



Kingdom of the Netherlands

UNESCO World Heritage Centre
Mr Lazare Eloundou Assomo,
Director
7, Place de Fontenoy
75352 Paris CEDEX 07
France

Permanent Delegation of the
Kingdom of the Netherlands
to UNESCO
7 rue Ebié
75007 Paris
France

Contact

Reference
2022B-03

Date: 20 January 2022

Subject: Response to concerns regarding World Heritage property 'Wadden Sea'

Dear Mr Eloundou Assomo,

On 7 May 2021 (CLT/WHC/EUR/21/13283) and on 30 November 2021 (CLT/WHC/EUR/21/13621) you asked the Dutch government to respond to the concerns of the Waddenvereniging and the Werkgroep Vrije Horizon Schiermonnikoog regarding the state of conservation of the Wadden Sea World Heritage property. I apologise for my delayed response. The delay was due to the fact that multiple developments arose in mid-2021. The Dutch government wishes to inform you of the latest state of affairs in the most complete way.

In its letter of 21 April 2021, the Waddenvereniging expressed its concerns about the impact of climate change, mining operations, the laying of a cable connecting an offshore wind farm north of the Frisian Islands, and the cumulative impact of all human activities on the natural environment of the Wadden Sea region. In its letter to you of 26 November 2021, the Werkgroep Vrije Horizon Schiermonnikoog shared its concerns regarding both the proposed Ternaard gas extraction operation and the construction of an electricity cable across the Wadden Sea. With reference to supplementary information, you requested a response in particular to the proposed gas extraction at Ternaard and the plans to run a cable across the Wadden Sea to connect an offshore wind farm in the North Sea to the electricity grid on the mainland. On 14 January 2022 the Waddenvereniging added to the views it had already made known to you by replying to your letter of 30 November 2021, which was published at the request of the Dutch House of Representatives.

The concerns above touch on issues that are relevant to the Dutch government's main objective to promote 'the sustainable protection and development of the Wadden Sea as a natural area and the preservation of its unique open landscape'. This objective is also central to the Agenda for the Wadden Sea Region 2050, which I will discuss below. In this letter, I will present the Dutch government's response to the concerns expressed and explain the policy on these matters.

I would like to emphasise that the Dutch government, in accordance with the agreements under the World Heritage Convention, is fully committed to protecting and preserving the authenticity and integrity of the Wadden Sea UNESCO World Heritage property. This means that activities in the Wadden Sea and below the seabed are permitted only if there is sufficient certainty that no irreversible damage will be done to the unique and fragile natural environment. However, achieving the main objective of the Wadden Sea is a complex undertaking and entails multiple dilemmas, some of which have been referred to by the letter writers.

I trust that the responses below will provide you with sufficient context with respect to these dilemmas.

Mining in the Wadden Sea

On the basis of current policy, as set out in the Third Policy Document on Development of the Wadden Sea, a key planning decision (PKB), salt and natural gas extraction in the Wadden Sea is permitted under strict conditions. This was also stated in the Wadden Sea World Heritage nomination documents.

On 10 January 2022, a new government took office in the Netherlands. The coalition agreement states that the current permit procedure for gas extraction in the Ternaard field will be concluded but that no new permits for gas extraction in the Wadden Sea will be issued.¹ This means that the permit application for gas extraction in the Ternaard field will be assessed on the basis of the current policy and applicable legislation, and that the requisite permits will be issued if the statutory requirements are met.

With respect to natural gas and salt mining in the Wadden Sea, a prior assessment will be made to determine in advance how much gas and salt can be extracted so that any subsidence remains within the limits of what can be compensated by natural sediment accretion. Subsidence activity and the impact on the environment will be strictly monitored so that extraction can be limited or halted before any negative effects occur. This monitoring and response system is based on a principle which is referred to as 'the hand on the tap'.

Below I will discuss the knowledge and experience that has been acquired with regard to the effectiveness of the monitoring and response system. Subsequently I will provide more specific information about the permit application for gas extraction at Ternaard.

