



Netherlands Commission for
Environmental Assessment

Open sea aqua culture project Aruba

Preliminary advisory report

1st of May 2025 / project number: 3884





Commissie voor de
milieueffectrapportage

our reference

3884 TS

handled by

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Mr Geoffrey B. Wever
Minister of Finance, Economic Affairs and Primary Sector
and
Mr Michiel G. Eman
Minister of General Affairs, Culture, Environment and Nature

L.G. Smith Boulevard 76
Oranjestad, Aruba

Date: 1 May 2025

Subject: Advisory report on open sea aquaculture project in Aruba

Dear Minister Wever and Minister Eman,

I would like to express my sincere gratitude to you for requesting the Netherlands Commission for Environmental Assessment to review the Environmental Impact Assessment Report on the Petros open sea aquaculture project. Your request shows that you consider an independent assessment to be hugely important for optimal decision making. Thank you also for your openness and warm hospitality in hosting the NCEA on your island. It is both special and significant that you, as the ministers responsible for Economy and Nature, are acting together, as the greatest justice is done to economic, social and environmental interests when they are assessed in conjunction.

Our opinion on the environmental assessment report

Your government and Petros both aim to meet the highest international standards ('best practice') in aquaculture and in environmental assessment. This is an ambitious goal, particularly as this is the first environmental assessment report commissioned by the government of Aruba. In that context, the resulting report is already quite thorough, thanks especially to the interim addition of information by Petros. However, we note that there are still areas that require further attention on your part, and therefore we recommend that you do not make the final decision on the project until supplementary information has been obtained on several topics. Below, I would like to share some observations that result from our review of the report.

The utility and necessity of farming Northern red snapper for Aruba

Petros intends this project to contribute to the economic diversification of Aruba and enhance food security. We conclude that Northern red snapper raised by the project that enters the local market will improve food security only for the upper tier of the Aruban population. The fish produced by the project are destined primarily for luxury restaurants, the tourism industry and export. We believe that it is important that you take this into consideration when deciding on the project.



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It is crucial to monitor the project's feasibility and environmental impact

We note that it is difficult to predict the project's practical, financial and environmental feasibility. Therefore, it is prudent that Petros proposes to limit annual production to a maximum of 500 tons of fish in the initial four years and only thereafter to scale up to 2,000 tons per year. Given the uncertainties involved, we recommend building in a decision moment after completion of the first phase, to enable the decision on whether or not to scale up to be based on thorough and systematic monitoring of the first phase of the project.

Importance of open communication and transparency

Environmental assessment not only entails producing a report, it is also a process in which economic, social and environmental interests are actively and transparently involved. In this regard, we stress the importance of communicating openly and with all relevant stakeholders, both within and outside the Aruban government, regarding the open sea aquaculture project.

Strategic handling of the fragile environment of Aruba, Bonaire and Curaçao

Aruba's marine ecosystem has been deteriorating for years, despite being a cornerstone of your economy. It is therefore essential that the government of Aruba and representatives drawn from a broad cross-section of its inhabitants together develop a more realistic picture of the maximum desirable and permissible load on the marine ecosystem and the economic activities that remain appropriate. A strategic environmental assessment report is eminently suitable to ascertain (possibly in conjunction with Bonaire and Curaçao) the load the system can still handle and, in light of this, how Aruba can achieve its economic, social and environmental ambitions.

Additionally, we have observed that the capacity for water treatment and waste disposal on the island is inadequate, posing significant risks to the environment, nature, and public health. A strategic environmental assessment report is an extremely appropriate tool for addressing these concerns as well.

To conclude

You have indicated that you intend to have the missing information supplemented in the Environmental Impact Assessment Report within a reasonable time and to submit it to us so we can issue our final opinion. We would of course be delighted to do so. I hope that this trajectory will assist you in applying international best practice in aquaculture and environmental assessment as well as in enhancing the practice of environmental assessment on your island. As discussed, we are eager to continue contributing to this endeavour.

Sincerely,

Signed By: Ms S.L.J.M. Filippini
01/05/2025 18:39:05 CEST
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S.L.J.M. (Simone) Filippini
President
Netherlands Commission for Environmental Assessment (International)



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1 The NCEA's advisory report on the EIA in brief

The company Petros Aquaculture Operations (hereafter Petros) plans to farm Northern red snapper¹ fish in Aruba for export and local consumption. The project aims to increase the diversity of the Aruban economy and strengthen food security

The Environmental Impact Assessment (EIA) prepared by Petros includes the proposed project's potential impact on nature and the environment in Aruban waters and on land.² The Minister of Finance, Economic Affairs and Primary Sector of Aruba requested the Netherlands Commission for Environmental Assessment (hereafter: the NCEA) for an independent advisory report on the EIA. In this advisory report, the NCEA expresses its opinion on the quality and completeness of the EIA, paying attention to aspects such as its accuracy and relevance for decision-making.

The project

Petros plans to produce up to 500 tons of fish per year in the four years of the project's first phase, ultimately rising to 2,000 tons per year in the second phase. Part is intended for local consumption, part for export.

The proposed components of the project on land will be a hatchery, a processing plant and a pier. At sea, about eight kilometres off the coast, there will be four fish cages in the first phase and sixteen cages in the second phase. Together the sixteen cages will cover an area of about 1 km² and will be anchored to the sea floor. See Figure 1 for land and sea locations. Vessels will sail back and forth several times a day to replenish or harvest the fish and for fish care. There will also be land transport (to and from ports and the airport) and transport of fish feed and fresh fish in planes.

The EIA

The EIA focuses exclusively on the first phase of the project and describes three scenarios for this: (0) no project, (1) avoid negative impacts entirely with all measures possible, and (2) minimise negative impacts as much as possible with measures Petros plans to take ('best practical means').

On land, the project site is in an industrial area. In terms of noise, odour, wastewater and air quality, the area's impact on the environment, which is already significant, will increase. Seawater quality may decline because the project will use seawater to raise the fish and some of the water will be discharged back into the sea after treatment. Wastewater from fish processing will go to the existing local sewage treatment plant (STP). Groundwater availability and quality may deteriorate during the project's construction and operation phases.

¹ *Lutjanus campechanus*.

² *Environmental Impact Assessment for Aquaculture Fish Farm Aruba, rev. 04*, ACE Firm Engineering, Feb. 14, 2025. Information designated confidential by the competent authority and not included in the public version of the EIA (version ('rev.') 05 dated March 11, 2025) was made available to the NCEA.

Although no animal and plant species protected on Aruba have been observed on the planned site, local animal species such as birds and lizards do occur and may be affected by the construction and operation phases. Solid waste from fish processing may attract vermin.

Manure from the fish in the cages eight kilometres offshore will be dispersed into the sea. The EIA states that currents and turbulence will rapidly reduce the concentration of these particles, with the result that there will be no measurable increased concentration at a short distance (50 to 100 metres) from the cages. The impact on the marine ecosystem is therefore expected to be limited in the immediate vicinity of the cages, but it will contribute to the already significant total load on the larger ecosystem of the Caribbean Sea and Gulf of Mexico.

