Sakhalin Energy Investment Company Ltd.

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Biodiversity Action Plan

План действий по сохранению биоразнообразия

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DOCUMENT REVISIONS HISTORY

Rev.	Location of Change	*Brief Description of Change*
01	Throughout the document	This is the third revision of the document. The first two were published with different numbers and/or names: Biodiversity Action Plan (0000-S-90-04-P-7123-00) and Biodiversity Strategy and Action Plan 2019+ (1000-S-90-04-P0305-00) and are superseded by this revision. The changes made are to bring the document in full compliance with the requirements of the International Finance Corporation Performance Standard 6.

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1 EXECUTIVE SUMMARY

1.1 BACKGROUND OF THE UPDATE

Sakhalin Energy Investment Company, Ltd. (Sakhalin Energy, the Company) first issued its Biodiversity Action Plan (BAP) in 2008 (Russian version followed by the English one in 2009) to outline the overall process of biodiversity issues management in the Company with the main purpose to minimize potential adverse impact from Sakhalin Energy activities on biodiversity values.

There was no legal requirement for the development of the BAP, therefore the Company produced the Biodiversity Action Plan voluntarily recognizing the importance of biodiversity risks management and in response to the expectations of the Russian Federation, shareholders, international lenders and the public.

The Biodiversity Action Plan was developed with due consideration of the provisions of the Russian Federation environmental legislation and international industry good practice related to biodiversity conservation and ecosystem services management, in particular: *the National Strategy for the Conservation of Biodiversity in the Russian Federation*; *the National Strategy for the Conservation of Rare and Endangered Species of Plants, Animals and Mushrooms*; and the guidelines of *the International Petroleum Industry Environmental Conservation Association* (IPIECA).

The 2008-2009 version of the BAP mainly covered the Company's biodiversity priorities identified by the results of the international-approach *Environmental, Social and Health Impact Assessments* (ESHIA 2003, ESHIA 2005) and mainly described, in a systematic and verifiable manner, the Company's impact monitoring process and implementation of the mitigation measures to ensure no significant adverse effects on biodiversity priorities from Sakhalin Energy activities.

In 2012, the Company has voluntarily committed to comply with the *International Finance Corporation Performance Standards* (IFC PS), including PS6 *Biodiversity Conservation and Sustainable Management of Living Natural Resources*. The standard introduced the necessity to develop the *Critical Habitat Assessment* (CHA) and update the BAP based on the results of the CHA with the purpose to demonstrate achievement of the *net gain*[1] for the critical habitat values. The standard was supported by an updated *Guidance Note 6 (GN6: Biodiversity Conservation and Sustainable Management of Living Natural Resources, 2019*), providing further details on how compliance with PS6 could be demonstrated.

Therefore, the purpose of this BAP revision is as follows:

1) reflect summary results of the Critical Habitat Assessment undertaken by the Company in 2019 (1000-S-90-04-P-0381-00-E) ;
2) identify biodiversity priorities based on the results of the CHA and other documents and commitments in relation to biodiversity and ecosystem services as may be applicable;
3) outline the Company's conservation actions in relation to the identified biodiversity priorities;
4) demonstrate achievement of net gain for the critical habitat biodiversity priorities.

The Lenders' Independent Environmental Consultant (Ramboll) has supported the draft of this revision of the Biodiversity Action Plan and the final version of the Conservation Management Plan (CMP) for the Sakhalin Gray whale feeding aggregation. Ramboll was unable to review and comment on the final version of the BAP and CMPs for the other biodiversity values of the Company, as Ramboll's engagement ended in the middle of December 2021 following maturation of the Phase-2 Senior Loan. However, in its final report (Sakhalin Energy - Third Party Reports and Materials), the consultant highlighted that "*Ramboll*

[1] PS6: Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated.

is confident that if the Company produces the other CMPs to the high standard of the western gray whale CMP (reviewed by Ramboll) these would be compliant with the IFC PS6 standards against which progress has been measured to date".

In line with the Company document control process the Biodiversity Action Plan will be reviewed, and where required updated, every 5 years.

Biodiversity of northern Sakhalin

1.2 IDENTIFIED BIODIVERSITY PRIORITIES

In line with the purposes of this BAP update, the following biodiversity priorities have been identified in relation to Sakhalin Energy's environmental footprint:

Critical Habitat biodiversity priorities:

- Gray whales (Sakhalin Gray whale feeding aggregation)
- Steller's sea eagle
- Sakhalin taimen
- Four species of Pacific salmon: Pink salmon, Chum salmon, Coho salmon, Masu salmon
- Sakhalin dunlin
- Aleutian tern
- Long-billed murrelet
- Glehn's spruce
- *Pogonia japonica*

Non-Critical Habitat biodiversity priorities, species groups:

- Coastal and wetland birds of the Chaivo peninsula
- Breeding birds of coniferous forest

- Breeding birds of river valley mixed woodland
- Salmonid fish populations of selected river systems (i.e. those that support significant areas of spawning and other habitat)

Non-Critical Habitat biodiversity priorities, habitats:

- Dark coniferous forest – remaining blocks / areas of this habitat, particularly in the north of the island;
- Larch-ledum forest – areas of intact habitat and well developed secondary forest;
- Well-developed and largely intact areas of secondary spruce-fir forest (e.g. Makarov mountains);
- Mixed primary or well developed secondary deciduous-coniferous forest along river valleys;
- Tracts of peatland and swamps supporting characteristic vegetation communities;
- River catchments with significant areas of intact forest habitat and those supporting important salmon populations;
- Shallow coastal lagoon systems and fringing wetland habitats; and
- Coastal and marine waters in Aniva Bay and the northeast Sakhalin shelf.

2 INTRODUCTION

In accordance with Article 2 of the United Nations Convention on Biological Diversity (CBD) biological diversity means the variability of living organisms on Earth from all sources, including terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are a part; this includes diversity within a species, between species and of ecosystems.

According to the World Economic Forum Global Risks Report 2020[2] the annual value of biodiversity for the global economy is estimated at US $33 trillion and biodiversity loss is in the top-5 risks for the global economy in terms of likelihood and impact. Recognizing the importance of private sector contribution to global environmental risks management, in 2021 Sakhalin Energy included “Carbon / Greenhouse Gas Emissions and Biodiversity Loss” into its corporate risk matrix.

Sakhalin Energy strives to exclude or reduce all negative impacts arising from its activities to a level where the risks are as low are reasonably practicable (ALARP) and particular attention is paid to impact assessment and preventive risk management.

The Company is committed to support biodiversity values that may be affected by its activities, to promote sustainable development, and to ensure continuous provision of ecosystem services and values for current and future generations.

Aim – to minimize negative impact and enhance biodiversity and ecosystem services within the zone of influence of Sakhalin-2 Project, including those areas affected by temporary works during construction.

Tasks:

- identify priorities for biodiversity conservation;
- conduct regular monitoring of state of the biodiversity priorities in the area of potential impact by the project;
- develop and implement mitigation measures where necessary;
- support biodiversity conservation and enhancement as may be appropriate and feasible.

View on the Prigorodnoye Production Complex

[2] *https://www.weforum.org/reports/the-global-risks-report-2020*

3 LEGAL FRAMEWORK AND CORPORATE REQUIREMENTS

3.1 INTERNATIONAL AND NATIONAL CONTEXT

Convention on Biodiversity (CBD)

The Convention on Biological Diversity is the first global agreement on conservation and sustainable use of biodiversity values. The Convention was formalized at the Earth Summit in Rio de Janeiro, Brazil in 1992. The Russian Federation ratified the Convention in April 1995.

Article 6 of the Convention sets out a general approach for conservation and sustainable use of biodiversity resources, including relevant provisions for the development of national biodiversity strategies and plans.

Convention on the Control and Management of Ships' Ballast Water and Sediments, 2004

The International maritime Organisation International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 is a general set of requirements to prevent the spread of harmful aquatic organisms from one region to another and halt damage to the marine environment from ballast water discharge, by minimizing the uptake and subsequent discharge of sediments and organisms. Russian Federation acceded to the Convention in April 2012. The convention entered into force in 2017 and thenceforth signatory flag states should ensure that ships flagged by them comply with standards and procedures for the management and control of ships' ballast water and sediments.

Russian Federation Environmental Laws

The laws and regulations of the Russian Federation (RF) set forth requirements for protecting flora and fauna and establish liability for causing damage to protected species and their habitats. Below are the main RF regulatory acts on protection of biodiversity:

- Federal Law of 10 January 2002 "On Environmental Protection", No 7-FZ;
- Federal Law of 24 April 1995 "On Wildlife", No. 52-FZ;
- Federal Law of 14 March 1995 "On Specially Protected Natural Areas", No. 33-FZ;
- Federal Law of 30 November 1995 "On the Continental Shelf of the Russian Federation", No.187-FZ;
- Federal Law of 23 November 1995 "On Environmental Expert Reviews", No.174-FZ.

The National Strategy for Conservation of Biodiversity in the Russian Federation (2002)

The National Strategy for Conservation of Biodiversity in the Russian Federation (2002) has been developed based on the provisions of the International Convention on Biological Diversity.

The National Strategy for Conservation of Biodiversity in the Russian Federation serves as a basis for the development of regional biodiversity conservation strategies, as well as strategies for conservation of individual species and ecosystems.

Biodiversity Conservation Strategy of Sakhalin Oblast, 2016

The Biodiversity Conservation Strategy of Sakhalin Oblast for the period up to 2025 was developed in 2016 and approved by the Interagency Environmental Council of the Sakhalin Oblast.

The Strategy is based on the Socio-Economic Development Strategy for the Sakhalin Oblast as part of the Russian Federation Action Plan for the implementation of the state policy on the environmental development of the country for the period up to 2030.

3.2 CORPORATE REQUIREMENTS

Production Sharing Agreement (PSA) and Third Amended and Restated Shareholders Agreement (TASHA)

The PSA, being the major project document that stipulated provisions for Sakhalin Energy to undertake its activities, together with the TASHA require that the Company operates: (i) in compliance with environmental and safety laws of the Russian Federation and with due consideration to the RF standards to the extent they are consistent with the international standards; (ii) in accordance with standards generally accepted in the international oil and gas industry and promote the effective management of HSE risks by applying HSE procedures consistent with those generally applied in the international petroleum industry.

The Equator Principles, 2013

The Equator Principles (EPs) represent a credit risk management framework adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and are primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making. Equator Principles Financial Institutions (EPFIs) commit to ensuring that the financed projects are developed in a manner that is socially responsible and reflects sound environmental management practices; and not providing loans to projects where the borrower will not or is unable to comply with the Equator Principles. The Company's Phase-2 Senior Lenders under the Phase-2 Loan Agreement committed to comply with the Equator Principles.

Equator Principles Financial Institutions (EPFIs) formulate their own environmental and social guidelines to comply with the Equator Principles framework, which in turn confirms compliance with the underlying IFC Performance Standards and World Bank Group EHS Guidelines.

International Finance Corporation Performance Standards (IFS PSs)

The IFC Performance Standards serve as an international benchmark for identifying and managing environmental and social risks and are integrated into environmental and social risk management systems of many projects and organizations worldwide.

In 2012, Sakhalin Energy voluntarily committed to adhere to IFC Environmental and Social Performance Standards.

IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts, 2012

The standard applies to all projects that have environmental and social risks and impacts. It establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project.

IFC Performance Standard 3: Resource Efficiency and Pollution Prevention

The standard outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices.

The client shall avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release. This applies to the release of pollutants to air, water, and land due to routine, non-routine, and accidental circumstances with the potential for local, regional, and transboundary impacts. To address potential adverse project impacts on existing ambient conditions, the client will consider relevant factors, including, for example (i) existing ambient conditions; (ii) the finite assimilative capacity of the environment; (iii) existing and future land use; (iv) the project's proximity to areas of importance to biodiversity; and (v) the potential for cumulative impacts with uncertain and/or irreversible consequences.

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

The PS6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. It addresses how projects can sustainably manage and mitigate impacts on biodiversity and ecosystem services throughout a project's lifecycle.

The risks and impacts identification process shall consider direct and indirect project-related impacts on biodiversity and ecosystem services and identify any significant residual impacts.

As a matter of priority, a project committed to comply with PS6 shall seek to avoid negative impacts on biodiversity and ecosystem services. When avoidance of negative impacts is not possible, measures to minimize and restore biodiversity and ecosystem services and to compensate for significant residual impact on biodiversity values of critical habitats should be implemented.

Environmental Social and Health Impact Assessments

Sakhalin Energy is committed to undertaking integrated impact assessments as documented in the Managing Risk Standard (0000-S-90-04-O-0006-00-E, Appendix 6).

The preliminary RF required environmental impact assessment (EIA) for the Sakhalin-2 project was formalised in 2001 followed by the public consultation process and subsequent issue of the Technical and Economic Substantiation for Construction (TESC) in 2002.

Following this, in 2002-2005 Sakhalin Energy developed an international-style environmental, social and health impact assessment (ESHIA 2003, ESHIA Addendum 2005) to bring the impact assessment work undertaken to date in line with international requirements.

System of Industrial Environmental Control and Local Monitoring (IEC&LM System), 2003

Based on the results of the impact assessments, the Company developed the System of Industrial Environmental Control and Local Monitoring. The IEC&LM consists of a number of impact monitoring programmes designed to clarify if there are any adverse impacts from operation of the industrial facilities and then develop mitigation measures to eliminate or reduce those impacts.

The system ensures the Company's compliance with the current environmental legislation and establishes quantitative and qualitative indicators to trace environmental impact.

The Health, Safety, Environment and Social Action Plan (HSESAP)

The HSESAP was developed by the Company under the Loan Agreement between Sakhalin Energy and the Phase 2 Senior Lenders. The HSESAP consolidated the commitments from the Environmental Health and Social Impact Assessment of the Sakhalin-2 Project and was based on the provisions of the IFC Performance Standards and other international standards, the Russian Federation requirements and good industry practices committed to be followed under the Loan Agreement. It detailed the measures agreed between the Company and the Senior Lenders to eliminate, mitigate or manage identified adverse HSE and social impacts to acceptable levels (as low as reasonably practicable) applicable for all Company facilities, construction and operation activities undertaken by the Company or on its behalf by contractors.

Biodiversity Standard

The standard (0000-S-90-04-O-0259-00-E) was developed to formulate the Company's commitments for the construction and operation phases of the project in relation to biodiversity and ecosystem services values, inter alia: (i) compliance with the requirements of Russian legislation; (ii) biodiversity risk management; (iii) reduction of potential impacts on biodiversity; (iv) application of the good international practices.

Biodiversity Action Plan

The Biodiversity Action Plan was developed to define biodiversity conservation priorities of the Company and covers actions on minimization and remediation of the Sakhalin-2 project impact on biodiversity values. It was first issued in 2008 and approved by the Environmental Council of the Sakhalin Oblast thereafter.

Biodiversity and Ecosystem services management system of Sakhalin Energy

4 OVERVIEW OF THE SAKHALIN II PROJECT

4.1 CURRENT PROJECT

Sakhalin Energy Investment Company Ltd. was founded in 1994 to develop the Piltun-Astokhskoye and the Lunskoye oil and gas fields in the Sea of Okhotsk offshore Sakhalin Island. Sakhalin Energy operates under the Sakhalin-2 project Production Sharing Agreement that has been signed by the Company and the Russian Federation represented by the Government of the Russian Federation and the Sakhalin Oblast Administration (currently, the Sakhalin Oblast Government).

The following companies hold shares in Sakhalin Energy through their subsidiaries: Gazprom (50% plus one share), Shell, (27.5% minus one share), Mitsui (12.5%) and Mitsubishi (10%).

Sakhalin-2 has been one of the most technically complex projects implemented in the global oil and gas industry over the last few decades. To develop the oil and gas fields, the company has built a large-scale infrastructure for the extraction, transportation, processing and subsequent marketing of hydrocarbons. The infrastructure of the project includes three fixed offshore platforms, offshore and onshore pipeline systems, an onshore processing facility, two booster stations, an oil export terminal with a tanker loading unit, a liquefied natural gas (LNG) plant with an LNG jetty, and gas transfer terminals.

In 2020, Sakhalin LNG accounted for more than 3.2% of global LNG demand, about 4.6% of LNG demand in the Asia-Pacific region, about 7.9% of LNG demand in Japan, about 4.7% of LNG demand in South Korea, more than 11.3% of LNG demand in Taiwan, more than 2.4% of LNG demand in China, and more than 1.6% of LNG demand in Singapore

The Sakhalin-2 project infrastructure

4.2 DEVELOPMENT PROJECTS

OPF Compression Project

The OPF compression facility (OPF-C) is designated to support the planned production levels due to future wellhead pressure drop in the Lunskoye field as the gas reservoir is depleted.

In 2019, oversized large-capacity equipment for the OPF-C was delivered to the construction site. In October 2019, Sakhalin Energy successfully completed the installation of two inlet separators on the base structures. The separators are designed for the treatment of gas supplied from the Lunskoye-A offshore platform.

As of the end of December 2021, the bulk of the general construction works and the installation of metal structures, pipe racks and major process equipment were completed and commissioning activities had begun.

Construction works of the OPF-C project

Growth Projects

As part of its Growth Strategy, the Company continues pursuing hydrocarbon maturation opportunities on the Piltun-Astokhskoye and Lunskoye fields and has been developing the following growth projects:

- Northern Gas Project;
- Piltun-Astokhskoye field Block 2 Project;
- The LUN-9 exploration well project;
- Lunskoye Block 1 Project.

These projects are currently at different stages of development including concept selection, costs estimation, schedule development, production profiles calculation, risk management plans preparation, etc.

LNG Train 3 Project

The Company has been considering expansion of the LNG plant, building an additional third train for natural gas liquification.

In 2017, Sakhalin Energy developed design documentation for the Sakhalin-2 LNG Train 3 project. The project design documentation received an endorsement from the State Expert Review by Glavgosexpertiza in 2018.

At present, the Russian party is considering options for development of the offshore hydrocarbon deposits of the Sakhalin Oblast. Sakhalin Energy continues to evaluate possible options for the gas source to fill Train 3 and is currently working on cost optimisation and opportunities to increase the Russian content in the project.

5 BIODIVERSITY OF SAKHALIN ISLAND AND THE SAKHALIN-2 PROJECT

5.1 BIODIVERSITY OF SAKHALIN

Sakhalin is the largest island of Russia. It is situated at the eastern coast of Asia. The length of Sakhalin in meridian direction is 948 km and 30-150 km from west to east. Sakhalin occupies less than 1% of the territory of Russia. Its area is 76004 km^2. In general the biodiversity of Sakhalin is relatively low in comparison with more southerly regions.

The abundance of species and geographical distribution of flora and fauna in Sakhalin are defined by a set of factors, the most important of which are the island's geological history (multiple mergers with and separations from Hokkaido island and the mainland), significant meridional length, extreme climate conditions, and the water bodies peculiarities (dense river network and strong ocean currents).

Fedor Bogdanovich Schmidt was the first person to highlight the significant difference between the flora and fauna of the southern and northern parts of Sakhalin. He divided Sakhalin into two botanical/geographical zones, the boundary between these zones (from 51°N to 49°N in the south-east direction) was later termed the 'Schmidt line'. Today, the Schmidt line is used to delineate two large floristic regions of the Holarctic Kingdom - Circumboreal Region and Eastern Asiatic Region.

Scenic view of the island's typical landscape

Terrestrial vertebrates

The diversity and endemism of terrestrial vertebrates on Sakhalin Island is relatively poor as opposed to the neighbouring mainland and Japanese Islands. There are 44 species of terrestrial mammals, 2 species of reptiles and 5 species of amphibians. Among mammals a few have been introduced for fur trade or hunting, such as the American mink (*Neovison vison*), the Japanese Weasel (*Mustela itatsi*) – currently extinct on the island, the Common muskrat (*Ondatra zibethicus*), the Red deer (*Cervus elaphus xanthopygus*) and the Moose (*Alces alces*).