Gas and salt extraction with monitoring and response

By letter of 2 December 2020 (no 2020B-13) I informed you that the then Minister of Economic Affairs and Climate Policy had established an independent advisory body to conduct a scientific evaluation of the effectiveness of the monitoring and response system. This advisory body, made up of Dutch scientists from Deltares,² TNO,³ NIOZ,⁴ Delft University of Technology and Utrecht University, issued an evaluation report, which was submitted to the Dutch House of Representatives along with the government's assessment on 28 June 2021.⁵ In its evaluation, the advisory body took account of the views of the Netherlands National Commission for UNESCO and the Waddenvereniging.

In summary, the advisory body determined that the monitoring and response system, as described in the nomination documents, has proved satisfactory thus far and, on the basis of current practices, the Wadden Sea environment is being adequately protected while permitted gas and salt extraction operations take place. However, for the future it recommends conducting a more thorough analysis of longer-term uncertainties, especially given the expected rise in sea level and the rate of natural sediment accretion. This mainly relates to the post-2050 scenarios for global mean sea level rise developed by the Intergovernmental Panel on Climate Change (IPCC). According to the advisory body, sufficient account has been taken of uncertainties with respect to subsidence due to mineral extraction operations.

The advisory body has confirmed that any subsidence of the seabed resulting from gas extraction in the eastern Wadden Sea will not contribute to the submergence of the tidal flats, even in the long term and in the event of extreme sea level rise. This means that subsidence due to gas extraction in the Wadden Sea, within the envisaged time frame for gas extraction operations, will be fully compensated by natural sediment accretion and will not pose an additional risk in combination with sea level rise. This is less certain for salt mining in the western Wadden Sea. The advisory body believes that there is a reasonable chance that in the long term sediment accretion will be insufficient to offset sea level rise caused by climate change because the estimated future effective subsidence capacity which can be compensated by natural sediment accretion in the Vlie tidal basin may not be sufficiently conservative.

The Dutch government will order further study into the future effective subsidence capacity of the tidal basin Vie. However, in the short term there is no need to limit or halt salt extraction. Should new scientific insights give reason to do so, the boundaries of the salt extraction site in the western Wadden Sea can be modified. Thus, the effectiveness of the 'hand on the tap' monitoring and response system is not in question for salt extraction either.

Mining is permitted in the Wadden Sea only if it can be done safely without risk to human health or the

¹ <https://www.government.nl/ministries/ministry-of-general-affairs/documents/publications/2022/01/10/2021-2025-coalition-agreement>.

² An independent institute for applied research in the fields of water and the subsurface.

³ The Netherlands Organisation for Applied Scientific Research.

⁴ Royal Netherlands Institute for Sea Research.

⁵ <https://www.tweedekamer.nl/kamerstukken/detail?id=2021Z12034&did=2021D26021>.

environment and there is sufficient certainty that ecosystems will not be harmed. On the basis of the evaluation, it can be concluded that the policy on mining in the Wadden Sea provides sufficient safeguards to prevent damage to the Wadden Sea World Heritage property. Nevertheless, the Dutch government will continue to work with all the parties involved to make improvements that are based on the latest scientific knowledge and the annual advisory reports of the independent audit committees on the ecological monitoring programmes.

Proposed natural gas extraction at Ternaard

In your letter of 30 November 2021, in part on the basis of the letter from the Werkgroep Vrije Horizon Schiermonnikoog and with reference to the views of the Netherlands National Commission for UNESCO, you referred to a number of specific concerns in connection with the plans for natural gas extraction at Ternaard. In your response you also referred to the resolution adopted on 9 September 2021 during the IUCN conference in Marseille, calling on the Dutch government not to authorise new gas extraction operations in the Wadden Sea.