The EIA states that all the project's negative environmental impacts are limited. With regard to the land-based part of the project, this is mainly because the existing environmental impact of the industrial area is already high and the increase resulting from the proposed plan will be comparatively small. According to the EIA, the impacts at sea will be limited in relation to the larger marine ecosystem of the Caribbean Sea.

Review framework: the EIA's format and international best practice

In the EIA it is stated that the document was prepared using the EIA format of the Ministry of General Affairs, Culture, Environment and Nature (Nature and Environment Directorate, DNM), and that the research was carried out in accordance with environmental best practices. However, international best practice, as expressed in the World Bank's 'IFC Performance Standards'³, prescribes a broader approach than DNM's format, such as depicting social and socio-economic impacts.

At the request of the government of Aruba, the NCEA reviewed the EIA against international best practice. Thus, in the interest of due diligence, the NCEA assessed the EIA against the highest international standards and came to the conclusions described below.

The NCEA's recommendations on the EIA

The recommendations in this advisory report are preliminary. The Aruban government has indicated its intention to adopt the NCEA's recommendations, and the environmental assessment report will be supplemented with additional information in the near future before being resubmitted to the NCEA for a final opinion.

The NCEA appreciates the obvious efforts taken to prepare the EIA. The NCEA also appreciates Petros's detailed response to the NCEA's written questions and, following the interim discussion of the EIA, the company's provision of additional information to the NCEA within weeks in the form of Appendix 37.

The EIA already provides a reasonably complete picture of the environmental consequences of the project and mitigation measures. On the whole, it provides a good picture of the current environmental impact on land through traffic counts and measurements of noise and air quality. Its description of the current state of the marine ecosystem is generally good. However, essential information on certain aspects is missing (see below).

³ These are internationally recognised standards for implementing projects sustainably; see section 2.5 of this advisory report.

Annex 37 of the EIA gives a good picture of the reasons for the choice of the offshore location, the design of the offshore aquaculture system, energy use and the possible reuse of solid waste. On the positive side, Petros intends to apply the Best Aquaculture Practices and Aquaculture Stewardship Council criteria.

The EIA states that this project will contribute both to the economic diversification of Aruba and to enhancing food security. However, the NCEA concludes from the EIA that this project will improve local food security only for the upper tier of the Aruban population, as the fish produced is mainly intended for luxury restaurants, the tourism sector and export. The NCEA recommends that the competent authority take this into account when assessing the project's utility and necessity (see section 3.1.1 of this advisory report).

The NCEA has identified a number of uncertainties, one being the difficulty of predicting the project's feasibility because Northern red snapper is not yet being commercially produced elsewhere and it is uncertain whether this species will thrive in cages in Aruban waters. In addition, there is uncertainty about the project's impact on the marine ecosystem, and stakeholders also have concerns about this. The NCEA therefore recommends building in a decision moment on completion of the first phase. It also recommends that the decision on whether or not to scale up to 2,000 tons per year should be based on thorough and systematic monitoring and evaluation of the first project phase (see section 3.1.2 of this advisory report).

In addition to these recommendations, the NCEA notes in its review of the EIA that important information is missing. It is essential to supplement this information in order to be able to fully consider the importance of the environment when considering granting the permits for the open sea aquaculture project in Aruba. This information is also necessary for compliance with Aruban regulations and international best practice for determining the environmental, social and socio-economic impacts of projects. The shortcomings to be addressed are itemised below:

- **Inadequate insight into certain parts of the project⁴.** The following information is required:
 - a **current overview of the projected layout** of the project site on land and the plan area on land, including boundaries;
 - the description of relevant **odour and noise sources** within the onshore processing process;
 - how **water will be supplied to the hatchery**, the volume of water involved, how much will be discharged and the resulting environmental impacts;
 - how pollution of the Barcadera lagoon will be prevented during the **cleaning and maintenance of vessels**;
 - the location and anchoring of the **pier** and the anticipated environmental impacts;
 - an overview of **maritime traffic and of transportation** across the pier and on public roads, and of their environmental impact.
- **Environmental impact of producing 2,000 tons of fish per year.** The EIA deals with the environmental impacts of the first phase of the project. The expected impacts of the second phase need to be estimated too, because this phase is an inseparable part of the project and essential for profitable operations.

⁴ The NCEA considers the total project to consist of the construction and operation phases, on land and at sea, with an annual production of 500 tons in the first phase and 2,000 tons in the second phase.

- **Wastewater treatment capabilities.** The EIA does not demonstrate that the island's wastewater treatment plants have sufficient capacity to process wastewater from the project, now or in the future. Nor does it adequately describe the options for on-site treatment of the project's wastewater if these plants have insufficient capacity.
- **Onshore and marine environmental impacts.** The cumulative environmental impacts on land in terms of noise, air quality, odour nuisance and traffic flows have not been worked out, and neither have the impacts on the adjacent Rooi Bosal (a coastal gully with mangrove stands) and the mitigation measures. Also inadequately elaborated are the impacts on the marine ecosystem – e.g. on coral, sea turtles and marine mammals, such as dolphins, and the harm to the Caribbean red snapper (*Lutjanus purpureus*) that might result from the decision to farm the Northern red snapper.
- **Social and socio-economic impacts.** Impacts on local fishermen have not been adequately described. The tourism industry has concerns that offshore cages may attract sharks, which may then turn up closer and more frequently at beaches. This risk is also inadequately described.
- **Environmental management system, monitoring plan and decision moments.** More insight should be given into the decision-making chain (go/no go decision moments) and how environmental and social impacts are managed (via an environmental management system⁵) and monitored. Monitoring should be SMART⁶.
- **Summarised overall view of project and environmental impacts.** Although the information in Appendix 37 of the EIA is very insightful on a number of points, the overall picture is missing. The EIA should be supplemented with a summary of the totality of environmental, social and socio-economic impacts and mitigation measures that is understandable even to the less-informed reader.

Only after the abovementioned missing information has been included in a supplement to the EIA should decisions be made about granting permits for the project.

Draft decisions not yet available

The EIA is intended to support decisions (including about permits) for the project. These decisions are not yet available in draft form and therefore the NCEA has been unable to check whether the EIA and the decisions are mutually consistent: for example, whether the EIA goes into the maximum environmental consequences that the decisions permit. It is up to the competent authority to investigate this at a later date.

Reading guide

In chapter 2 of this advisory report, the NCEA explains the rationale for commissioning its review of the EIA, the decision-making process and the NCEA's role. In chapters 3 and 4 the NCEA explains its substantive assessment. Chapter 3 describes the NCEA's review against Aruban regulations. In chapter 4, the NCEA specifically discusses its assessment on the basis of the World Bank's IFC Performance Standards.

⁵ Called 'Environmental and Social Management System (ESMS)' in IFC Performance Standard 1.

⁶ SMART: Specific, Measurable, Acceptable, Realistic, Time-bound.

