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WWF Baltic Ecoregion Programme

Position Statement

on the Nord Stream Gas Pipeline ESPOO EIA Report

7 May 2009

1. General remarks

The Nord Stream natural gas pipeline is the largest submarine structure ever planned for the Baltic Sea, extending over the territories of 5 countries and over a length of app. 1200 km. The process undergone in the Espoo procedure is unique not only for the Baltic Sea but also the methodology – a co-ordinated and simultaneous EIA procedure in 5 countries with a relatively transparent approach – was undertaken in such a comprehensive form for the first time.

Given the complexity and the size of the project, Nord Stream has had to undertake quite a comprehensive compilation of data, including some research leading to additional knowledge on the ecosystem and threats of the Baltic Sea. The research programme agreed upon in the scoping phase of the process has been formally fulfilled and has added new details to our still largely unsatisfactory knowledge about man-made impacts in the Baltic Sea.

Nonetheless, there are significant gaps in the EIA. Some of them are severe and there are numerous others that inhibit an accurate assessment of the pipeline's impacts. This position statement presents a detailed analysis of the most critical shortcomings of the EIA which must be addressed in order to make an informed and accurate assessment of the project's environmental impacts.

This position statement demonstrates that the negative implications of the Nord Stream pipeline project on the environment, especially the marine environment, are much more severe than characterized by Nord Stream in the EIA. The classification of a substantial number of hazards as insignificant simply contradicts evidence to the contrary and is therefore not only incorrect but inappropriate. Also, quite a number of the other impacts are considerably more severe than stated, meaning their significance classification must be raised to a higher level. Further, given the misclassification of impacts the EIA lacks appropriate proposals for ensuring effective mitigation and compensation measures necessary to minimize and offset negative impacts.

Significant problems also arise with regards to undersea munitions, the integrity of some Natura 2000 sites and MPAs (especially concerning birds) and the risks posed by increased eutrophication by nitrogen and phosphorus and pollution by harmful substances such as cadmium.

Despite some thorough research, the remaining data gaps are too large to make a detailed assessment of the pipeline's impacts in many of the respective fields. The EIA does not take the obligatory approach to evaluate the worst case scenario in these situations, but rather relies on assumptions that can only be qualified as wild guesses in some cases. Additionally, the cumulative effects of other projects are not taken into account in adequate depth², although they will be very extensive.

Based upon the evidence presented in this position statement, it is clear to WWF that the EIA prepared by Nord Stream is insufficient. It must be dramatically revised, updated and completed with all of the necessary data (currently missing) in order to ensure that an adequate assessment of the environmental impacts of the pipeline project can be fairly considered.

¹ The following organizations are partners within the WWF Baltic Ecoregion Programme: Baltic Fund for Nature, Estonian Fund for Nature, Lithuanian Fund for Nature, Pasaules Dabas Fonds, WWF-Denmark, WWF-Finland, WWF-Germany, WWF-Poland,

WWF's general position on use and transport of natural gas.

WWF's general position is that fossil energy should be phased out as energy for heating and power generating and that renewable energy should be given priority for these purposes. However, as long as renewables cannot completely substitute fossil energies, natural gas is one of the fossil energies with the lowest greenhouse gas emissions and with relatively high energy efficiency. So in some European countries WWF does regard the use of natural gas as a justified bridging technology for some years.

WWF does not comment about the geo-political role of gas supply of Western Europe from Russian sources. This is a geo-strategical discussion which will have to be handled in a forum separate from the Environmental Impact Assessment.

The transport of natural gas through large sea areas via pipelines is a common and relatively mature technology. A transport alternative would be to liquidise the natural gas and to transport it via LNG tankers to Western Europe and the world market. This would add substantial ship traffic to the already very intensive traffic travelling through the Baltic and increase the risk of ship accidents. During the liquidising process there will be also a loss of energy content of approx. 25%.

WWF has claimed during the pipeline discussion in recent years that our main focus is to guarantee an EIA process of highest standard in order to avoid and mitigate negative environmental impacts as well as insure that full compensational measures are implemented to offset potential damages.

The following position on the EIA report presented by Nord Stream for the Baltic Gas pipeline Espoo consultation process is the result of the evaluation of the documents presented by Nord Stream in March 2009.

Guiding principles:

Demand for highest quality quantified data without gaps

In general, WWF claims that the research results should be comprehensive and quantified so that an appropriate judgement of the impacts of the project can be derived, mitigation measures be developed and - if no mitigation is possible - compensation measures be designed and planned.

For remaining gaps: precautionary principle – worst case assumption

For the existing gaps, due to lack of data **a worst case assumption is for WWF the only way to estimate the potential degree of environmental impacts.** Unfortunately, the procedural rules in the Espoo report do not demand scientifically proven judgements of the authors of the EIA as the only basis. This allows taking unjustified speculations as the basis for the prognoses made. Accordingly, this in several cases leads to drastically false assumptions. **In consequence, some findings of the impact assessment of the pipeline can be described as unjustified.**

The methodology put forward and described by the Nord Stream team as a *"precautionary approach"*³ is neither scientifically sound nor acceptable. In situations of absolute uncertainty, the predicted impact is envisaged on the basis of being *"likely to occur or not"*⁴. This is far from any worst possible effects as a basis. As long as there is simply no data to support an assumption, it is prudent to take the worst case into account, even though this might often not be the probable case. The EIA's conclusions about the environmental impact in ALL cases where gaps exist are therefore false or - in the best cases - severely doubtful. The EIA clearly describes the methodology used in these cases, and it is also clear that this methodology is unsuitable. For this reason, **much of the EIA must be thoroughly revised, and it will be inevitable to drastically elevate some of the predicted impacts to more acute levels.**

WWF-Russia and WWF-Sweden.

² e.g. p. 1360 ff., 1536 ff.

³ p. 1659

⁴ p. 1659: *"Where the magnitude of impacts cannot be predicted with certainty, the EIA team has used its professional experience and available scientific research from the Baltic Sea to judge whether a significant impact is likely to occur or not."*

Although there is a dedicated chapter for addressing the gaps⁵, the Espoo report does not name a single measure or method on how the serious issue of the numerous remaining gaps should be dealt with. Simply stating that one has collected some data in addition to already published material known to science is simply unacceptable and does not deal with the issue of gaps, but rather that of already filled gaps.

All gaps must be filled in order to be able to reliably estimate the consequences of the pipeline; otherwise assuming a worst case scenario is the only acceptable way to address these gaps.

A proper EIA should also cover the stone mining operations near Kotka and the necessary transportation measures (also for a reliable assessment of the total CO₂, SO₂ and NO_x emissions caused by the project) as well as the plants for coating of the pipes in Kotka and Sassnitz.

The time frame for the construction process of the pipeline is not explained in sufficient detail with the different options needed (especially in case not all needed permissions have been granted by the end of 2009). In the Gulf of Finland it is crucial that no pipeline construction works will take place during winter months, as this could cause problems for maritime safety. For the Finnish EEZ, it is not stated where the construction process will be started, during which months it will be completed and how long the total process will take. This information is critical, as the impacts on various biota cannot be adequately assessed without considering these factors.

Additionally, the geological data around the Isle of Gogland is based on sediment maps and bathymetric maps without any field surveys⁶. In our view this is not satisfactory, as the alternative southern route is crucial in order to protect the Natura 2000 areas and the Eastern Gulf of Finland National Park in the Finnish waters.

1.2. Evaluation of alternative routes

Land route alternative

No land route (e.g. the southern through Poland) has been evaluated⁷. There is no reason why such an alternative route should not be studied. Just like the undersea solution, a land pipeline could be routed solely through the territories of Russia and EU member states. The practicability of such an alternative thus cannot be disqualified, especially without any further justification. An assessment of the environmental impacts of such a route is demanded from the Espoo convention.

In consequence, the non-consideration of the land route in the evaluation of the alternatives is a severe shortcoming. With the provided data, no judgment can be made if the selected route is indeed the one with the least negative impacts, or if a land route would be the ecologically least detrimental solution. Appropriate data must be provided to fill these gaps.

