is complete and clearance team moves on to the next clearance site. Fishing vessels will be able to avoid the exclusion zones without significant route deviation. As per **Section 9.8.1** the impact in terms of a restriction on navigation for fishing vessels originating from all the countries of the Baltic Sea, and hence the transboundary nature of the impact, has been assessed to be of **minor** significance and will cease following munitions clearance.

- PoO countries : Russia, Finland and Sweden
- AP countries : Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

The impacts associated with an exclusion zone around the lay barge are anticipated to occur anywhere along the pipelines route, but are likely to be more frequent in the vicinity of where the pipelines' route crosses the main approach channels to the target fishing areas. The exclusion zone, together with the pipe-laying barge and support vessels, will progress along the pipelines' route at an average of 2 to 3 km a day and therefore will not impose a permanent change to fishing vessel navigation. As with munitions clearance, fishing vessels will be able to avoid the exclusion zone without significant route deviation. As per **Section 9.8.1** the impact in terms of a restriction on navigation for fishing vessels originating from all the countries of the Baltic Sea, and hence the transboundary nature of the impact, has been assessed to be of **minor** significance and will cease following construction.

- PoO countries : Russia, Finland, Sweden, Denmark and Germany

- AP countries : Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

Restriction on Navigation for Shipping Vessels

As detailed in the preceding section describing the restriction on navigation for fishing vessels, such restrictions are also expected on normal shipping in the Baltic Sea. For the most part the pipelines' route is not within major shipping lanes but does cross and run parallel to them. As a result, the imposition of exclusion zones around munitions clearance sites and around the pipe-laying barge is expected to impact on the navigation of shipping vessels whose course may coincide with Project construction activities. At certain locations in the Gulf of Finland these exclusion zones will extend into the Estonian EEZ.

As per **Section 9.8.2** the impact on shipping vessel navigation due to imposition of an exclusion zone around munitions clearance sites has been assessed to be of **minor** significance for one location in Swedish EEZ. In the Gulf of Finland (Russia and Finland), however, the area available to shipping narrows and thus the impact from exclusion zones in this area is expected to increase and has been assessed to be of **minor** to **moderate** significance. These exclusion zones would affect shipping originating from all the Baltic Sea countries and thus this impact is regarded as being transboundary. The restriction on navigation will cease following munitions clearance.

- PoO countries : Russia, Finland and Sweden

- AP countries : Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

As per **Section 9.8.2** the impact on shipping vessel navigation due to imposition of an exclusion zone around the pipe-laying barge has been assessed to be of **minor** significance for most of the pipelines' route. In the Gulf of Finland (Russia and Finland), however, the impact has been assessed to be of **minor** to **moderate** significance. This exclusion zone would affect shipping originating from all the Baltic Sea countries and thus this impact is regarded as being transboundary. The restriction on navigation will cease following construction.

- PoO countries : Russia, Finland, Sweden, Denmark and Germany

- AP countries : Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

11.6.2 Transboundary Impacts Occurring during the Pre-commissioning and Commissioning Phase

The only impacts deemed to be of significance and of **regional** scale in the pre-commissioning and commissioning phase are those associated with the intake of seawater and discharge of pressure-test water. These activities will take place within the Russian EEZ in Portovaya Bay. The assessment in **Section 9.3** concludes that the associated impacts will not extend beyond Portovaya Bay and thus will not impose any significant transboundary impacts on resources/receptors in the neighbouring EEZs (Finland and Estonia).

11.6.3 Transboundary Impacts Occurring during the Operational Phase

The only impacts that have been identified as transboundary impacts during the operational phase are those to fisheries as itemised in **Table 11.15.**

Table 11.15 Transboundary impacts during the operational phase

Transboundary Impact	Activity	Resources/ Receptors	Scale of Impact	PoO country	AP country
Disruption of current fishing patterns	Pipeline presence	Fisheries	Regional - National	Russia, Finland, Sweden and Denmark	All
Damage to fishing equipment	Pipeline presence	Fisheries	Regional - National	Russia, Finland, Sweden and Denmark	All