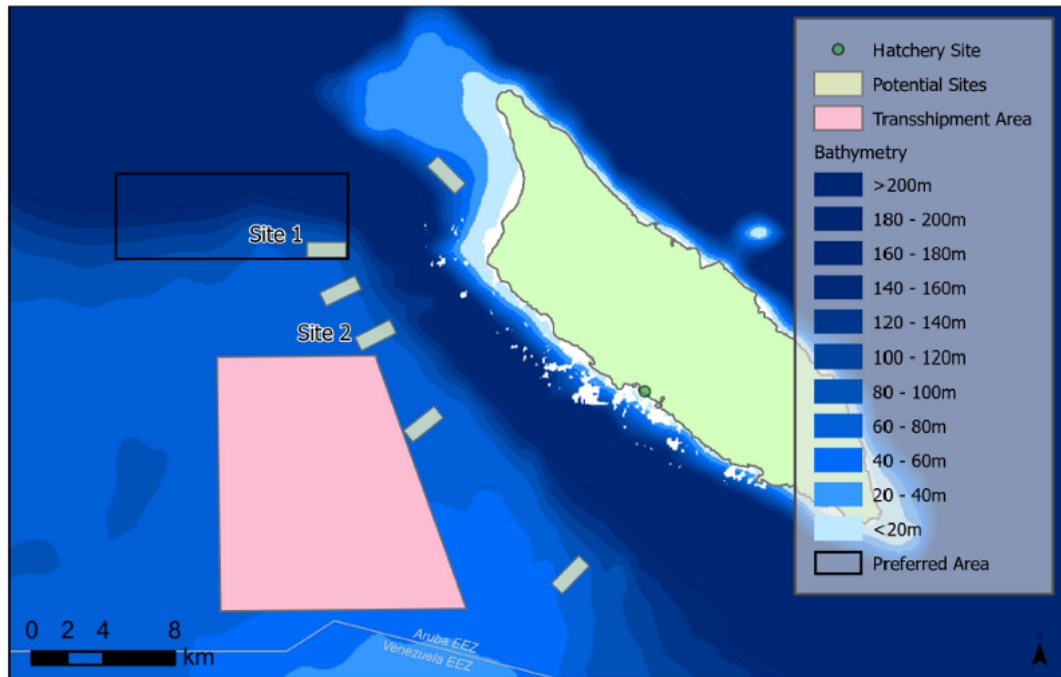


Figure 1. Project locations on land ('Hatchery Site') and at sea (Site 1') (source: EIA, p. 57)

2 Rationale, decision-making and the NCEA's role

2.1 Rationale for the EIA for the project

Petros Aquaculture Operations wishes to farm the Northern red snapper (*Lutjanus campechanus*) in Aruba for export and local consumption. Although Aruba has no regulations requiring an EIA for projects with significant environmental impacts, the ministers concerned (see section 2.2) requested an EIA in support of Petros' permit applications. Petros complied.

2.2 Competent authority for decisions for the project

The competent authority for decision-making on the project comprises four ministers of the country of Aruba. They are listed below, together with the decisions that they are responsible for:

- Establishment licence: Minister of Finance, Economic Affairs and Primary Sector;
- Construction permit: Minister of Infrastructure, Energy and Telecommunication;
- Nuisance permit: Minister of Justice, Integration and Public Transportation;
- Flora and fauna exemption: Minister of General Affairs, Culture, Environment and Nature.

The Minister responsible for the EIA is the Minister of General Affairs, Culture, Environment and Nature.

2.3 Rationale for commissioning this advisory report and the NCEA's method of working

The Minister of Finance, Economic Affairs and Primary Sector commissioned the NCEA to issue an advisory report on the EIA to ensure an independent assessment of the EIA's quality and completeness. The NCEA's working group visited Aruba and the project site on land during the week of 20 January 2025, and met with representatives of the government of Aruba⁷, Petros and external stakeholders⁸.

The composition and working methods of the NCEA's working group and further project details are in Appendix 1 of this advisory report. The project documents used when preparing this advisory report are on the NCEA's website.⁹

2.4 The independent role of the NCEA

The NCEA – a statutory independent knowledge institution – advises on the content and quality of an EIA. It is neutral and has no judgement about the project presented in an EIA. In the Netherlands, the NCEA has the statutory task of advising on environmental impact reports. Abroad, the NCEA supports countries, at their request, in strengthening their environmental and social impact assessments through advice and capacity development.

The NCEA sets up a working group of independent experts for each project. It does not write environmental assessment reports; that is done by the initiator, in this case Petros. It is the competent authority, in this case the ministers mentioned in section 2.2, that decides on the project.

2.5 Review framework for the NCEA advisory report

The NCEA assesses the quality and completeness of the information, including its correctness and relevance for decision-making. In this case, the EIA states that the environmental study was conducted in accordance with DNM's 'EIA format'¹⁰ and in accordance with 'environmental best practices'¹¹. The NCEA therefore first reviewed the EIA against the policies and regulations of Aruba, including the EIA format. The assessment that resulted from applying this assessment framework is in chapter 3 of this advisory report.

⁷ The ministers of Economic Affairs and Nature, Directorate of Economic Affairs, Trade and Industry (DEZHI), Aruba Investment Agency (ARINA), Directorate of Nature and Environment (DNM), Directorate of Agriculture, Livestock, Fisheries and Market Halls (DLVVM-Santa Rosa), Fundacion Centro di Pesca Hadicurari, Directorate of Infrastructure and Planning (DIP), Directorate of Shipping Aruba (DSA) and the Harbour Master.

⁸ Aruba Tourism Authority (ATA), Aruba Hotel and Tourism Association (AHATA), Flora and Fauna Protection Commission, Aruba Marine Mammal Foundation, TortugAruba, Aruba Conservation Foundation, ScubbleBubbles and Aruba Birdlife Conservation.

⁹ These can be found by searching for 3884 at www.commissiener.nl.

¹⁰ This format contains the content requirements of an EIA for projects in Aruba, see Appendix 1 of the EIA.

¹¹ EIA, p. 13.

Next, at the request of the Aruban government, the NCEA reviewed the EIA against international best practice, as expressed in the World Bank's IFC Performance Standards¹². These are internationally recognised standards for implementing projects sustainably. They describe how risks and impacts of projects can be identified, prevented and mitigated. They also provide guidelines for public participation and disclosure of information by the project's initiator. The Kunming–Montreal Global Biodiversity Framework (2022) provides guidelines on possible actions to take if biodiversity is threatened by a project. Aruba subscribes to this Framework. The review against these standards and the Biodiversity Framework is in chapter 4 of this advisory report.

3 NCEA's recommendations concerning the EIA explained

3.1 Utility, necessity and feasibility of the project

3.1.1 Utility and necessity: particularly economic diversification

In discussions with external stakeholders, the NCEA heard concerns about the project's usefulness and necessity and the proportion of Aruba's residents and businesses that will benefit from the project.

The EIA states that the project will contribute to economic diversification in conjunction with strengthening food security (Annex 37, section 1.0). The NCEA notes that local food security will be strengthened only for the upper tier of society and economy (mainly luxury restaurants and tourism sector). It is relatively expensive to farm Northern red snapper, and the positive effects on Aruba's economy will occur mainly because most of the fish produced will be exported to the United States and Europe, with a smaller portion going to Aruba's affluent tourism sector. Because of this specific market focus, farming Northern red snapper will not contribute to food security in all segments of Aruba's population.

The NCEA recommends that the authority take this into account when evaluating the project's utility and necessity.

