# Introduction

## Report Objectives

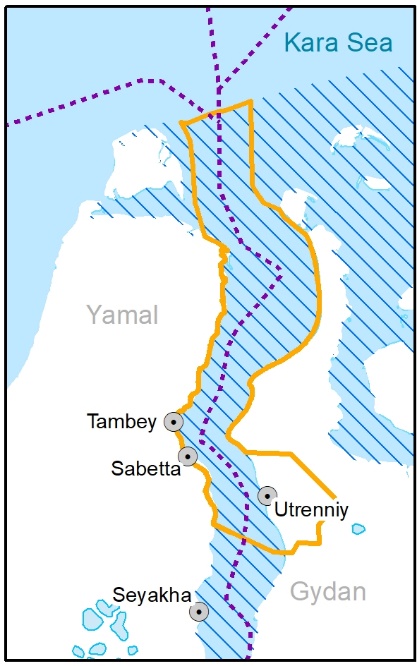
Дудов

This report is focused on identification of globally and regionally significant ecosystems and biodiversity components that match the “critical habitat” criteria set by the IFC Performance Standard 6 and that occur in the landscape/ seascape where Arctic LNG is located and could potentially be affected by the Project. Critical habitats are seen as constraints to project activities; their presence in the area of potential impact triggers the need to adopt special measures to avoid location of Project infrastructure or activities in those areas, to prevent or minimise impacts if avoidance is not possible, to restore damaged ecosystems/ populations and to offset any residual impacts. In addition, a net gain outcome is needed for any features with Critical Habitat. This report provides the basis for biodiversity conservation strategies and action plans within the Project’s area of influence.

## Arctic LNG 2 project and its predicted environmental impacts

The Arctic LNG 2 is a project in the sphere of hydrocarbons extraction, production and offloading of liquefied natural gas and stabilized gas condensate. The Project comprises three process trains for production 6.6 MTPA of liquefied natural gas each, and up to 1.6 MTPA of stabilised gas condensate. The combined capacity of the three LNG trains is 19.8 MTPA. The resource base for the Project is the Salmanovskoye (Utrenneye) oil, gas, and condensate field (OGCF) at the border of the Gydan and Yamal petroleum regions in the West-Siberian oil-and-gas bearing province.

The Project includes the following components:

1. Salmanovskoye (Utrenneye) OGCF Facilities Setup (well pads, power supply facilities, gas treatment facilities, water intake and treatment facilities, wastewater treatment and disposal facilities, SMCIW disposal site, helicopter pads, materials and equipment facilities, temporary accommodation camps, Emergency Rescue Centre, infrastructure, temporary facilities for the construction phase;

2. Construction of the GBS Plant for production, storage and offloading of liquefied natural gas and stabilised gas condensate (GBS with LNG & SGC storage facilities, topside including process modules, loading arms and power supply facilities, onshore facilities (flare system, Operations Control Complex, pipe racks, boiler plant, utilities, drainage channel);

3. Construction of the Utrenniy liquefied natural gas and stabilised gas condensate terminal, including

- Temporary berth structures;

- Early development facilities (approach channel, port water area, ALP-1 with a quayside, general-purpose berth, utilities, storage facilities);

- Operating phase facilities (ALP-2 with a quayside, port fleet berth, ice barriers, navigation safety systems).

Figure .: Project Area of Influence. Diagonal hatch indicates EBSA. Dashed line – Northern Sea Route

The main impact on marine ecosystems is expected to be due to propagation of polluting substances and physical impacts (warming effect, turbulence, suspension of sediments, underwater noise, transformation of the thermohaline structure, etc.) along the prevailing directions of flows - i.e. river flows, sea-water penetration, tidal and wind-induced flows. Sea transport will be used during construction and operation of the Project facilities, and the resulting increase of load on the navigation routes and port infrastructure can be considered as a source of direct, indirect and cumulative impacts. The development of hydrocarbons in Yamal and Gydan will lead to an increase in ship traffic The growth of ship traffic as cumulative impact which will continue in the Ob Estuary even without the participation of the Company will lead to noise pollution, the risks of ship strikes both in ice-covered and ice-free seasons and oil spills.