The Baltic Sea fishing industry is transnational. Each of the Baltic Sea countries has its own fishing fleet and the EEZ boundaries have little bearing in terms of the fishing patterns of these fleets. Publically available information on the geographical focus and the fishing patterns of the Baltic Sea fleets is limited and there remains a level of uncertainty regarding the ability of fishermen to adapt their current patterns to accommodate the barrier effect posed by the presence of the Nord Stream pipelines. As such, Nord Stream has embarked on a concerted consultation programme with fisheries representatives to better understand the level of constraint that the pipelines will impose on current patterns and practices and the extent to which these can be adapted to accommodate the permanent presence of the two pipelines. A precautionary approach has been adopted to assess the impacts attributable to the long term presence of the pipelines in the Baltic Sea on fishing fleets. While the scale of the impact will be

restricted to the pipelines, the fact that it is expected to impact fleets from all Baltic Sea countries categorises the impact as transboundary.

Impacts to fisheries resulting from the presence of the pipelines on the sea floor are essentially limited to bottom trawling activities and mainly in areas where free spans greater than 0.5 m in height occur. The use of passive gear such as gill nets, pound nets, Danish seine and long lines allows the fishermen to select specific areas, even near the pipelines, without the risk of incidence or obstruction. Pelagic trawlers will be able to avoid the free spans by allowing sufficient distance between free span sections of the pipelines and the towed net.

Disruption of Current fishing Patterns

The presence of the pipelines will permanently exert some form of restriction on bottom trawling in the immediate vicinity of those parts of the pipelines that are located in open waters of the Baltic Sea where trawling is practised. The impact will only occur at those locations within the pipelines corridors, where trawling vessels sweeping across the pipelines will need to lift their gear (those vessels sweeping in a traverse pattern across the pipeline corridors may need to lift their gear frequently) to avoid interaction with the pipelines. Since it is currently anticipated that the pipelines will be 'overtrawlable' to a limit (depends on approach angle and speed of crossing) when placed on the sea bed, this disruption of normal trawling practice is only expected to occur in areas where the pipelines' protrusion (free span) above the seabed is in excess of 0.5 m (see **Figures 9.15** to **9.18** in **Section 9.8.1** for the distribution of free spans along the pipelines route). Many of the locations destined for free spans are in any event currently unsuitable for bottom trawling because of the rocky substrate inherent at these locations. This serves to constrain the scale of the impact. No free spans exceeding 0.5 m will be present in Germany.

The capacity of bottom trawling fishermen to adapt to the barrier effect of the pipeline free spans is currently difficult to anticipate. As such, a precautionary approach, based on this uncertainty, has led to an assessment of the impact in **Section 9.8.1** as being of **minor** to **moderate** significance. It is anticipated that the fleets of all Baltic Sea countries may experience some level of impact.

- PoO countries : Russia, Finland, Sweden and Denmark
- AP countries : Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

Damage to Fishing Equipment

Experience from the extensive network of marine pipelines in the North Sea where intensive fishing has taken place over many years indicates that the occurrence of significant interactions between fishing equipment is rare. Moreover, experimental studies commissioned by Nord

Stream where trawl nets have been pulled over a pipeline at different angles and typical speeds, suggest that the sections of pipelines on, or partly buried in, the seabed are mostly overtrawlable. Free spans exceeding 0.5 m in height along the pipelines' route will, however, present a greater risk of fishing gear becoming hooked underneath one of the pipelines or support structures, thereby resulting in damage to fishing gear, disruption of the fishing vessel's course and, conceivably in the case of a snagged anchor, potential loss of the vessel.

In order to reduce this impact, the alignments of the pipelines will be identified on nautical charts and in notices to mariners, as will the locations of free spans. Fishing vessels will therefore be able to minimise the likelihood of snagging their fishing equipment (or anchors) on the pipelines by either avoiding trawling in the vicinity of free spans or by ensuring that nets and anchors are lifted when free span locations are approached. This notwithstanding, the pipelines may also attract fishermen to fish in the vicinity of the pipelines, because of the expected higher abundance of commercial fish near the pipelines or rock fill as fish are known to aggregate near artificial structures on the seabed. For this reason, Nord Stream may apply for permanent exclusion zones to be created around the free spans but the zones will need to be set by the relevant National Authority for each of the PoO countries.