Missing alternative sea routes

The planned pipeline crosses high-risk munitions-polluted areas near Bornholm, Gotland, Finland and presumably Russia. We are aware that in some of these cases there will be no alternatives, but there still are some obvious alternative route options worth evaluating. There would be more than one option for a route east and south of Gotland (the only alternative evaluated route runs west of the island)⁸. Also, another option includes a route near Bornholm further south (it might have to cross through Polish waters, but that cannot be an argument to rule it out) might relieve conflicts concerning possible ammunition encounters.

The alternative route with the EIA on land, either through the Baltic countries (Amber -pipeline) or through Finland and Sweden is not given in the present EIA - only the history of the pipeline is described.

⁵ p. 1660

⁶ Finnish EIA p. 198

⁷ p. 299 ff.

⁸ p. 346

Evaluated alternative sea routes

WWF is not convinced by the arguments put forward in favour of the alternative route north of Gogland, because the cross-boundary impacts on the Eastern Gulf of Finland National Park (only 6,5 km away from the planned gas pipeline in the Russian waters) and two Natura 2000 sites (F10408001 and F10100078) will be high. The Eastern Gulf of Finland National Park is also a Baltic Sea Protected Area (BSPA) area designated by HELCOM. Furthermore, Finland is planning to designate two new offshore Natura 2000 areas - Länsileton alue (F10400001) and Luodematalat (F10400002) - to protect reefs (1170) in the Eastern Gulf of Finland south of Kotka and Pyhtää. These two areas are candidates to be designated also as BSPA-areas under the HELCOM umbrella. The northern route alternative around the Isle of Gogland could cause serious impacts especially on the Länsileton alue-site north of Gogland. For these reasons, WWF's view is that the southern route alternative around Gogland Island should be chosen. Further, as a connection to the previous alternative southern route, the alternative route in the Finnish EEZ should be chosen (1a/2a)

In the Kallbådagrund area the southern route alternative (C16) should be chosen. There is a seal sanctuary in the vicinity (9km) and furthermore, the Finnish government is planning to designate a new offshore Natura 2000 area (F10100106) to protect reefs southeast of Kallbådagrund. The Finnish EIA also states several other reasons to choose the southern route alternative: there is less need to build stone bridges and, for this reason, the harmful impacts of the relocation of sediments (including the leakage of nutrients and harmful substances) are lower.

1.3. Impacts of sea bed interventions

The planned twin pipeline will - with a total length of 2.440 km - probably be the most massive man-made structure in the Baltic Sea. Its location on or in the sea floor makes massive interventions into natural sea bed structures and communities inevitable. The conclusion of the EIA, which claims that these impacts will be largely insignificant or minor cannot be shared.

The very rough and inhomogeneous structure of the underwater landscape along much of the pipeline's projected route (ridges, peaks reaching close to the surface, followed by deep channels and basins, sometimes steep drop-offs) combined with unfavourable water and soil chemistry (oxygen-depleted zones, H₂S) make it a technical challenge to lay a stable and safe pipeline. Ideally a pipeline needs plain ground and should not be placed in an environment with aggressive substances that could corrode the pipe or destroy the concrete coatings. Instead, along the proposed pipeline route in the Baltic Sea there are drop-offs of up to 200m in depth, free span areas of several meters length and highly unfavourable conditions.

Because of the uneven terrain, there is a need to either remove obstacles like ridges or build artificial underwater support structures (berms and bridges) to offer a suitable ground for the pipeline. Even though stated as a major technical challenge from an early stage of the project on, the EIA does not give much detail on these underwater structures and their impacts. It is unknown to us to what extent rocks will have to be cut, blown away (which would generate additional noise from explosions, apart from the habitat loss in the route of the pipeline) and where small-scale relocations of material will occur. The EIA provides absolutely no data on this. Also, the possible disposal of surplus material must be clarified in respect to where, and to what extent, possible dumpings will occur.

Dredging, quarrying, dumping and anchoring lead to substantial sediment spread and the release of harmful substances. The corridor affected by massive deposition of the material (e.g. > 10mm) can reach a width of more than 1 - 2 km⁹. Depending on the grain size of the dumped material and its relation to the underlying ground, a long-term change in benthic communities in the affected area is possible. Defining the effect as "reversible" is thus not generally appropriate and must be modified.

High-rise underwater structures needed to support the pipeline will interrupt currents and produce zones with an elevated sedimentation of organic material and potentially lowered oxygen supply in the sediment and potentially also in the lower part of the water body. These structures will also be an obstacle for fishing activities, risking the loss of gear and thereby increasing the number of 'ghost nets' (abandoned fishing nets which may spend years drifting about on the sea floor entangling and killing fish and other marine life).

⁹ see e.g. p. 912, 1244, 1277

In the Gulf of Finland, no detailed data are given on where exactly the total amount of rock and gravel material needed for stone bridges will be mined or transferred.

1.4. Explosives and other munitions

The construction of the pipeline will require the removal of explosives in Danish, Swedish, Finnish and probably Russian waters (the latter to a completely unknown extent!). Possibly, the removal of dumped munitions may also be necessary in Germany. The most important mine fields were observed in the Gulf of Finland. In Finnish waters alone, 31 active and highly explosive mines were detected along the planned route of the pipeline by Nord Stream. The only planned way to deal with ammunition is to blast it¹⁰. Any alternatives, possibly more environment-friendly methods that could be an option at least in shallower waters, are neither presented nor even discussed.

Nord Stream has gone to great efforts in locating explosives on the sea floor along the route. Nonetheless, the methods employed cannot provide certainty that all munitions present have been discovered. Natural sedimentation can cover up explosives and make detection difficult to impossible. Nord Stream also expresses that minor modifications of the pipeline's route may still occur, possibly even during the construction work. This could mean that the pipeline construction could intrude into un-investigated areas with a potentially high risk of running into additional explosives. Also the effects of the anchor vessels needed to stabilize the pipe laying vessel during laying are not yet studied. They will operate in an area of about 1000m from the pipeline corridor. The anchor-sites were not studied in advance – and, consequently, the findings of ongoing munition screening on the anchor sites are not reflected in the EIA. All risks and impacts connected with explosives have therefore to be assumed higher than indicated in the EIA. The same is true for chemical weapons (which most likely exist in the Danish munitions risk areas).

Explosions are estimated to severely harm marine mammals within a radius of more than 10 - 30 km around the blasting site¹¹, so this is the minimum extent of the shockwave where severely detrimental effects have to be expected. If mitigation measures like bubble curtains can be applied, this distance can possibly be reduced. The EIA unfortunately does not describe any detailed mitigation measures. The EIA's assumption that the extent of the shockwaves resulting from munitions blasts is unknown, is simply false.¹² The shockwaves of underwater explosions have been studied in great detail, not only in a military context¹³. Of course the distance greatly varies, depending on the size and type of the explosive, its specific location on the sea floor and the mitigation measures applied (e.g. bubble curtains). Also, the used threshold to define the point where the resulting shockwave's strength is no longer significant is decisive. Nonetheless, a detailed prediction of different shockwave types is simply not needed for an adequate EIA assessment. **For the precautionary approach to be applied in the EIA, the occurrence of large explosives in unfavourable conditions must be envisaged, since this can neither be ruled out nor be regarded as improbable.**

No procedures for dealing with chemical weapons have been set up, nor have the ecological consequences of their handling or disposal been taken into account. Since the pipeline will run through several areas that are known to carry a heavy pollution with dumped chemical munitions, this is a severe gap. **Action plans with a strong focus on mitigation measures must be developed to tackle possible dangers and additional emissions of harmful substances.** The handling and removing of munitions can have severe effects on marine life – a fact that is critically underestimated in the EIA.