There is one endemic species of rodents – the Sakhalin vole (*Microtus sachalinensis*) and endemic sub-species of ungulate mammals – the Sakhalin musk deer (*Mochus moschiferus sachalinensis*).

The colonization of the island by terrestrial mammals has been limited because of its length and harsh

climate, in particular deep snow cover, therefore some of the species generally only inhabit the northern part of the island (the Reindeer, the Wolverine, the Sakhalin vole), while the other (the Raccoon dog) occur in the southern part. Anthropogenic impact such as habitat loss and hunting have also led to the loss of some species (e.g. the Lynx) and significant reduction in the populations of others (e.g. the Wolverine).

Reptiles are represented by the common European adder (*Vipera berus*), whose range is limited to southern and central Sakhalin, and also by the Viviparous lizard (*Zootoca vivipara*), which is spread all over the island. Sakhalin amphibians comprise the widely spread Siberian salamander (*Salamandrella keyserlingii*), the Siberian wood frog (*Rana amurensis*), the Hokkaidō frog (*Rana pirica*) and the Asiatic common toad (*Duttaphrynus melanostictus*). The Japanese tree toad (*Dryophytes japonicus*) occurs only at Cape Slepikovsky in the south-western part of Sakhalin.

Terrestrial mammals of Sakhalin

Marine mammals

There are 27 species of marine mammals represented by pinnipeds and cetaceans occurring permanently, seasonally or sporadically in the Sea of Okhotsk.

Cetaceans occurring in the Okhotsk Sea are represented by nineteen species. All these species are included in the IUCN red list, and eight of them are included in the Red Book of the Russian Federation, including three species listed as endangered. These are the Gray whale (*Eschrichtius robustus*), the Bowhead whale (*Balaena mysticetus*), the North Pacific right whale (*Eubalaena japonica*).

Eight species of pinnipeds occur in the Okhotsk Sea, four of these species – the Ringed seal (*Phoca hispida*), the Spotted seal *(Phoca largha)*, the Ribbon seal *(Histriphoca fasciata)* and the Bearded seal *(Erignathus barbatus)* – belong to *Pinnipedia phocidae*, or ice seals. These seals breed on ice in the winter period.

As the ice recedes, ringed seals, spotted seal and bearded seals may establish onshore rookeries, while some of the ribbon seals begin migrating into the high seas. The Northern fur seal *(Callorhinus ursinus)* and the Steller's sea lions *(Eumetopias jubatus)* are another two pinniped species occurring in the Okhotsk

Sea. These eared seals come ashore only for a short period of time for breeding. The Steller's sea lions can be sighted in the high seas during summer, whereas the Northern fur seals migrate through the coastal waters of Sakhalin in spring (May through June) and autumn (October, November and December) to spend winter in the Sea of Japan. The occurrence of Harbour seal (*Phoca vitulina*) and Sea otter (*Enhydra lutris*) in the Sea of Okhotsk is limited to the coastal waters of the Kuril Islands and the southern coast of the Kamchatka peninsula.

A calf of the Gray whale

Birds

Sakhalin bird fauna comprises approximately 400 bird species, 201 of these species are nesting birds: 152 nesting birds species occur in the northern part of the island, 160 in the central part and 155 in the southern part.

The composition of the avifauna has certain peculiarities. There are a few Japanese islands endemics that occur on Sakhalin: the Japanese snipe (*Gallinago hardwickii*), the Japanese Robin (*Luscinia akahige*), the Japanese Accentor (*Prunella rubida*), the Brown-headed Thrush (*Turdus chrysolaus*), the Japanese Green-pigeon (*Treron sieboldii*), the Russet Sparrow (*Passer cinnamomeus*).

Significant contribution to the birds' species composition is made by marine species - nesting, migrating or wintering ones. The Eastern-Asian-Australian migration route of waders lies within the island. The northern part of Sakhalin is a southern border habitat for some of the typically Holarctic bird species, such as the Black-throated Diver (*Gavia arctica*), the Red-throated Diver (*Gavia stellate*), the Horned Grebe (*Podiceps auratus*), the Long-tailed Duck (*Clangula hyemalis*), the Dunlin (*Calidris alpine*), the Red-necked Phalarope (*Phalaropus lobatus*).

There is only one endemic sub-species of birds – the Sakhalin dunlin (*Calidris alpine actites*).

The Steller's sea eagles and the White-tailed eagles

Terrestrial invertebrates

Terrestrial invertebrates of Sakhalin include 41 species of land molluscs and 341 spider species. The total number of insect species is 7.8 thousand. There are endemic species such as *Carabus avinovi, Carabus lopatini, Parnassius amgunensis*.

Fish

Sakhalin freshwater fish fauna is represented by 16 families consisting of 98 fish species, 66 species of freshwater molluscs and 51 species of malacostracans.

The key species critical for maintaining ecosystems on Sakhalin are salmon species that provide mineral nutrients (nitrogen, phosphorus, trace elements) and organic substances crucial for ecosystem productivity as a result of their migrations from the marine environment to freshwater and terrestrial ecosystems. Sakhalin and Kuril Islands ranked second in the world after Kamchatka in salmon species diversity. There are 5 species of salmonids on Sakhalin, 4 species belong to Pacific salmon genus – the Pink Salmon (*Oncorhynchus gorbusha*) the Masu (*Oncorhynchus masou*), the Coho salmon (*Oncorhynchus kisutch*), the Chum salmon (*Oncorhynchus keta*); and the Sakhalin taimen (*Parahucho* perryi) - an endangered salmon species from *Parahucho* genus, listed in the Red Book of the Russian Federation and the Sakhalin Region and the International Red List of the International Union for Conservation of Nature (IUCN).

Flora

The vascular flora of Sakhalin Island is represented by more than 1500 species, including about 1200 indigenous species. The flora of Sakhalin is, however, considered significantly less diverse than that of Hokkaido or neighbouring mainland territories such as Khabarovsk or Primorye.

The updated Red Book of the Sakhalin Oblast (2019) includes: 112 species of vascular plants, 12 species of mosses, 9 species of algae, 21 species of lichens and 14 species of fungi.

Cypripedium macranthos (protected species)

Endemic species

In general, Sakhalin biota is characterised by a low level of endemism. The Sakhalin vole *(Microtus sachalinensis)* is the only land mammal that is endemic to Sakhalin.

The flora of the island possesses no endemic families, with the only exception of one monotype genus – *Miyakea* – which is very similar to *Pulsatilla* genus. Sakhalin's endemic species of plants account for just 2.5% of total species occurring on the island. Low endemism in Sakhalin's higher plants is an evidence of their short-term isolation and the likelihood of relatively recent, from the geological development perspective, species flow between Sakhalin, the Kyril and Japanese islands and the mainland.

There are two endemic freshwater fish species on Sakhalin – the Sakhalin stickleback *(Pungitius tymensis)* and the Chinese minnow (*Phoxinus lagowskii oxycephalus*).

There are six endemic mollusc species known to occur on Sakhalin – one in the north of the island, three in the south and two in the Tym river basin. This represents around 7% of all freshwater mollusc species of Sakhalin.

Out of 30 orthopteran species and subspecies, 13.3% are endemic to Sakhalin. A high level of endemism is common for some other insect groups, which, similar to plants, are associated with the ancient mountainous areas of Sakhalin formed in the Paleogene age.

5.2 BIODIVERSITY WITHIN SAKHALIN-2 PROJECT FOOTPRINT

North-East Part of Sakhalin Shelf and Coastal Zone

Three offshore platforms and offshore pipeline are located in this water area.

Marine mammals

23 species of marine mammals, including 17 species of cetaceans (whales, dolphins, porpoises) and six species of pinnipeds (seals) occur in the area of the Sakhalin-2 project in the coastal waters of the Sea of Okhotsk.

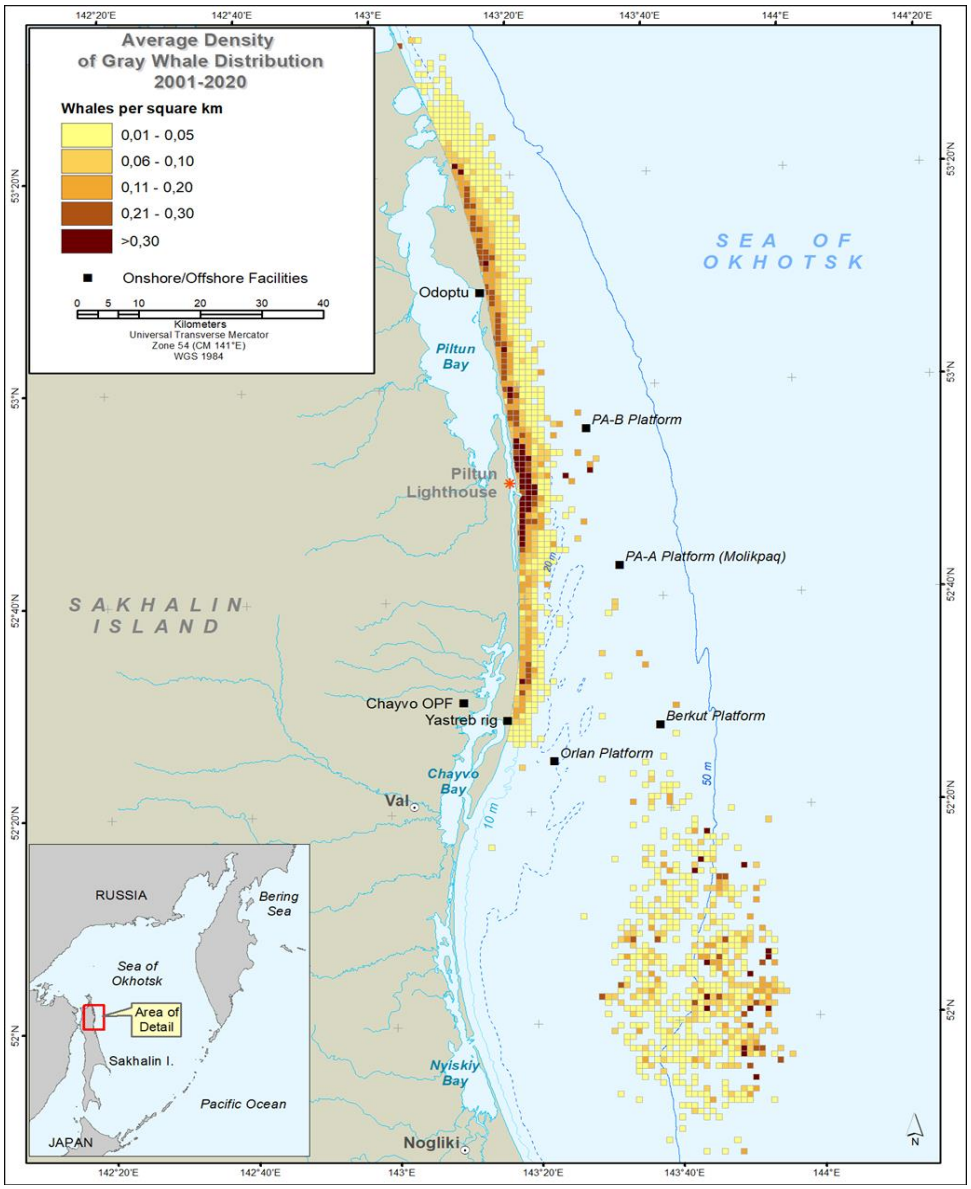
Of these, 8 species are listed in the Red Book of the Russian Federation — the Gray whale, the Bowhead whale, the North Pacific right whale, the Fin whale, the Cuvier's beaked whale, the Harbour porpoise, the

Far Eastern population of the carnivorous killer whale as well as pinnipeds such as the Steller sea lion.

The Okhotsk-Sea population of Gray whales, which has a high conservation status in the Red Book of the Russian Federation and Red List of the International Union for Conservation of Nature (IUCN), annually feeds near Sakhalin Energy's offshore production assets during the ice-free period.

In 2018, valuable information gained as a result of gray whale monitoring by Sakhalin Energy and Exxon Neftegas off Sakhalin shelf (the Joint Program) enabled IUCN to change the vulnerability status of the species from Critically Endangered (CR) species to Endangered (EN) subpopulation (western subpopulation of gray whales).

Two species of cetaceans Bowhead whale and North Pacific right whale also have high conservation status in the Red Book of the Russian Federation and IUCN Red List. However, North Pacific right whale only sporadically occurs in the North-East Part of Sakhalin and the Bowhead whale is distributed in more northern parts of the Okhotsk sea away from the Company's offshore assets.



Piltin and Offshore feeding areas of Eschrichtius robustus

Birds

The north-eastern coast of Sakhalin Island can be considered as a vital location for birds during seasonal migrations and the nesting period. A significant number of protected bird species have been identified here. Thirteen bird species found here account for more than 1% of their world population.

For wetland and marine birds migrating in spring and autumn, the Piltun, Lunsky, Nabil, and Chaivo Bays are the most important areas along the north-eastern coast. Up to 45 thousand of the Whooper swans (*Cygnus cygnus)* were sighted there during their autumn migration flight. During autumn migration, seven to ten thousand of the Bewick's swans (*Cygnus bewickii*), 20 to 25 thousand ducks and two to three thousand gulls concentrate in the north-eastern and northern parts of the Piltun Bay.

The offshore area northwards of the Lunsky Bay is important for preserving the population of marine ducks amounting to 10,000 to 50,000 individuals at a time. Summer peak numbers of the White-winged scoter (*Melanitta deglandi*) reach 250 thousand individuals (Tiunov, Blokhin 2011).

The northeastern coast with sea lagoons belongs to the main nesting area of the Steller's sea eagle on the island. Total island population of the Steller's sea eagle is estimated at approximately 940–1,100 individuals.

Two protected bird species establish breeding colonies on the north-eastern coast of Sakhalin: Kamchatka (Aleutian) tern (*Sterna camtschatica (=aleutica))*, with local colonies representing up to 36-40% of the world population and Sakhalin Dunlin (*Calidris alpine actites)* with local breeding colony over 90% of its total island population.

Calidris alpine actites

Sterna camtschatica

Fish

Ichthyofauna and fish stock surveys at the Piltun-Astokh area were undertaken as a part of general baseline studies offshore north-east Sakhalin in September – November 1999 and in August 2000.

129 fish species and subspecies attributed to 81 genera and 27 families were identified offshore north-east Sakhalin. Most species belong to the following families: *Cottidae* (21 species), *Liparidae* (18 species), Zoarcidae (15 species) and Pleuronectidae (12 species).

At the Piltun-Astokh area, 34 fish species attributed to 29 genera were identified. Commercial fish species

were common in the area during baseline studies. The total quantity of commercial and predominant fish species of the area was estimated at 7,600 tonnes**.**

Species composition is represented by marine fish and fish that can inhabit waters with various salinity levels.

Some species (*Clupea pallasii, Osmerus mordax dentex, Eleginus gracilis, M. Playcephalua, Platichthus stellatus*) inhabit both subsaline waters as well as waters with oceanic salinity. Most species in that area inhabit open sea sections.

Flora

Flora of coastal territories, lakes and lagoons on the northeastern coast of Sakhalin in the area of Sakhalin-2 project is represented by approximately 100 species of vascular plants from 73 genera and 32 families.

Flora is formed by autochthonous species, there are no adventitious species. The families *Cyperaceae, Ericaceae, Astersaeae* prevail in the flora of these territories, which is typical for the large flora of the Holarctic.

The vegetation cover is represented by two main vegetation formations: larch forests and sedge-sphagnum marshes. In marsh cenoses, a huge role is played by sphagnum mosses, which often cause swamping of the territory. Coast communities are mainly represented by thickets of *Leymus mollis* with sporadical occasions of *Lathyrus japonica, Chorisis repens* and *Artemisia stelleriana*.

There are about 54 species of moss-like and 70 lichen species found in the area.

OPF and OPF-C

Birds

In the vicinity of the OPF there are about 170 bird species, including 34 species of birds included in the Red Book of the Sakhalin Oblast (2016).

Three avifauna are distinguished:

1. Avifauna of larch and larch-dark coniferous forests is populated by 80 species of birds. 15 species of birds are predominant, most notably the Pallas's leaf-warbler (*Phylloscopus proregulus)* and the Northern red-flanked bluetail *(Tarsiger cianurus)*;
2. Avifauna of larch-ledum and shrubby-sedge-moss bogs is populated by 57 species. Such species as the Eurasian skylark (*Alauda arvensis)*, the Olive-backed pipit (*Anthus hodgsoni),* the *Green-headed wagtail (Motacilla taivana)*, the Common stonechat *(Saxicola torquate)*, the Dusky warbler (*Phylloscopus fuscatus)*, the Brown shrike (*Lanius cristatus)*, the Siberian Rubythroat (*Luscinia calliope)* predominate;
3. Avifauna of the residential area (OPF boundaries) - 18 species. The predominant avifauna are the Black-backed wagtail (*Motacilla lugens)* and the Eurasian Tree Sparrow (*Passer montanus)*.

Forest areas to the west, southwest and southeast of the OPF are very important habitats for the Siberian Grouse (*Falcipennis falcipennis)*. This species is endemic to Russia. On Sakhalin it is a rare species as the island is on the periphery of its range. Mature larch forests around the OPF are an important nesting site for the protected Long-billed murrelet *(Brachyramphus perdix*). In the area adjacent to the OPF, an increased density of owls is noted including the Boreal owl (*Aegolius funereus*), the Eurasian Pygmy-owl (*Glaucidium passerinum*), the Northern hawk owl (*Surnia ulula*).

Male Siberian Grouse

Flora

North of the OPF, a large part of the territory is occupied by various types of swamp phytocenoses, formed as a result of natural successions in conditions of excessive moisture and hindered drainage. Typical marsh species are *Vaccinium uliginosum, Ledum palustre, Myrica tomentosa, Eriophorum vaginatum, Rubus chamaemorus, Drosera rotundifolia, Carex middendorffii, Carex globularis, Oxycoccus microcarpa, Oxycoccus palustre*, and species of sphagnum mosses. There is no tree cover in these communities, there is practically no growth of larch (*Larix cajanderi*).

Coniferous forests extend to the west of the OPF, the predominant species here are larches (*Larix cajanderi), spruces (Picea ajanensis) and firs (Abies sachalinensis*). The shrub layer is represented by two substages: *Betula middendorffii* and *Sorbus sambucifolia* predominating in the upper layer (1-1.5 m high); the *Ledum palustre* and *Vaccinium axillare* predominating in the lower layer (50-70 cm high). The grass and shrub layers are composed mainly of boreal species - *Maianthemum dilatatum, Chamaepericlymenum canadense, Linnaea borealis, Vaccinium vitis-idaea, Coptis trifolia*. The moss-lichen cover is composed mainly of green mosses, *Sphagnum girgensohnii* growth in micro-depressions. Almost no ground lichens occur in the area.

A narrow strip of larch dark coniferous forests extends to the south of the OPF. Spruce and fir in the tree cover gradually disappear farther to the south, while larch dark coniferous forests are replaced by monodominant larch forests represented mainly by the shrub larch. *Ledum palustre* predominates in the bush layer.

To the east of the OPF and OPF-C, separate areas of larch dark coniferous forest have been preserved isolated by swampy areas located on the edge of the fire-sites. The shrub layer is represented by two substages: *Betula middendorffii* and *Sorbus sambucifolia* predominate in the upper layer; *Ledum palustre* and *Vaccinium axillare* - in the lower layer. The grass and shrub layers are composed of short grass (*Maianthemum dilatatum, Chamaepericlymenum canadense, Coptis trifolia*), moss-lichen - green moss (*Hylocomium splendens, Pleurozium schreberi*, etc.).