The plans of the Nederlandse Aardoliemaatschappij (NAM) are to drill for natural gas in the Ternaard gas field, a small part of which is situated in the subsurface of the mainland and the largest part under the Wadden Sea. To access the gas field under the seabed, NAM intends to drill at an angle from a production site on the mainland near the Frisian village of Ternaard. The procedure for land-based oblique drilling was recognised and deemed acceptable during the nomination procedure of the Wadden Sea as a UNESCO World Heritage property. NAM intends to start producing gas from this site from 2023 and applied for the necessary permits in 2019. On the basis of the documents provided by NAM in support of its application, the Dutch government concluded before summer 2021 that NAM's permit application is in compliance with the requirements laid down in the Mining Act and the Nature Conservation Act. This means that NAM has satisfactorily demonstrated that the proposed activities will not harm the natural environment. The positive draft decisions concerning this gas extraction operation were accordingly made available for inspection for six weeks starting on 27 August 2021.⁶ Residents, public authorities and civil society organisations could submit a response to the draft decisions during that period.

All submissions are currently being studied to determine whether there are any insights that give reason to amend the draft decisions. The advisory report of the Netherlands Commission for Environmental Assessment⁷ on the environmental impact assessment (EIA) will also be considered. A final decision about the gas extraction operation is expected to be taken in March 2022. The decisions will be published along with a memorandum of reply setting out the government's response to the Commission's advisory report on the EIA and to the views on the draft decisions submitted by parties in the consultation procedure, including the views of the Netherlands National Commission for UNESCO. On the basis of the Commission's advisory report, NAM was asked to provide supplementary information for the EIA, which will be published along with the final decisions.

Under current legislation, Natura 2000 areas enjoy far-reaching protection from the harmful effects of projects of any kind, including deep mineral extraction operations. The protection of these areas under the Nature Conservation Act is based on the EU Habitats Directive, which is grounded in the precautionary principle. This is in alignment with the UNESCO decision (Phnom Penh, 2013)⁸ to which you refer, as stated in my letter of 8 October 2019 (no. 2019B-16). By applying the precautionary principle on the basis of the 'hand on the tap' monitoring and response system, we can guarantee that the ecological values will not be harmed. This serves to secure the integrity and protection of the Outstanding Universal Value of the Wadden Sea UNESCO World Heritage property.

Operational Guidelines

In your response, you referred to paragraph 172 of the Operational Guidelines for the Implementation of the World Heritage Convention,⁹ in which it is agreed that UNESCO will be notified of any new activities in World Heritage properties. You have asked for an explanation as to why the proposed gas extraction project at Ternaard was not reported.

By letter of 8 October 2019 (no. 2019B-16) the Dutch government informed you of the proposed gas extraction project at Ternaard during the initial phase of the permit procedure. In line with paragraph 172 of the Operational Guidelines, it would have been preferable for the Dutch government to have

⁶ The draft decisions (in Dutch) are published here: [Gaswinning Ternaard - fase 1 - gaswinningslocatie | RVO.nl | Rijksdienst.](https://www.rvo.nl/nl/onderzoek-en-toezicht/onderzoek-en-toezicht/gaswinning-ternaard)

⁷ An independent advisory body for environmental assessments.

⁸ [Decision 37 COM 7; Phnom Penh, 2013.](https://whc.unesco.org/en/decisions/37)

⁹ [https://whc.unesco.org/en/guidelines/.](https://whc.unesco.org/en/guidelines/)

informed you that the draft decisions were available for inspection, to give you an opportunity to respond. The government regrets that this did not happen.

The current procedure concerns the issue of a permit for production drilling and extraction from the Ternaard natural gas field on the basis of the North Friesland extraction permit issued in 1969. The nomination file includes information about other extraction operations based on this concession. In 2009 the Wadden Sea was placed on the list of Natural World Heritage Sites on the basis of the current protection regime. When the nomination was presented to UNESCO, it included all of the activities that were ongoing at the time, including natural gas extraction in the Wadden Sea on the basis of the 'hand on the tap' monitoring and response system. Under this system drilling operations and their impact are strictly monitored to ensure that they have no impact on the natural environment of the Wadden Sea. As indicated previously, the nomination documents state that after inclusion on the list new drilling operations would not be permitted within the World Heritage property. However, drilling is permitted outside the World Heritage property as long as the property is not damaged as a result. In addition, if a project of this nature has the potential to cause seabed subsidence in the Wadden Sea, an extraction permit will be issued only if all uncertainties and doubts about harmful effects to the natural environment and landscape of the Wadden Sea have been sufficiently addressed. The proposed gas extraction operation at Ternaard has been designed and will be assessed in accordance with these guiding principles. In line with the IUCN's recommendations, the government asked NAM to draft a separate memorandum concerning the potential impact on the Outstanding Universal Value of the Wadden Sea as a World Heritage property. This memorandum (in English) is appended to this letter.