Alternative methods of dealing with undersea munitions with a reduced noise transmission are constantly being investigated and improved. These methods are suitable at least for shallower water areas. The installation of bubble curtains or the disposal or blasting of munitions on land is possible - not in all cases, but this has to be decided as the case arises. Sometimes it is also possible to direct a part of the noise into the sediment instead of the water body. As Nord Stream only states that

¹⁰ p. 871

¹¹ e.g. Koschinski: <http://www.wal-und-mensch.de/wum2007/koschinski.php>; with further literature citations

¹² p. 913

¹³ e.g. Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals (2003): *Ocean Noise and Marine Mammals*. Washington D.C.

munitions are to be removed by explosions, we doubt that all possible mitigation measures have been evaluated. It has to be taken into account that more munitions than already discovered might have to be removed along the route, and this might well be the case in shallow water areas. But we also do not find any data on mitigation (or why it should not be possible in this concrete case) concerning the known locations of explosives. **Action plans and a thorough evaluation of alternative methods of munition removal in every specific case must be added to the EIA assessment.**

For all munitions removals, regardless of the depth, measures to minimize losses of marine mammals and fish must be applied. This means that mammals and fish must be scared out of the dangerous areas prior to explosions. It is still unknown how successfully this can be achieved. For fish, only a small number of the individuals can probably be saved this way, for mammals it may be more successful. Nonetheless, a substantial negative impact still remains, but the mitigation measures at least will reduce both numbers and probability of losses. **Detailed plans must be developed for all sites with explosives. A monitoring of the effectiveness of fish and mammal deterrent is particularly important to be able to possibly improve the success in subsequent blastings.**

Harbour porpoises can be present throughout almost the whole length of the pipeline. It is not at all justified to omit harbour porpoises from the planning with reference to their rarity. The occurrence of harbour porpoise must therefore be detected along the whole route – which, given current research methodologies and state of the art technology, should be easily done.

As a result of blasts, there will be holes with a diameter of up to 15 meters and a depth of 7 meters in the seafloor. The total amount of sediment removed as a result of the explosion is 5.000 tonnes – and this is only in the Finnish EEZ - and it will be suspended in the whole water column. The EIA states that most of the sediment will settle down back to the sea bottom. However, a part of it will be carried to other sea areas by currents. And although the suspended sediment will settle down again, it is most probable that some of the harmful substances and nutrients will have impact on biota.

1.5. Specifics at the two landfall areas

Intensive seabed interventions will take place near both landfall areas, since the pipeline is to be buried into the ground. This makes some temporary disposal of sediment material necessary, which, as we understand, will only be undertaken in the sea through dumping.

The temporary dumping of sediment at a 4km² dump site in German waters will severely impact benthos communities and important feeding areas for ducks. Long-tailed ducks regularly reach densities of > 100 birds / km² in that area, which are the highest values, recorded on German coasts. Over much of the year, the local population (not limited to the dumping site, but extending further into the Oder bight) exceeds the 1%-criteria of the biogeographical population. Red-breasted mergansers also show the highest densities recorded in German coastal waters at the site (>5 ind. /km²)¹⁴. It is to be expected that the marine benthos communities at the dumpsite / spoil ground will be severely diminished, both through the dumping and the following dredging activities¹⁵. The value of the area for waterbirds will consequentially decline and the outstanding importance may be lost. No adequate mitigation or compensation measures have been developed by Nord Stream to address this. **The establishment of this dump site is unacceptable under these conditions. If it is to be used, proper mitigation/compensation measures must be identified in order to minimize and/or offset the severe damage expected.** Namely, the lost values of the marine habitats must be compensated for by **recreating similar marine habitats** with comparable values elsewhere, preferably in the near vicinity.

The cumulative environmental impacts from other projects are not conceded by Nord Stream. The written data provided by Nord Stream therefore shows substantial gaps in the consideration of other projects' implications such as the cumulative negative impacts of big projects which have already been

¹⁴ Mendel, B. et al. (2008): Artensteckbriefe von See- und Wasservögeln an der deutschen Nord- und Ostsee. Naturschutz und Biologische Vielfalt 59

¹⁵ Krause, J.C. (2002): The effects of marine sediment extraction on sensitive macrozoobenthic populations in the southern Baltic Sea. Diss. Univ. Rostock

Körner, E. (2000): Sauerstoffmangelresistenz von *Travisia forbesii* JOHNSTON, 1840 - Auswirkung des Kiesabbaus vor der Küste Mecklenburg-Vorpommerns auf eine empfindliche Benthosart. Dipl.-Arb. Biologie Univ. Rostock
Annex 7 of the EIA (UVS) of the German part of the pipeline, p. 2

applied for or permitted at or around the German landfall area (dredging activities for shipping channels, 3 power plants at the Lubmin industrial site¹⁶).

Specifically, an intolerable loss of marine habitats with considerable importance for resting and overwintering birds is already prejudiced or approved through the aforementioned projects. The conservation values of some areas are therefore already severely threatened¹⁷. The impacts from the Nord Stream pipeline will come on top of this, and thus it is uncertain if it will be compatible with Natura 2000 network requirements under these circumstances.

Nord Stream factually negates numerous strong impacts, such as the loss of several breeding sites of rare birds, e.g. the White-tailed Eagle. While the loss of the breeding site itself is conceded, it is voiced as irrelevant, because the loss is also predicted as a possible consequence of one of the other planned projects and not as an additional step which will further degrade the site. This approach by Nord Stream is simply illegal and seriously flawed. **The conclusions on the compatibility of the Nord Stream pipeline with the ecological requirements as well as environmental and planning laws specifically around the German landfall area are thus unjustified and largely false.**

Russian landfall

The detailed data for the Russian landfall area were unfortunately presented after the deadline for comments in some countries had already expired. So the statement can only be based on general information presented in the Espoo-EIA. The area of the Portovaya Bay is the area with the highest concentrations of hazardous substances (benzol, phenol) and also of nutrients in the Eastern Gulf of Finland. At the same time the most intensive seabed intervention works will take place in this area as here the highest quantities of dumped rock will be needed to stabilize the pipeline tubes. Consequently, the effect of re-suspended nutrients and toxic substances into the water will be highest in this region - adding to the already high background level. Given that the detailed reports for that area have not been available, we have to judge the report with highest precaution and to assume the worst case until detailed facts can prove the contrary.

The existence of planned projects including their predicted impacts must, under all circumstances, be integrated into the EIA. WWF demands strong corrections in all Nord Stream materials in this respect.

1.6. Decommissioning of the pipeline

It is not discussed in detail how the gas pipeline will be demolished or handled after the end of its active use (50 years time). It is only stated that the decision will be made during the coming 50 years. There should be both a clear commitment by Nord Stream that they will take care of the demolition process as well as a clear concept on how this could be achieved, what environmental impacts should be anticipated and how these impacts could be kept to a minimum. Consequently it must also be guaranteed that financial means will be available for that in the future.

2. Emissions of harmful substances

2.1. Toxic substances

Unfortunately, the standards set by the HELCOM Baltic Sea Action Plan (no additional emissions) clearly cannot be met by the project. Instead, a multitude of additional sources of harmful substances will be introduced into the ecosystem, and numerous emissions of toxic materials, which are not even identified (at least concerning the actual extent of their impact) in the Espoo report. These include:

Sacrificial anodes:

¹⁶ Annex 1 of the German EIA alone names 44 such projects.

¹⁷ For a detailed explanation and validation, see e.g. WWF's extensive comments on the Lubmin hard coal power plant EIA and technical description.

Sacrificial anodes are mounted on the pipeline tubes all along the pipe as corrosion protection. This is also common practice for ship hulls. About 6.000 tons of Aluminium and also app. 6.000 tons of zinc anodes are planned to be deployed at the pipelines.