There are 5 protected species of vegetation registered in the monitoring area (4 epiphytic lichens and 1 moss).

Bryocaulon pseudosatoanum

Onshore Pipeline

Birds

The avifauna along the pipeline route includes more than 218 species of birds, including 43 that are protected.

Five sites along the pipeline route are included in the monitoring program for protected bird species as areas of their greatest concentration (Dolinskiy, Makarovskiy, Tymovskiy and Noglikskiy (2 areas) Districts).

Most of the rare bird species were found during the migration period. Their distribution along the pipeline route is uneven. The Japanese snipe inhabits almost all areas. However, its highest density is in the Dolinsky district. In the process of restoring vegetation on the ROW, the Japanese snipe settled it in the southern and central regions of the island, and after expanding its range to the north, began to colonise the Nogliki district. In Dolinsky district, the Mandarin duck, the Osprey and the Red sparrow are regularly recorded. Mandarin duck (*Aix galericulata*) and Boreal Owl (*Aegolius funereus*) nesting are noted in the Makarovsky district. In the Tymovsk district, an increased density of the Yellow-breasted Bunting (*Ocyris aureolus*) and the Japanese quail (*Coturnix japonica*) is noted. Only at this monitoring site was nesting of the Great Gray Owl (*Strix nebulosa*) revealed. Breeding of the Japanese waxwing (*Bombycilla japonica*), the Siberian grouse (*Falcipennis falcipennis*) and the Northern hawk owl was recorded in the Nogliki region.

Fish

There are around 61,000 rivers and streams found on Sakhalin island, around 1,000 of them were crossed by the pipeline route. Almost 70% of rivers have high fishery value. Among mass species of Pacific salmon, four species of the genus *Oncorhynchus (gorbuscha, masou, kisutch, keta)* occur in the rivers crossed by the Sakhalin-2 pipeline. Two species of taimen inhabit the rivers of Sakhalin (*Hucho hucho* and *Parahucho perryi).* Illegal fishing of the critically endangered *Parahucho perryi* is considered the main threat and reason for the species dramatic decline.

Flora

The north of Sakhalin along the pipeline on the Northern-Sakhalin plain is predominated by sparse larch forests. The Pleurocarpous-moss dark coniferous forests are predominated by the Ajan spruce and the

Sakhalin fir, which also occur abundantly across the central and southern Sakhalin on the mountain slopes and drained terraces.

In plains and lowlands, dark coniferous forests alternate with larch forests. River valleys are covered by deciduous forests comprised of willows, alders and chosenias, as well as by tall-grass meadows. Sphagnous swamps are widely spread on the lowlands between mountain ridges.

In the southeast of the island along the pipeline, larch forests are usually of artificial origin. In the larch forests on the Korsakov Plateau species of the Tertiary flora, which have survived to the present day, such as *Schizandra chinensis, Actinidia kolomikta*, and *Hydrangea petiolaris* are winding around the trunks of the trees. There are also shrubs of *Araliaceae* family — *Aralia elata* and *Eleutherocóccus senticósus*. All these species grow on the northern edge of their range on Sakhalin Island. The canopy of larch trees is home to multiple forest herb species: *Convallaria keiskei*, *Chamaepericlymenum canadense*, *Maianthemum dilatatum*, and *Trientalis europaea*. An integral part of the larch forests are epiphytic fruticose lichens of *Bryoria* and *Usnea* genera.

Dark coniferous forests formerly predominant on Sakhalin were exposed to uncontrolled cutting and fires for many years, which has resulted in their fragmentation and partial transformation. In Tymovsky, Smirnykhovsky and Poronaisky administrative districts, dark coniferous forests with green mosses are most common, with Ayan spruce being the predominant species. In Makarovsky district Sakhalin fir prevails in dark coniferous forests along the pipeline.

In the south of the island, at Aniva Bay, dark coniferous forests with a rare species - the Glehn's spruce (*Picea glehnii*), have preserved. These forests are situated in water-logged areas within the Mereya river floodplain in the area where the Company's onshore pipeline connects with the Prigorodnoye production complex.

As a result of floristic studies along the pipeline route, 567 species of vascular plants belonging to 319 genera and 99 families have been identified.

During the monitoring of flora and vegetation at the permanent plots along the onshore pipelines route 37 protected species of plants, lichens and fungi were found.

Protected species Pogonia japonica

Wetlands

Oligotrophic peat bogs are the most widespread wetland landscape on Sakhalin including onshore pipeline locations.

Sakhalin swampland features include significant peat bed thickness (up to 8 m), oligotrophic swamps generally predominate, mesotrophic swamps predominate only in the far south and in the northern part of the Tym-Poronaysk plain, and a significant amount of poorly decomposed plant residues is present in mineral interlayers between peat layers.

About 50% of pipeline crossings in the wetland areas are represented by waterlogged, thin larch forest. Large territories of marshes are concentrated along the pipeline route in northeastern Sakhalin: in the Nogliki District (Chaivo Spit), in the Tym-Poronai Lowland; in the south: in the Dolinsky and Korsakovsky Districts.

One protected species (*Pogonia japonica)* included in Red Book of the Russian Federation and Red Book of the Sakhalin Oblast was found in a swamp in the Dolinsky district during environmental monitoring works of the Company. To date, this is the only finding of this species on Sakhalin.

Prigorodnoye production complex

Baseline studies of vegetation, birds, soil, terrestrial and marine mammals, rivers and marine flora and fauna of Aniva Bay were conducted by the Company in 2000-2001 as a part of the environmental impact assessment of Sakhalin-2 project. The studies were continued starting in 2008 in the format of regular monitoring of impacts during the operational phase of the Phase-2 project.

Birds

To date, 175 species of birds have been registered in the Prigorodnoye production complex area, with 33 protected species among them. Several rare species listed in the federal and regional Red Books were observed in the area around the Prigorodnoye production complex including the Japanese snipe, the White-tailed eagle (*Haliaeetus albicilla*), the Japanese sparrowhawk (*Accipiter gularis*), the Reed bunting (*Emberiza schoeniclus*), the Temminck's cormorant (*Phalacrocorax capillatus*) and the Mandarin duck (*Aix galericulata*).

The Japanese snipe, a typical inhabitant of open spaces, plays an important role in the avifauna around the Prigorodnoye production complex. This species was chosen as a key monitoring object because it is the only protected species with a high abundance. The results of the regular monitoring of the species during the post-construction period showed a positive upward trend in its abundance, which is explained by the fact that new meadow areas appropriate for the species nesting have formed after construction and reinstatement works at the Prigorodnoye production complex were completed. The birds started occupying territories which they had not used before. At this stage, the population of the Japanese snipe is stabilizing.

Japanese snipe on the Company's pipeline warning sign pole

Marine mammals in Aniva Bay

The waters of Aniva Bay are slightly less diverse in marine mammals than the northern part of the island.

Monitoring of marine mammals in the Aniva Bay was carried out during the construction of the port of Prigorodnoye in 2005-2006.

Cetaceans

Cetaceans occur in Aniva bay in the summer-autumn period during their local foraging migrations. The most common among these species are: *Balaenoptera acutorostrata*, *Orcinus orca, Phocoenoides dalli, Phocoena phocoena* and *Lagenorhynchus obliquidens*. All other species appear less frequently in the area.

There are no local groupings among cetaceans that inhabit the bay permanently. Whale species migrate along the bay and adjacent areas of the Sea of Okhotsk, feeding in small groups or individually.

Pinnipeds

Steller sea lions (*Eumetopias jubatus*) form coastal rookeries on the hard-to-access uninhabited islands and rocky promontories. Northern fur seals *(Callorhinus ursinus)* are pelagic species that live mainly full time in the open sea (7-9 months) and sporadically appear in Aniva Bay. The main accumulation of the species is located near Tyuleni Island at the southern tip of Sakhalin - the main reproductive area for this species on the island.

Three species of earless seals – the Spotted seal (Phoca largha), the Ringed seal (*Phoca hispida)* and the Bearded seal (*Erignathus barbatus)* inhabit Aniva Bay. Most common among them is the Spotted seal or larga.

The Steller sea lion

Fish

The Goluboy Creek flows on the territory of the complex and divides it into 'oil' and 'gas' parts within the green protection zone; it is a landmark of the Prigorodnoye production complex. The brook is about six kilometres long, it springs from the western slope of the Yunona mountain ridge and flows into Aniva Bay 15 kilometres east of Korsakov. Ichthyic fauna of the brook is represented by typical Sakhalin fish species, such as the Pink salmon, the Masu salmon, the East Siberian char, the Dolly varden char, the Rainbow smelt, the Pacific redfin, etc.

From the start of construction in 2003 to the present, Pacific salmon continue entering the Mereya River and the Goluboy Creek for spawning. Furthermore, the location of the Goluboy Creek in the protected area which is not accessible to poachers has contributed to steady rates of the Pink salmon arrival for spawning and the subsequent fry migration.

Marine flora and fauna of Aniva bay

Offshore waters in the water area of the port of Prigorodnoye (Aniva Bay) to the depth of 30 m have been previously identified as places of mass feeding and spawning of valuable and other commercial fish species. This shelf area has high fishery value category.

Marine communities in the areas of hydrocarbon transportation terminals are characterized by the variability of quantitative and qualitative indicators associated with the distribution of various types of soils.

As a result of the long-term monitoring of Aniva Bay marine flora and fauna conducted since 2009, over 750 species of phytoplankton, over 100 forms of zooplankton, about 40 species of ichthyoplankton and 170 species of benthos have been identified. In addition to this, new species of seaweed and planktonic animals which had never before been recorded in Aniva Bay but are local inhabitants in view of biogeographic and environmental characteristics, were registered.

No protected species of flora and fauna have been registered during the environmental monitoring of Prigorodnoye port waters.

Flora

There are 11 protected species of vegetation registered in the monitoring area (8 vascular plants, 3 epiphytic lichens). Among these species, the Glehn's spruce (*Picea glehnii*) and the Japanese yew (*Taxus cuspidata*) are included in the Red List of IUCN (Least Concerned). *Picea glehnii* growing to the north-west of the production facility is of particular interest. On the south of Sakhalin, it is the northern boundary of the habitat of this species where it inhabits boggy areas in humid larch dark coniferous forests along with the Labrador tea (*Ledum palustre*).

Picea glehnii

6 ENVIRONMENTAL IMPACT ASSESSMENT AND MONITORING

6.1 ENVIRONMENTAL IMPACT ASSESSMENTS

As mentioned in section 4.2, the Company has undertaken several mandatory RF legislation required and voluntary international-style environmental impact assessments (EIA) to identify potential impacts arising from the project on environmental receptors and design appropriate mitigation measures prior to execution of the project or project's expansions or developments.

An impact assessment generally includes the following main components:

- identification of all main potential biophysical and socio-economic impacts arising from a project and receptors of those impacts, assessment of the magnitude of each of the defined impacts and sensitivity of each of the receptors exposed to the impact magnitude, rating of the overall potential impact's significance;
- development of the Mitigation Strategy that defines specific detailed actions to ***avoid, mitigate and restore potential impacts***, so that there are no significant residual impacts following implementation of the Mitigation Strategy.

The primary purpose of an impact assessment is to ensure that the project implementation will not create significant irreversible environmental, social or health impacts. Therefore, each international-style impact assessment necessarily contains a project alternatives chapter where different project design options are discussed in detail including an option of non-execution of a project should environmental, social or health risks be deemed to be unacceptably high.

Each environmental impact assessment requires development and implementation of a public consultation process to ensure that all relevant stakeholders and their interests are covered within the impact assessment process. Every EIA passes through the relevant approval process.

The list of the international-style EIAs that were undertaken by the Company to date:

- Environmental Impact Assessment, 2003 (Sakhalin Energy - Environmental impact assessment)
- Technical Western Gray Whale Environmental Impact Assessment, 2003 (Sakhalin Energy - Environmental impact assessment)
- Environmental Impact Assessment, 2005 (Sakhalin Energy - Environmental impact assessment)
- Comparative Environmental Analysis of the Piltun Astokh Field Pipeline Route Options, 2006 (Sakhalin Energy - Environmental impact assessment)
- Environmental Impact Assessment Report South Piltun Site Survey, June 2012 (Sakhalin Energy - Environmental impact assessment)
- The International ESHIA, 4D seismic survey at Piltun-Astokh and Lunskoye, June 2015 (Sakhalin Energy - Environmental impact assessment)
- Integrated environmental, social and health impact assessment for OPF compression project, 2016 (Sakhalin Energy - Environmental impact assessment)
- The International ESHIA for 2018 4D seismic surveys, June 2018 (Sakhalin Energy - Environmental impact assessment)
- The International ESHIA for 2022 4D seismic surveys (Sakhalin Energy - Environmental impact assessment)

All environmental impact assessments that have been undertaken by the Company to date were executed in line with the principles outlined above and received relevant authorities' and/or stakeholders' approvals.

Summary of the overall main biodiversity impacts of the Sakhalin-2 project identified by the impact assessments:

- ✓ threats to the endangered sub-population of the Gray whale through noise and physical disturbance (offshore operations including construction and seismic activities, support vessels, helicopters' flights), hydrocarbon pollution and vessel strikes;
- ✓ potential losses in riverine fisheries' productivity and biodiversity, particularly of salmon species, caused by river crossing activities and induced erosion as a result of the clearance of the pipeline right of way;
- ✓ potential losses in coastal fisheries' productivity and marine benthic biodiversity as a result of dredging and disposal activities in Aniva Bay;
- ✓ the risk of onshore or offshore oil spills during oil production, which can pose threats to wildlife, livelihoods, recreational activities and human health unless properly managed;
- ✓ threats to rare and migratory bird species listed in the Red Books of the Russian Federation and the Sakhalin Oblast due to general disturbance caused by project activities in their habitats. This is principally an issue associated with project activities in the OPF and Chaivo Bay area;
- ✓ habitat modification/fragmentation and induced access, in particular related to the integrated onshore pipeline system construction in the areas of natural dark coniferous forests.

For each of the main identified impacts listed above the Company designed and has implemented a relevant mitigation strategy. Based on the assumption that the mitigation strategies would be successfully implemented, the EIAs **did not identify significant residual impacts** arising from the implementation of the project or any of the project's developments.

6.2 MITIGATION STRATEGY

The mitigation strategy of Sakhalin Energy is built on the principle of a hierarchy of **avoidance, minimization and restoration** of negative impacts to ensure that those identified by the relevant EIA are reduced to as low as reasonably practicable (ALARP) and no significant residual impacts exists following implementation of the mitigation actions, i.e. an appropriate mitigation hierarchy is designed and followed (more detailed information about the mitigation hierarchy is provided in section 7.1.1 of this document).

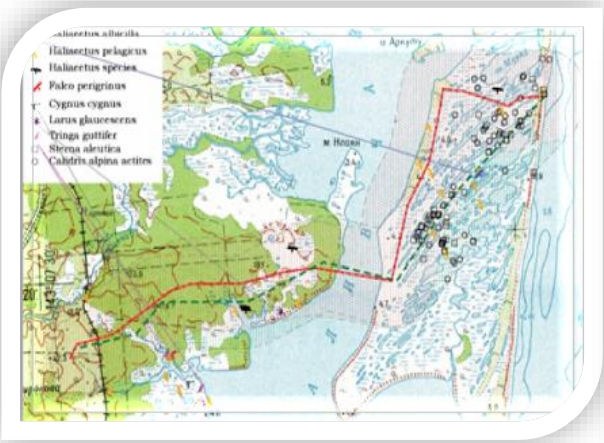
The details of the main mitigation actions for each of the main impacts are covered by the relevant EIAs and the first issue of the Biodiversity Action Plan 2008 (Sakhalin Energy - Biodiversity Action Plan). Below is a brief summary that covers the principal actions of the Company's mitigation strategy.

Impact Avoidance:

- Rerouting of the offshore pipeline approximately 20 km south in comparison with the originally planned route to avoid the main feeding grounds of the endangered sub-population of the Gray whale.
- Altering the route of the onshore pipeline in Chaivo area to avoid birds' nesting locations.
- Suspending construction works for the entire nesting period of protected bird species at Chaivo Spit and in the nesting grounds of the Steller's sea eagle.
- Horizontal directional drilling (HDD) of the main most sensitive spawning rivers of the Sakhalin Taimen and Pacific Salmon species.
- Suspension of the river crossings construction works during spawning and migration of the Sakhalin Taimen and Pacific Salmon species.

Impact Minimization:

- Establishing safety corridors and vessels' routes, control over vessel's speed limit, employment of Marine Mammals Observers (MMO) to minimize the risk of collision with the Gray whale and other marine mammals.
- Execution of noisy operations outside of the whales' peak feeding season, employment of noise minimization techniques and control over aircraft permitted altitude to minimize the risk of noise disturbance for the Gray whale and other marine mammals.
- Design of the integrated pipeline system to RF and international design codes to withstand earthquakes, accidental 3rd party interference, subsidence, and corrosion; employment of pipeline integrity monitoring (intelligent pigging) and pipeline leak detection technology; development and implementation of an Oil Spill Response Plan for each of the assets to minimize the impact of any oil spills.
- Erosion control measures to minimize adverse impact on the vegetation cover and sediments run-off into the rivers.
- Minimizing construction time of the river crossings to mitigate potential adverse impact on the watercourses.
- Development and implementation of the special impact mitigation measures for the pipeline construction in marshland areas (plank-roads, limiting the width of impact area).
- Limitation of disturbance activities near the Steller's sea eagle nesting grounds (presence of people and machinery, buffer zone, protection screens, number of vehicles allowed, prohibition of honking and stops, speed limit, etc.)



Altering the route of onshore pipeline in Chaivo area

River crossing in wintertime

Plank-roads for working in marshland areas

Horizontal directional drill (HDD) crossings of rivers

Restoration Examples, Sustainable Development:

- Technical reclamation and the biological reinstatement (revegetation) of the onshore pipeline Right of Way (RoW) after construction.
- Reinstatement of the riverbanks with reno-mattresses/gabion, riprap and other erosion control measures on all the crossings where it was required to stabilise the banks.
- Reconstruction of the fish-pass at Goluboy Creek to enable Pacific salmon enter the creek for spawning.

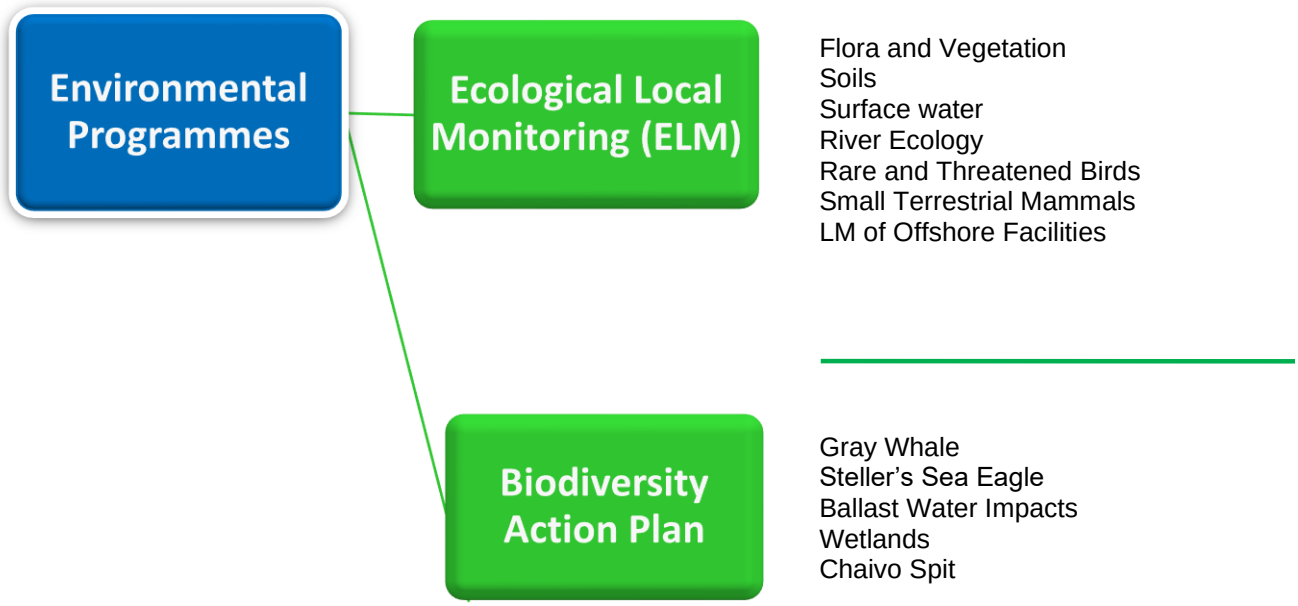
Technical reclamation of the right-of-way

Reinstatement of vegetation on the RoW

6.3 ENVIRONMENTAL MONITORING PROGRAMMES AND EFFECTS ASSESSMENT SUMMARY

To verify the conclusions of the executed environmental impact assessments and check the effectiveness of the applied mitigation measures, the Company designed and has implemented an appropriate Environmental Monitoring Programme (EMP) for the identified biodiversity sensitive receptors.