As per **Section 9.8.2** the impact on Baltic Sea fishing fleets in terms of damage to fishing equipment is assessed to be of **minor** significance. Since there are no free spans exceeding 0.5 m above the seabed anticipated in Germany, impacts are not expected to vessels fishing in this country. The highest densities of free spans are planned in the Gulf of Finland. It is expected that the fishing fleets of all Baltic Sea countries may experience some level of impact.

- PoO countries : Russia, Finland, Sweden and Denmark
- AP countries: Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

11.6.4 Transboundary Impacts as a Result of Unplanned Events

Unplanned events, which include a fuel/oil spill, the disturbance of conventional munitions(1) and pipeline failure, have the potential to impact upon resources/receptors in countries other than the PoO country in which the event takes place (**Table 11.16**). The probability of these unplanned events occurring has been assessed to be generally **low** throughout, with the exception of the disturbance of munitions in known dumping areas where the probability increases to **medium** and for small fuel/oil spills where the probability is **high**. As discussed in

(1) Impacts associated with the disturbance of chemical munitions have been assessed to be of a local scale and hence are excluded as potential transboundary impacts.

Chapter 7, the probability of an unplanned event contributes materially to the assessment of the significance of its impact.

Table 11.16 Unplanned events resulting in transboundary impacts

Unplanned Event	Resources/ Receptors	Scale of Impact	PoO country	AP country
Fuel/oil spill	Water column	National	All	All
	Atmosphere	National	All	All
	Plankton	National	All	All
	Marine Benthos	National	All	All
	Fish	National	All	All
	Sea Birds	National	All	All
	Marine mammals	National	All	All
	Conservation areas	National	All	All
	Fisheries	National	All	All
	Shipping and navigation	National	All	All
	Tourism and recreation	National	All	All
	Offshore industry	National	All	All
Disturbance of conventional munitions	Water column	Local - regional	All	Russia, Finland, Estonia, Sweden and Denmark
	Marine mammals	Regional	All	Russia, Finland, Estonia, Sweden and Denmark
Pipeline Failure	Atmosphere	National	All	All

Each unplanned event is discussed in turn below. In each case reference is made to the detailed assessment of impacts arising from unplanned events presented in **Chapter 9**.

Fuel/Oil Spill(1)

Fuel/oil spills could, depending on the quantity of hydrocarbon released and the release location, spread across EEZ borders of neighbouring countries. Spills of a transboundary scale could result from shipping collisions involving a Project vessel. Spills associated with refuelling operations will typically be small and will in most cases be such that they can be contained and

(1) A distinction is made between an accidental release of fuel during fuel handling operations (such as re-fuelling at sea) and the loss of containment of a vessel's oil tank as a result of a collision involving a Project vessel.

hence will not give rise to a significant transboundary impact. As detailed in **Section 9.10,** the probability of a major spill occurring involving a Project vessel is **low** but could occur anywhere along the pipelines' route, mainly during the construction phase. A slight increase in probability of such an initiating event is expected where the pipelines' route interacts with major shipping lanes. Small refuelling spills are of **high** probability, however, safety measures would ensure that such spills are avoided and no transboundary impact is expected. Depending on the spill location, both the EEZs of the OAP countries and those of the other PoO countries may be impacted. The resources/receptors expected to be significantly impacted on a **national** scale should a major spill occur include the following:

- Water column
- Atmosphere
- Plankton
- Marine benthos
- Fish
- Sea birds
- Marine mammals
- Conservation areas
- Fisheries
- Shipping and navigation
- Tourism and recreation
- Offshore industry

As detailed in **Section 9.10.2**, and equally applicable in the transboundary context, impacts on these resources/receptors as a result of a fuel/oil spill have been assessed to be of **minor** to **major** consequence. However, on consideration of the **low** probability of a major fuel/oil spill occurring, the overall significance is **low** with the exception that the impacts on marine benthos, fish, sea birds, marine mammals, nature conservation areas and fisheries will be of **low** to **moderate** overall significance.