Cable connecting offshore wind farm to onshore grid

By letter of 18 June 2020 (no. 2020B-06) you were informed of plans to lay a 700MW cable across the Wadden Sea area to connect one of the offshore wind farms north of the Frisian Islands.

In January 2021, the Minister of Economic Affairs and Climate Policy published the preferred alternative route for connecting the wind farm north of the Dutch Frisian Islands. This option was chosen on the basis of the integrated impact assessment (IIA), which in addition to a first-phase EIA included studies of the surroundings, costs, technology and future resilience. The first-phase EIA also considered the area's World Heritage status.

Developing more offshore wind energy sites is one of the government's ambitions. Offshore wind energy contributes significantly to our efforts to fulfil the climate goals and limit global warming as laid down in the Paris Agreement. As such it also contributes to the conservation of the Wadden Sea, to which sea level rise poses a major long-term threat. Furthermore, the circumstances for wind energy at sea are favourable for achieving the desired scale. For these reasons, in parallel, we have examined, in consultation with the local and regional stakeholders, which potential cable routes to the mainland from wind energy sites to be designated in the North Sea would be promising for the period up to and including 2030.

Ecological feasibility and avoiding significant negative effects on ecosystems are important factors in the decision-making process. Building and maintaining cable connections have ecological effects. Given the Outstanding Universal Value of the Wadden Sea as a World Heritage property, additional research was therefore conducted into innovative methods of traversing the Wadden Sea. With a view to ensuring prudent use of space, offshore and onshore cable routes will be combined with new and existing energy infrastructure wherever possible. This will prevent irreversible damage to the World Heritage property and minimise the impact on the natural environment, liveability, shipping, agriculture, fisheries, recreation and tourism, landscape, cultural heritage and archaeological assets.

Great caution must be exercised in fulfilling the ambition to develop offshore wind energy and traverse the Wadden Sea World Heritage property. Specifically with respect to the Wadden Sea, on 2 December 2021 the Dutch government decided to obtain more information before initiating a spatial planning procedure for a preferred route.¹⁰ This is why you have not as yet received further information about the next phase of this procedure.

In a specific spatial planning programme, a study will be carried out in the coming period to determine how the 700MW of offshore wind power under current plans (of which you were informed on 18 June 2020) and an additional 4GW to be developed in the future can be transported to shore without causing damage to the World Heritage property. Regional parties will be closely involved. The aim of this programme is to generate a more complete picture of the impact of the construction techniques on the

¹⁰ [Letter to parliament \(in Dutch only\) about exploring options for connecting offshore wind farms to onshore grid 2030 | Parliamentary Paper | Rijksoverheid.nl.](#)

environment and identify how much capacity remains for cable and hydrogen connections after 2030. The NIOZ position paper you referred to will be used, and experiences with existing cable routes in the trilateral Wadden Sea cooperation area. The information obtained will be assessed in a Strategic Environmental Assessment (SEA), with specific attention for the Wadden Sea's World Heritage status. I will share this assessment with you in due course. In the coming period the Dutch government will be working out the time line of this programme with stakeholders.