The EMP consists of the 12 separate impact monitoring programmes: 7 programmes are conducted as a part of the Ecological Local Monitoring (ELM), which is a part of the Industrial Environmental Control and Local Monitoring System developed to comply with the requirements of the 'State environmental expertise approval of the Technical and Economic Substantiation of the Sakhalin-2 Phase 2 project'; and another 5 were designed based on the biodiversity priorities identified in the Biodiversity Action Plan 2008. The scope of the EMP, such as area, frequency and parameters of the monitoring, was developed based on the large-scale in-depth baseline studies conducted by the Company in 2000 – 2005 as a part of the EIA process. The monitoring during the operations phase has been executed immediately following finalization of the construction phase, i.e. since 2008-2009.



Environmental Monitoring Programmes

Flora and vegetation monitoring programme

Sakhalin Energy implements the environmental monitoring programme of vegetation cover, which allows assessment of current vegetation conditions and timely response to any adverse environmental impact from the company assets.

The monitoring programme includes the following objectives:

- to monitor the condition of vegetation in the areas adjacent to the company assets;
- to evaluate and forecast natural and man-induced changes/successions in the plant communities;
- to monitor the state of rare and protected species of plants and lichens;

- to monitor the restoration of vegetation within the rights-of-way and generate recommendations for additional work required in some areas.

The results of long-term monitoring of vegetation in the potential impact zone of the OPF and OPF-C, the LNG plant and the integrated onshore pipeline system did not reveal a significant negative impact of production activities on the surrounding vegetation cover. The structure and species composition of plant communities at the monitoring sites remain unchanged. Tree stands in forest communities do not experience negative impact from the assets. There are some slight fluctuations in the number of trees noted, which are caused by natural processes in phytocenoses, such as the release of undergrowth into the mature layer, and the natural death of old trees. The condition of protected species of vascular plants and their habitats is not disturbed. The degree of vegetation reinstatement of the pipeline RoW reached 75-100% in most monitoring areas.

Soils monitoring programme

A system of regular soil monitoring allows for the identification of trends and potential changes. The Company assesses the soil condition along the onshore pipeline routes, at the production assets, and around the Prigorodnoye production complex and the OPF at intervals prescribed in the monitoring programme. The monitoring is conducted at the sites situated in three directions (bearings) 0.5, 1.0, 2.0 and 4.0 km away from the border of the production area of the assets within the most representative landscape conditions, as well as the baseline sites to track if impacts occur also outsize the zone of influence of Company activities.

The soils monitoring programme includes the following components:

- obtaining data on the physicochemical and agrochemical characteristics of soils;
- analysing the content of pollutants in soils in the territory of the Prigorodnoye production complex and along the pipeline route.

The long-term monitoring results did not reveal significant adverse impact by the Company's activities and, overall, demonstrate the following:

- the concentration of organic matter in the soil varies greatly: from elevated levels (black bog soils) to relatively low (high moor soils) and low levels (brown forest soils)
- no deterioration of the soil layer or signs of degradation related to the operational activity of the Company's assets has been recorded at any of the monitoring sites;
- the concentrations of petroleum hydrocarbons and benzo(a) pyrene in the soils of all monitoring sites are within background levels throughout all soil cross sections and do not exceed permitted levels;
- no contamination by the ecotoxicants under study has been recorded: the average level of cumulative petroleum hydrocarbons in 2020 monitoring period in the 0–25 cm soil layer varied in the 15–289 mg/kg range, which is considerably below the permissible level (1,000 mg/kg); the average concentration of benzo(a)pyrene in the 0–25 cm soil layer was below the detection threshold.

Surface water and river ecology monitoring programmes

The onshore pipeline system, covering virtually the whole territory of Sakhalin Island, crosses more than a thousand water bodies (rivers, streams, lakes and canals) from Chaivo Bay in the north to Aniva Bay in the south. During the design and construction stages, the company conducted baseline studies and operational monitoring of all crossings of water bodies.

For the operational stage, a comprehensive observation programme was developed to monitor environmentally significant and hydrographically complex watercourses. This allows the Company to monitor any changes, to identify critical areas, to develop and take timely corrective measures.

The surface water and river ecology monitoring programmes cover several areas: the quality of surface waters, bottom sediments, and benthos. The quality of river ecosystems primarily indicates the nature and specifics of potential impact on aquatic ecosystems during the operation of pipeline and infrastructure facilities. The other objective of monitoring is to identify any potential adverse impact from natural factors on the Sakhalin-2 project infrastructure. The monitoring is currently conducted on 18 watercourses crossed by the pipelines, on the Vatung River in the area of potential impact of the OPF; and on the Mereya River and the Goluboy Creek in the area of the Prigorodnoye production complex.

The monitoring is performed during two hydrological seasons: summer low water and autumn high water. Sampling is carried out at two cross sections: the upstream baseline (with no impact from the Company assets) and downstream monitoring sections.

The monitoring includes:

- determination of hydrological and hydrochemical characteristics of watercourses;
- assessment of bottom sediment condition in river beds;
- identification of hydromorphological changes (river bed and bank erosion in the areas of pipeline route crossings);
- assessment of the composition and abundance of benthos (community of sediment dwellers);
- assessment of the size and quality of potential Pacific Salmon spawning areas (Goluboy Creek).

Overall, the outcomes of the surface water and river ecology monitoring programmes have not identified adverse impact from Sakhalin Energy's production assets on the quality of surface waters or their flora and fauna. The monitoring results conducted in 2020 demonstrated the following:

- the crossings are in satisfactory condition, no damage to utility lines or significant horizontal or vertical deformations of riverbeds are detected on most of the investigated river-crossing sites (from the upstream to the downstream cross sections);
- the physicochemical properties of surface waters in all observation seasons comply with regulatory benchmarks, demonstrated identical change trends, and had similar quantitative and qualitative characteristics upstream and downstream in each water course;
- the oxygen regime of surface water is within norms during all observation periods. Suspended solids demonstrates minor seasonal fluctuations in their concentrations;
- among all the studied metals, concentrations of iron and copper show the highest variability. In most of the watercourses, the content of these metals exceeded the corresponding maximum allowable concentration (MAC) standards. However, the elevated concentrations of iron and copper is a natural phenomenon common for surface waters in Sakhalin;
- monitoring did not reveal surface water contamination by petroleum products. All measured values are insignificant and complied with maximum permissible concentrations for fish (MPCf);
- the content of petroleum products in bottom sediments did not significantly change from season to season. The measurements of their concentrations made at the upper sections were the same as those made at the lower ones;
- grain-size distribution of bottom sediments was homogenous in all watercourses in all seasons and was mainly made up of grains of 10 mm or larger. The proportion of these size particles in both the summer and autumn periods was more than 50% of the total mass;
- the analysis of habitat conditions (bed type, current speed, sediment type, depth), quantitative and qualitative indices of macro-zoobenthos, showed that the variability of the composition, state and structure of benthos communities between the baseline and control sections of the

watercourses under study is due to natural variability, in particular the heterogeneity of biotopes and hydrologic-hydrochemical indicators at monitoring stations;

- 17260 humpbacked salmon fry are estimated to have migrated in the Goluboy Creek in 2020. In 2020, the timing of humpbacked salmon spawning migration in the Goluboy Creek was close to the average for rivers of the Tonino-Anivsky Peninsula. Filling of the spawning grounds in the Goluboy Creek was significantly lower than the long-term annual average value — the number of spawners that entered the area in 2020 was estimated at 10 thousand specimens. Around 70% of the total number of fish that entered the area actually spawned in the stream, while the rest were killed by poachers. Most salmon failed to get further than the bridge across the federal road. Most humpbacked salmon spawning grounds were registered within the protected area of the LNG plant and in the area from the LNG plant to the federal road.

Rare and threatened birds monitoring programme

During the Sakhalin-2 project planning stage, extensive in-depth studies of avifauna were conducted along the entire onshore pipeline route and in the waters of the offshore fields and Prigorodnoye Port. The results helped to establish species composition and number of birds, and identify important nesting, migration, and feeding areas. Avifauna studies were primarily focused on a few protected bird species that are especially sensitive to human-induced impact; these species became the target of subsequent observation as part of the environmental monitoring and biodiversity conversation programme during the operational phase of the project.

The objective of the rare and threatened birds monitoring programme is to assess the impact of Company's activities on the population and habitat of rare and protected bird species.

The following tasks are addressed by the programme:

- identification of the species composition and the density of the background bird community; assessing the condition of avifauna and key habitats;
- identification and mapping of nests and nesting sites of rare and protected bird species in the areas of potential impact of the production facilities;
- mapping of the locations where rare and protected bird species were spotted; collecting data on species, gender, number and behaviour;
- assessment of the condition of rare and protected bird species, in particular key monitored species − the Sakhalin Dunlin and the Aleutian Tern at the Chaivo Spit; the Siberian grouse, owls, and the long-billed murrelet near the OPF; the Latham's snipe near the Prigorodnoye production complex; the Latham's snipe, rare owl species, the yellow-breasted bunting, and the mandarin duck along the pipeline route.
- Conducting a comparative analysis of the results against background surveys and monitoring data from previous years to identify changes and, if necessary, to develop remedial environmental measures to mitigate the impact of the ongoing production activities of the company on the avifauna.

Based on the results of the long-term monitoring in the potential impact zone of the Prigorodnoye production complex, including the adjacent offshore area, 29 protected species were registered, the most important of which were the Latham's snipe and the Japanese robin. Reclamation works carried out in the areas of materials and soil storage in the vicinity of the LNG plant after the completion of its construction created additional meadow areas suitable for the nesting of the Latham's snipe. Since the plant's commissioning, the number of individuals has been increasing steadily. Currently, breeding pairs occupy all suitable habitats in the area around the plant. It is predicted that the density of this species will stabilise and subsequently decrease with the emergence and development of tree vegetation in the meadow areas.

Even though the Japanese robin was removed from the list of protected species in the latest (2016) edition of the Red Book of the Sakhalin Oblast, it is still being monitored. It has been observed that the number of individuals fluctuates significantly in the vicinity of the LNG/OET− from one to nine pairs in different years − due to the natural instability of the Japanese robin population abundance on the border of their habitat.

Other protected species include several pairs of the reed bunting nesting in the reed on the shore of Mereya lake. Nesting of the Long-billed murrelet and the White-tailed eagle has also been assumed after young and adult individuals were spotted in the summer period.

In the course of the long-term monitoring along the pipeline route, 43 protected bird species have been observed. Most of them are registered during seasonal migrations when they cross the island. Special attention is given to the condition of such nesting species as the Siberian grouse, the Japanese quail, the mandarin duck, the Latham's snipe, the green sandpiper, the Japanese waxwing, the yellow-breasted bunting, diurnal birds of prey, and owls. Due to the great variety in the birds' habitats along the pipeline route, their distribution is extremely uneven.

The long-term monitoring of the Latham's snipe revealed the species' gradual resettlement to the north of the island. The emergence of grassy vegetation on the pipeline route in the forest area has had a positive effect on their numbers. The snipe has gradually populated the pipeline right-of-way in the southern and central districts of the island, and recently there have been occurrences in the northern area. Despite its high abundance, this species is protected due to its limited distribution.

The monitoring area in the valley of the Lesnaya river is used for the assessment of abundance of the mandarin duck, while the Tymovsk valley serves for tracking the condition of the nesting aggregation of the yellow-breasted bunting, the Japanese quail, and the great grey owl. The northern stretch of the pipeline crosses the habitats of the Japanese waxwing, the Siberian grouse, the Northern hawk owl, the boreal owl, and the Eurasian pygmy owl.

The long-term avifauna monitoring along the pipeline route has shown that the species composition of protected nesting bird species is stable, which indicates absence of impact. The population of owls demonstrates yearly fluctuations linked to the abundance of mouse-like rodents that they prey upon.

In the vicinity of the OPF, 31 species of birds listed in the Red Books of the Russian Federation and the Sakhalin Oblast have been registered. The area adjacent to the OPF is highly populated by such rare species as the Siberian grouse, the long-billed murrelet, the Northern hawk owl, the boreal owl, and the Eurasian pygmy owl. The monitoring of their populations is divided into two periods. The spring period is designated for assessing the number of males of the Siberian grouse at the lekking sites and counting owls in the nesting areas. In the summer period, the long-billed murrelet is monitored in the mornings and the evenings when pairs fly from the feeding areas at the seacoast to the nests and back.

The study of the Siberian grouse using individual markings showed that males are quite conservative in terms of habitats: every year they choose the same lekking grounds, which makes this species extremely vulnerable. The density of the Siberian grouse population in the OPF area corresponds to the density of this species in optimal habitats on the mainland part of their range. During the operational stage, the monitoring revealed a decrease in the number of Siberian grouse, associated with the reduction of the forest habitat areas due to third party man-made impact. Monitoring of the long-billed murrelet demonstrates that up to 6–7 pairs of this species make nests in the woods adjacent to the plant.

Small terrestrial mammals monitoring programme

Shrews and mouse-like rodents play an important role in natural ecosystems. Their high numbers and fertility, short lifespan and fast population turnover make them great indicators of the state of the environment. Human-induced impact decreases the total number of species, changes species

composition and the structure of small mammal communities. Animal mortality increases, which in turn results in intensified breeding. The breeding rate rises due to increased fertility and accelerated maturation of young-of-the-year. Decrease in the quality and quantity of forage resources impacts the values of exterior parameters. Individuals from reference areas are often larger than those from contaminated areas.

The monitoring of small terrestrial mammals was conducted by the Company in the potential impact zone of the LNG plant, BS-2 and OPF between 2008 and 2016. The monitoring at these assets was suspended as no adverse impact by the Company's operational activities was identified. Presently, Sakhalin Energy executes the monitoring of small terrestrial mammals in the potential impact zone of the OPF-C asset to identify if there is any negative impact from the construction activities of the asset. The studies are carried out on three test sites in the area of potential impact of the production facility, and on three corresponding reference sites located in similar plant communities more than 3 km away from the asset. The structure of small mammal communities, species diversity, the abundance of rodents and shrews, as well as the morphometric and demographic parameters of the indicator species are assessed.

The results of the latest monitoring conducted at the OPF-C in 2019 have shown that Laxmann's and slender shrews were the most abundant shrew species, and the Northern red-backed vole was the predominant species among the rodents. The long-clawed shrew and grey red-backed vole were less abundant. Naturally low abundance of the least shrew, large-toothed shrew, wood lemming and Korean field mouse was registered. The total number of shrews amounted to 14.5 ind./100 cone-days, and of rodents, 30.8 ind./100 trap-days. Shrew communities were single-species predominant in the test sites with the Laxmann's shrew being the predominant species (65.0%), double-species predominant in the reference sites, with the slender shrew being subdominant (34.1%). Rodent communities demonstrated a stable single-species predominant structure in all monitored sites with the Northern red-backed vole being the predominant species (86.2–99.0%). Most of the monitored morphometric and demographic parameters of the indicator species were within the natural range, both in the test and in the reference sites. However, some exterior parameters of the Laxmann's shrew, Northern red-backed vole and grey red-backed vole showed a significant difference between the test and the reference sites. Moreover, a higher breeding intensity of the Northern red-backed vole was registered in the test sites in the vicinity of the production facility. These differences can be caused both by a potential minimal impact of human-induced activities in the production facility area and by natural causes. This will be clarified during subsequent monitoring.

Offshore facilities impact monitoring programme

Environmental safety and conservation of the marine environment during offshore field development are key priorities of Sakhalin Energy. To ensure timely detection of potential impact on the quality of sea water, bottom sediments and the condition of biological communities as well as to monitor the effectiveness of impact mitigation measures, the Company conducts regular environmental monitoring in the potential impact area of the offshore facilities.

As a part of the offshore facilities impact monitoring programme, Sakhalin Energy studies the condition of the marine biota and its habitat near the Company's production assets in the shelf area of the Sea of Okhotsk off the north-eastern shore of Sakhalin and in the coastal area of Aniva Bay. Field studies in the Piltun-Astokhskoye and Lunskoye oil and gas fields (near the PA-A, PA-B and LUN-A platforms, as well as in the vicinity of drilling waste disposal wells) are conducted in the autumn period from the supply vessel Gennadiy Nevelskoy. The monitoring of the Prigorodnoye Port water area in Aniva Bay (near the tanker loading unit of the oil export terminal (TLU-OET) and the LNG jetty) is conducted from the Company's tugs.

Overall, the long-term monitoring did not identify significant residual impact by the operations of the offshore assets. The latest monitoring executed in 2020 demonstrated the following:

- the hydrochemical indicators and levels of contaminants (total petroleum hydrocarbons (TPHs), phenols, detergents) in sea water near the offshore production assets are generally considerably below the maximum permissible concentration (MPCf) values established for fishery waters and do not exceed baseline levels for these water areas;
- the distribution of chemicals (phenols, detergents, TPH) in bottom sediments is uneven due to the mosaic distribution of bottom sediment types and geological properties of the region;
- in general, concentrations of contaminants in the bottom sediments near the platforms are low and do not exceed baseline levels (average TPH levels varied between 0.54–2.30 µg/g, phenols — 0.05–0.06 µg/g, detergents — 1.83–2.93 µg/g) and are considerably below the concentration values that can cause primary biological effects on the individual and community levels of marine ecosystems;
- the concentration of TPHs determined by the studies in bottom waters and bottom sediments near the drilling waste disposal wells do not exceed baseline levels. The maximum concentration of TPHs in the sea water reach 0.032 mg/dm3, which is 1.5 times lower than the MPCf. TPH levels in bottom sediments peaked at 5.5 µg/g, which is 6 times lower than baseline values typical for these water areas;
- no accumulation of pollutants is recorded near the wellheads of the abandoned appraisal wells at the Piltun-Astokhskoye and Lunskoye fields;
- the concentrations of methane and TPHs in bottom waters and bottom sediments do not exceed background values established for these license areas;
- several benthic communities have been identified near the platforms and at the borders of the fields. They are typical for the shelf of the Sea of Okhotsk and are characterized by high species diversity with great abundance indicators comparable to baseline values. Common sand dollars, sea anemones, bivalves and gastropods make up the majority of the benthos biomass. Polychaetes and crustaceans are the most abundant representatives of the communities. Amphipods and polychaetes have the largest number of species; bivalves and gastropods are also quite diverse. The species composition of the benthos is stable. No downward trends in the indices of species diversity and abundance have been identified in the study areas;
- overall, the water area of Prigorodnoye Port is characterised by low concentrations of contaminants both in the sea water and in bottom sediments, as well as by a high abundance of indicator species in the benthos; species sensitive to pollution are the most abundant in the benthic communities.