The sacrificial anodes alone can lead to an additional release of > 1.1 tons of cadmium and > 0.55 tons of lead into the Baltic Sea water over the anode lifetime¹⁸. The cadmium emissions from the sacrificial anodes thus amount to 2.7 % of the yearly cadmium load released into the Baltic Sea¹⁹. **This alone justifies and demands a reclassification of the "Release of pollutants from anti-corrosion anodes" to a higher significance than "insignificant", as stated in the EIA. The assessment in the Espoo report is therefore seriously underestimated and incorrect.**

No sufficient data is given in the Espoo report on the "other metals" contained in the anodes, e.g. their type and the impurity of the employed zinc and aluminium. The potentially harmful effects of the huge aluminium emissions from the sacrificial anodes are not evaluated in the EIA. **Additional data must therefore be provided.**

The total mass of the sacrificial anodes employed on the pipeline amounts to an equivalent of those fixed on 1.000 - 1.500 tankers. This illustrates the massive increase of long-term metal emissions which will stem from the pipeline after the pipeline has been installed.

The claim of the EIA that no contaminants will be added to the seabed as a result of the project²⁰ is simply false, particularly when taking the sacrificial anode emissions into account. A particularly damaging effect will occur in the close vicinity of the pipeline, where foraging animals may encounter greatly polluted food sources that might accumulate in the food chain. Vertebrates (especially fish) are most susceptible to possible damage.

Pressure test / pipeline cleaning before commissioning

It is not stated which oxygen scavenger will be used for the first flushing of the pipes²¹. The ecological effects can thus not be foreseen at the moment and the conclusions in the Espoo report must be severely doubted.

The statement that these treatment products are "*natural substances that already exist in seawater*" is extremely misleading, at best, and casts strong doubt on Nord Stream's understanding of the problem. Even if comparable compounds should occur (which we cannot judge, due to missing detail about the substances in the EIA), their concentration is drastically different. Regardless of the eventually employed substance, a copious oxygen consumption can be foreseen upon the release of the proposed 25,4 million m³ of diluted liquid into the environment in Portovaya Bay. The calculations in the report²² are incorrect, the prevailing temperatures at the time of the discharge in late summer or early fall²³ substantially exceed the average values used in the calculations. Furthermore, the calculations do not take into account adverse weather conditions with particularly hot spells, possible algal blooms or little movement in the water body. Widespread deoxygenation is therefore not only possible, but probable, and with it a prevalent death of fish and invertebrates. The impact will thus either have to be designated in its alarming severity in the EIA, or appropriate and convincing mitigation measures will need to be developed and realized. **Even with mitigation measures, we severely doubt that an impact significance of "Minor" is an apt description of the inevitable effects of the scavenger release. On top of this comes the still unknown substance to be released, which may have a high toxicity to marine life and a possibly precarious longevity in the ecosystem.**

WWF demands

¹⁸ calculated from p. 125 f.

¹⁹ HELCOM (2007): Heavy Metal Pollution to the Baltic Sea in 2004. Baltic Sea Environment Proceedings 108

²⁰ p. 890

²¹ p. 207

²² p. 881

²³ p. 103

- a clear prediction of the consequences of the oxygen scavenger release,
- an unambiguous statement on the substances used and emitted and
- the employment of qualified measures for mitigation.

Hazardous Substances – PAHs

PAHs (Polycyclic Aromatic Hydrocarbons) can be released from the corrosion cover of pipelines. The coating will begin to degrade when the steel is corroded or the external protective concrete layer is damaged. The PAH release amounts to roughly 1% / year of the total amount included in the coating²⁴. Neither the total amount of PAHs in the pipeline coating is stated in the EIA, or the predicted release over parts and the whole of the pipeline. PAH can be acutely toxic for marine organisms and can also be bioaccumulative.

The Espoo report gives a poor indication of the actual release of metals and PAHs currently immobilized in the sediment, as no total figures resulting from both intervention works and ammunition blastings are calculated. It is doubtful that they will be as negligible as stated. **Possible emissions of cadmium and lead from the sediment have not been quantified, but will add to the release from the sacrificial anodes.**

Dioxin

Dioxin release from the sediment may be small, but is far from "insignificant", as stated in the EIA, especially in Finnish and Russian waters, as dioxin concentrations are already beyond target level in these areas. The dioxin content in Baltic herring and salmon are already intolerably high. The estuary of Kymijoki river in the eastern Gulf of Finland is one of the most contaminated sea areas in the world by dioxins. The emissions are therefore to be regarded as a major further deterioration of an already overly impacted ecosystem.

In the Gulf of Finland the contents of As, Cd, Cr, Cu and Zn in the sediment are so high that permission from the Finnish authorities is needed to dump drenched material into sea. Thus it is alarming that the total amount of sediments translocated / transferred amounts to 13.500 tonnes (alternative route C16). At least some portion of this load will be carried by waves to other areas, which will have subsequent impacts on biota.

It is stated as a presumption that the stone material needed for stone bridges should not contain any harmful substances like heavy metals²⁵, however, it is not stated in the EIA how this will be proved.

It will also be critical that ozone-depleting blowing agents be strictly avoided when installing the polyurethane foam layer at the pipeline joints²⁶.

2.2. Eutrophication

Seabed intervention work will induce a significant increase of nitrogen and phosphorus levels in the Baltic for several years. Stating the expected 1% increase of nitrogen and 2.3% of phosphorus from seabed intervention works in the Baltic proper as "*not significant*"²⁷ demonstrates little awareness for the critical situation of the Baltic Sea area. The amount of potentially remobilized P by the pipeline works in 4 years corresponds to 1/3 of the annual amount of P released into the Baltic Sea by all states (12.000t). Nord Stream completely ignores eutrophication as the major problem of the Baltic Sea. Huge efforts and costs are required for removing nutrients from the basin for compensating a comparable increase through the pipeline. More than 70% of the nitrogen input in the Baltic catchment

²⁴ Aquateam – norsk vannteknologisk senter A/S (1999): Virkning på marint miljø av miljø-skadelige stoffer i rørledninger. Rapport nr 99-025, juni 1999

²⁵ p. 104

²⁶ p. 122

²⁷ p. 878 f.

area comes from diffuse sources that can only be reduced by measures covering wide areas²⁸. A substantial reduction (even if only aiming at 1%) thus requires very demanding actions and induces considerable expenses.

The duration of the increase of 10 years (N) or 5 years (P) is also not negligible. It clearly shows that many of the so-called "short-term" impacts on the ecosystem are in fact quite persistent and that the resilience of the ecosystem to buffer and compensate has strict limitations.

The assigned impact significance of the eutrophication effect in the EIA of "not significant" must absolutely be lifted to a higher category. Adequate mitigation/compensation measures must be developed and their implementation secured. (The Nord Stream contribution will have to be added to the commitments for nutrient reduction in the Baltic Sea Action Plan.)

3. Fisheries

No evaluation has been made of the side-effects of permanent prevention of fisheries around the pipeline and associated constructions. The exclusion of fisheries from this area may well lead to a stronger fisheries impact elsewhere, possibly even in nearby protected areas of the Natura 2000 network. The impacts of this have not been considered. This will need to be delivered in addition to the submitted EIA. Especially for the Natura 2000 sites, concepts to reliably prevent any additional fishing pressure will have to be developed and successfully implemented.

The landfills and especially the high-rise free-spanning structures and bridges that are to be built on the sea floor will pose serious obstacles for any fisheries active in the area. Fishing nets may get entangled with these constructions, thereby risking the loss of gear or even the sinking of fishing vessels²⁹. Lost nets will increase the number of 'ghost nets'. Spanned on the high structures and (typical for these canyon-like locations) often exposed to a current, these lost 'ghost nets' may induce huge incidental catches and big losses of marine life for many years. Not only fish, but also marine mammals or birds, can be affected. This aspect has not been considered (apart from financial compensation to fisheries), nor have any mitigation /compensation measures been expressed nor quantified. **If no precise statements can be made, a precautionary perspective must be employed. The need for additional mitigation/compensation measures will be substantial.**

4. Risks for maritime safety

The vessels employed for construction works and maintenance can act as unexpected obstacles for sea traffic. Risks of collisions occur especially around frequently used shipping channels, such as in the Gulf of Finland or at the crossings of the pipeline with main shipping lines. Particularly sensitive are also the areas with excavation activities for burying the pipeline, namely the Greifswalder Bodden area including the adjacent parts of the open sea and the landfall near Vyborg. Both areas have a high shipping intensity.