Agenda for the Wadden Sea Region 2050

In its letter, the Waddenvereniging also referred to the Agenda for the Wadden Sea Region 2050 ('the Agenda'), expressing concern that it would fail to provide for sufficient protection of the Wadden Sea. By letter of 2 December 2020 (no. 2020B-13) I informed you about the status of the Agenda as a voluntary policy framework for the bodies and organisations that endorse it, including the Dutch government. The Agenda was definitively adopted in February 2021 when more than 50 parties signed the statement of agreement. It offers a guiding and integrated vision of the future development of the Wadden Sea region and is intended to facilitate a careful and coordinated approach, so that the main objectives for the Wadden Sea (the sustainable protection and development of the Wadden Sea as a natural area and the preservation of its unique open landscape) and for the Wadden Sea Region (protected, vital and resilient in 2050) can be achieved.

All of the parties involved are currently working on an implementation programme for the 2021-2026 period. I would like to stress again that the Agenda will not result in any transfer of tasks or competencies. Each party has its own role and responsibility, but they all need each other. We can only protect the Wadden Sea and achieve the ambitions for the natural environment to the best extent possible if we consider this in the context of the related undertakings for the Wadden Sea region as a whole and work jointly with all the stakeholders.

Climate change

The Agenda states that it is important to prepare in time for the impact of climate change and sea level rise by investing in robust and resilient ecosystems, so that the natural environment can accommodate the effects of climate change. In addition, the Dutch government is committed to reducing greenhouse gases in accordance with the targets laid down in the Paris Agreement. In this way, the Netherlands is helping to limit global warming and, by extension, protect the natural environment of the Wadden Sea, to which sea level rise poses one of the most serious long-term threats. The Dutch government shapes its climate policy in consultation with regional authorities, civil society organisations and the private sector on the basis of the National Climate Agreement. This is also mentioned in the Agenda.

To achieve the Netherlands' climate goals for 2030 and 2050, the government is working in accordance with the National Climate Agreement towards decarbonisation of the gas system by means of energy conservation and by transitioning from natural gas to electricity, green gas, sustainable hydrogen and sustainable heating. Nevertheless, for the next several decades natural gas will be needed for heating in industry and the built environment, for the production of electricity and as a raw material in the chemical and other industries. The scenarios for limiting global warming also show that natural gas will remain necessary. In these scenarios, coal and oil, which are the most taxing on the environment, will be phased out first and natural gas last. In addition, natural gas produced in the Netherlands is preferable to imported gas because production of the former results in much lower emissions of carbon dioxide and other greenhouse gases. Extracting natural gas from small fields contributes significantly to maintaining national gas production and limits the need to import gas. This means that gas extraction in the Netherlands helps to limit carbon emissions in the global energy system.

Cumulative effects

Cumulative effects are identified when new activities are assessed on the basis of the Nature Conservation Act and the Mining Act. Within the framework of the Agenda further work will be done to develop our knowledge of cumulative effects. This will be addressed in a research programme focusing on the effects of climate change on the natural environment of the Wadden Sea region. This programme will contribute significantly to the development of knowledge in line with the Agenda and the Trilateral Research Agenda for the Wadden Sea Region and its World Heritage Site.¹¹ Additionally, the programme will develop knowledge about the cumulative effects of all human activity on the natural environment of the Wadden Sea region and explore how, in the case of shared use, human activities can best be assessed in relation to other activities, as agreed in the Agenda.

I hope you will find this information helpful. A copy of this letter will be sent to the Waddenvereniging and the Werkgroep Vrije Horizon Schiermonnikoog.

¹¹ [Trilateral Research Agenda | Wadden Sea \(waddensea-worldheritage.org\)](https://www.waddensea-worldheritage.org/).

Yours sincerely,

Hans Wesseling

Ambassador,
Permanent Delegate of the Kingdom of the Netherlands to UNESCO



Assessment – Impact of gas extraction at Ternaard on the Outstanding Universal Value of the Wadden Sea World Heritage site

FROM
ARCADIS

DATE
14 January 2022

TO
NAM

OUR REFERENCE
D10047152:14

Assessment – Impact of gas extraction at Ternaard on the Outstanding Universal Value of the Wadden Sea World Heritage site

The Environmental Impact Assessment and the Appropriate Assessment for Gas Drilling and Gas Extraction at Ternaard address the potential environmental impacts and effects on nature of the proposed activities. This document summarises the key findings in relation to the Outstanding Universal Value of the Wadden Sea World Heritage site.