3.1.2 Feasibility and environmental impact: a step-by-step build-up is essential

For commercial reasons, Petros proposes scaling up the project to a production volume of 2,000 tons per year, starting from the fifth year. However, the NCEA is of the opinion that both the project's feasibility and the actual environmental impact are difficult to predict, as explained below.

¹² See [Performance Standards on Environmental and Social Sustainability | International Finance Corporation \(IFC\)](#).

Some uncertainty surrounds the project's feasibility

The feasibility of this project is difficult to predict because of uncertainty related to the following aspects:

1. **Scale.** Northern red snapper is not yet being farmed on a commercial scale elsewhere, which makes the financial and practical feasibility of the project uncertain;
2. **Maintainability of Northern red snapper in cages in Aruban waters.** Because no empirical data is available, it is unclear whether Northern red snapper will do well in cages in Aruban waters – for example, given the maximum water temperatures. Its distribution area is almost exclusively north of the Caribbean Sea. In the Caribbean Sea, the Caribbean red snapper is the more dominant species.^{13,14} Moreover, it is also uncertain whether a bottom predator like the Northern red snapper is suitable to be grown in the pelagic environment of a cage. In addition, measurements by Petros show that for much of the year the current velocity appears to be very high for farming this species.¹⁵

A step-by-step build-up is essential, also because of the uncertain environmental impact

The NCEA appreciates the research already conducted by Petros and the aquaculture expertise Petros brought in. Nevertheless, it is difficult to predict how a fish species not previously produced on this scale will fit into this new farming environment. In addition, there is some uncertainty about the actual impacts, particularly on the marine ecosystem.¹⁶ In the case of similar projects and uncertainties elsewhere in the world, experiments are first conducted before possible upscaling, and during the first years of operation specific decision moments are built in, at which the competent authority makes a decision on scaling up on the basis of interim monitoring and evaluation.

The NCEA considers a step-by-step build-up using go/no go decision moments, monitoring and evaluation to be essential here. This is also important because in its discussions with stakeholders from the tourism, fisheries, nature and environmental sectors, the NCEA heard concerns about environmental and economic impacts. The NCEA therefore recommends that a decision moment on scaling up be included after the first phase of the project. It also recommends that the decision on whether or not to scale up annual production to 2,000 tons should be based on thorough systematic monitoring and evaluation of the first phase, which

¹³ Compare the distributions of *L. campechanus* and *L. purpureus*.

¹⁴ Sources mentioning Northern red snapper in locations south of Cuba most likely involve strays (perhaps seasonal) or possibly Caribbean red snapper, which is morphologically difficult to distinguish from *L. campechanus*. While the species distinction is not great (Da Silva et al. 2020), it is likely that *L. purpureus* is better adapted to conditions off Aruba. Sources: Robertson D.R. & J. Van Tassell 2023. Shorefishes of the Greater Caribbean: online information system. Version 3.0 Smithsonian Tropical Research Institute, Balboa, Panamá; Da Silva, R., C. del R. Pedraza-Marrón, I. Sampaio, R. Betancur-R, G. Gomes & H. Schneider 2020. New insights about species delimitation in red snapper (*Lutjanus purpureus* and *L. campechanus*) using multilocus data. *Molecular Phylogenetics and Evolution* 147, 106780.

¹⁵ The 'Sustimar Remote Site Characterization Report' (Innovasea, September 2021) presents data showing that at the preferred site the average flow rate outside the mesh is 0.78 m/s (0.41 – 1.23 m/s for 85% of the time) and that for 95% of the time the flow exceeds 0.5 m/s. This measured flow appears to be much higher than the desired flow rate of no more than 0.5 m/s mentioned in the preceding 'Sustimar Remote Site Selection' report (Innovasea, Feb. 18, 2021): in that report it is stated that the red snapper grows optimally at 0.1 m/s and that although, in principle, a flow of 0.5 m/s is not a problem, such a greater velocity can cause stress and fatigue for prolonged periods.

¹⁶ The findings in the EIA on impacts to the marine environment are based in part on assumptions and experience from other parts of the world, combined with some data available from around the proposed offshore project site. It is therefore not entirely certain what environmental impacts will actually occur.

should include, for example, impacts on marine life and biodiversity at different distances from the fish cages and initial insights into the feasibility of fish farming.¹⁷

Incidentally, the NCEA understands from Petros that the primary reason for choosing to farm Northern red snapper is export to the United States, as this species is the only one recognised as red snapper there and thus is the most profitable. At the same time, Petros does not rule out export to Europe. This, combined with the aforementioned uncertainties, may make it more logical to farm Caribbean red snapper in Aruba waters. Therefore, the NCEA recommends that the choice for Northern red snapper be well substantiated. See also section 3.5.3 of this advisory report.

3.2 Overall view of the EIA's quality and completeness

In this and subsequent sections, the NCEA elucidates its conclusions on the quality and completeness of the EIA and gives recommendations about supplementing the information in the EIA. These recommendations are included in a text box. The NCEA believes that it is crucial for these to be implemented to enable the ministers of Aruba to take full account of the environmental interests in their decision-making.

Existing environmental pressures on land and sea are mostly well depicted

The NCEA appreciates the obvious efforts invested in preparing the EIA. For example, onshore and offshore surveys were conducted to gather environmental information and information was obtained from various government and civil society organisations. The EIA covers almost all environmental topics relevant to the project and contains almost all the essential components of an EIA. As a result, the picture of the project's environmental impacts and the mitigation measures available is already reasonably complete.

The EIA contains an outline of the state of Aruba's marine ecosystem. The results of the field surveys are clearly presented, especially for the marine environment. The methods used for sampling the water and sea bed and determining marine depth are in accordance with scientific standards. Current environmental pressures on land are also mostly well depicted by traffic counts and noise and air quality measurements. A positive feature is the detailed overview of mitigation measures ('Mitigation Management Plan') in Annex 33 of the EIA.

For the onshore site, insufficient insight is given into the design and various components of the project and their environmental impacts (impacts at an annual production volume of 2,000 tons of fish per year, for example: see section 3.3 below), and wastewater treatment capacity (section 3.4 below). Furthermore, important information on cumulative environmental impacts on land is missing (section 3.5.1 below). In addition, information on the impacts on the Rooi Bosal and through it the impacts on the mangroves and lagoon at Barcadera is incomplete (section 3.5.2 below). The same applies to impacts on the marine ecosystem (section 3.5.3 below).

¹⁷ For specific recommendations on monitoring, see section 3.6 of this advisory report.

Culture system, energy use and solid waste reuse clearly described

The information provided more recently by Petros gives a sufficiently complete picture of the design of the marine culture system, energy use and possible solid waste reuse.¹⁸ On the positive side, Petros intends to apply the Best Aquaculture Practices and Aquaculture Stewardship Council criteria. This certification will result in two complementary quality labels for the final product, which will be communicated to consumers, governments and non-governmental organisations. The environmental impacts on the total production chain are not described in the EIA itself but will have to be stated in order to be able to use these quality labels (see also chapter 4 of this advisory report).