Gray whale and other protected marine mammals monitoring programme

According to the long-term data, the most common species in the waters of the north-eastern coast of Sakhalin are cetaceans such as the harbour and Dall's porpoises, the minke whale, the gray whale; and pinnipeds such as the largha or spotted seal, the northern fur seal, and the Steller sea lion. Individual specimens of other rare species, including the Cuvier's beaked whale, the short-finned pilot whale, the northern right whale dolphin, and the North Pacific right whale have been observed over the years of monitoring.

The Okhotsk-Sea population (Western subpopulation) of gray whales, which also has a high conservation status in the Red Book of the Russian Federation and is on the Red List of the International Union for Conservation of Nature (IUCN), feeds near Sakhalin Energy's offshore production assets during the ice-free period. The Company therefore pays close attention to the monitoring and conservation of gray whales, as well as other marine mammal species.

The corporate Marine Mammal Protection Plan (MMPP) makes it possible to take into account all the risks associated with production activities, and to take timely measures to reduce any negative impact. This includes establishing special corridors for vessels to bypass the main feeding areas of gray whales, imposing speed restrictions for vessels, prescribing specific minimum distances between vessels and marine mammals to ensure their safety. Another key component of the MMPP is the presence of marine mammal observers while conducting vessel operations in the areas where whale encounters are more likely, which has been run as a separate observation programme since 2003.

As in previous years, Sakhalin Energy, in close cooperation with the Sakhalin-1 operator, continued implementing an integrated monitoring programme (the Joint Programme) of the Gray whale near the north-eastern coast of Sakhalin Island that started in 2002.

During the monitoring season in 2020, 175 individual whales were preliminarily identified, including nine calves and two new adult whales. Updates on 11 newly registered whales have been made to the Sakhalin photo identification catalogue, which, as a result, now includes 332 animals. In addition to field studies, considerable efforts are focused on making an interdisciplinary analysis of the data collected over the past years, and on preparing research results for publication in peer-reviewed scientific journals.

The results of the long-term monitoring indicate the well-being of the gray whale feeding aggregation that comes near to the Company's offshore production assets. According to experts from the Western Gray Whale Advisory Panel (WGWAP), the number of individuals in the subpopulation has seen an annual increase of 4.3–5.4%.

There were zero incidents negatively impacting marine mammals registered since the start of Sakhalin Energy's operations on the north-eastern shelf of the island. All of this indicates the management of the environmental aspects of the Company's activities and the measures applied to minimise their impact are effective.

Steller's sea eagle monitoring programme

The Steller's sea eagle is the world's largest fish-eating bird of prey. This species is listed in the IUCN (International Union of Conservation of Nature) Red List (Category VU, Vulnerable), in CITES (the Convention of International Trade in Endangered Species) Appendix II, in the Bonn Convention, in bilateral agreements on the protection of migratory birds between Russia and the USA, Japan, and South Korea, in the Red Book of the Russian Federation (Category III, Rare), and in the Red Book of the Sakhalin Oblast (Category II, Rare).

The company monitors eagles and has implemented impact mitigation measures for the Steller's Sea Eagle and White-Tailed Eagle during construction and operation stages of the Sakhalin-2 project.

Monitoring is conducted in the Nogliki District within a 2 km corridor along the onshore pipeline routes, within a 3 km zone around OPF boundaries, and in the control zone at a distance of up to 2 km from the northern part of the Lunsky Bay shoreline. The research is focused on the following parameters:

- the total number of Steller's sea eagles, their age composition, the number and quality of nests
- the predator pressure by brown bears, and;
- the degree of anthropogenic impact.

Comparison of the data obtained at the monitoring sites and the control zone makes it possible to assess the degree of influence of the Company assets on the nesting population of eagles.

The monitoring results of 2020 identified the following:

- 137 Steller's sea eagles and 5 white-tailed eagles were identified during the field study;
- 174 nests were inspected, of which 13 were newly-built;

- 77 eagle nesting sites were inspected along the pipeline route: 13 nests were used by eagles for breeding, 22 nests were occupied by eagle pairs that did not breed in them, 7 nests were visited by eagles only occasionally, 12 nests were unoccupied, 13 nests were abandoned, and 10 were destroyed;
- in total, 67 eagle nests were identified within the pipeline impact area, 69% of which were in good and satisfactory condition. Most of the nests had been built in trees, but 37% were located on power transmission line supports;
- in the control zone located in the northern part of Lunsky Bay, 91 eagle nesting sites were inspected. 19 of them were inhabited by nesting pairs, 16 nests were permanently occupied, 9 nests were occasionally visited by eagles, 10 nests were unoccupied, and 7 nests had been abandoned;
- one third of all nests recorded in the control zone in 2019 (30 nests) had ceased to exist due to the windfall. As a result, there were 61 eagle nests in the control zone as of 2020, 57% of which were in good and satisfactory condition;
- of the 13 eagle nests along the pipeline route, 9 nests were inhabited by pairs which successfully raised one chick each; three nests on the Chaivo Spit had been ravaged by a bear, and from one of the nests, a chick fell out and died. In total, 9 chicks left the nests;
- of the 19 nests in the control zone, one chick per nest was successfully raised by eagle pairs inhabiting 14 nests, two chicks per nest were reared in 4 nests, and one chick died in one nest. The total number of chicks that left the nests was 22;
- the average Steller's sea eagle brood size in the potential pipeline impact area was 1.0 chicks per pair, and in the control zone — 1.22 chicks;
- in 2020, six nesting sites were inspected in the area of potential OPF impact. Two of the identified nests had been abandoned, and four nests had fallen to the ground as a result of storms. The anthropogenic load observed in recent years in the vicinity of the OPF and on the adjacent sea coast persists;
- during the field study of 2020, young immature individuals accounted for only 1.5% of the birds. The low proportion of immature individuals is due to the fact that in summer they tend to spend most of their time in the feeding areas, on the shores of shallow bays, and therefore are not included in the head count carried out at the nesting sites;
- in 2020, the impact of bears on the eagle population, or the predator pressure, was characterised as significant for the potential pipeline impact area (3 nests were destroyed) and insignificant for the control zone. In the control zone, no confirmed cases of nests destroyed by bears were identified; in four cases, however, fresh claw marks were noted in the lower part of the trees with nests.

Overall, the long-term monitoring showed that the are no significant adverse impact on the breeding population of eagles in the potential impact area of the Company.

Sakhalin Taimen monitoring programme

The Sakhalin taimen is a relative of Pacific salmons. In favourable conditions, it reaches an impressive 1.5 m in length and can weigh more than 50 kg. Sakhalin taimen is anadromous species but is often considered semi-anadromous since it undertakes multiple migrations, back and forth, between sea and river. The species is endemic with a range limited to separate areas. Major taimen habitats include estuarine and lower regions of large rivers, as well as brackish lagoons, estuary canals, and bays. Most large and stable taimen populations of Sakhalin are known in the rivers of northwest of the island.

Taimen grows slowly and has late sexual maturity. They first spawn at 6-8 years old, which increases the vulnerability of the species. The Sakhalin taimen is now listed in the IUCN Red List as a critically endangered species.

Sakhalin Energy has monitored the Sakhalin taimen between 2008 and 2017 on the following rivers:

- The Severnaya Handasa river and its tributaries;
- The Lazovaya river and its tributaries;
- The Pilenga river and its tributaries;
- The Val river and its tributaries.

The monitoring results of the Severnaya Handasa river showed that the largest abundance and biomass of Sakhalin taimen were observed in the area of the river crossing by the Sakhalin Energy integrated pipeline system. During the monitoring traces of illegal installation of nets were recorded.

The monitoring results on the Lazovaya river in different years registered presence of the Sakhalin taimen in summer period. A decline in the average number of juvenile taimen from 2013 to 2015 was noted. Low number of adult fish producers entering the river and use of the river for different types of fishing are recognized as a potential reason.

The monitoring of the Pilenga River identified feeding habitats of Sakhalin taimen that are limited to the main riverbed in its lower part as these are suitable biotopes for the species: relatively deep areas with a slow flow and a large number of shelters. No taimen spawning habitats have been found in the Pilenga River.

The same feeding habitat limitations of the Sakhalin taimen were identified at the Val river, i.e. relatively deep areas with a large number of shelters and the lack of fishing/poaching activities. Juvenile fishes of the Sakhalin taimen inhabit parts of the river with long stretches and holes with aquatic vegetation available. Based on the size and age characteristics of the Sakhalin taimen individuals, the Val river was recognized to have an important spawning significance for this species.

No contamination of the chemical nature of the watercourses or significant coastal erosion attributable to the operations of the Company was identified.

Based on the results of the monitoring of the Sakhalin taimen in 2008 – 2017 no significant adverse impact from the Company's activities on the Sakhalin taimen was identified. At the same time, a decline of the species was recorded, putting the Sakhalin Taimen at risk of extinction. Poaching is recognized as a major threat for the species.

Ballast water impact monitoring programme

Every year over 200 standard hydrocarbon cargoes are loaded onto oil tankers and LNG carriers arriving to the Prigorodnoye production complex, mainly from ports of the Asia Pacific Region. Ballast water taken on by a vessel at the port of departure may contain invasive (alien to the local environment) marine organisms, which, under favourable conditions, can adapt to the local environment, disturb the balance of the ecosystem of Aniva Bay and cause harm to human health.

Sakhalin Energy has developed a package of preventive measures to manage ballast water risks based on international regulations and best industry practices. Currently the most effective measures to prevent the introduction of alien species are either ballast water exchange on the high seas (D-1 regulation) or employing ballast water treatment system on the vessel (D-2 regulation). These methods are in accordance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Convention), adopted by the International Maritime Organisation in 2004. The Company included requirements to manage this risk in the corporate Ballast Water Management Policy in 2009 prior to the start of large-scale hydrocarbons transportation. Since September 2017, ballast water and sediment management requirements have become mandatory for all countries that have joined the Convention, including the Russian Federation, which ratified it in 2012.

Ballast water monitoring and control of tankers and LNG carriers to be loaded in Prigorodnoye port include:

- checking vessels' logbooks for confirmation of ballast water exchange in deep waters of the Pacific Ocean and the Sea of Japan;
- bacteriological analysis of ballast waters from the vessels with installed and operational ballast water treatment systems (D-2 regulation);
- planktonic organisms sampling for subsequent analysis in the laboratory to identify dangerous species.

A vessel is only allowed to commence discharging ballast water and loading hydrocarbons when an exchange of ballast water in deep waters or its treatment using a dedicated system is confirmed.

The results of phyto- and zooplankton species analysis in the ballast waters from tankers and LNG carriers occasionally detect potentially dangerous planktonic organisms among species that are not typical for Aniva Bay in some ballast water samples. Since these organisms were found only rarely and in small quantities, the risk of their adaptation and mass growth in Aniva Bay waters is very low. Bacteriological analysis of ballast waters from vessels that employ ballast water treatment systems did not reveal any dangerous microorganisms.

Overall, the results of the long-term monitoring did not identify significant adverse impact from the ballast water operations of the Company on marine flora and fauna of Aniva Bay.

Wetlands monitoring programme

Wetlands are important to global biodiversity and are sensitive habitats dependent on the hydrological regime, where disruption to hydrological processes may significantly alter their vegetation characteristics. The value of wetlands for the environment is significant - they store and purify water that feeds streams and rivers and regulate flow, thereby creating conditions for fish spawning. Some wetlands provide essential habitat for birds during seasonal migration. Wetlands play a crucial role in absorbing atmospheric carbon. According to the Ramsar Scientific and Technical Review Panel, wetlands cover just 2-3% of the planet's land surface yet are estimated to store 35% of terrestrial carbon[3].

The Sakhalin-2 integrated onshore pipeline system crosses about 200 boggy areas. Most of them are oligotrophic wetlands - the most common type of wetlands on the island, that are especially fragile.

Sakhalin Energy regularly monitors the restoration of natural bog vegetation on the right-of-way and in the pipeline potential impact zone. The objectives of the wetlands monitoring programme include:

- to monitor wetlands recovery processes after the construction and reinstatement works of the right-of-way;
- to monitor the condition of vegetation cover in the adjacent areas;
- to assess all potential adverse impacts on wetlands resulting from onshore pipeline operations;
- to develop impact mitigation measures, if necessary.

Originally the monitoring was conducted on the 20 main and 15 additional wetland areas, however, some wetlands areas have completely reinstated, therefore monitoring at those areas is no longer required. The reinstatement of the remaining areas is progressing at a stable, although not very quick pace, which was originally expected as wetlands, by their nature, are slowly recovering ecosystems. That is why the primary mitigation by the Company was to recultivate disturbed habitats in the wetland areas following

[3] https://wetlandinfo.des.qld.gov.au/wetlands/ecology/processes-systems/carbon-cycle.html

finalization of the pipeline construction in a way to create conditions for successful natural recovery of the wetlands rather than forcing quick man-made restoration that did not match original conditions.

The results of the recent years monitoring demonstrated high rates of the vegetation cover recovery at the wetland locations. The grass cover in all areas is above 75%, with the average being 80–90%. Good recovery of the grass-shrub layer is observed on the right-of-way on most of the monitored locations.

Positive recovery trends of moss, lichen, and shrub layers has been observed. No new to Sakhalin invasive species of vegetation on the right-of-way that can be harmful for local ecosystems have been recorded. The only natural habitat of the Pogonia Japonica (a protected plant species from the orchid family), identified on Sakhalin Island during wetlands monitoring, has not been violated, and the plants are in good condition.

Chaivo spit monitoring programme

The monitoring of Chaivo spit is executed by the Company as a part of the rare and threatened birds monitoring programme. The Chaivo spit occupies a special place in the birds monitoring programme, since it is a part of the Lagoons of North-Eastern Sakhalin, a key ornithological territory of international significance. The reason for this is that the migration routes of gulls, ducks and waders lie along the spit; in addition, the Chaivo spit attracts wetland birds as a nesting site. During the long-term avifauna monitoring of the Chaivo spit, 193 bird species were registered in the summer periods, 37 out of them are listed in the Red Books of the Russian Federation and the Sakhalin Oblast.

At the pipeline route designing stage, colonies of the Sakhalin dunlin and the Aleutian tern − both protected species − were discovered in the pipeline landfall area at the Chaivo spit. To reduce the impact of the project on these species, the pipeline route was diverted to bypass the colonies, and the subsequent construction work was suspended for the entire nesting period. Certain types of work were not permitted until the mapping of the nesting grounds was completed and the birds' absence in the work area was confirmed. Subsequent monitoring of the nesting colonies showed that the laying of the pipeline route did not affect the number of breeding pairs of the Sakhalin dunlin and the Aleutian tern at the Chaivo spit. The observations have shown that individuals of the Sakhalin dunlin are highly attached to their nesting sites. As for the Aleutian tern, it has been revealed that the colony distribution within the area is not consistent, i.e. birds do change their nesting areas from year to year, which is due to the biological peculiarities of this species.

Nests of the red-necked phalarope, the long-toed stint, the horned grebe, the American scoter, the common goldeneye, the red-breasted merganser, the black-throated diver, the red-throated diver, and other species have been discovered in the area of potential impact from the pipeline at the Chaivo spit. Most of them are located on the southern border of their nesting ranges, which increases the importance of preserving the birds' habitats at the spit.

7 IDENTIFICATION OF BIODIVERSITY PRIOIRITIES

7.1 CRITICAL HABITAT BIODIVERSITY PRIORITIES

As provided by the Introduction chapter to this document, in 2012 Sakhalin Energy voluntarily committed to adhere to IFC Environmental and Social Performance Standards (PS), including PS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources, 2012). The PS6 requires every project committed to the IFC PS to achieves a net gain for critical habitat biodiversity values though the development and implementation of biodiversity offsets for significant measurable residual impacts after appropriate avoidance, minimization and reinstatement of impacts. Further support on implementation is provided in Guidance Notes (GN).

GN6-91. "A Biodiversity Action Plan (BAP) is required for projects located in critical habitat and is recommended for high-risk projects in natural habitats. The BAP describes (i) the composite of actions and a rationale for how the project's mitigation strategy will achieve net gain (or no net loss), (ii) the approach for how the mitigation hierarchy will be followed, and (iii) the roles and responsibilities for internal staff and external partners. BAPs are living documents that should include agreed-on timelines for regular review and update as new information arises, project implementation progresses, and conservation context changes over time…"

PS6 "Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated. Net gains may be achieved through the development of a biodiversity offset and/or, in instances where the client could meet the requirements of paragraph 17 of this Performance Standard without a biodiversity offset, the client should achieve net gains through the implementation of programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity."

PS6 "For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance, minimization, and restoration measures have been applied. A biodiversity offset should be designed and implemented to achieve measurable conservation outcomes that can reasonably be *expected to result in no net loss and preferably a net gain of biodiversity; however, a net gain is required in critical habitats. The design of a biodiversity offset must adhere to the "like-for-like or better" principle and must be carried out in alignment with best available information and current practices. When a client is considering the development of an offset as part of the mitigation strategy, external experts with knowledge in offset design and implementation must be involved."*

7.1.1 MITIGATION HIERARCHY AND RESIDUAL IMPACT

IFC PS6 requires that a project applies the Mitigation Hierarchy for the management of its impacts on biodiversity and ecosystem services (BES). The Mitigation Hierarchy is not a goal but a tool that helps organizations and projects to contribute to the sustainable management of living natural resources and provide for balanced decisions aimed at meeting project development and biodiversity conservation needs. It implies three main steps (avoid – mitigate – reinstate) supplemented by the fourth one as may be required (offset). The MH is to be applied subsequently by a project in the early stages of the development to manage its BES risks until those risks are deemed to be well balanced. The first three steps of MH are mandatory for all clients in natural habitats, the fourth offset step is required for the projects in critical habitats for compensation of significant residual impacts persisting after appropriate implementation of avoidance, mitigation and restoration measures.

As defined by the Cross-Sector Biodiversity Initiative (CSBI, 2013), the mitigation hierarchy is: *'the sequence of actions to anticipate and avoid impacts on biodiversity and ecosystem services; and where*

avoidance is not possible, minimize; and, when impacts occur, rehabilitate or restore; and where significant residual impacts remain, offset.

Mitigation Hierarchy ("A cross-sector guide for implementing the Mitigation Hierarchy", TBC 2015).

According to IFC PS6 biodiversity offsets are "*measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimization and restoration measures have been taken."* Offsets are normally implemented in the areas not impacted by the project (i.e. off-site).

Offset should be always the last resort step to manage significant residual impacts that cannot be addressed through avoidance, minimization and restoration measures. Offsets are usually expensive and complex actions that are not always certain in outcomes. Thus, the need for an offset should be reduced as far as possible through the timely application of preceding stages of mitigation hierarchy (i.e. avoidance – minimization – restoration).