OUV criterion (viii) – geological processes:

The geological processes have been assessed in EIA Part B, Chapter 10 Hydromorphology.

Large scale sedimentation, *minimum available sedimentation rate* and *Effective Subsidence Capacity* (EIA Part B, page 33)

The tidal basins of the Wadden Sea have a specific ability to accommodate a certain level of relative sea level rise, which is a combination of sea level rise and soil subsidence due to gas extraction, with sedimentation. The *Effective Subsidence Capacity* (ESC), which is the maximum spatially averaged subsidence rate available for (planning of) human activities, is determined by the difference between the *minimum available sedimentation rate* and the rate of sea level rise. The *minimum available sedimentation rate* is determined per tidal basin based on the geological history.

A relatively low *minimum available sedimentation rate* is chosen to be certain that the sedimentation rate is feasible. This precondition is applied in advance when determining the maximum extractable volume of gas, as well as during extraction, by applying the “hand on the tap” method. This means that the soil subsidence resulting from all gas extraction activities (both the proposed gas extraction at Ternaard and the existing gas extraction activities at Ameland and MLV¹²) in the affected Pinkegat and Borndiep will not exceed the *Effective Subsidence Capacity* of these tidal basins.

Since the extent of the soil subsidence due to gas extraction is carried out within the *minimum available sedimentation rate* and the *Effective Subsidence Capacity* is not exceeded, the geomorphological equilibrium and the sediment balance of the tidal basins are preserved. This has been demonstrated in the Appropriate Assessment for gas extraction in the Wadden Sea (Ministry of Economic Affairs, 2006), in further studies carried out as part of the monitoring of the same extraction activities (Wang et al., 2017) and in studies commissioned by the Waddenacademie (van der Spek, 2018, Wang et al., 2018). At the current rise in sea levels¹³ and rate of soil subsidence due to mining activities, the Wadden Sea would not become submerged (TNO, 2021).

These studies cover all subsidence under the tidal basins, irrespective of the gas field or gas fields in which the extraction takes place. The findings of these studies therefore also apply to soil subsidence because of gas extraction at Ternaard. Using this strict limit, which is safeguarded through application of the “hand on the tap” method, means there will be no impact on the characteristic morphological elements and processes in the Wadden Sea. There will therefore be no structural impact on the sediment supply and the morphology of the Wadden Sea because of soil subsidence due to gas extraction, including the gas extraction at Ternaard. The amount of sedimentation is sufficient to compensate the sea level rise and subsidence resulting from the gas extraction.

¹² Moddergat, Lauwersoog and Vierhuizen

¹³ A larger sea level rise gives a smaller Effective Subsidence Capacity

Tidal flat area and length of dry period (EIA Part B, page 34)

The proposed gas extraction at Ternaard, in accordance with the “hand on the tap” method, does not result in changes to the intertidal system in the Wadden Sea. There are no measurable or observable effects on sediment composition and the area of channels, tidal flats or salt marshes.

Based on calculations, the findings of the Appropriate Assessment are that the temporary decrease in the volume of sediment is equivalent to a decrease in the tidal flat height of no more than 1.6 mm, averaged over all flats in the entire tidal basin. This temporary decrease in the height of the flats does not result in a changed dry percentage.

OUV criterion (ix) – Ecological and biological processes:

The ecological and biological processes have been assessed in Chapter 11 of the EIA. An Appropriate Assessment has also been prepared.