The environmental reasons behind the choice of the offshore location are clear to follow

The EIA states that the proposed offshore project site lies eight kilometres west of the coast of Aruba and is approximately 0.84 km² in size. The sea here is approximately 85 to 95 metres deep. The EIA also states that this location was chosen based on information about economic activities, maritime traffic, telecommunications infrastructure and the environment. The choice of this site was coordinated with the Aruban government, according to the EIA.¹⁹

From a conversation with the Directorate of Shipping of the Aruban government the NCEA understood that formal approval for the offshore site would not yet be given. The NCEA cannot assess the degree of coordination between Petros and the government. However, it does consider that from an environmental perspective, the narrowing down to the preferred location is clearly described in the information supplemented by Petros in Appendix 37 of the EIA, where it is clearly described how the environmental situation played a role in the choice of this site.²⁰

3.3 Description of the overall project and environmental impacts

An important basis for an EIA is the description of the proposed project's intentions – all its facets. Without a clear description of these, the environmental consequences cannot be described in a traceable manner.²¹ The EIA describes both the construction and use phases of the project, offshore and onshore.²² For example, it explains that the on-land part of the project will consist of a hatchery, a processing plant and a pier. At sea, the project will consist of four fish cages in the first phase, and in the second phase these will be increased to sixteen.

Appendix 37 of the EIA describes the transport movements required during the operational phase. These include 'stocking' (transport of fish from the land site to the fish cages), 'harvesting and processing' (transport of mature fish from sea to land) and 'shipping' (sea, land and air transport of the processed fish to customers). The movements also involve transportation between the land and sea sites for daily operations such as delivering fish feed.

¹⁸ Note that the NCEA was given access to information on these sections that had been designated confidential by the competent authority and not included in the public version of the EIA.

¹⁹ EIA, pp. 28–29.

²⁰ The NCEA has seen information on the choice of offshore location designated confidential by the competent authority and not included in the public version of the EIA.

²¹ See also section 3.2 of DNM's EIA format.

²² EIA, section 5.3.

3.3.1 Description of components of the project and their environmental impacts

The NCEA finds that the description of the project's components is insufficiently complete and so does not substantiate the environmental impact. More information is required on the following five points:

- **Location and layout of the on-land component of the project.** An impact assessment is possible only if the details of the project location are correctly described and the project site layout, plan area and boundaries are depicted accurately. However, during its site visit on 21 January 2025, the NCEA found that the map of the project site and plan area on land included in the EIA was out of date.
- **Processing process (odour and noise).** Appendix 37 in the EIA contains a detailed description of the onshore processing process. However, this description does not describe possible sources of noise and odour pollution within this process. The Mitigation Management Plan (MMP, Appendix 33) does mention measures to prevent noise emissions, but because the relevant noise sources are not described, the relationship between mitigation measure and effect is not clear. Odour is rightly named as a relevant aspect in the EIA but does not appear later in the MMP or in the Environmental Monitoring Plan (EMP, Appendix 34).
- **Supply and discharge of water for the hatchery.** It is not indicated how water for the hatchery will be supplied from the Barcadera lagoon,²³ the volume of water involved, how much will be discharged and what the environmental effects of this will be.²⁴
- **Cleaning and maintenance of vessels.** Not indicated is how pollution of the lagoon is prevented when cleaning and maintaining vessels.
- **The pier and its anchoring.** The pier and its anchoring may have effects on the marine ecosystem, but these have not been described. Moreover, it has not been indicated whether the *Ruimtelijk Ontwikkelingsplan met Voorschriften* (Spatial Development Plan with Regulations) allows for a pier to be constructed at this location and used by vessels.
- **Transport movements.** The EIA still lacks an overview of transport movements over the pier and public roads and a description of the 'stun and bleed process'²⁵ aboard the vessels. The frequent transport may have environmental impacts that are part of the project (greenhouse gases, noise) but these are not described in Appendix 37. Electric-powered vehicles and vessels would be less polluting.

The NCEA recommends that, prior to the decisions on the project's permits, the EIA supplement the descriptions of the project with

- up-to-date maps of the layout of the project site on land and the plan area, including boundaries;
- and with descriptions of relevant odour and noise sources within the onshore processing process;
- how water will be supplied to the hatchery, the volume of water involved, how much will be discharged and what the environmental impact of this is likely to be;
- how pollution of the Barcadera lagoon will be prevented during the cleaning and maintenance of vessels;
- the location and anchoring of the pier and environmental impacts;
- transportation movements over the pier, water and public roads, and the environmental consequences of this transportation.

²³ Between Barcadera harbour, Palm Island Key, Parkietenbos Key and the Barcadera coast.

²⁴ The volume of water is likely to be limited, but the EIA does not specify this.

²⁵ The process by which farmed fish are killed aboard ships.

3.3.2 Quantitative picture of environmental impacts after scale-up

The NCEA infers from the EIA that the environmental impacts have been determined for the first phase of the project. Given that it is explicitly intended to scale up the project in the second phase to a production volume of 2,000 tons per year, and because this figure is essential for profitable operations, a complete picture of the environmental consequences of the intended upscaling is needed now. Unless these consequences are mapped out now, there is a risk – both for the competent authority and for the project initiator – that it might only become apparent that the second phase is unacceptable after the first phase has been completed.

The NCEA recommends augmenting the EIA with quantitative estimates of the environmental impacts of the second phase of the project before any decisions are made about the project's permits.

3.4 Wastewater treatment options

The primary goal of the project is to achieve an advanced and sustainable form of aquaculture. Petros aims to apply proven techniques for sustainable fish farming. The project focuses on responsible resource management, farming methods with low environmental impact and the use of advanced technologies to ensure the ecological integrity of the marine environment.²⁶ This EIA does not compare options to achieve those goals, yet the NCEA sees opportunities for the project to be operated with less wastewater.

Section 3.5.3 of this advisory report describes that the marine ecosystem around the project site on land is highly vulnerable and that the quality of the coral reef is deteriorating significantly. This degradation is due in part to sewage and nutrient discharges to the sea.

Wastewater goes to Parkietenbos STP for treatment

The EIA describes that wastewater from this project will be conveyed to the STP in Parkietenbos (Barcadera district).²⁷ Appendix 37 then states that the STP will have sufficient capacity in the future to handle the wastewater from the project. This is substantiated by an email from Aruba Wastewater Sustainable Solutions (AWSS, which operates the STPs, among others).

Insufficient substantiation of STP capacity, significant risk to environment and health

The email in Appendix 37 shows the positive intention from AWSS to facilitate the project by, among other things, expanding the capacity of the STPs. However, it has not been demonstrated that the intended expansions (1) have been formally approved and (2) fit within the intended operation and scaling up of Petros as well as with the other developments on the island. This is important, to avert the risk that more untreated wastewater will enter the sea and result in significant impacts on the marine ecosystem, including the coral reef and mangroves, and on public health.

²⁶ EIA, para. 5.4.

²⁷ EIA, para. 5.3.1.4 and para. 7.1.8.

An alternative is to treat the wastewater at the project site itself, thereby eliminating the need to route wastewater to one of the STPs. This adequately treated water can then be discharged into the sea

The NCEA recommends that, prior to the decisions on the project permits, the EIA demonstrate that the STPs have sufficient capacity to treat wastewater at the project site, now and in the future. In addition, it recommends exploring options for treating wastewater within the project if the STPs have insufficient capacity. The environmental impacts of these options should be considered and compared with the scenarios already described.