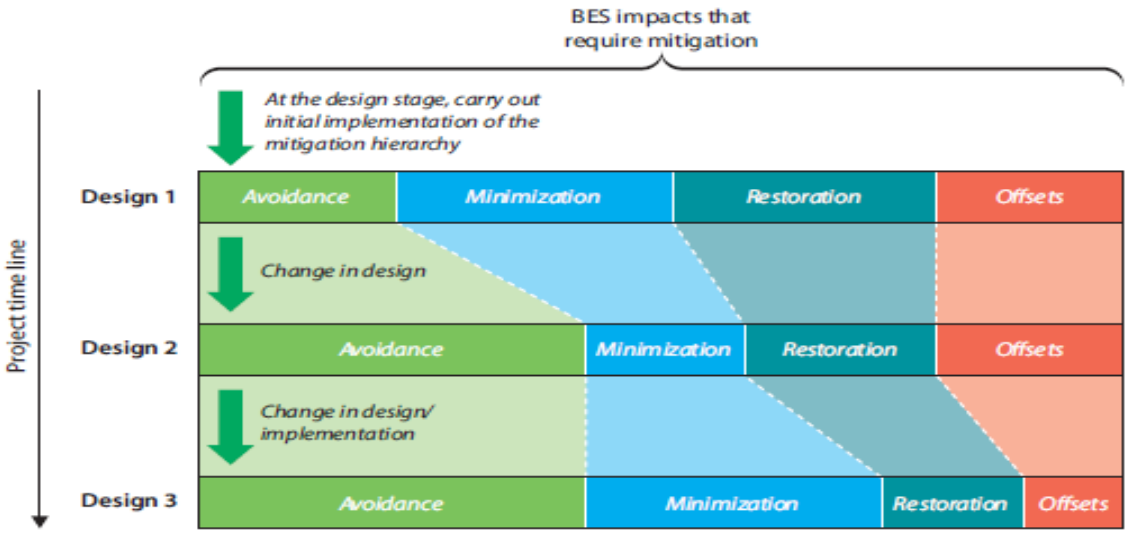


Figure 2. Successive application of MH through a project lifetime leading to minimization of residual impact ("A cross-sector guide for implementing the Mitigation Hierarchy", TBC 2015).

To identify and assess possible impacts of the project on the local environment and define mitigation measures, during the design stages Sakhalin Energy developed the main project international-style environmental and social impact assessment in 2003 followed by an addendum in 2005 (EIA 2003, 2005). In the course of the assessment, the Company identified and evaluated its potential major construction and operational impacts on the local biodiversity and ecosystem services. The results of the assessment

estimated the overall residual impact on biodiversity values after appropriate implementation of avoidance, mitigation and restoration measures as being from '***minor'*** to ***'moderate'***. During the construction and operational phases, the Company has successfully implemented the avoidance – mitigation – restoration measures proposed in the EIA.

The results of the long-term impact monitoring **have not identified significant measurable residual impacts** on the key biodiversity values covered in this BAP. Therefore, the Company considers that formal measurable offsets are not required to be developed. Instead, Sakhalin Energy proposes to apply the concept of Additional Opportunities (AO) or Additional Conservation Actions (ACA) to generate positive conservation outcomes for the identified biodiversity priority values.

CSBI, 2015: "*As well as offsets, projects may undertake 'additional conservation actions' (ACAs). The term refers to a wide range of interventions that are intended to be positive for BES, the impacts of which may be hard to quantify. ACAs may or may not target BES features that have been significantly impacted by a project, but unlike offsets they are not designed to provide measurable gains that can be set against those impacts."*

7.1.2 SUMMARY OF CRITICAL HABITAT ASSESSMENT

Paragraphs 16 to 19 of the IFC PS6 stipulate the requirements for managing globally important biodiversity. To confirm its compliance with these requirements, the Company conducted a Critical Habitat Assessment that was finalized and formalized in 2019.

The Critical Habitat Assessment evaluates the biodiversity importance of an area based on the value of its biodiversity units and not the potential impacts of a project. Should a species qualify an area as Critical Habitat, it does not necessarily mean that it will require any specific mitigation if there are no project impacts. However, where potential impacts do occur, PS6 requires the project to "*fully exercise the mitigation hierarchy*", including compensation of significant residual impacts.

In accordance with paragraphs 16 to 19 (IFC PS6), habitats in the potential impact zone of Sakhalin-2 project were assessed for the presence of the following critical habitat qualifying features:

- ✓ **Criterion 1 (Cr1)** - Critically Endangered and Endangered species (globally or nationally);
- ✓ **Criterion 2 (Cr2)** - Endemic/Restricted-range species;
- ✓ **Criterion 3 (Cr3)** - Concentrations of migratory or congregatory species;
- ✓ **Criterion 4 (Cr4)** - Highly threatened and/or unique ecosystems; and
- ✓ **Criterion 5 (Cr5)** - Areas associated with key evolutionary processes.

It is important to note, however, that in Sakhalin Energy case, the CHA was conducted for a larger area than the project potential impact zone covering biodiversity values that inhabit areas where no Company assets or impacts exist (e.g. Kaluga fish species which only occurs in the western part of the island).

The CHA document distinguished 6 Discrete Management Units (DMUs). DMU is an area that has a definable boundary (either ecological or, if not possible, political) within which the biological communities have more in common with each other than they do with those outside the boundary. In June 2019 the International Financial Corporation issued an updated PS6 Guidance Note, which replaced the term "DMU" with "Ecologically Appropriate Areas of Analysis" (EAAA). The term EAAA is used here in the BAP to be aligned with the updated IPS PS GN, the terminology in the CHA will be updated at the next revision.

EAAAs identified by the CHA:

1) North-east Shelf Zone (EAAA 1): The offshore area extending from the coast to 100m depth. The northern extent is the northern border of Tropto Bay. The southern extent aligns with the northern end of the Sakhalin Central ridge (located to south from Lunskyi Bay). There are two platforms In the northern part of this area and one platform in the southern part. The total area is 14,244 km2.
2) Inner Lagoons (including areas between lagoons) (EAAA 2): Habitat of Sakhalin Taimen in the North-East Lagoons and places for rest, food and water for wetland birds at the North-East and South parts of Sakhalin.
3) Aniva Bay (EAAA 3): The offshore area at the southern end of Sakhalin Island. From the shoreline to 100m depth. Extending from the promontory Aniva on the east till the promontory Crillon on the west. The total area is 7,171 km2.
4) Water bodies of northeastern Sakhalin (EAAA 4): Habitats which include some genetically distinct populations of Sakhalin taimen (Val River, Dagi River, Tym River, Nabil River, and Piltun Bay).
5) Poronai River Basin (EAAA 5): Habitats which include some genetically distinct populations of Sakhalin taimen (Langeri River, Poronai River and its tributaries, Onorka River, Onorsky, Barachny, Bolotny, Porok and Usanovka, Elnaya River, Severnaya Khandasa, Orlovka).
6) The terrestrial area from Chaivo Spit to Aniva Bay along the pipeline (EAAA 6): The length of more than 800 km and a width of 10 km in each direction from the pipeline Right of Way. This Zone significantly covers the area of potential impact of project facilities zone. The width of zones around OPF including OPF-C, BS-2, planned BS-3 and BS-4 (Train-3 Project) and Production Complex “Prigorodnoye” is 4 km.

Table 7.1 Results of the assessment. Critical Habitat qualifying features for Sakhalin Energy.

1	2	3	4	5
#	**CHA value (species)**	**EAAA number**	**Habitat**	**CH criterion**
Mammals				
1	Gray whale	1	Offshore north-east	Cr 1, Cr 3, Cr 4, Cr 5
2	Sakhalin musk deer	6	East mountain zone	Cr 4, Cr 5
Birds				
3	Steller’s sea eagle (SSE)	2, 6	Terrestrial zone/near shore from Chaivo Bay to Lunskiy Bay	Cr 2, Cr 4
4	Spoonbill sandpiper	2, 3	Lososey Bay as a part of Aniva Bay	Cr 1, Cr 3, Cr 4
5	Australian curlew	2, 3	Inner lagoon and Lososey bay	Cr 1, Cr 4
6	Sakhalin dunlin	2	North-eastern inner lagoons part	Cr 1, Cr 2, Cr 4, Cr 5

1	2	3	4	5
#	**CHA value (species)**	**EAAA number**	**Habitat**	**CH criterion**
7	Great knot	2, 3	North-eastern inner lagoons, Lososey Bay	Cr 1, Cr 3, Cr 4
8	Bewick's swan	2	Inner Lagoons north east zone	Cr 3, Cr 4
9	Whooper swan	2	Inner Lagoons north east zone	Cr 3, Cr 4
10	Baikal teal	2	Inner Lagoons north east zone	Cr 3, Cr 4
11	Greater scaup	1, 2	Offshore northeast	Cr 3, Cr 4
12	Harlequin duck	1, 2	Offshore northeast Inner Lagoons north east zone	Cr 3, Cr 4
13	Siberian scoter	1, 2	Offshore northeast Inner Lagoons north east zone	Cr 3, Cr 4
14	Black scoter	1, 2	Offshore northeast Inner Lagoons north east zone	Cr 3, Cr 4
15	Red-necked stint	1, 2	Offshore northeast and inner lagoon zone and Lososey Bay	Cr 3, Cr 4
16	Black-tailed godwit	1, 2	Offshore northeast and inner lagoon zone	Cr 3
17	Aleutian tern	1, 2	Offshore northeast and inner lagoon zone	Cr 3, Cr 4, Cr 5
18	Long-billed murrelet	1	Offshore northeast	Cr 3, Cr 4
19	Grey-tailed tattler	2, 3	Lososey Bay	Cr 3, Cr 4
Fish				
20	Sakhalin taimen	2, 3, 5	Water bodies (including inner lagoons) of north eastern and north western part of the island	Cr 1, Cr 2, Cr 4, Cr 5
21	Kaluga	N/A[4]	Northwest water bodies	Cr1, Cr 5
22	Sakhalin sturgeon	N/A	Inner lagoons of NW Sakhalin (Vihtu, Tyk and Lakh bays)	Cr1, Cr 5

[4] No EAAA was distinguished in the CHA for the western part of the island as there are no Sakhalin Energy assets or activities that impact this area.

1	2	3	4	5
#	**CHA value (species)**	**EAAA number**	**Habitat**	**CH criterion**
23 - 26	Pacific salmons (4 species): • Pink salmon • Chum salmon • Coho salmon • Masu salmon	3, 6	Rivers/pipeline crossing	Cr 4, Cr 5
Plants				
27	Glehn's spruce	6	Korsakov area (LNG plant zone)	Cr 2, Cr 4
28	*Pogonia japonica*	6	Terrestrial area in Dolinsk district	Cr 2, Cr 4
29	*Mecodium wrightii*	6	Along the pipeline in Makarovsky district	Cr 2, Cr 4
30	*Miyakea integrifolia*	6	East mountain zone	Cr 5
31	*Pulsatilla tatewakii*	6	East mountain zone	Cr 5

Based on the results of the assessment, 31 critical habitat qualifying biodiversity values or species have been identified. Section 7.1.3. below identifies the biodiversity priorities for Sakhalin Energy among these species.

7.1.3 BIODIVERSITY PRIORITIES OF SAKHALIN ENERGY BASED ON THE RESULTS OF THE CRITICAL HABITAT ASSESSMENT

To identify its biodiversity priority species, the Company conducted further analysis that links the CHA results with residual impact from Sakhalin Energy assets and activities. The results of this analysis are provided in tables 7.2 through 7.4 below.

Table 7.2 is based inter alia on the relevant monitoring reports and indicates presence of impact for CHA species arising from the project construction and operation activities as well as highlights the status of the species in a global context and in the project influence zone. Rows marked in grey are the species with no identified impact from the project during both construction and operation stages, i.e. no residual impact by the Company persisting on these species – these species are not further considered as potential biodiversity priority species in this BAP.

Tables 7.3 and 7.4 are designed to assess and identify species priority. A scoring system has been developed based on Sakhalin Energy's own assessment of the number and importance (weighting) of critical habitat qualifying criteria, identified impact by the project and status in the project impact zone for each of the CHA biodiversity values. The highest points score is given to the species with decreasing status in the project impact zone, species that trigger bigger number of CH qualifying criteria and species

that have Endangered (EN) or Critically Endangered (CR) status[5:]

- **Number of CH qualifying features** - a point is given for each CH qualifying feature triggered by a species;
- **Cr1 (CR or EN)** – three points are given to the species triggering this criterion;
- **Decreasing status in the project impact zone** – three points are given to the species triggering this criterion.
-

Table 7.2. CH qualifying species: number of CH criterion and status in the impact zone

1	2	3	4	5	6	7	8	9	10
#	**CHA value (species)**	**CH criteria**	**Impact by the project during construction**	**Impact by the project during operation**	**Status (global)** [6]	**Status (RF)** [7]	**Status (Sakhalin)** [8]	**Population trend** [9] **(global)**	**Population trend (project impact zone)** [10]
1	Gray whale	Cr 1, Cr 3, Cr 4, Cr 5	yes	yes	EN	1	n/a	increasing	increasing
2	Sakhalin musk deer	Cr 4, Cr 5	no	no	n/a	1	1	n/a	n/a
3	Steller's sea eagle (SSE)	Cr 2, Cr 4	yes	yes	VU	3	2	decreasing	decreasing
4	Spoonbill sandpiper	Cr 1, Cr 3, Cr 4	no	no	CR	1	1	decreasing	n/a
5	Far Eastern curlew (Australian curlew in the CHA)	Cr 1, Cr 4	no	no	EN	2	2	decreasing	n/a
6	Sakhalin dunlin	Cr 1, Cr 2, Cr 4, Cr 5	yes	no	n/a	2	1	n/a	stable

[5] As listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species. The determination of critical habitat based on other listings is as follows: (i) If the species is listed nationally / regionally as critically endangered or endangered, in countries that have adhered to IUCN guidance, the critical habitat determination will be made on a project by project basis in consultation with competent professionals; and (ii) in instances where nationally or regionally listed species' categorizations do not correspond well to those of the IUCN (e.g., some countries more generally list species as "protected" or "restricted"), an assessment will be conducted to determine the rationale and purpose of the listing. In this case, the critical habitat determination will be based on such an assessment.

[6] Based on IUCN Red List status: CR – critically endangered, EN – endangered, VU – vulnerable, NT – near threatened, LT – least concerned, n/a - species not covered/information not available.

[7] Based on the status in the 'Decree of Approval of RF Fauna Red List' (dated 24 March 2020): 1 – endangered, 2 – declining, 3 – rare, 5 – recovering/least concerned, n/a - species not covered/information not available.

[8] Based on the status in Sakhalin Region Red Book.

[9] Based on the population trend in the IUCN Red List.

[10] Based on the result of Sakhalin Energy monitoring surveys.

1	2	3	4	5	6	7	8	9	10
#	CHA value (species)	CH criteria	Impact by the project during construction	Impact by the project during operation	Status (global) [6]	Status (RF) [7]	Status (Sakhalin) [8]	Population trend [9] (global)	Population trend (project impact zone) [10]
7	Great knot	Cr 1, Cr 3, Cr 4	no	no	EN	2	n/a	decreasing	n/a
8	Tundra swan (Bewick's swan in the CHA)	Cr 3, Cr 4	no	no	LC	3 (for European population of Russia)	5	n/a	n/a
9	Whooper Swan	Cr 3, Cr 4	no	no	LC	n/a	5	n/a	n/a
10	Baikal teal	Cr 3, Cr 4	no	no	LC	2	5	increasing	n/a
11	Greater scaup	Cr 3, Cr 4	no	no	LC	n/a	n/a	decreasing	n/a
12	Harlequin duck	Cr 3, Cr 4	no	no	LC	n/a	n/a	increasing	n/a
13	Siberian scoter	Cr 3, Cr 4	no	no	LC	n/a	n/a	decreasing	n/a
14	Black scoter	Cr 3, Cr 4	no	no	NT	n/a	n/a	decreasing	n/a
15	Red-necked stint	Cr 3, Cr 4	no	no	NT	n/a	n/a	decreasing	n/a
16	Black-tailed godwit	Cr 3	no	no	NT	n/a	3	decreasing	n/a
17	Aleutian tern	Cr 3, Cr 4, Cr 5	yes	no	VU	n/a	3	decreasing	fluctuating [11]
18	Long-billed murrelet	Cr 3, Cr 4	yes	yes	NT	n/a	3	decreasing	stable
19	Grey-tailed tattler	Cr 3, Cr 4	no	no	NT	n/a	n/a	decreasing	n/a
20	Sakhalin taimen	Cr 1, Cr 2, Cr 4, Cr 5	yes	no	CR	1	2	decreasing	n/a

[11] The species uses the potential impact zone territory (pipeline RoW) for nesting only in years when their regular habitat becomes flooded, thus although the number of birds using the ROW varies from year to year, the overall status of the species is considered stable.

1	2	3	4	5	6	7	8	9	10
#	**CHA value (species)**	**CH criteria**	**Impact by the project during construction**	**Impact by the project during operation**	**Status (global)** [6]	**Status (RF)** [7]	**Status (Sakhalin)** [8]	**Population trend** [9] **(global)**	**Population trend (project impact zone)** [10]
21	Kaluga	Cr1, Cr 5	no	no	CR	1	2	decreasing	n/a
22	Sakhalin sturgeon	Cr1, Cr 5	no	no	CR	1	1	decreasing	n/a
23-26	Pacific salmons (4 species): • Pink salmon • Chum salmon • Coho salmon • Masu salmon	Cr 4, Cr 5	yes	no	n/a	n/a	n/a	n/a	n/a
27	Glehn's spruce	Cr 2, Cr 4	yes	no	LC	2 (declining)	3 (rare)	stable	stable
28	*Pogonia japonica*	Cr 2, Cr 4	no	yes	n/a	3 (rare)	3 (rare)	n/a	n/a
29	*Mecodium wrightii*	Cr 2, Cr 4	no	no	n/a	2 (declining)	3 (rare)	n/a	n/a
30	*Miyakea integrifolia*	Cr 5	no	no	n/a	1 (endangered)	2 (declining)	n/a	n/a
31	*Pulsatilla tatewakii*	Cr 5	no	no	n/a	n/a	3 (rare)	n/a	n/a

For 19 biodiversity values, out of the total of 31 identified by the CHA, there has been no identified impact from the project during either construction or operation phases and these are not further considered in the process of biodiversity prioritization of the current BAP.

Table 7.3. Number of triggers

#	Biodiversity value (species)	Triggers more than 1 CH qualifying	Triggers CR1 (EN/CR)	Impact by the project during	Impact by the project during	Global status decreasing	Status in the project impact zone	Total number of triggers (+)

		features		construction	operation		decreasing	
1	Gray whale	+	+	+	+	-	-	**4**
2	Steller's sea eagle (SSE)	+	-	+	+	+	+	**5**
3	Sakhalin dunlin	+	+	+	-	-	-	**3**
4	Aleutian tern	+	-	+	-	+	-	**3**
5	Long-billed murrelet	-	-	+	+	+	-	**3**
6	Sakhalin taimen	+	+	+	-	+	unknown	**4 + 1 unknown**
7-10	Pacific salmons (4 species)	+	-	+	-	unknown	unknown	**2 + 2 unknown**
11	Glehn's spruce	-	-	+	-	-	-	**1**
12	*Pogonia japonica*	-	-	-	+	-	-	**1**

Table 7.4. Value of triggers

#	Biodiversity value (species)	Number of CH qualifying features	Triggers CR1 (EN/CR): yes - 3; no - 0	Impact by the project during construction: yes - 1; no - 0	Impact by the project during operation: yes - 2; no - 0	Global status decreasing: yes - 2; no - 0; unknown - 0.5; complex - 1	Status in the project impact zone decreasing: yes - 3; no - 0	Total score
1	Gray whale	4	3	1	2	0	0	**10**
2	Steller's sea eagle (SSE)	2	0	1	2	2	3	**10**
3	Sakhalin dunlin	4	3	1	0	0.5	0	**8.5**
4	Aleutian tern	3	0	1	0	2	0	**6**
5	Long-billed murrelet	2	0	1	2	2	0	**7**
6	Sakhalin	4	3	1	0	2	0.5	**10.5**

	taimen							
7-10	Pacific salmons (4 species)	3	0	1	0	0.5	0.5	**5**
11	Glehn's spruce	2	0	1	0	0	0	**3**
12	*Pogonia japonica*	2	0	0	2	0	0	**4**

From the evaluation in table 7.4, Sakhalin Energy identified three main biodiversity priority species for net gain delivery, those with a score of 10 points or above, as follows:

- Gray whale (GW);
- Steller's sea eagle (SSE);
- Sakhalin taimen (ST).