There is also a theoretical risk for shipping from the elimination process of ammunitions. Although the controlled blasts are usually carried out under conditions with wide-area evacuation and closure, risks remain in the period before this point during possible discovery during the course of construction works, investigation of the located object, unearthing etc.

The EIA correctly points out that the risk of ruptures of the pipeline is particularly high in areas with great shipping density³⁰. This emphasizes that there is a risk of direct collisions or entanglement of gear that can lead to damages of both pipeline and shipping vessels. Accidental pollution of the marine environment with fuels or other harmful substances would follow. In case of a pipeline rupture, there are substantial risks for ships in the vicinity. They are described in the EIA³¹. A sinking of vessels can occur in these cases, and this could again induce harmful consequences for the environment, of which the EIA makes no mention. Environmental liability issues for such accidents have to be made

²⁸ HELCOM (2009): Eutrophication in the Baltic Sea An integrated thematic assessment of the effects of nutrient enrichment in the Baltic Sea region. Baltic Sea Environment Proceedings **115B**

²⁹ p. 1333

³⁰ p. 1399

³¹ p. 1398

clear beforehand, namely that adequate compensation measures can be secured also for possible legally dubious cases.

There are three main crossing shipping lanes in the Gulf of Finland: one from Germany to Russia, one between Tallinn and Helsinki and one from the Gulf of Riga to the Gulf of Bothnia. Oil tankers are trafficking in the Germany - Russia route and in the crossing route the speed ferries between Tallinn and Helsinki. In general, safety zone of 2500 - 3000 m will be established around the vessels operating with the gas pipeline. However, in the Finnish EEZ the captain of the vessel together with the VTS-center will finally decide the size of safety zone needed.

There is a traffic separation scheme in the Gulf of Finland in practice; however it can be followed only during the open water period. The Gulf of Finland is very narrow and for this reason also the gas pipeline can be built only during the open water period. The biggest threat is that two vessels collide in the narrow crossing shipping lanes. The most critical phase will be when the gas pipeline will be built in the area off Helsinki.

More intensive (than usual) guidance and monitoring of ships is needed by the Finnish VTS centre in Helsinki to avoid collisions or groundings. Nord Stream needs to give a commitment that they will build the gas pipeline in the Gulf of Finland only during open water period to minimize the risk of ship accidents.

5. Biodiversity

5.1. Marine invertebrates

Increased sedimentation will render large areas of the sea floor unusable for the traditional benthos fauna at least temporarily. The recovery of the typical benthos fauna will take a several year long succession process at best, which is a substantially longer term than indicated in the Espoo report. It is true that benthos organisms can quickly colonize newly-created sites, as they would occur in areas with high sedimentation after construction works, on dumped material or on dug-up or refilled sites. But the resulting benthos communities are usually different from those naturally occurring in the area, as they represent early succession stages with a modified pool and abundance of species and a reduced age (esp. maximum age) of organisms. For e.g. marine bivalves, this can mean a several year impact, until old individuals will have had the time to re-grow. With a changed sediment structure (e.g. sandy bottoms substituted by clay and the input of a clean hard substrate) the community changes will prevail much longer and can even be irreversible. **The EIA suggests that the impacts will only be of a short-term nature³², but this is often not the case and can especially not be generalized in the manner it has been in the Espoo report³³.**

Some areas will stay permanently uninhabited by the typical benthos fauna due to interventions on the sea floor relief, leading to increased deposition of organic material especially on the lee side of the structure and possibly to de-oxygenized zones.

WWF demands a more accurate characterization of the circumstances and a clear statement that the destruction of benthos communities is not in all cases reversible, as implied by the EIA assessment. This may cause adjustments in the significance assessments necessary.

5.2. Fish

Fish will be severely affected by explosions of munitions. Sprat and herring in an area of more than 7 km² (a 3 km diameter circle) will be killed³⁴, and detrimental effects will occur well beyond that. The amount of fish that will die later due to severe injuries cannot be estimated accurately, but it will likely be significant and in an affected area manifold the aforementioned size. The clearing of munitions in the planned manner therefore has a significant impact on local fish stocks. **This is unfortunately not being reflected well in the EIA.**

³² e.g. p. 1017

³³ Nordstream provides data on possible long-term changes in annex 7, p. 2 of the German EIA

³⁴ p. 1028

Stationary fish with habitats near the pipeline will likely suffer from an elevated input of harmful substances. Possible positive effects of the artificial reef-like structure of the pipeline (sometimes voiced by Nord Stream) are regarded to be significantly outweighed by this problem. Additionally, the added value of an artificial reef in an otherwise soft-bottomed environment can be doubted (and in a hard-bottom surrounding it is simply not needed). At least, it is a sizeable change of natural conditions, and WWF does not see any compensation effect in the artificial reef structures planned by Nord Stream.

The spawning areas of cod in Danish and Swedish waters may suffer from quite severe impacts. High supporting structures for the pipeline may block currents and lead to oxygen-depleted zones and higher sedimentation rates of organic material in these spawning areas. This could degrade parts of the few remaining spawning sites of the species, e.g. the Bornholm deep. **Since Nord Stream does not provide any detailed bathymetry data, we cannot judge how widespread this problem might be. A worst case scenario must therefore be applied here, unless Nord Stream provides more detailed and meaningful data.**

In the Russian sector migratory routes of lampreys (directed to the rivers in the Viborg gulf) may be affected, this can be potentially true also for populations of the Baltic herring (*clupea harengus membras*). The effects have to be properly evaluated in detail.

The EIA states that harmful substances will not dramatic impact fish because all suspended material will stay under the halocline or thermocline during and after building process of the gas pipelines. However, at least when blasting the 31 mines in the Gulf of Finland, bottom sediment will come up and mix in the whole water column having, most probably, impacts on phyto- and zooplankton and fish. The impacts on fish can be either direct or indirect via the foodweb. This in turn could have impacts on human beings. Suspended material with harmful substances could also have direct impacts on floating eggs and juveniles of sprat during summer months. It is stated in the Espoo report that impacts on eggs and juveniles are considered to be local and only for a short period. However, even a short period is enough if eggs or juveniles are contaminated by harmful substances as both eggs and juveniles are known to be sensitive to harmful contaminants.

5.3. Birds

Negative effects on birds will be especially strong around the two landfall areas. Construction work will temporarily degrade breeding and resting grounds, and some impacts will persist for much longer, possibly indefinitely.

A major impact of the pipeline will be the disturbance of bird stocks during construction works, leading to a total or partial removal of birds from the area where current construction works will take place. The EIA provides data on this, although focused on the Natura 2000 site network and other MPAs. We will come back to this issue in the context of the Natura 2000 network.

Birds which are diving when blasting explosives occurs could get killed or severely injured.

The dumping of sediment - even if only temporarily for later reuse in refilling - can have long-term negative effects on marine benthos needed as food sources by e.g. ducks and divers through a lasting modification of the ground relief. **This is a widespread and substantial impact in the Natura 2000 sites crossed by the pipeline in Germany, and even going beyond that when taking the planned dump site into account. The EIA does not take this into account, since it considers the effects to be solely temporary.**

5.4. Marine mammals

Marine mammals are particularly sensitive to underwater noise. Typical underwater explosions from munitions may still be lethal to harbour porpoises at a distance of several kilometres. Not much is known about the reaction of seals, but given a similar physiological structure of ears and internal organs, it is likely not much different. Clearing ammunition by blasting can therefore pose a severe mortal threat to the health and well being of marine mammals. **Nonetheless, Nord Stream regards the effects on population level as "reversible" – which is not an adequate judgement for the severely endangered Baltic harbour porpoise.**

Effects of explosions on marine mammals can range from temporal damages of organs to permanent deafness and mortality. It is estimated that within a distance of at least 4 km, primary blast injury can occur. Severe injuries in gas filled organs (lung, ear, gut) and hemorrhages in the brain can lead to an instant or early death of the affected animals. Up to a distance of 13 km, permanent damage of the hearing system can occur, and beyond that (to more than 30 km) explosion noise can cause temporary defects in hearing ability³⁵. As harbour porpoises orient largely using acoustic signals, they would be heavily affected by a loss of hearing.