- PoO countries : Russia, Finland, Sweden, Denmark and Germany

- AP countries: Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

Disturbance of Munitions

The disturbance of munitions has been considered in terms of triggering unexploded conventional munitions, such as mines, that are present on the seabed. The Project has ensured, by means of various surveys and careful routing, that the pipelines' route generally avoids areas of concern and where this is not possible, certain munitions will be cleared prior to construction. However, the possibility, albeit very small, still exists that the Project may disturb some unidentified munitions. The probability for the disturbance of conventional munitions is **low**.

The disturbance of munitions is only likely to result in transboundary impacts when the disturbance takes place in close vicinity to the EEZ of another country. The likelihood of disturbing munitions is considered highest (but still of **low** probability) in Russia, Finland and Sweden based on the findings of the munitions surveys to-date. The disturbance of munitions in these countries could impact resources/receptors in Russia, Finland, Estonia, Sweden and Denmark. Resources/receptors that may potentially be affected on the transboundary level include the water column and marine mammals.

As detailed in **Section 9.10.2** , and similarly applicable in the transboundary context, impacts on these resources/receptors as a result of the disturbance of munitions have been assessed to be of **minor** to **moderate** consequence. However, on consideration of the **low** probability of the event occurring, the overall significance is generally **low**.

- PoO countries : Russia, Finland and Sweden

- AP countries: Estonia and Russia, Finland, Sweden and Denmark

Pipeline Failure

Any damage to the pipelines that affects their functionality is regarded as a pipeline failure. The worst case level of pipeline failure is a pipeline rupture, which would result in a large release of natural gas. This gas plume would rise rapidly through the water column before being released into the atmosphere. The probability of this occurring is **low** as per **Section 9.10.4.** While such an event would have severe consequences to shipping and the environment in the immediate vicinity of the failure event, the only resource/receptor that may be significantly impacted upon by a pipeline rupture on a **regional** or greater scale is the atmosphere (all other impacts, however significant, would all be local in nature and hence would not give rise to a transboundary effect).

There will be the equivalent (at atmospheric pressure) of 210 million cubic metres of gas within one enclosed pipeline. The mass of this volume of gas is around 148,000 tonnes at the average temperature of the seabed. Should all the gas within the pipeline enter the atmosphere it would be equivalent to the release of 3.7 million tonnes of carbon dioxide in terms of global warming potential. In comparison to national carbon dioxide emissions, this is equivalent to less than 0.25 % of Russia's annual emissions, less than 0.5% of Germany's annual emissions, but equivalent to roughly 7.0% of Denmark's or Sweden's annual emissions. The methane released in a pipeline rupture would be equivalent in terms of global warming potential to approximately 9% of the total annual carbon dioxide emissions from shipping traffic in the Baltic Sea. As per **Section 9.10.4**, the impact on the atmosphere due to pipeline rupture has been assessed to be of **moderate** consequence. However, as the probability of a pipeline rupture is **low**, the overall significance is assessed as **low**. This impact is transboundary and would affect all the PoO countries as well as all the OAP countries.

- PoO countries : Russia, Finland, Sweden, Denmark and Germany
- AP countries: Estonia, Latvia, Lithuania and Poland as well as Russia, Finland, Sweden, Denmark and Germany

11.7 Conclusion

Most transboundary impacts resulting from planned activities during the construction phase occur in the Gulf of Finland and affect resources/receptors in the Estonian EEZ. The exception is the emission of pollutant gases from vessel movement during the construction phase as well as the restrictions on navigation of fishing and shipping vessels due to exclusion zones, which will affect the PoO countries as well as the OAP countries. The transboundary impacts associated with planned events during construction have all been assessed to be of **minor** significance with the exception of munitions clearance where the impact is expected to be of **moderate** significance and the restriction on navigation of fishing and shipping vessels in the Gulf of Finland, which is expected to be of **minor** to **moderate** significance. All PoO countries will experience some back-to-back impacts during construction where the pipelines cross EEZ boundaries. These impacts are generally of **minor** significance on the seabed, marine benthos, fish and sea birds with **moderate** impacts only expected between Denmark and Germany.