3.5 Environmental impacts

A core component of an EIA is the description of the significant environmental consequences of the overall project. The NCEA notes that in addition to the points mentioned in section 3.3,²⁸ there are three environmental themes for which the EIA does not provide sufficient relevant information to allow the environmental interest to be fully considered in the decision-making process.

The NCEA recommends that, prior to decisions being made on the project's permits, the EIA is augmented with further details on the following environmental impacts:

- Cumulative environmental impacts on land (noise, odour, air quality), see section 3.5.1.
- Terrestrial flora and fauna (including the current situation and the representativeness of the field surveys and impacts on the Rooi Bosal and adjacent mangrove vegetation) and mitigation measures, see section 3.5.2.
- The marine ecosystem (impacts on coral, protected sea turtles and marine mammals, including dolphins) and the choice of Northern red snapper in light of the potential harm that farming this species could cause to the Caribbean red snapper, see section 3.5.3.

3.5.1 Cumulative environmental impacts on land

The EIA states that noise levels will increase as a result of the project, as will impacts on air quality. However, it does not describe the noise sources and what the total noise levels and air quality in the surrounding area will be. This is the total environmental impact of all developments in the surroundings taken together. From Appendix 37 of the EIA it is clear that Petros is taking measures to meet applicable standards and to prevent impacts as much as possible. However, what result these measures will have is not substantiated. Nor is it clear what maximum noise levels and impacts on air quality are cumulatively acceptable,²⁹ or what effect the project will have on traffic flows.

²⁸ Environmental impacts from the location and anchoring of the pier, from vessel movements and transport movements over the pier and public roads, and from the second phase of the product (scaling up to a production volume of 2,000 tons of fish per year).

²⁹ The EIA assesses noise using the World Bank IFC Guidelines and air quality using World Health Organization standards. However, the air quality standards from 2005 used in the EIA are outdated (the most recent standards date from 2021). Moreover, the standards apply to environments where people reside. It is not clear whether that is the case here.

The EIA also mentions odour nuisance. However, although it states that mitigating measures will be taken,³⁰ it does not give details. The measures are not elaborated in scenarios 1 and 2 and in the Mitigation Management Plan (Appendix 33), and therefore, the project's effects on the surroundings are not clear.

3.5.2 Terrestrial ecology

Description of current situation is both not current and incomplete

The representativeness of the field surveys for terrestrial ecology is not described in the EIA. This is especially relevant now that a rock crusher appears to be located at the current site of the onshore processing plant, as the NCEA noted during its site visit.

In addition, the flora and fauna site survey data included in the EIA are both insufficiently clear and incomplete. For example, in the immediate vicinity of the plan area, at least one occupied nest of the 'shoco' (Aruban burrowing owl, *Athene cunicularia arubensis*) is known. From the photos in Appendix 7 of the EIA and recent aerial photos it appears that the plan area is a suitable nest location for this species. However, the EIA does not mention the likelihood or actual presence of the owl. The NCEA cannot comment further on this, as the underlying field studies are not available.

Impacts on Rooi Bosal and opportunities to mitigate effects

The EIA does not address potential adverse effects on nearby vulnerable vegetation. The plan area lies east of the Rooi Bosal, a coastal gully through which rain and groundwater from the plateau drain to the sea. The xeric woodland and xeric shrub vegetation in Rooi Bosal contains significant numbers of species protected in Aruba.

Mangrove vegetation grows at the mouth of Rooi Bosal. Both the vegetation and individual mangrove species are locally protected. Mangroves themselves and the plant and animal species living in mangrove ecosystems are sensitive to water pollution. The Rooi Bosal also has an important function in collecting sediment transported in rainwater runoff. This function is particularly important during very wet periods. Under the influence of climate change, these periods will occur more frequently.

If the shrub and forest vegetation in this gully and the mangroves around the estuary disappear due to damage and/or pollution, significant amounts of water, wastewater and sediment may wash into the sea. This aspect has not been investigated in the EIA³¹ and hence measures to prevent negative impacts have not been discussed. One such measure could be to plant a buffer of native shrubs and trees along the eastern edge of the gully. Another option would be to build a concrete retaining wall to prevent any saltwater or wastewater leaking from the hatchery and fry farm and entering the gully.

Other impacts on flora and fauna

The NCEA notes the following shortcomings regarding the project's impacts on animal species and areas:

³⁰ EIA, p. 77.

³¹ The Barcadera Business Park is next to the sea. The *Ruimtelijk Ontwikkelingsplan met Voorschriften* (Spatial Development Plan with Regulations) stipulates that its construction and use may not have a negative impact on the values and qualities of the sea. Negative impact can occur, for example, through dust falling into the sea, erosion or artificial light.

- The EIA does not address impacts on migratory species, especially bird species.
- The EIA states that the project site on land may not affect the wetlands protected as an Aruban National Park under the Ramsar Convention. But on 10 November 2023, the Minister of Transportation, Integrity, Nature and Elder Affairs announced that almost the entire southwestern coast of Aruba had come under the protection of the treaty.³² This being the case, the EIA should also mention that the coastal area around the project site is a wetland and that measures are needed to protect it.³³ No specific measures have been described.

3.5.3 Marine ecosystem

Aruba marine ecosystem under pressure, caution required

A characteristic of Aruba's marine environment is its clear oligotrophic (i.e. nutrient-poor) and oxygen-rich seawater. Locally, the sandy seabed is home to organisms such as the filter feeders feather stars (*Crinoidea*) and sea pens (*Pennatulacea*). In the shallow coastal waters, seagrass fields can be found. Coral reefs are the basis for rich biodiversity. Corals form through an association (a symbiosis) of an animal (polyp) and plant (alga) component, and require clear, translucent water in order to be able to lay down a calcium carbonate skeleton. If the environment contains too many nutrients, the symbiosis comes under pressure: the corals become overgrown by cyanobacterial mats.

The ecosystem in Aruba's waters has been under strong pressure in recent decades. Among the stresses it has to cope with are: the rise in seawater temperature due to climate change; the waste resulting from high numbers of water recreationists; the overflow of untreated wastewater from the Bubali and Parkietenbos STPs; and sediment-laden runoff. The existing coral reef is very vulnerable and has been deteriorating for decades, as evidenced by the increasing bleaching of corals, the occurrence of coral diseases and the proliferation of biomats. Therefore, great caution is needed when allowing activities that could harm the coral.

Effects on coral insufficiently elaborated

Fish in cages produce manure that passes through the mesh and spreads into the sea. If not dispersed by currents, this organic material can accumulate. Where this occurs, it affects benthic biodiversity. In the EIA, it is stated that the water changes in the fish cages will generally be large³⁴ and that the concentration of manure will dilute rapidly due to currents and turbulence. As a result, there will be no measurable increase in concentration even at a short distance (50 to 100 metres) from the cages, and, consequently, the impact on the marine ecosystem in the immediate vicinity of the cages will be limited.

Appendix 37 to the EIA indicates that at the time the measurements were made, the prevailing direction of current flow was not towards Aruba. However, the NCEA notes that the flow of seawater at the project site varies in strength and direction throughout the year and that the natural baseline is clear, oligotrophic water. The EIA lacks a complete picture of the impact of the observed seawater flow on the waste escaping from the cages (uneaten feed, manure, remains of fish, cage fouling) in relation to the poor condition of Aruba's coral.