For those animals that survive a blast but sustain injuries, a long suffering may begin, eventually leading to death though possible infections, starvation or other causes.

Marine mammals must to be expected, sometimes in great numbers, along the entire pipeline route.

Harbour porpoise:

The harbour porpoise is very rare in the whole Baltic Sea area, due to a drastic population decline in the past decades. The Baltic population east of Darss sill is estimated to number only a few hundred individuals today and requires strict protection. In the southern Baltic, grey seals and harbour seals can also be found in varying densities. In the high risk area for munitions in the Gulf of Finland, grey seal, ringed seal and harbour porpoise are to be expected. Highest care must be taken to ensure that these species, under special protection by EU law, will not be affected.

For the construction work and during the removal of munitions special measures must be elaborated to avoid any loss of these species. Special mitigation measures have not been described in the EIA. For harbour porpoises the EIA assumes that there are none present in the Gulf of Finland and consequently no specific measures to detect their occurrence or to minimise effects of the pipeline works have been taken into account. This is not sufficient regarding the disconcertingly poor status of the Baltic harbour porpoise population (200 to 600 animals). Harbour porpoises visit at least the western part of the Gulf of Finland and can also be expected along the route of the pipeline throughout the Baltic proper and the southern Baltic, so their presence in an area affected by blast noise anywhere in the risk areas is quite possible.

Seals:

The severe losses of ringed seals due to increasing mild winters in the region (due to loss of breeding sites) demand also increased efforts to reduce further unnatural reductions. **According to Nord Stream experts, studies on the behaviour of seals are currently ongoing. Given the critical importance of this information, WWF believes that these behaviour studies must be completed before any permission for blastings be given.**

There is a seal sanctuary on Kallbådagrund only 9 km from the planned gas pipeline and thus it is crucial to check that there are no seals diving or swimming closer than 4 km before starting to explode mines in the Gulf of Finland. It is also important to recognize the fact that marine mammals need to get back to the surface to breathe every now and then.

In the Russian sector of the pipeline ringed seals could be affected by munition blastings and the seabed intervention works. In the critical winter time ringed seal haulout areas exist close to the pipeline site near the Beryozovya Islands. For many reasons the wintertime should be strictly avoided for this kind of work and a detailed survey for seals be undertaken.

These impacts must be minimized by using the best available technology to keep marine mammals away from the ammunitions and other construction works. Additional knowledge about the behaviour of these animals in the concerned waters is needed and mitigation measures must be tailored to meet their needs. This includes the employment of PODs to record their presence, the use of suitable methods to deter them from the vicinity of the explosion and the installation of appropriate mitigation/compensation measures to minimize as well as address possible losses and reductions in vitality and life expectancy.

³⁵ <http://www.wal-und-mensch.de/wum2007/koschlinski.php>

Alternative methods of removing explosives must also be taken into account in a regular assessment procedure before deciding for blasting in every case.

6. Protected areas

6.1. Natura 2000 network

A large number of Natura 2000 sites are affected in the close vicinity or at the very location of the pipelines. Especially, the stretches of the pipeline near the landfall are rich in conflicts, but the EIA also shows negative impacts in other areas. The data provided in the Espoo report is quite concise. For example, no detailed assessment of bird distribution around the pipeline route is provided, even in the vicinity of clearly affected areas like Hoburgs Bank and Norra Midsjöbanken, making the assessment of impacts inaccurate and partly unfounded. **Once again we have to emphasize therefore that mitigation and compensation measures must be based on worst case scenarios, as the coherence of the network might otherwise be endangered.**

Even in Natura 2000 sites in a distance of several kilometers from the pipeline's route, breeding and resting populations may be affected, because these populations often extend beyond the designated area and may well reach the close vicinity of the pipeline.

In Finland/Russia, the routing around the Isle of Gogland needs to be considered carefully as the impacts from the northern routing option will most likely have harmful transboundary impacts on Natura 2000 sites in the Finnish territorial waters. The southern option keeps some distance to these areas and is therefore likely the better choice. In the Kallbådagrund area in the Gulf of Finland, the southern route option must be followed to minimize the environmental impacts for underwater biodiversity, as the area is a proposed part of the Finnish offshore Natura 2000 network.

The impact of noise from the numerous planned explosions will have adverse effects on marine mammals in particular in all Finnish Natura 2000 sites mentioned in the EIA. This will be most pronounced in the Eastern Gulf of Finland archipelago and water areas SPA/SCI that lies close to the pipeline route. This site is so close to the pipeline that, besides mammals, fish might also be harmed. **Therefore, the assessment of the significance with "no impacts"³⁶ is definitely not adequate and must be revised.**

Nord Stream's view that munitions clearance will also affect seals outside the protected areas is correct. **The claim that effects will only extend up to 2 km³⁷ is unfounded, however. Further, it is not only seals, but also harbour porpoises which may be affected, and the EIA does not relate how marine mammals will be successfully scared away before explosions.**

In the Gulf of Finland there are three new offshore Natura 2000 candidates in the Finnish EEZ - Länsileton alue (FI0400001), Luodematalat (FI0400002) and Sandkallan (FI0100106), all to protect reefs (1170). The three new candidates in the offshore area are not discussed in the EIA report as they were not proposed by Finnish authorities prior to the launch of the EIA report. Thus, there is a need to make a new EIA to study also those offshore areas, which are indeed close to the planned gas pipeline. In our view also the Natura 2000 evaluation is needed according to the Finnish Nature Conservation Act, 65 §.

No less than six Natura 2000 sites will be directly crossed in German waters and at landfall. Trenching works, excavation of trenches, depositing of material and re-depositing will have significant impacts on the surrounding waters which are important bird breeding, feeding, resting and wintering areas, important spawning and nursery areas for herring and which also are of great importance for the current reestablishment of grey seals and the Baltic Sturgeon.

Major impacts of the pipeline occur wherever the pipeline comes close to Natura 2000 sites. These impacts include the disturbance of birds during construction or maintenance works, the destruction of seafloor habitats and benthos through excavation, dumping and sedimentation and the implications of explosions. Due to the trenching technique applied, construction works will be noisier than in most other parts of the pipeline. Besides, the mobilization of toxic substances can be an issue especially in the eastern part of the route.

³⁶ p. 1495

³⁷ p. 1495

Given these impacts, the conclusions in the EIA regarding the Natura 2000 site network are disturbing.

The impacts on all Natura 2000 sites are classified as "not significant" in the EIA, even in those cases where the pipeline crosses right through the sites. This is not only incorrect, it is simply not acceptable and must be reclassified.

Numerous negative impacts are described in the EIA, such as the disturbance of long-tailed duck and black guillemot around Norra Midsjöbanken and Hoburgs Bank and a great variety of birds in German waters. While they may not in all cases endanger the integrity and coherence of the Natura 2000 network if seen isolated from other possible impacts, they can still exhibit significant implications on the sites. We therefore demand that a more fitting classification be chosen in all cases with declared negative implications on the sites.

The designation of impacts as "not significant" could lead to the mistaken assumption that mitigation and compensation measures are unnecessary. This is not the case, of course, since any deterioration of the sites must be avoided at least from a precautionary approach - even if not significant in the sense of endangering the coherence of the network or the conservation objectives of the particular site. We are aware that Nord Stream has declared to follow this approach, so we anticipate proposals for proper mitigation and compensation measures. Projects cannot only be judged as solitary impacts, but must be assessed in the context of other man-made implications and the possibility of cumulative effects assessed as any other practice would jeopardize conservation objectives. A detailed assessment of cumulated effects is, however, not part of the EIA. Following the precautionary approach and considering worst case scenarios must therefore be used as the basis for assessing adequate mitigation and compensation measures.