The main significant transboundary impact during the operational phase of the pipelines is the impact on fisheries. The current uncertainty regarding the ability of the Baltic Sea fleet, particularly bottom trawlers in the open seas of the Baltic Sea, to adapt their approaches and patterns to accommodate the presence of the pipelines requires a precautionary approach to be taken in assessing the significance of this impact. For this reason it has been assessed to be of **minor** to **moderate** significance. The impact will originate from the presence of the pipelines, and mainly pipeline free spans, in Russia, Finland, Sweden and Denmark and will be

experienced by each of the nine Baltic States. All PoO countries will experience some back-to-back impacts during operations where the pipelines cross EEZ boundaries. These impacts are generally of **minor** significance on fish with **moderate** impacts only expected between Denmark and Germany.

Unplanned events are mainly associated with the construction phase (pipeline failure being the exception). With the exception of disturbance of unexploded ordnance, transboundary impacts resulting from unplanned events could be initiated in any of the PoO countries and the effects could be experienced in any of the AP countries, depending on the location of the initiating event. In most instances, the transboundary impacts arising from any single unplanned event would only affect the PoO country and one AP country. Exceptions would be a pipeline leak, which would impact all Baltic States and a major oil spill which could (depending on spill location, size of spill, local oceanography and prevailing meteorological conditions) impact any number of the Baltic States. The transboundary impacts associated with unplanned events have been assessed to be of **low** overall significance in most cases. The only transboundary impacts assessed to be of **low** to **moderate** significance (taking into account the low probability of such an event occurring) are those on marine benthos, fish, sea birds, marine mammals, nature conservation areas and fisheries (**moderate**) resulting from a major oil spill.

A summary of all significant transboundary impacts that will be experienced by the PoO countries and the OAP countries is presented in **Table 11.17** for planned events during the construction and operational phases and in **Table 11.18** for unplanned events. Back-to-back impacts are included in italics for easy identification.

Table 11.17 Transboundary impact summary for the PoO countries and the OAP countries (back-to-back impacts in italics)

	Transboundary Impact	Activity	Resources/ Receptors	PoO country					OAP country			
				Russia	Finland	Sweden	Denmark	Germany	Estonia	Latvia	Lithuania	Poland
Construction Phase	Increase in turbidity	Munitions clearance	Water column	-	Minor	-	-	-	Minor	-	-	-
			Marine benthos	-	Minor	-	-	-	Minor	-	-	-
		Seabed intervention works	Water column	-	-	-	-	-	Minor	-	-	-
		Pipe-laying and anchor handling	*Marine benthos*	*Minor*	*Minor*	*Minor*	*Minor*	*Minor*	-	-	-	-
	Release of contaminants	Munitions clearance	Water column	-	Minor	-	-	-	Minor	-	-	-
		Seabed intervention works	Water column	-	-	-	-	-	Minor	-	-	-
		Pipe-laying and anchor handling	*Marine benthos*	*Minor*	*Minor*	*Minor*	*Minor*	*Minor*	-	-	-	-

	Transboundary Impact	Activity	Resources/ Receptors	PoO country					OAP country			
				Russia	Finland	Sweden	Denmark	Germany	Estonia	Latvia	Lithuania	Poland
	Noise and vibration	Munitions clearance	Fish	-	Minor	-	-	-	Minor/ Minor – Moderate	-	-	-
			Marine mammals	-	Minor	-	-	-	Minor/ Moderate	-	-	-
			Marine benthos	-	-	-	-	-	Minor	-	-	-
		Pipeline presence	*Fish*	*Minor*	*Minor*	*Minor*	*Minor*	*Minor*	-	-	-	-
	Emission of pollutant gases	Construction	Atmosphere	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor
	Physical alteration of the seabed	*Anchor handling*	*Seabed*	*Minor*	*Minor*	*Minor*	*Minor*	*Minor*	-	-	-	-
	Physical loss of seabed habitats	*Anchor handling*	*Marine benthos*	*Minor*	*Minor*	*Minor*	*Minor - moderate*	*Moderate*	-	-	-	-
		Pipe-laying	*Marine benthos*	*Minor*	*Minor*	*Minor*	*Minor - moderate*	*Moderate*	-	-	-	-
	Smothering	*Pipe-laying*	*Marine benthos*	*Minor*	*Minor*	*Minor*	*Minor - moderate*	*Moderate*	-	-	-	-
	Visual/physical disturbance	*General construction and vessel movement*	*Sea birds*	-	-	-	*– /Moderate*	*Moderate*	-	-	-	-