The impact on both the hydromorphological system of the tidal basins within the sphere of influence of the Ternaard gas extraction and the protected natural values can be summarised as follows. The majority of the effects only occur during the construction phase, during which the works required around the drilling location, which is situated onshore, generate disruption due to light, noise, vibrations and optical distortion. There are no spill-over effects during extraction – the autonomous process of pressurised gas flowing from the field to the grid. At no point do the disruptive effects reach Natura 2000 areas, meaning there is no degradation of the natural characteristics of these areas (EIA Part B, page 38). Although construction does result in temporary emissions of eutrophying substances (nitrogen), the emissions as such are limited and deposition only occurs in isolated places within the Wadden Sea Natura 2000 area. Moreover, the temporary additional NO_x depositions in these locations are so low that they do not lead to the Water Framework Directive being exceeded or cause effects, given the trophic level of the local system (accumulation of silt deposits in salt marshes).

The gas extraction activities will, however, result in soil subsidence within the tidal basin and onshore in the Netherlands. The expected subsidence will not result in measurable or observable effects on channels, tidal flats and salt marshes in the Wadden Sea, because implementation takes place with the available *Effective Subsidence Capacity* for the Pinkegat area (EIA Part B, page 83), which means that the sedimentation rate is high enough to counteract the subsidence. Nor is there any change in the sediment composition or any cumulation of negative effects with activities and projects that act through the same impact chain, such as sand nourishment or other gas extraction activities.

In conclusion, the planned gas extraction activities in the vicinity of Ternaard will not result in a detrimental impact on protected natural values. The gas extraction activities are primarily guided by the *Effective Subsidence Capacity* determined for gas extraction in the Wadden Sea. Consequently, there is no measurable impact on the tidal flats area, the salt marsh area and the sediment composition. Nor is there any degradation of the available area of nesting and foraging sites for the designated bird species for the Wadden Sea (EIA Part B, page 83).

OUV criterion (x) – Biodiversity:

In the Appropriate Assessment, the characteristic features providing the basis for the high biodiversity in the Wadden Sea have been assessed in accordance with the Nature Conservation Act.

Dotted along the mainland and across the islands are salt marsh areas that are host to very diverse flora and fauna. The salt marshes along the Frisian mainland coast are the result of human intervention. Where the more elevated, green salt marshes meet the lower, wetter reclamation marshes there is a natural erosion zone, known as a salt marsh cliff. The salt marshes on the Wadden Islands¹⁴ have a natural geomorphology, characterised by incremental gradients, meandering creeks and variability in the amount of natural drainage. The soil is typically sandy, due in part to the influence of sand drifting across from nearby dune land areas. The gradual transition from the mudflats towards the dunes provides for a high level of biodiversity. With hydrodynamics and geomorphology that are virtually undisturbed, natural processes ensure the conservation and development of characteristic landscapes and habitats, and result in ever-shifting boundaries between land and water. The Wadden area derives part of its identity from the natural relationships between the Wadden Sea, the Wadden Islands, the North Sea Coastal Zone and the mainland coast, and the characteristic transitions between land and sea, saltwater and freshwater, and wet and dry areas. The Natura 2000 area is a designated area for 13 types of habitat, 6 Habitats Directive species, 13 species of breeding bird and 39 species of non-breeding bird (Appropriate Assessment 2020, page 70). The Appropriate Assessment evaluates the impact to these.

As indicated above, the proposed gas extraction at Ternaard, in accordance with the “hand on the tap” method, does not result in changes to the system in the Wadden Sea. There are no measurable or observable effects on sediment composition and the area of channels, tidal flats or salt marshes. There is no detrimental impact to the natural characteristics of the Wadden Sea (Appropriate Assessment 2020,

¹⁴ Most of the salt marshes of the Wadden Islands are part of the Wadden Sea Natura 2000 area.

page 106). This applies across the types of habitat, the Habitats Directive species and the species of breeding and non-breeding birds. As a result, no impact to biodiversity is expected.

Conclusion in respect of the preservation of the integrity and authenticity of the Wadden Sea World Heritage site

Mining activities under the Wadden Sea are only permitted if they can be carried out in a manner that is safe for people and the environment and which provides sufficient certainty that there will be no adverse impact on nature. In the Environmental Impact Assessment and Appropriate Assessment, the impact on geological processes, ecological processes and biodiversity – and thus also the impact on the Outstanding Universal Value – has been assessed against the Nature Conservation Act and Environmental Permitting (General Provisions) Act.