³² See [Grote uitbreiding beschermde wetlands Aruba onder het Ramsar Verdrag – WUR](#).

³³ EIA, p. 76.

³⁴ EIA, para. 6.2.4.2.

An additional point is that the total emissions from the fish cages at sea will be significant. At the envisaged production of 2,000 tons per year in the second phase, these emissions will be equivalent to the emissions produced by about 20% of the population of Aruba (i.e. about 20,000 to 25,000 people).³⁵ The EIA does not clarify what the total emissions will be by comparison with the existing situation in the Caribbean Sea and Gulf of Mexico. Some parts of the Gulf of Mexico already become deoxygenated during certain times of the year, with very negative consequences for the marine ecosystem. So far, similar oxygen-free conditions have not occurred around Aruba, but there are locations at risk of this happening, for example at the Bubali STP overflow. In addition, the deterioration of the coral reef has reached a point at which it is doubtful that the coral can withstand any further load.

The EIA is correct to say that dilution limits the environmental impact *per unit area*, but does not describe how the total emissions relate to the existing total load (industry, housing, agriculture combined) in the marine environment and to the (long-term) risk that parts of the Caribbean Sea will become deoxygenated and coral will deteriorate further.

Impact on sea turtles and marine mammals not worked out

Nature and environmental organisations expressed their concerns to the NCEA about the project's impact on sea turtles and marine mammals, including dolphins. Appendix 37 to the EIA states that there will be no impacts on these species, as evidenced by aquaculture experiences in Hawaii and Panama. At those locations, no fatal incidents among sharks, birds and marine mammals have been reported.

The NCEA considers this assessment of environmental impact to be inadequate. The fact that no victims have been reported elsewhere in the world does not guarantee that victims will also be absent from the proposed project site at sea. In order to form a picture of possible risks it is necessary to know the presence of sea turtles and marine mammals at and around this site. Information on the species in question is available from the nature and environmental organisations at Aruba. Based partly on experience elsewhere and on the specific attractiveness of the fish cages proposed for use in Aruba, the NCEA recommends that after this information has been assembled, an expert is called in to estimate the project's potential impacts.

Choice of Northern red snapper in light of the risk of harming the Caribbean red snapper

As noted earlier, the areas where the Northern red snapper and Caribbean red snapper occur overlap. The centre of gravity in the distribution of the Northern red snapper is in the Gulf of Mexico, whereas the centre of gravity in the distribution of the Caribbean red snapper is in the Caribbean Sea. It is not entirely clear whether the Northern red snapper recorded around Aruba is a native species (see section 3.1.2 of this advisory report). If the Northern red snapper is not native to Aruban waters and it somehow escapes from the project's cages, the Caribbean red snapper could suffer harm.

The risk of such harm has not been elaborated in the EIA. The NCEA therefore recommends substantiating (using data and expert judgement) the extent to which the Northern red snapper actually occurs in Aruban waters and elaborating on the information and assumptions that allow the claim that harm to the native species to be dismissed. The latter

³⁵ According to the NCEA's calculations.

information should include details on the source location of the hatchery's juvenile broodstock. If harm to the Caribbean red snapper cannot be ruled out, the NCEA recommends that the EIA describe the risks of farming Northern red snapper to the Aruban ecosystem. The choice of this species must be supported from an environmental perspective.

3.6 Environmental management system, monitoring plan and decision moments

Due to uncertainties in the project's environmental impact and feasibility, monitoring and evaluation of the project's feasibility and impact are essential (see section 3.1.2 of this advisory report). What is required is an environmental management system³⁶ drawn from the IFC Performance Standards (see chapter 4 of this advisory report).

Environmental impact monitoring and monitoring of the operation of the project site on land are included in Annexes 34 and 35 of the EIA. However, the monitoring is not yet SMART.³⁷ For example, the indicators to be used for monitoring have not always been mentioned. Neither is it clear what the consequences of certain monitoring results will be: they might include, for example, Petros taking contingency measures to mitigate unforeseen environmental impacts. This means that target and warning values for the indicators need to be defined.

In addition, it is unclear in the EIA whether the competent authority must still explicitly decide on scaling up to 2,000 tons per year in the interim, and on which criteria and monitoring results it will base its decision. The NCEA recommends incorporating a decision moment about the scaling-up: see section 3.1.2 of this advisory report.

The NCEA recommends that, prior to making the decisions on the permits for the project, the EIA provide more insight into the decision-making chain. Details should be given on how the development of the environmental effects will be monitored and managed in an environmental management system. Insight should be provided into the totality of uncertainties in the EIA and how they will be dealt with. Make the monitoring design SMART and indicate what measures Petros has in reserve to mitigate unforeseen effects

3.7 Summary of the body of environmental information

Decision-makers and commenters first read the summary of the EIA, and therefore, this section deserves special attention. The summary should be readable as a stand-alone text, even for the less-informed reader, and should accurately reflect the content of the EIA. The summary of this EIA is clear on its own and contains the main conclusions of the EIA. However, the supplementary information added to Appendix 37 following the subsequent

³⁶ Called 'Environmental and Social Management System (ESMS)' in IFC Performance Standard 1, where it is stated that 'The ESMS will incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.'

³⁷ SMART: Specific, Measurable, Acceptable, Realistic, Time-bound.

discussion between the NCEA and Petros has made it difficult for readers to get a complete picture of the environmental impacts and mitigation measures.

The NCEA recommends not making any decisions about the project's permits on the basis of the EIA until the EIA has been amended and summarises the body of environmental information in a way that is understandable to the less-informed reader. The amended EIA should include an overall picture of the environmental impacts and mitigation measures to be taken.

3.8 Methodological concerns for follow-up

The NCEA does not deem it necessary to amend the account of the methodology contained in the EIA under review, but it does wish to highlight three points and from them derive points of attention for future environmental impact reports in Aruba.

- **Systematic comparison of scenarios.** In terms of presentation and design, the EIA would have been stronger if it had provided a more systematic comparison of scenarios 1 and 2, especially in the text. Appendices 31 and 32 of the EIA contain insightful tables that could have been used for this. And it would have been helpful to add explanatory text to each environmental theme in the main report.
- **Distinction between coarse and fine particulate matter.** The distinction between coarse and fine particulate matter is inconsistent in the EIA. Coarse particulate matter, which comprises all particulate matter, is visually perceptible. It is generated during construction work and dry bulk handling and often causes nuisance and impairs vision. Mitigation measures for this are semi-permeable dust screens and filters in the exhaust systems. Fine particulate matter (anything smaller than 10µm) is not visually perceptible and results from, among other things, combustion, the production process and traffic. This fine dust enters the respiratory tract, so impacts health. A better distinction between these forms of dust would contribute to a more consistent impact assessment.
- **Description and motivation of choice of preferred option.** In the Netherlands, project EIAs like the one reviewed here also describe the preferred option and its environmental consequences. This is the option Petros has proposed, partly on the basis of the EIA, including mitigation measures. Insight into the preferred option provides important information for decision-making and the environment because it gives a picture of the project that will be realised in principle. In this case, that would have entailed describing the preferred option for the project on the basis of scenarios 1 and 2 and the environmental consequences of phase 2.