	Transboundary Impact	Activity	Resources/ Receptors	PoO country					OAP country			
				Russia	Finland	Sweden	Denmark	Germany	Estonia	Latvia	Lithuania	Poland
	Ice breaking	Construction and support vessel movement	Marine mammals	-	-	-	-	-	–/ Moderate	-	-	-
	Restriction on navigation for fishing vessels	Munitions clearance and imposition of an exclusion zone	Fisheries	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor
		Construction and support vessel movements and imposition of an exclusion zone	Fisheries	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor
	Restriction on navigation for shipping vessels	Munitions clearance and imposition of an exclusion zone	Shipping and navigation	Minor/ Minor – Moderate(1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)

(1) The impact is of minor to moderate significance in the Gulf of Finland.

	Transboundary Impact	Activity	Resources/ Receptors	PoO country					OAP country			
				Russia	Finland	Sweden	Denmark	Germany	Estonia	Latvia	Lithuania	Poland
		Construction and support vessel movements and imposition of an exclusion zone	Shipping and navigation	Minor/ Minor – Moderate(1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)	Minor/ Minor – Moderate (1)
Operational Phase	Disruption of current fishing patterns	Pipeline presence	Fisheries	Minor – Moderate	Minor – Moderate	Minor – Moderate	Minor – Moderate	Minor – Moderate	Minor – Moderate	Minor – Moderate	Minor – Moderate	Minor – Moderate
	Damage to fishing equipment	Pipeline presence	Fisheries	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor
	Physical alteration of the seabed	*Pipeline presence*	*Fish*	-	-	*Minor*	*Minor - moderate*	*Moderate*	-	-	-	-
	Introduction of secondary habitats	*Pipeline presence*	*Fish*	*Minor*	*Minor*	*Minor*	*Minor - moderate*	*Moderate*	-	-	-	-

(1) The impact is of minor to moderate significance in the Gulf of Finland.

Table 11.18 Unplanned event transboundary impact summary for the PoO countries and the OAP countries

Unplanned Event	Resources/ Receptors	PoO countries					OAP countries			
		Russia	Finland	Sweden	Denmark	Germany	Estonia	Latvia	Lithuania	Poland
Fuel/oil spill	Water column	Low	Low	Low	Low	Low	Low	Low	Low	Low
	Atmosphere	Low	Low	Low	Low	Low	Low	Low	Low	Low
	Plankton	Low	Low	Low	Low	Low	Low	Low	Low	Low
	Marine benthos	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate
	Fish	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate
	Sea birds	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate
	Marine mammals	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate
	Conservation areas	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate	Low – Moderate
	Fisheries	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Shipping and navigation	Low	Low	Low	Low	Low	Low	Low	Low	Low
	Tourism and recreation	Low	Low	Low	Low	Low	Low	Low	Low	Low
	Offshore industry	Low	Low	Low	Low	Low	Low	Low	Low	Low

Unplanned Event	Resources/ Receptors	PoO countries					OAP countries			
		Russia	Finland	Sweden	Denmark	Germany	Estonia	Latvia	Lithuania	Poland
Disturbance of conventional munitions	Water column	Low	Low	Low	Low	-	Low	-	-	-
	Marine mammals	Low	Low	Low	Low	-	Low	-	-	-
Pipeline failure	Atmosphere	Low	Low	Low	Low	Low	Low	Low	Low	Low

11.8 Reference List

Nord Stream AG & Ramboll. 2008. Memo Spreading of sediment and contaminants during works in the seabed.

Nord Stream AG & Ramboll. 2008. Memo Spreading of sediment and contaminants from clearing of munitions.