Gas extraction at Ternaard in accordance with the “hand on the tap” method will not impact the natural characteristics of the Wadden Sea, with the integrity and authenticity of the Wadden Sea remaining intact in every respect.

In addition, application of the precautionary principle means the “hand on the tap” method includes monitoring of biotic and abiotic parameters in the Wadden Sea. The monitoring programme consists of detection measurements that determine the occurrence of any unexpected measurable detrimental effects on the conservation objectives of the Wadden Sea Natura 2000 area that could be related to soil subsidence as a result of gas extraction. The monitoring reports are prepared (NAM, 2021), published and evaluated (CieMer, 2021) on an annual basis by an independent audit committee (forming part of the EIA Committee), at the request of the Ministries of Economic Affairs and Climate policy and Agriculture, Nature and Food quality.

References

- 1) *MER Gasboring en Gaswinning Ternaard* [EIA relating to Gas Drilling and Gas Extraction at Ternaard] (May 2020)
EIA Part A: <https://www.rvo.nl/sites/default/files/2021/07/MER-gasboring-en-gaswinning-Ternaard-Deel-A-14052020.pdf>
EIA Part B: <https://www.rvo.nl/sites/default/files/2021/07/MER-gasboring-en-gaswinning-Ternaard-Deel-B-14052020.pdf>
- 2) *Passende Beoordeling (PB) Gasboring en Gaswinning Ternaard* [Appropriate Assessment relating to Gas Drilling and Gas Extraction at Ternaard] (May 2020)
A digital copy of the Appropriate Assessment is available at
<https://www.rvo.nl/sites/default/files/2021/07/Passende-beoordeling-en-Bijlagen-III-VII-VIX-bij-het-MER.pdf>
- 3) Ministry of Economic Affairs, 2006. *Gaswinning binnen randvoorwaarden* [Extracting gas subject to preconditions]; *Passende Beoordeling van het rijksprojectbesluit gaswinning onder de Waddenzee vanaf de locaties Moddergat, Lauwersoog en Vierhuizen* [Appropriate Assessment for the central government project decision on gas production at Moddergat, Lauwersoog and Vierhuizen in the Wadden Sea].
- 4) Wang, Z.B., Cleveringa, J. & Oost, A., 2017. *Morfologische effecten bodemdaling in relatie tot gebruiksruimte* [Morphological effects of soil subsidence in relation to functional space]. Report 1230937-000. Deltares (Delft)
- 5) Wang, Z.B., E.P.L. Elias, A.J.F. van der Spek, Q.J. Lodder, 2018. Sediment budget and morphological development of the Dutch Wadden Sea: impact of accelerated sea-level rise and subsidence until 2100. *Netherlands Journal of Geosciences* Volume 97, p. 183-214.
- 6) van der Spek, A. J.F. 2018. The development of the tidal basins in the Dutch Wadden Sea until 2100: the impact of accelerated sea-level rise and subsidence on their sediment budget – a synthesis; *Netherlands Journal of Geosciences* Volume 97, p. 71-78
- 7) TNO, 2021 *Verdrinkt het Nederlandse wad? Hand-aan-de-kraan en meegroeivermogen* [Are Dutch mudflats becoming submerged? “Hand on the tap” method and adaptive capacity]
Digital copy: https://www.nlog.nl/sites/default/files/2022-01/meegroeivermogenwaddenzee_age220103.pdf
- 8) NAM, 2021. Wadden investigation reports
Digital copy: Wadden investigation reports | NAM

- 9) CieMER, 2021 Advisory report of the Netherlands Commission for Environmental Assessment on the monitoring of gas production in the Wadden Sea at Moddergat, Lauwersoog and Vierhuizen for the 2020 reporting year.
Digital copy: 3534_ov_advies_auditcommissie_aardgaswinning_waddenzee.pdf (commissiemer.nl)