We clearly state that without proper mitigation and compensation measures based on worst case scenarios, we have strong doubts that the pipeline project will be compatible with the conservation objectives of some sites. This applies to all Natura 2000 sites potentially affected by munitions blastings (leading to possible mortality or injury for significant numbers of indigenous marine mammals). Since detailed bird data along the pipeline's route is not provided, the relation of bird stocks along the pipeline to those in the total Natura 2000 sites, their temporary distribution and current trends in local stock development is largely unclear. Nord Stream will either have to deliver substantial additional data to enable accurate judgments or stick to worst case scenarios requiring and guaranteeing proper mitigation and compensation measures.

Unfortunately, as Nord Stream does not provide data on mitigation and compensation measures, no judgment on the legality of the project in its relation to the Natura 2000 network is possible at this time. We understand that Nord Stream is planning mitigation and compensation measures because there are indications of this in the national EIAs, but the total extent of the measures eventually planned is still absolutely unclear, as there is no mention at all of them in the Espoo report.

A severely critical situation is present in relation to the anticipated negative impacts of the pipeline on the Natura 2000 sites in Germany. We assert that there are significant shortcomings and erroneous conclusions in the EIA concerning this stretch of the pipeline.

The summary on the quite extreme situation in Germany with direct crossings of Natura 2000 sites claiming that *"all the effects outlined (...) occur outside the designated protected areas and also outside areas that the designated birds use as feeding areas."*³⁸ is incorrect and **raises deep concern on the seriousness and reliability of Nord Stream's acquisition and interpretation of data. Bird densities inside the Natura 2000 sites are well documented**, and the route of the pipeline is no exception to the overall situation that virtually the whole area is intensely populated by feeding and resting birds. Even the EIA states that construction works merely avoid *"the peak period for staging seaducks, grebes, mergansers, and divers"*³⁹ (referring to the Greifswalder Bodden Randschwelle). There is therefore a substantial disturbance and removal of these (and other) species from the habitat, which is (at least largely) temporary, but clearly existent. **The logic of the EIA that by simply avoiding the peak period they can ensure no significant effect to the Natura 2000 areas is not only illogical, but absolutely unfounded.**

The Greifswalder Bodden SCI and SPA and the Greifswalder Boddenrandschwelle SCI show great densities of long-tailed ducks, common scoters, red-breasted merganser, great crested grebe, red-

³⁸ p. 1535

³⁹ p. 1532

throated diver, black-throated diver, cormorant and others in the close vicinity of the planned pipeline. Of particular importance is the greater scaup, which shows very distinct aggregations around the pipeline route. Razorbill, common and black guillemot also reach greater numbers in the Boddenrandschwelle area, but are especially present in high densities in the Natura 2000 sites in the Pomeranian bight⁴⁰. These bird aggregations will inevitably be affected, and **we do not share the opinion of Nord Stream that the disturbance will only be of a short-term nature and "affect only few individuals"**⁴¹, as stated in the EIA.

It is additionally not considered in the EIA that unexpected obstacles of any kind may lead to delays in building activities and that thus other seasons than those currently planned might be subject to disturbance. The encounter of munitions might be such a case, and munitions removal by blasting could additionally harm marine mammals (harbour porpoise, grey seal, harbour seal) and possibly fish (namely the herring in its spawning areas, if time and location of possible munitions findings are bad), depending on the method used.

The relocation of up to five individual grey seals from the Greifswalder Bodden⁴² must be seen with respect to the total population in the area which is not much higher, and, as such, the impact will be substantial. Also, it is unfounded to deduce that "no significant impacts" by simply voicing that no seal reproduction takes place in the area. On the one hand, this may well be expected in the years to come, on the other it is not justifiable why feeding and resting areas should not be of importance. Taking into account the important life-stage areas for birds is a commonly accepted approach also by Nord Stream.

Describing the duration of the impacts with "*Temporal (days)*" is unfitting (at best) when taking into account that trenching and pipe laying works will last up to six and a half months. Dredging and backfilling will occupy 8 months⁴³. The effects of sediment relocations are assessed to be limited to four years. This may be true for much of the area, but as outlined above with reference to the dump site, effects can - under adverse conditions - last considerably longer.

The impacts of the pipeline construction will add to the already severely detrimental impacts from other projects. The Greifswalder Bodden is already under severe pressure by eutrophication, industrial development and dredging of water traffic lines. Additional projects are currently in the planning or approval process or have already been approved. WWF has voiced that these projects (especially the Lubmin coal power plant, but there are also great concerns with the cumulated impacts of the other projects) will have effects strongly conflicting with the conservation objectives and coherence criteria of the Natura 2000 network in the area and will lead to a massive decline of species and habitats to an extent that would exceed anything that might be legally feasible. The pipeline construction would add to the already intolerable impacts of these projects and deteriorate the Natura 2000 sites even further, which stands in clear conflict with the legal requirements. Nord Stream does not provide mitigation or compensation measures for the damaged ecological functions and values in the area, so a further deterioration is inevitable. WWF sees no legal basis for this and must thus state that the construction of the pipeline in the area cannot be legally realized, unless

- **decisive negative impacts from aforementioned other projects are eliminated to such an extent that the cumulative effects will no longer go beyond the frame set by Natura 2000 coherence requirements and conservation objectives,**
- **Nord Stream provides a convincing and functional concept of mitigation and compensation measures which clearly minimize and offset the damaged ecological functions and values of the specific marine habitats making them suitable for use by the affected species,**
- **radical changes in the project setup are possible that would eliminate the above-mentioned negative implications.**

⁴⁰ Mendel, B. et al. (2008): Artensteckbriefe von See- und Wasservögeln an der deutschen Nord- und Ostsee. Naturschutz und Biologische Vielfalt 59

⁴¹ p. 1532

⁴² p. 1531

⁴³ p. 1530

6.2. National Marine Protected Areas (MPAs)

The Nord Stream pipeline project poses negative implications for national MPAs at a number of locations, most of which are also part of the Natura 2000 network. In Russia, (among other sites) the proposed national park and current nature reserve of the Ingermanlandskiy Islands will be severely affected. The area is a potential habitat for grey and ringed seals and harmful munitions may well be present. Their removal would create a major conflict with marine mammal protection in the area. The EIA does not provide much detail on the site, so judging the consequences of pipeline construction and operation is difficult. **The blasting of explosives will foreseeably be one important and wide-reaching conflict. We do not see that this has been adequately addressed within in the EIA.** The statements made above for the Natura 2000 network apply respectively.

There are three National Parks in the Gulf of Finland: The Eastern Gulf of Finland National Park (min. distance to the pipeline 6,5 km), Ekenäs Archipelago National Park (min. distance 19 km to the pipeline) and the Archipelago Sea National Park (min. distance to the pipeline 28 km). In the Gulf of Finland there are additionally four seal sanctuaries which are located at the distance of 9-35 km from the planned gas pipeline.

7. Summary of environmental impacts

As demonstrated in the previous sections, the negative implications of the Nord Stream pipeline project on the environment, especially the marine environment, are much more severe than voiced by Nord Stream in the EIA. The classification of a substantial number of hazards as insignificant simply contradicts evidence to the contrary is therefore not only incorrect but inappropriate. Also, quite a number of the other impacts are considerably more severe than stated, meaning their significance classification must be raised to a higher level.

Even when classified as "insignificant", "minor" or "reversible", there are usually substantial impacts that must be mitigated or addressed with compensation measures. We regard the classifications as often misleading, since they result from the wide-scale assessments, taking into account huge areas and making more or less average judgments. The actual situation around the pipeline is often different, with likely effects including habitat loss and pollution coupled with strongly deteriorating environmental quality. Numerous negative impacts are described in the EIA, and they demand an appropriate mitigation and compensation measures.

Significant problems arise with regards to undersea munitions, the integrity of some Natura 2000 sites and MPAs (especially concerning birds) and the risks posed by increased pollution by harmful substances such as nitrogen, phosphorus and cadmium.

Despite some thorough research, the remaining **data gaps are too large to make a detailed assessment of the pipeline's impacts in many of the respective fields.** The EIA does not take the obligatory approach to evaluate the worst case scenario in these situations, but rather relies on assumptions that can only be qualified as wild guesses in some cases.