4 Assessment against IFC Performance Standards

The previous chapters have covered topics that are also central to the IFC Performance Standards. In this chapter, the NCEA highlights a number of topics on which these standards provide specific requirements or guidance. To meet the standards, the project and EIA would need to supplement the information listed below.

The standards also include stakeholder involvement and disclosure obligations. The NCEA has not conducted a full review of these aspects because it is not possible for it to fully

assess how stakeholders were actually involved and because the method of disclosure was not clear at the time of EIA review.

Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts.

- **Extreme situations and their management.** The EIA lacks a risk analysis of extreme situations that may occur (for example, hurricanes ship collisions, large spills from the land-based site) and a management plan to deal with them.
- **Consequences (opportunities and risks) for the current fishing industry.** The consequences in terms of economy and employment are presented qualitatively in Appendix 37 of the EIA, but could be elaborated quantitatively. Two other aspects that are also specifically relevant to the fishing industry but that have not been dealt with in the EIA are (1) a possible increase in competition and (2) the risk that farmed fish will become genetically different from wild counterparts after a number of generations. If farmed fish escape from the fish cages, the fishery industry may be affected: the escaped fish may mate with wild red snapper, changing the genetic diversity of the wild population(s). A map of current fishing areas would be a helpful addition to the impact assessment.
- **Attraction of predators (sharks); risk to tourism.** In discussions with representatives of the tourism industry, the NCEA learned of concerns that the fish cages will attract predators, particularly sharks, thus increasing the likelihood that sharks will also show up at the beaches. The EIA refers to the experiences of projects elsewhere in the world and argues that predator attraction to the cages will be limited or absent. Nevertheless, the risk at this specific location cannot be dismissed at this time. The NCEA recommends giving more details on experiences elsewhere in the world in the EIA, by documenting and presenting them substantively.
- **Measures for 'doing good'.** In projects that may reduce biodiversity it is useful to investigate compensatory measures from the perspective of the principle of 'do good' derived from the Global Biodiversity Framework³⁸. Measures that Petros could consider supporting are initiatives such as marine ecosystem restoration and tree planting for CO₂ sequestration.
- **Animal friendliness.** The EIA contains no information on how stress and pain will be prevented during the handling of the fish, including during live transport and slaughter. Nor does it contain information on how fish disease will be averted. In this respect, it would be helpful to acquire the Aquaculture Stewardship Council label and Best Aquaculture Practices label. In any case, it is important to have good working protocols in place that minimise risk of disease.
- **Participation and communication, and structural consultation with stakeholders.** In the EIA, Petros has clearly explained its positive intentions regarding transparency, participation and communication.³⁹ Nevertheless, in its discussions with stakeholders, the NCEA encountered great uncertainty among external stakeholders about the project and its impacts, and this uncertainty is partly responsible for resistance among some stakeholders. Among the reasons for this is the stakeholders' perception that not all information is shared with them and that their concerns are not explicitly addressed.
- **Fish feed in the chain.** To produce 2,000 tons of fish per year in the long term requires a large amount of imported fish feed. One promising way to make the environmental impact in the value chain more sustainable is through the choice of feed ingredients. The

³⁸ See [Kunming-Montreal Global Biodiversity Framework](#) (2022).

³⁹ See also the description of the 'stakeholder session' in Appendix 37 of the EIA.

NCEA recommends that the EIA include a description of the rough composition and origin of the fish feed and the environmental impact of feed production.

- **Climate impact per kilogram of fish produced.** For the purpose of communicating the climate impact of the project, it is recommended to show how many CO₂ equivalents the company will generate per kilogram of fish produced.
- **A rough idea of the exit strategy** should be provided, for the event that the project has to be dismantled. A fund can be established for this purpose.

Other points have already been addressed in chapter 3 of this advisory report.

Performance Standard 2: Labour and Working Conditions

- The EIA has limited discussion of employee health (noise exposure, air quality). This could be elaborated further: for example, by considering exposure to emissions of fine dust (particulate matter <2.5µm) and combustion gases from the adjacent power plant and stone processing.

Performance Standard 3: Resource Efficiency and Pollution Prevention.

This point was addressed in chapter 3.

Performance Standard 4: Community Health, Safety, and Security.

This point was addressed in chapter 3.

Performance Standard 5: Land Acquisition and Involuntary Resettlement.

This point is not relevant to this project.

Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.

This point was addressed in chapter 3.

Performance Standard 7: Indigenous Peoples

This point is not relevant to this project.

Performance Standard 8: Cultural Heritage

This point is not relevant to this project.

ANNEX 1: Project data for interim review of the EA-report

Review by the NCEA

The NCEA consists of a working group of experts. This working group reviews the EA-report to ensure it includes the required environmental information and to verify its accuracy. The NCEA will determine whether any missing or inaccurate information qualifies as essential. This applies when, in its judgement, additional information might result in different considerations. In such cases, the NCEA recommends ensuring that the missing or corrected information is made available before the decision is finalised. The working group visited the area that is susceptible to potential environmental consequences, to gain a better understanding of the situation. Further details about the [NCEA](#) and its [procedures](#) can be found on our website.

Composition of the working group

This project's working group consists of:

Drs. Simone Filippini (chair)

Dr. Godfried van Moorsel

Dr. André van Proosdij

Dr. Marc Verdegem

Ir. Paul van Vugt

Dr. Arend Kolhoff (technical secretary international)

Mr. Roel Silleviss Smitt (technical secretary Netherlands, pen holder)

Act (or acts) for which this environmental assessment report was drawn up and competent authority

Establishment permit (Minister of Economic Affairs, Communication, and Sustainable Development);

Construction permit (Minister of General Affairs, Innovation, Public Administration, Infrastructure, and Spatial Planning);

Nuisance permit (Minister of Justice and Social Affairs);

Exemption for flora and fauna (Minister of Transport, Integrity, Nature, and Senior Citizens).

Competent authority for the EA-procedure

Minister of Transportation, Integrity, Nature and Elderly Affairs.

Initiator decision on the open sea aquaculture project

Petros Aquaculture Operations.

Why is an environmental impact assessment being prepared for this project?

Aruba does not have regulations requiring an EIA for projects with significant environmental impacts. The ministers involved have decided to ask the initiator to prepare an EIA to support the permit applications.

Has the NCEA included public submissions and advisory reports in its own advisory report?

The NCEA has read all the views and opinions sent by the competent authority through to the 20th of January 2025. She has incorporated them into the advisory report, where relevant.

Stakeholder meetings during advisory trajectory

In the week of January 20, 2025, the NCEA has spoken to the Aruba Tourism Authority (ATA), Aruba Hotel and Tourism Association (AHATA), the Commission of flora and fauna protection, Aruba Marine Mammal Foundation, TortugAruba, Aruba Conservation Foundation, Scubble-Bubbles en Aruba Birdlife Conservation.

Where can I find the documents assessed by the NCEA?

The project documents used in the advisory report can be accessed by entering project number [3884](#) in the search field at www.commissiener.nl (in Dutch).

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