The Area of project Influence (AoI) is presented on Figure 1.1. The AoI has been agreed as the basis for ESHIA and planning with lenders and is limited to some extent by management control of the Project. The rationale for the AoI is presented in the “Project Area of Influence. Arctic LNG2 Project. Addendum to the ESIA”. Taking into account the wide connectivity of the arctic ecosystems it can be precautionary assumed that direct, indirect and cumulative impacts from the Project may spread beyond this area. Thus, the conservation planning for the Net Gain achievement and monitoring activities will not be geographically limited by AoI. The spatial scope of these actions will be determined in detail for each species or ecosystem separately within the framework of Biodiversity Action Plan.

The impact on terrestrial ecosystems is expected in relation to long-term and short-term land take/ habitat loss, compaction of soil, alteration of soil hydrology, noise, disturbance, light pollution, deposition of pollutants emitted to the air, activation of exogenous geological processes. Displaced husbandry activity will potentially lead to overgrazing and thus to tundra degradation and is considered to be an indirect impact. Impacts on bird populations in association with the airport are also possible (collisions with aircraft). Cumulative impacts associated with planning hydrocarbon development on Yamal and Gydan Peninsulas are possible. These effects potentially will be associated with light pollution leading a possible change in the migration routes of migratory birds and an increase in the pressure on tundra ecosystems due to displaced reindeer husbandry. Barriers to migration between the Yamal and Gydan Peninsulas may be created by shipping traffic and its effects on ice (considered to be a cumulative effect with increasing traffic activity during the ice period and climate change). This will potentially lead to further isolation of the isolated wild reindeer population of Schokalskogo island.

Переработать

## Key terms

Чужеродный и инвазивный – различная трактовка для наземных и морских экосистем

МНК – пожалуйста распиши про эфемерофиты, степень натурализации и пр.

NU b VKh – просьба дать обзор ключевых терминов для моря.

Все ключевые термины предлагаю свести в таблицу

Key terms and definitions after the above cited reference are presented in Table 1.

Table 1 Glossary: key terms and definitions[[1]](#footnote-2)

|  |
| --- |
| **Ecosystems** is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit. Humans are an integral part of ecosystems. Ecosystems vary enormously in size; a temporary pond in a tree hollow and an ocean basin can both be ecosystems |
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Инвазивные виды в понимании СД6 МФК – требования и ограничения к проекту. Дудов

## Limitations

# Assessment Methodology

## Overview

Основные логические шаги

Figure 2.1: Assessment flow chart

## Потенциальные пути заноса чужеродных видов

Существующая ситуация. Чужеродные виды рыб. СД

NU и VKh – опишите пожалуйста потенциальные пути заноса. Можно дать карту с трафиком в Сабетту

MNK – надо описать схему поступления диаспор с травосмесями. Какие еще пути есть – техника с немытыми колесами? Грязные ботинки и пр.

## Источники информации и их анализ

Надо очень подробно описать, откуда берем данные, как анализируем.

Table 2.1: Significance of the [Пример оформления таблицы]