As Pacific salmon (PS) and the Sakhalin Taimen are generally covered as a group in the Company's impact assessments, monitoring programmes and Additional Opportunities programmes implemented to date, the four species of Pacific salmon will additionally be included in this revision of the BAP. Therefore, the final list of Sakhalin Energy biodiversity priority species for the net gain achievement in this revision of the BAP consists of **seven species** as follows:

- **Gray whale (Sakhalin Gray whale feeding aggregation);**
- **Steller's sea eagle;**
- **Sakhalin taimen;**
- **Pink salmon;**
- **Chum salmon;**
- **Coho salmon;**
- **Masu salmon.**

The Company has developed three dedicated Conservation Management Plans (CMP) covering all seven biodiversity priority species. These demonstrate application of the Mitigation Hierarchy concept including achievement of net gain. The CMPs are provided in Appendices 1 to 3 of the BAP. The remaining five lower priority species for net gain achievement identified based on the results of the CHA will be addressed in a subsequent revision of the BAP.

7.2 OTHER (NON-CRITICAL HABITAT) BIODIVERSITY PRIORITIES

There are a number of biodiversity values that are not covered by the results of the CHA as they do not trigger any of the critical habitat criteria, however, they were identified as biodiversity values for Sakhalin Energy by the original version of the BAP based on the following criteria:

- environments sensitive to potential impact by the project;
- protection status afforded them via the Russian Federation legislation;
- social and ecological value placed on species and habitats;
- areas of natural or relatively intact habitat;

- habitats and areas supporting high species or habitat diversity;
- species and habitats where significant declines in populations and area have been documented and may be continuing;
- areas and habitats that are considered important for providing and maintaining ecological processes and ecosystem function.

These Non-CH biodiversity values remain valid for the current revision of the BAP and are described below. It is important to highlight that Company's primary target in relation to these values is **not** to deliver a net gain, but to mitigate the impact on the values potentially arising from the project operations. However, there are cases when a Critical Habitat value is a part of a Non-Critical Habitat value, e.g. the Sakhalin dunlin (CH value) is a part of Coastal and wetland birds of the Chaivo peninsula (Non-CH value). For these cases, the Company's commitment is to deliver **a net gain only for the CH part** of the biodiversity value.

Non-Critical Habitat Biodiversity values:

Species groups

- Coastal and wetland birds of the Chaivo peninsula;
- Breeding birds of coniferous forest;
- Breeding birds of river valley mixed woodland; and
- Salmonid fish populations of selected river systems (i.e. those that support significant areas of spawning and other habitat).

Habitats

- Dark coniferous forest – remaining blocks / areas of this habitat, particularly in the north of the island;
- Larch-ledum forest – areas of intact habitat and well-developed secondary forest;
- Well-developed and largely intact areas of secondary spruce-fir forest (e.g. Makarov mountains);
- Mixed primary or well developed secondary deciduous-coniferous forest along river valleys;
- Tracts of peatland and swamps supporting characteristic vegetation communities;
- River catchments with significant areas of intact forest habitat and those supporting important salmon populations;
- Shallow coastal lagoon systems and fringing wetland habitats; and
- Coastal and marine waters in Aniva Bay and the northeast Sakhalin shelf.

Unlike the Critical Habitat values, there is no stand-alone Conservation Management Plans developed for the Non-Critical Habitat values by Sakhalin Energy. The Company manages interests of the Non-CH biodiversity values via existing strategies, plans, standards, procedures, and programmes that cross-reference each other to ensure comprehensive and rigorous approach in the mitigation of impact on the Non-CH biodiversity priorities.

The below framework captures the main components of the Company impact mitigation management system of the Non-CH biodiversity priorities.

Table 7.5. Guidance for the development mitigation measures for the Non-CH biodiversity values

Issue / impact	Description of the impact – source / cause / effect
Non-CH value type	Habitat/species classification / identification
Current status	Brief description of distribution of the species/habitat type on Sakhalin and wider area, including key vegetation and faunal associations. Note any characteristics that make this species/habitat distinct from those occurring on the Russian mainland. If historical context is available (e.g. change in distribution or decline in extent due to human influence) then this should also be noted. Status of the species/habitat in relation to project activities (using available baseline and monitoring data). Protection status, if applicable.
Factors affecting species/habitat	List and describe the primary factors influencing the species/habitat on Sakhalin. Description of potential project-related impacts / effects that have affected or may affect this species/habitat.
Objective	Define what is the project objective for this species/habitat and any associated target(s).
Actions	Define what management actions (mitigation measures, research, monitoring) are to be undertaken to minimise impacts to this species/habitat and the species that it supports. Is there any legal status afforded to this species/habitat or federal / local policies that relate to its management or protection? List and describe any legislative requirements / changes that may be required in order to achieve the stated project objective. May include the need to inform policy makers and / or legislators to ensure that the species/habitat management needs are incorporated into current and future management and development plans (e.g. future oil and gas exploration plans). Also, are any licenses or permits required to implement activities? Describe any actions needed to provide guidance, training or advice to project staff, managers, partners etc. to explain required management measures and their implementation. For each task, allocate responsibilities and timeframes for implementation.
Resources	Provide a summary of anticipated costs, budget source and allocation.
Monitoring	What research and monitoring work is proposed to support management actions for this species/habitat? Such work need not be confined to project-related activities and effects but could recognise wider needs for more detailed ecological / biological data. Work in this area could include: • Site-specific monitoring work (e.g. documenting ecological processes and linkages to potential impacts or effects) • Collation, analysis and dissemination of data collected by the project • Monitoring of extent, distribution, community types etc. to determine potential change linked to project activities Research to reveal information on ecology or biology that may be required to better inform management decisions related to this species/habitat and the species that it supports.
Communication	Description of actions that may be required to increase awareness (internal and external) of the work being undertaken. Identify opportunities for internal and external parties to be involved in the work being undertaken. List opportunities for media involvement.
Partners	List and describe role of other partners (if any) involved in developing and implementing the action measures (or associated projects, initiatives).
Reference Documents	List relevant procedures / documents necessary for successful implementation of actions (e.g. scope of works for monitoring activities).
Other	Notes / comments etc.

7.3 SUMMARY OF THE BAP COVERAGE

Accordingly, the following biodiversity priorities have been identified in relation to Sakhalin Energy's environmental footprint:

Critical Habitat biodiversity priorities:

- Gray whales (Sakhalin Gray whale feeding aggregation)
- Steller's sea eagle
- Sakhalin taimen
- Four species of Pacific salmon: Pink salmon, Chum salmon, Coho salmon, Masu salmon
- Sakhalin dunlin
- Aleutian tern
- Long-billed murrelet
- Glehn's spruce
- Pogonia japonica

Non-Critical Habitat biodiversity priorities, species groups:

- Coastal and wetland birds of the Chaivo peninsula
- Breeding birds of coniferous forest
- Breeding birds of river valley mixed woodland
- Salmonid fish populations of selected river systems (i.e. those that support significant areas of spawning and other habitat)

Non-Critical Habitat biodiversity priorities, habitats:

- Dark coniferous forest – remaining blocks / areas of this habitat, particularly in the north of the island;
- Larch-ledum forest – areas of intact habitat and well-developed secondary forest;
- Well-developed and largely intact areas of secondary spruce-fir forest (e.g. Makarov mountains);
- Mixed primary or well developed secondary deciduous-coniferous forest along river valleys;
- Tracts of peatland and swamps supporting characteristic vegetation communities;
- River catchments with significant areas of intact forest habitat and those supporting important salmon populations;
- Shallow coastal lagoon systems and fringing wetland habitats; and
- Coastal and marine waters in Aniva Bay and the northeast Sakhalin shelf.

Sakhalin Energy's commitment in relation to the Critical Habitat biodiversity values is to deliver a net gain for these values. At the same time, Company's intention is relation to the Non-Critical Habitat biodiversity values continues to be the mitigation of adverse impact potentially arising from the project activities.

8 STAKEHOLDER ENGAGEMENT

The value of collaborating with key stakeholders in the development and implementation of specific plans, and in the broader context of regional biodiversity management, is recognised as a meaningful element of successful operations by Sakhalin Energy. A partnership approach to implementation of the specific measures allows for greater and wider benefits in biodiversity conservation to be achieved. A further value of successful partnerships and engagement with stakeholders is an opportunity to promote trust, avoid conflict, and manage its reputation on local and international levels.

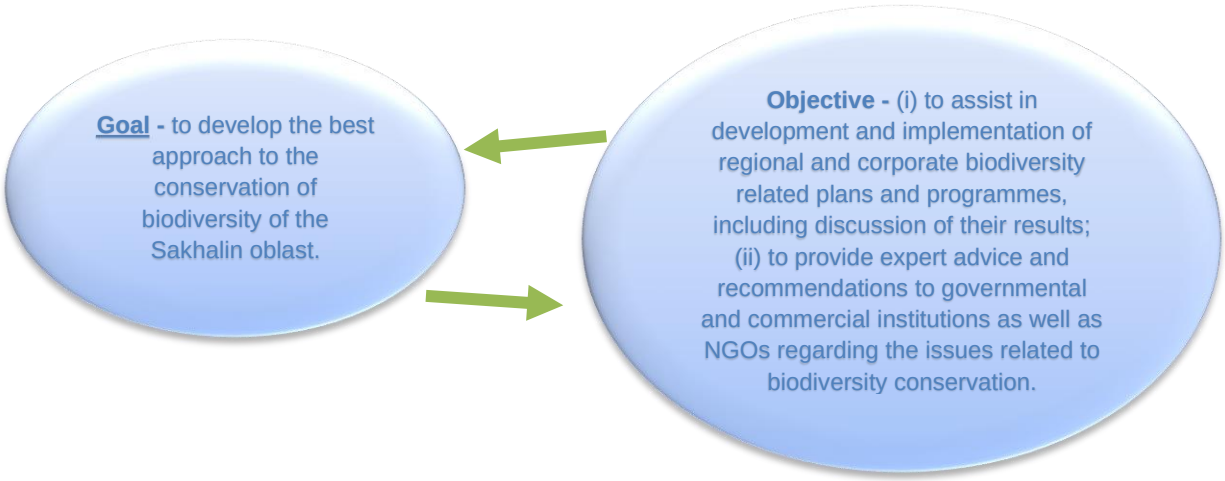
Therefore, an important element of the BAP process is identification of and consultation with stakeholders, so that potentially conflicting issues and / or priorities among stakeholders can be addressed. Opportunities to develop partnerships to deliver biodiversity objectives and actions contained within or linked to the BAP are continuously explored and developed where suitable.

Below are a few examples of Sakhalin Energy stakeholder engagement (participation in conferences, forums, meetings) on biodiversity related agenda in 2020- 2021:

- The 22nd meeting of the Western Gray Whale Advisory Panel (WGWAP-22) that took place from 09 to 10 November 2021 in Gland, Switzerland.
- Noise Task Force virtual meeting of the Western Gray Whale Advisory Panel in October 2021 (NTF 20).
- Noise Task Force virtual meeting of the Western Gray Whale Advisory Panel in March-June 2021 (NTF 19).
- XI international conference “Marine Mammals of Holarctic”, where the Company shared its practice on the development of the technology on neuron networks (automatic identification of Gray whale individuals based on the photo images of the whale) in March 2021.
- Arrangement of the practical oiled wildlife response training for the participants of a youth forum “Islands” in August 2021.
- Participation in public meetings at the information centres of Sakhalin with an aim to share Company’s experience on the environmental monitoring and biodiversity conservation as a part of Sustainable Development reporting preparation (Global Reporting Initiative) in 2020-2021.
- The 21st (virtual) meeting of the IUCN's Western Gray Whale Advisory Panel (WGWAP-21) that took place from 17 to 19 November 2020.
- Noise Task Force virtual meeting of the Western Gray Whale Advisory Panel in April 2020 (NTF 18).
- Working Group for the Conservation and Recovery of Certain Rare, Threatened and Endangered Wildlife Species in the Russian Federation, sessions of the Scientific and Technical Council (STC) under Rosprirodnadzor in 2020.

Biodiversity Expert Working Group (BEWG)

Recognising that biodiversity must be protected and managed also in terms of a broader approach, Sakhalin Energy engages with Sakhalin oblast authorities, scientific organisations and communities on BAP-related matters. Biodiversity Expert Working Group (previously known as Biodiversity Group (BG)) was established by the Ministry of Natural Resources (Ecological Council) of the Russian Federation in 2007 following Sakhalin Energy initiative to consolidate joint efforts in biodiversity conservation in Sakhalin Oblast.



The BEWG included representatives of the federal and regional governmental environmental agencies, commercial and scientific organisations, international experts and representatives from Russian and International NGOs.

Core activities of the group:

- assisting the Ecological Council of the Sakhalin Oblast in shaping a regional biodiversity strategy and policy;
- developing expert advice and recommendations to governmental and commercial institutions as well as NGOs regarding biodiversity related issues;
- assisting in the development and implementation of regional and corporate biodiversity action plans upon request.

Table 8.1. Participants and agenda of 2019 spring Biodiversity Expert Working Group meeting

Participants	Agenda
1. ***Ministry of Natural Resources and Environment of the Sakhalin Oblast (chair)*** 2. ***Ministry of Forestry and Hunting of the Sakhalin Oblast*** 3. ***Sakhalin Oblast Fishery Agency*** 4. ***Sakhalin Branch of the Botanical Garden Institute of the FED RAS*** 5. ***Sakhalin State University*** 6. ***Exxon Neftegas Limited*** 7. ***Sakhalin Energy Investment Company, Ltd. (secretary)***	**Action Plan for implementing the Sakhalin Biodiversity Preservation Programme through 2025.** **Activities for preserving protected bird species of the Sakhalin Oblast:** Implementation of federal state supervision in the field of protection and use of wildlife and its habitats in the Sakhalin Region except wildlife and its habitats located in specially protected natural areas of federal importance and federal state hunting supervision in the Sakhalin Oblast. Avifauna monitoring in the vicinity of Sakhalin-1 project facilities. Monitoring of protected bird species in the potential impact areas of Sakhalin Energy facilities.

Participants	Agenda
8. ***OOO Gazprom Dobycha Shelf Yuzhno-Sakhalinsk*** 9. ***Sakhalin Research Institute of Fisheries and Oceanography (FSUE SakhNIRO)*** 10. ***FSBI Glavrybvod, Sakhalin branch*** 11. ***Gazpromneft-Sakhalin LLC***	Programme for monitoring Steller's sea eagles in the potential impact areas of Sakhalin Energy facilities. **Steps taken by oil and gas companies operating in the offshore NE Sakhalin to mitigate impact on gray whales and other marine mammals in 2019:** Steps to be taken in 2019 to mitigate impact on marine mammals during geophysical surveys of ENL. Planned activities of Gazpromneft-Sakhalin LLC related to environmental monitoring and preserving marine mammals in 2019. **AOB** Information about the Oiled Wildlife Rescue Training Course planned by Sakhalin Energy. Development of portal Window to the World of Nature of Sakhalin; activities related to the International Salmon Day; on potential option to render support in publishing the monography Fishes of Aniva Bay. On considering the possibility of supporting L.G. Ustinova in publishing of the third part of Atlas-Identifier (birds of the Sakhalin Oblast). On creation and development of the initiative Business and Biodiversity within the framework of the federal project Preservation of Biological Diversity and Development of Ecological Tourism of the national project Ecology. Proposals for the Autumn EWG meeting.

For many years the Biodiversity Expert Working Group was an effective body that created a platform for mutually beneficial dialogue of business, government and academia on legislative, scientific and operational issues related to biodiversity conservation. Unfortunately, in 2020 the group ceased to exist due to administrative changes in the structure of RF ministries. Sakhalin Energy hopes that the group's work will be renewed and has sent to the ministry relevant message expressing its position over the importance of the group.

Biodiversity Expert Group Meeting

Western Gray Whale Advisory Panel (WGWAP) [12]

The Company has operated successfully, over many years, with the guidance and recommendations from experts of the Western Gray Whale Advisory Panel (2005 - 2021), which provided independent scientific advice and recommendations to the Company on its marine activities off Sakhalin in the context of gray whales. The gray whales off Sakhalin are accorded special protection by the authorities. They use two crucial, feeding areas in the vicinity of the Company's zone of activity. In response to concerns of the Russian and international conservation community and the report of an IUCN-convened Independent Scientific Review Panel (ISRP, 2005), the Lenders and the Company requested that IUCN (International Union for the Conservation of Nature) establish the WGWAP, which IUCN has convened and managed since then. This unique relationship between the Industry and the scientific/conservation communities formed the basis for several innovative, multi-disciplinary scientific papers and reports including: 'Responsible practices for minimising and monitoring environmental impacts of marine seismic surveys with an emphasis on marine mammals' (Nowacek et al., 2013 – co-authored inter alia by several Panel members), 'Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys: A resource guide for managers' (Nowacek & Southall, 2016) and 'WGWAP Stories of Influence' (G. Martin-Mehers, 2016 – co-produced by IUCN, WWF and IFAW and based on interviews with more than 20 experts and stakeholders) [13].

With the guidance of the WGWAP, the Company implemented several scientific research projects as part of the Joint Program (jointly with Exxon Neftegas Limited) to enhance the scientific knowledge of the GW in support of its conservation.

[12] Western Gray Whale Advisory Panel | IUCN

[13] Western Gray Whale Advisory Panel stories of influence | IUCN Library System

These unique relationships between business and conservationists, inter alia, allowed to reassess species vulnerability from ‘critically endangered’ to ‘endangered’ and to change the understanding that Sakhalin gray whales are not an isolated population as previously assumed, but the part of a larger population of the GW or a sub-population.

Gray whale on the foreground of Academic Oparin research vessel

9 ACTION LIST

Below is the list of actions to be undertaken by the Company in relation to the biodiversity priorities covered by this BAP prior to or during the next revision of the document.

#	Action	Details and Due date
1	**Identify and engage with relevant experts to obtain qualitative validation of the net gains in line with the developed CMPs (GW, SSE, ST & PS) as required by the IFC PS6.**	The results of the net gains verification by the relevant experts with local knowledge and expertise of particular species (GW, SSE, ST & PS) to be provided in the next revision of the BAP.
2	**Ensure ongoing efforts for the conservation of the critical habitat priorities in line with the developed CMPs (GW, SSE, ST & PS).**	Ongoing commitments provided by the relevant CMPs to be followed, the results are to be provided in the next revision of the BAP.
3	**Conservation Management Plans for the remaining 5 Critical Habitat values (Long-billed murrelet, Aleutian term, Sakhalin dunlin, *Pogonia japonica*, Glehn's spruce) demonstrating achievement of a net gain following relevant Mitigation Hierarchy implementation are to be developed.**	In the next revision of the BAP.
4	**Critical Habitat Assessment (2019) is to be revised in line with the updated Guidance Notes 6 (June 2019) of the IFC PS6 (change of the criteria attributions).**	The update of the CHA is to be completed prior the work of the next BAP revision starts as it may trigger changes in the list of the biodiversity priorities, i.e. by the end of 2025.