Cumulative effects of other projects are not taken into account in adequate depth⁴⁴, although they will be very extensive. The mere 2 1/2 page chapter (9.9) does not shed much light on this matter.

An important point for securing environmental liability is that the risks of the pipeline construction cannot be subject to a normal insurance contract. A deposit of at least 1.5-fold the construction costs should thus be furnished as a security to combat possible unexpected and costly effects of construction or initial operation.

8. Gaps in research

Nord Stream has attempted to provide a comprehensive assessment of impacts and has shown some efforts to also furnish a prediction of impacts in areas of insufficient or missing data or knowledge.

⁴⁴ e.g. p. 1360 ff., 1536 ff.

These interpretations are, by their nature, inaccurate and unreliable. In these cases, worst case scenarios must be used in order to determine the needed mitigation and compensation measures to minimize/offset possible impacts. But even these will suffer some uncertainty due to lacking basic data.

Nord Stream must therefore supply some more data for an accurate judgment (and the ability to judge) on the environmental impact and the adequacy and acceptability of mitigation and compensation measures. **Many of the erroneous conclusions in the EIA are sourced in the huge data gaps - in conjunction with the inability to apply worst case scenarios instead of a postulated "likely" situation.**

Major additional information is needed in the following fields:

- The bathymetry data must be related in detail. No regionalized or localized judgment of impacts is possible, since text descriptions and depictions on maps are far too broad. We expect at least some of this information to be available with Nord Stream and find it disappointing that this was not included in the documents.
- Data on explosives in Russia must be provided.
- Data on explosives in the anchor sites must be provided.
- While the chemical composition of the oxygen scavenger(s) to be released into the Baltic ecosystem is probably known to Nord Stream, it has not been provided in the materials, making a reasoned verdict about its ecological effects impossible. This must be amended.
- The ecological characterization of much of the route of the pipeline is still poor and must be improved in order to secure a more accurate prediction of effects to e.g. benthos, fish and birds.
- Substantial knowledge gaps exist concerning the reactions of various marine animals, particularly birds and mammals, towards noise generated by construction works and explosions. The current scientific knowledge in this field must be taken into account and a detailed species and area-specific handling concept be submitted for evaluation in the permitting process.
- Data on the occurrence of harbour porpoise have not been collected- this must be supplied for the whole route before any permission can be given.
- Implications of the pipeline on spawning sites and spawning activities of fish (e.g. Baltic cod) are completely unknown and must be further investigated (Bornholm deep).
- A clear list and description of the mitigation and compensation measures is indispensable for a judgement on the environmental effects of the project. In this concept also the specific values that are negatively affected by the construction must be properly considered (nutrient surplus, hazardous substances input, etc.). These lists must be prepared and added to the EIA.
- The cumulative effects of other already approved or applied projects in Natura 2000 areas in EU countries must be submitted in order to estimate the additional effects of the pipeline.

9. Mitigation & compensation measures

9.1. Mitigation

Mitigation measures are especially unsatisfying concerning the removal of dumped munition. Clearance of explosives by other means than blasting should be essential in the light of the adverse consequences otherwise. If blasting is inevitable, activities to deter at least a part of the potentially affected species from the dangerous areas must be thoroughly planned and carried out. Efforts must be made to move fish, diving birds and marine mammals to a safe distance from the danger zone before making any explosions. For marine mammals, this zone must include a diameter of at least 10km.

A major barrier to securing adequate mitigation measures seems to be Nord Stream's view that major implications have only "*insignificant*", "*minor*" or "*reversible*" effects, while at least worst-case scenarios or a precautionary perspective mandate a different verdict.

WWF demands a substantial improvement in the proposals for effective mitigation and compensation measures.

9.2. Compensation

The Espoo report does not relate any compensation measures. This is very unfortunate, because under these circumstances an overall assessment of the overall environmental compatibility of the project in both the ecological and legal sense is not possible. Of course, without adequate compensation measures, the project will be absolutely incompatible with environmental law. The negative implications to the environment are considerable, despite frequent, and incorrect, classifications as "insignificant", "minor" or "reversible".

The ideas voiced in the national EIAs by Nord Stream for compensation measures are totally inadequate. They will not adequately compensate for the negative impacts on the marine environment, as the benefits will be effective in other habitats (largely on land). The environmental situation of the Baltic Sea would thus deteriorate further with the Nord Stream pipeline in place. This is unacceptable. A concept for pipeline compensation measures must address key issues in marine habitat conservation in conjunction with the nature of the pipeline's major negative implications. This means that compensation measures will must furnish:

- A substantial reduction of nutrient (N, P) input into the Baltic.
- A further reduction of heavy metal emissions and other harmful substances.
- Creation or substantial improvement of habitats for natural benthos communities and macrophyte growth.
- Creation or substantial improvement of habitats for diving birds, such as ducks, mergansers, guillemots and cormorants.
- The improvement of the stocks of marine mammals, especially the harbour porpoise.

All of these areas will have to be addressed, since negative impacts also cover all of these topics. In order to reinstate the lost functions and qualities of the ecosystem, the creation or regeneration of similar qualities is essential.

9.3. Essential long-term monitoring

Nord Stream plans to perform a monitoring programme in conjunction with the construction of the pipeline. Details on monitoring activities in the Espoo report are insufficient, however, and the planned monitoring measures fall far short of what is required. WWF sees special needs in the following fields:

- A thorough biological monitoring programme is essential to assess the effects of explosions and long-term impacts of construction on the sea floor and benthos. This should include areas where trenching and rock dumping will be carried out as well as areas exposed to munitions blasts and sedimentation areas where various harmful substances are likely to be abundant.
- Monitoring should also be performed in important bird areas where the above mentioned activities are carried out in critical habitats (i.e. feeding, resting, mating etc) for important bird populations.
- A determination of the efficiency of measures to deter marine mammals and fish from the vicinity of explosions must be performed. The results should be suitable for initial implementation into the methodology applied for munitions removal. This has to go far beyond the "watching brief on-board construction vessel by a suitable expert."⁴⁵ As described in the EIA (we regard this passage as insufficient as it does not explain how the work will be undertaken).
- The harmful substances in the whole food web should be monitored after the building process to confirm that there were no impacts as promised in the EIA report. The zoobenthos should be monitored to get an overview perspective as to what the real impacts could be.
- Monitoring should also be performed in dumping and heavy sedimentation areas, concerning both benthos and bird populations. A comparative approach with unaffected areas is necessary.

⁴⁵ p. 1649

- Monitoring and potential further research should address necessary decommissioning measures at the end of the pipeline's lifetime: Which impacts to the environment can be expected, what can be done to minimize them and which alternatives would be at hand.
- A full lifecycle analysis of the pipeline with a focus on environmental impacts and resource use should be compiled, answering how exactly the pipeline affects the environment and for how long. This would involve continuous data collection and should also include the activities at the end of the pipeline's lifetime.
- There should be a special monitoring programme for all compensation measures, in order to judge their success and make any necessary improvements.

The monitoring programme must be in place before the pipeline is constructed. Otherwise it will be difficult or impossible to compare scientific results. Generally, external expertise should be employed for these tasks, since they are too special to be dealt with by Nord Stream themselves. This would also ensure the transparency and independent judgement necessary to assure external observers.

10. Conclusion

Based upon the evidence presented in this position statement, it is clear to WWF that the EIA prepared by Nord Stream is insufficient. It must be dramatically revised, updated and completed with all of the necessary data (currently missing) in order to ensure that an adequate assessment of the environmental impacts of the pipeline project can be fairly considered. **WWF therefore urges all contracting parties to the ESPOO convention, and particularly all Baltic Sea affected countries, to demand that Nord Stream address the issues raised in this document to a sufficient extent in order to assure that informed decisions can be made regarding this project.** Given what we already know about the fragile state of the Baltic Sea environment, moving forward with this project in the absence of clear answers to all of the issues raised in this position statement could be of serious consequence to the environment of the Baltic Sea.