| No. | Criterion | Significance | Description |
| --- | --- | --- | --- |
| 1 | Uniqueness or rarity | High | The area is the biggest estuary system in the Arctic, affecting the entire adjacent marine ecosystem of the Kara Sea. The huge river run-off has a great impact on the Arctic Ocean, influencing hydrology, ice regime and geochemistry. Some populations of semi-anadromous fish are particular to this area, i.e., Ob Sturgeon, but there are no endemic species of fish, seabirds or marine mammals. |
| 2 | Special importance for species development cycle stages | High | Estuaries are important staging areas for aquatic birds, important habitat for white fishes (feeding, migrating, wintering); the maritime zone, with recurring polynya, is an important spawning area for polar cod (*Boreogadus saida*), while the fast ice in the gulfs is a breeding ground for ringed seals. |
| 3 | Importance for threatened, endangered or declining species and/or habitats | Medium | Important summer feeding grounds for beluga whales (IUCN near threatened), important staging areas for long-tailed duck (IUCN, VU), velvet scoters (IUCN, VU) and Steller’s eiders (IUCN VU). Polar bears (IUCN VU) occur in the outer part of the area. |
| 4 | Vulnerability, fragility, sensitivity, or slow recovery | Medium | The dynamic hydrological regime acts as a buffer for many external impacts; animals such sea ducks and white fishes have long life expectancy and low reproductive rates, thus slow recovery rate; sea ducks and polar cod fry are particularly vulnerable to oil spills, while the estuarine ecosystem in general may be vulnerable to changes in the salinity regime caused by large-scale bar dredging for port construction |
| 5 | Biological productivity | High | Owing to high primary production at the frontal zones the area supports large stocks of freshwater and semi-anadromous fishes, aquatic birds and waterfowl |
| 6 | Biological diversity | Low | Biodiversity of the lower trophic levels is relatively low due to a variable hydrological regime and vast zone of brackish waters; however, there are remarkable gradients towards offshore areas while waterfowl and shorebirds are relatively diverse. |
| 7 | Naturalness | Medium | The Yenisei river estuary is rather pristine while Ob Gulf is already experiencing shipping traffic, geological explorations and onshore infrastructure construction in several points. Rivers bring considerable amounts of pollutants (on the Arctic scale) from their vast watersheds. |

The middle part of the Ob Estuary referred to as the Ob-Taz area (see Figure 2.6) is considered as a priority fishery conservation area (FCA) due to the high concentration of fish of many species during wintering and spawning, including Siberian sturgeon, which is listed as globally Endangered on the IUCN Red List (Matkovsky et al., 2014)[[2]](#footnote-3). [Примеры ссылок на литературу]

The above areas with high-value biodiversity components are shown in Figure 2.6.

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| --- | --- |
|  |  |

Figure 2.6: Water areas of the high environmental value in the Project area [Пример рисунка]

Надо описать весь подход к статистике. Какие пакеты в R используем

Нам надо придумать некую общую балльную оценку потенциальной значимости.

# Assessment Results

## Marine Ecosystems

### Ichthyofauna

Везде делаем краткие локальные выводы, чтобы из них собрать общее заключение

### Plankton

Potential alien species (with illustrations), with short ecological characteristics, potential

impact of introduction of each species (intersection with the trophic and spatial niches of the

local species). For benthic species – component of biofouling and/or existence of planktonic

larva. Take into account climate change.

### Benthos

### Conclusions

## Terrestrial Realms

### Plants

### Conclusions

# recommendations

**Monitoring recommendations: where (terminals, points of ballast water discharge) and**

**how often (plankton and benthos need different frequency of monitoring). Management**

**recommendations**

**Краткий текст, структурированный по объектам (планктон, бентос и пр.), сделаем общую таблицу со всех предложений**

# Conclusion

# Annex 1. LISTS with non-native species

1. International Finance Corporation’s Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources January 1, 2012 (updated June 27, 2019) and "Millennium Ecosystem Assessment". www.millenniumassessment.org. Archived from the original on 24 February 2018. Retrieved 28 April 2018 with addition [Вот так цитируется литература – при первом упоминании в сноску, далее (Автор, год) ] [↑](#footnote-ref-2)
2. A. K. Matkovsky, P. A. Kochetkov, B. V. Stepanova, S. I. Stepanov. Ecological rationale for the creation of a fishery conservation area and reduction of anthropogenic load on the ecosystem of the Ob-Taz estuarian zone // Fishery Sciene Bulletin. 2014. Vol. 1. No. 2. pp. 12-26. [In Russian] [↑](#footnote-ref-3)