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APPENDIX 1 - CONSERVATION MANAGEMENT PLAN: SAKHALIN TAIMEN AND PACIFIC SALMON

Species	Five species of fish from the salmon family (Salmonidae): • The Sakhalin taimen (ST) • Four species of Pacific salmon (PS) genus: the Pink salmon, the Chum salmon, the Coho salmon, the Masu salmon
Illustration (juvenile Sakhalin taimen)	
CHA Ecologically Appropriate Areas of Analysis (EAAAs, previously named Discreet Management Units / DMUs)	EAAA #2 - Inner Lagoons (including areas between lagoons) EAAA #4 - Water bodies of northeastern Sakhalin EAAA #5 - Poronai River Basin EAAA #6 - The terrestrial area from Chaivo Spit to Aniva Bay along the pipeline

Critical Habitat triggering criterion (Cr)	Cr 1 - Critically Endangered or Endangered species (ST) Cr 2 - Endemic and/or restricted-range species (ST) Cr 4 - Endangered and/or unique ecosystems (ST, PS) Cr 5 - Key evolutionary processes (ST, PS)
Objective	To avoid and mitigate impact on the Sakhalin taimen and the four species of Pacific salmon arising from construction and production activities of the Company and implement additional conservation opportunities where applicable and possible, to deliver a net gain for biodiversity values in critical habitat, as required by the International Finance Corporation Performance Standard 6.
Current status in potential impact zone	The Company has initiated its river impact monitoring programme to assess the impact on the waterways potentially arising from the construction and operation of the integrated onshore pipeline system back in 2004 during feasibility studies of the project. As part of this monitoring programme in 2008-2011, following construction works finalisation, Sakhalin Energy was conducting the monitoring of the river crossings to assess the impact on salmon spawning grounds on the most sensitive rivers. The main part of this monitoring was undertaken in 2008 on 84 rivers in the crossing locations and baseline areas up and downstream the crossings. The monitoring scope included: visual assessment of the Pacific salmon spawning grounds; assessment of the PS redds (spawning ground / nest) density; assessment of the survival rate of Pacific salmon eggs. The visual inspection of suitable salmon spawning grounds identified that in comparison with pre-construction data, the spawning grounds in all surveyed watercourses have reduced in all locations, including the background ones. Upstream the crossings and 500 downstream the crossings the variation was within the range of natural fluctuations. At the crossing sites the decline in spawning grounds was higher, however, it was attributable to the fact that at many crossings, construction or reinstatement works were still ongoing and therefore, the crossings were not suitable for the spawning yet. This parameter of spawning grounds state at the crossing locations has improved based on the results of the further years monitoring and assessed from “medium” to “good”. The changes of redds density in comparison to the pre-construction years of monitoring has been determined by natural fluctuations of the quantity

	of Pacific salmons running for spawning and has not been associated with the construction and reinstatement works in the crossing areas. The content of fractions safe for the fish eggs survival (> 1 mm) in bottom sediments improved in 65% surveyed locations, compared to the pre-construction period, and in 50% of locations compared to the background data, which demonstrated the evidence of early stages of watercourses recovery up to the initial fishery characteristics. Further monitoring of the spawning habitats in 2009-2011 did not reveal significant adverse impact on the PS population attributable to the pipeline crossings and the direct PS monitoring programme was stopped. Monitoring of the general impacts on rivers (benthos, bottom sediments, hydrology) continued. Between 2009 and 2017 specific monitoring for Sakhalin taimen was conducted on several rivers crossed by the pipeline. Over this time a significant decline in species numbers was identified in all of the monitored rivers (at some rivers the unit volume decline was up to 14 times (Lazovaya river)). At the same time, maximum abundance of the species in the Severnaya Khandasa river in 2011 was recorded at the pipeline river crossing area. There has also been a marked decline in commercial catches of salmon in the Sakhalin region in recent years (pink salmon commercial catch decreased from 225.6 thousand tones in 2009 to 28.2 thousand tones in 2019 (SakhNIRO, 2021)), it may be reasonably supposed that numbers of salmon species have also declined in the project potential impact area. The reduction in numbers of the ST and PS is most likely caused by well-documented illegal fishing, which is assessed to be one of the major threats to the species and the primary reason for its decline. In addition to this, commercial overfishing and climate change, with shift of fish populations to the north, are considered by scientists to be among other possible reasons for the decline of PS.
Potential impact by the project	Potential impacts: physical disturbance of the ST and PS spawning grounds at the river crossing locations (construction phase); increase in suspended sediments in the rivers as a result of the pipeline river crossings (construction phase) and riverbanks repair works (operational phase); pollution from spills to rivers (Horizontal Directional Drilling (HDD) liquids, lube oils, pipes

	hydrotesting wastewater, vehicles' fuel) as a result of the pipeline river crossing works (construction phase); hydrocarbon pollution of rivers from pipeline leaks (operational phase); increased poaching of the ST and PS due to induced access to formerly intact habitats as a result of roads construction required for the pipeline river crossings construction and maintenance (construction and operational phases). The Environmental Impact Assessment 2005 (EIA 2005, Pipeline River Crossing Report) assumed that the area of salmon spawning habitat within the potential impact zone of the pipeline construction works, i.e. the main works that could potentially affect salmon species, could vary from **0.38 -1.34%** of the total available salmon spawning habitat in the sensitive rivers. However, it was considered **highly likely** that the **total area affected would fall within the lower part** of this range. The impact on spawning habitat was assumed to be temporary and, on the basis of available research and monitoring data, full recovery was expected within 1-2 years. As such, considering a proportionally very small area of potential impact, short-term character of impact and proposed mitigation and restoration measures, the residual impacts on salmon species were projected as ***minor, i.e. not significant***.
Residual impact by the project	The mitigation hierarchy, detailed in table 1 below, was implemented generally in line with the proposal of the EIA, however with some recorded deviations, mainly with the potential to release sediment into the water bodies. However, subsequent monitoring did not identify any significant residual impact. The details of the deviations and implemented remedial actions are provided in 'Rivers, Erosion Control and Reinstatement, and Wetlands Remedial Action Plan (2007)'. To verify the conclusions of the EIA and check the effectiveness of the applied mitigation measures, the Company designed and has implemented an appropriate impact monitoring programme, which has been executed during the operation phase of the project since 2009. In addition to this, a separate programme to assess the potential impact on Pacific salmon spawning habitats (details and results covered in section "Current status in the potential impact zone" above) was conducted from 2008-2011. The current monitoring programme is based on the comparison of the river water quality in two sections – upstream the pipeline crossing, where there is no impact by the pipeline; and downstream the crossing, where changes due to the pipeline

	would be revealed, if any. The monitoring parameters include benthos composition and abundance, suspended solids in water, grain-size composition of the bottom sediments, hydrocarbon content in water and bottom sediments. The results of the long-term monitoring have not revealed significant adverse effect of the project on the health of the rivers ecosystem. The physicochemical properties of surface waters at the upstream and downstream of the crossings of each of the monitored watercourse generally met the regulatory criteria, suspended sediments changed insignificantly within seasonal variations. The particle size distribution of bottom sediments in all of the monitored watercourses was generally heterogeneous in all seasons and was mainly represented by particles with a diameter of 10 mm and larger, i.e. safe for the salmon eggs survival. The monitoring did not reveal contamination from oil products in water or bottom sediments nor adverse changes in variability and abundance of benthos. Most of the temporary access roads have been removed. There were no notable chemical or hydrocarbon spills registered during construction or operation phase. Therefore, the applied impact mitigation strategy is considered successful. No significant residual impact on the ST and PS species attributable to the Company activities has been identified.
Achievement of a net gain under IFC PS6	In addition to the effective mitigation measures implemented in line with the EIA, a number of additional actions for the benefit of the salmon species have been implemented by the Company. These measures qualify as Additional Opportunities - AO as per IFC PS6. The dimension and the achievements of these AOs, summarized below, are assessed as significant. • Producing a net positive value via creation of additional salmon spawning habitat (10,700 m2) in excess of the area reinstated that was assumed in the EIA could be affected by the construction works (15,300 m2). • Joint project with the international “Wild Salmon Center” organization: rivers’ monitoring, anti-poaching campaigns, clean-up campaigns, 6 fishery companies awarded Marine Stewardship Council Certification (MSC) – an international recognition awarded to

	fishery companies employing sustainable practices in their production operations. • Financing of modernization of two fish nursery plants as a compensation of potential damage to fishing resources with total amount of investments around USD 11 million. • Co-financing of construction of two fish nursery factories in Korsakov district: around 5 million pink salmon fries are released annually. • Educational programmes: around 10,000 children participated in various educational programmes on the sustainable use of fish resources and conservation of salmon. Therefore, in terms of application of AO to achieve net gains in line with IFC PS6, Sakhalin Energy considers that this has been demonstrated. To continue contributing to conservation of the ST and PS species Sakhalin Energy will inform authorities about illegal fishing nets placed on rivers if revealed during the Company's regular river monitoring.
Key references	• Biodiversity Action Plan, 2009 (publicly available, Sakhalin Energy - Biodiversity Action Plan) • Critical Habitat Assessment for Sakhalin-2 project (1000-S-90-P-0381-00-E) • Environmental Impact Assessment, 2003 (publicly available, Sakhalin Energy - Environmental impact assessment) • Environmental Impact Assessment, 2005 (publicly available, Sakhalin Energy - Environmental impact assessment) • River Crossing Strategy, 2005 (publicly available, Sakhalin Energy - River Crossing) • Rivers, Erosion Control and Reinstatement, and Wetlands Remedial Action Plan, 2007 (publicly available, Sakhalin Energy - River Crossing) • Oil Spills Prevention and Response Plan for Onshore Pipeline Operations (publicly available, Sakhalin Energy - Oil Spill Response Documentation) • HSESAP, Emergency Preparedness and Response Standard, Appendix 15, Spill Preparedness and Response (publicly available, Sakhalin Energy - Health, Safety, Environment and Social Action Plan, 2015)

	• HSESAP, Biodiversity Standard, Appendix 1, Biodiversity Standard Overview (publicly available, Sakhalin Energy - Health, Safety, Environment and Social Action Plan, 2015) • HSESAP, HSE Monitoring and Reporting Standard, Appendix 6, HSE Monitoring Overview (publicly available, Sakhalin Energy - Health, Safety, Environment and Social Action Plan, 2015) • River Crossing Execution Plan (internal document number: 5600-S-90-04-P-0016-00-01) • River Crossing Monitoring Plan (internal document number: 5600-S-90-04-P-0017-00-03) • System of Industrial Environmental Control and Local Monitoring, Volume 3 (internal document number: 0000-S-90-04-T-8078-03-R) • Report: Monitoring of Sakhalin Taimen Populations Along the Onshore Pipeline in the Russian Federation 2009 (0000-S-90-04-T-0265-00) • Assessment of the Condition of a Typical River Basin Crossed by the Right-of-way and Status of the Sakhalin Taimen in its Ichthyofauna 2011-2017 (0000-S-90-04-T-0361-00, 0000-S-90-04-T-0361-0432, 0000-S-90-04-T-0167-00, 0000-S-90-04-T-0109-00, 0000-S-90-04-T-0273-00, 0000-S-90-04-T-0810-00, 1000-S-90-04-T-0308-00) • Surface water monitoring reports (6000-S-90-04-T-0016 0000-S-90-04-T-0303 0000-S-90-04-T-0217 0000-S-90-04-T-0783 0000-S-90-04-T-0853) • Report Surface Water Body Fishery Characteristics Monitoring results in 2009. Sakhalin II Project (1000-S-90-04-T-0089-00-E) • Development of Fishery Characteristics for Watercourses Crossed by Sakhalin II project Pipeline Routes (5600-C-90-04-T-0012-00) • Combined Report on the Results of Fishery Survey in Reference Watercourses. Pre-construction Monitoring of Watercourses Crossings by Sakhalin II Project Phase 2 Pipeline Routes in 2004 (5600-C-63-04-T-0006-00) • Analytical report: On fishery characteristics monitoring of watercourses in autumn 2005 (5600-C-90-04-T-0033-00) • Analytical report: On fishery characteristics monitoring of watercourses in 2006 (5600-C-90-04-T-0070-00) • Analytical report: On fishery characteristics monitoring of watercourses in 2007 (5600-C-90-04-T-0125-00)

	• Analytical report: Post construction fishery characteristics monitoring of watercourses in 2008 (5600-C-90-04-T-0139-00) • Data base on monitoring on fishery characteristics of watercourses 2007 - 2008 (5600-C-90-04-T-0136-00) • Report Surface Water Body Fishery Characteristics Monitoring results in 2009. Sakhalin II Project (1000-S-90-04-T-0089-00-E) • Post construction fishery characteristics monitoring of watercourses in 2011 (0000-S-90-04-T-0387-00) • Wild Salmon Center website (annual reports 2004-2012, Home - Wild Salmon Center) • Save the Salmon Together website (www.salmon-friend.ru)

Table 1. Preventative, remedial and other measures delivered for the ST and the four species of PS and the main outcomes.

#	Action	Key dates	Main Outcomes	Value/ effectiveness
Preventative measures: Avoidance and Mitigation				
1	Pre-construction baseline data collection and identification of avoidance & mitigation measures for construction and operation phases.	2001-2004	Baseline data surveys allowed compilation of a list of the possible river habitats for the Sakhalin taimen and to determine the timing of the species spawning and migration. It also helped to develop the salmon rivers importance rating that was done jointly with the relevant fishery authorities. This important data helped to (i) improve knowledge about the ST among scientific communities, (ii) identify possible impacts on the ST and PS during construction and operational phases of the project, (iii) identify impact avoidance & mitigation measures.	H

2	Horizontal Directional Drilling (HDD)	2004-2009	HDD, involves drilling a horizontal borehole beneath the banks and bed of a watercourse and, therefore, significantly reduces the creation of in-stream suspended sediment concentration, was executed on 6 major rivers and Chaivo lagoon identified as the most important in terms of commercial fisheries potential.	H
3	Execution of major construction works outside of the ST and PS spawning and migration (i.e. in winter season) or during periods of low flow.	2005-2009	To minimize suspended sediments run-off impact on rivers as a result of riverbed disturbance caused by river crossing excavation works, the following construction schedule was developed and followed, linked to the sensitivity group of each watercourse: • **Group 3** (high sensitivity watercourses, around 44% of all crossings) - midwinter (January-February); • **Group 2** (medium sensitivity watercourses, around 22% of all crossings) - December to April period or during periods of low flow in October-November if this was outside of the ST/PS spawning season (no fish spawning activity observed within and downstream of the crossing area) subject to the formal agreement with the local Fishery authorities; • **Group 1** (low sensitivity watercourses, around 34% of all crossings) - year-round, however, those watercourses feeding into Group 2 or 3 rivers that had the potential to cause downstream impact (i.e. through sediment transport) were crossed in the same manner as Group 2 or 3 rivers respectively.	H

4	Minimizing construction time of crossings.	2005-2009	To minimize possible adverse impact on watercourses, the following crossing timeline was designed and followed for each individual crossing (i.e. for oil, gas and fibre optic cable (FOC)) and not all crossings in aggregate): • wet-cut crossings of minor water bodies (less than 3 m wide) within a period of **24-hours**; • wet cut crossing of intermediate water bodies (between 3 and 30 m wide) within **48 hours**. In practice, most of the small watercourses were crossed within a shorter period, whereas some intermediate water bodies, especially those wider than 10 m where special crossing plans were implemented, took a longer time to cross. To allow in-stream work to be undertaken within a minimal period, night shift working was allowed subject to the relevant safety precaution measures.	H
5	Erosion control measures to minimize sediments run-off into the rivers: stabilization of riverbanks, seeding of soil stockpiles, silt fence, etc.	2005-2009	Internationally recognized best available techniques were employed at all watercourse crossings, irrespective of their classification, to protect surface and ground waters from sediments impact, inter alia: • minimise the width of the Right of Way (RoW) where practicable and only use its middle section for construction; • postpone the removal of bank vegetation for as long as possible; • avoid grubbing bank shrubs except on the trench line; • minimise area of bank disturbance as far as possible; • install silt fence and/or snow bank; • store bank and bed material separately for reinstatement; • when backfilling, lower bucket into water before releasing fill; • avoid disturbance of bank section between pipe trenches; • ensure that the suitable equipment and sufficient erosion control materials are available on-site in preparation for the river crossing; • protect existing stockpiles of soil to prevent erosion and subsequent run-off of suspended sediment loads into streams.	H

6	Hydrocarbons/chemicals spill prevention.	2005 – 2009 (construction) Evergreen (operation)	To minimize the risk of hydrocarbon/ chemicals spill pollution, the following measures were developed and implemented: **Design:** • The pipeline is designed to RF and international design codes to withstand earthquakes, accidental 3rd party interference, subsidence, corrosion, etc. **Construction:** • To minimise the risk of HDD drilling mud release: (i) use of a contractor specializing in HDD to perform the construction of HDD; (ii) develop and implement HDD crossing plan; • Hydrotesting: hydrotest water discharges contained non-toxic waste only and were released in sediment pits or surface filter/dissipaters. When the sediment has settled, the water was drain away on the ROW on vegetated areas, sediments were cleaned up and transported from site. For the short pipe sections that were hydrotested in winter, antifreeze (mono-ethylene glycol based) discharges were collected into dedicated tanks and sent back to the manufacturer; • Oil Spill Response Plan at the construction stage for handling fuels, lube oils, etc. was developed and followed at all the crossings. **Operation:** • Pipeline integrity monitoring (intelligent pigging) and pipeline leak detection technology - SKADA leakage control system allows fast identification of the location of a leak and automatically shut-in the corresponding section of the pipeline; • Permanent monitoring of the pipeline RoW with the help of remote sensing methods (satellite monitoring, helicopter and drone patrolling); • Oil Spill Response Plan at the operational phase covering potential spill scenarios, response strategies and techniques, training programme, drill schedule, oil spill tracking system, organization and contractual system, etc.	H

			has been developed and is being followed and updated when required accordingly. There were no significant hydrocarbon/chemical spills to waterbodies recorded during the pipeline construction and operational phases.	
7	Mitigation of the induced access impact.	2004-2009	To minimize the impact of increased public access (leading to increased poaching) to previously undisturbed or relatively intact habitat as a result of RoW/roads construction, the following actions were developed and followed: • Routing of the RoW close to existing access networks and infrastructure (e.g. roads, railway and transmission lines), i.e. no new access is constructed; • Fencing/barriers on newly constructed roads; • Removal of the temporary access roads following construction finalization, minimizing the number of permanent roads; • Development and implementation of a no hunting, fishing or gathering policy applicable to the Company employees and contractors. Providing relevant awareness trainings to the employees and contractors.	H
Remedial measures: Restoration				
8	Riverbanks and riverbeds reinstatement.	2005 – 2009 (construction) Evergreen (operation)	Reno-mattresses/gabion, riprap and other erosion control measures were installed on all the crossing where it was required to stabilise the riverbanks. During the operation phase the Company conducts regular inspection of the riverbanks (e.g. in 2021 Sakhalin Energy carried out 13 river crossings surveys) and executes repair works of the riverbanks as required based on the results of inspections (1 river per two years on average). Riverbeds disturbed as a result of excavation works undertaken for the crossings construction at the areas of potential salmon spawning habitats were reinstated with gravel or cobbles. The total area reinstated was around 15,300 m2, i.e. the whole area assumed by the EIA as maximum possible salmon spawning area potentially affected by the river crossing works.	H

Remedial measures: Additional Conservation Opportunities				
9	Creation of additional salmon spawning habitat.	2005-2009	Creation of additional salmon spawning habitat (10,700 m2) in excess of the reinstated area estimated in the EIA to be affected by the construction works (15,300 m2). The riverbeds upper layer was covered with gravel or native cobbles or pebble. Based on the results of river monitoring after reinstatement completion, fries of the ST and PS in one of the restored rivers (Khandasa river) were observed highly abundant in the river bed area where natural pebble and gravel backfilling was done by the Company as part of the river crossing reinstatement.	H
10	Sakhalin Salmon Initiative	2004-2012	A partnership project arranged jointly by the Company and the “Wild Salmon Centre”, an international non-profit organization supporting the preservation and sustainable use of Sakhalin’s wild salmon and salmon river ecosystems. Deliverables: • establishment of public salmon councils in 6 regional districts (more than 100 anti-poaching surveys on 20 rivers conducted during 2009, riverbanks clean-up campaigns); • 19 Sakhalin fishing companies underwent assessment against the international certification standard of the Marine Stewardship Council for compliance with environmentally responsible fishing, six fishing companies that annually catch up to 6500 metric tons of pink salmon have been awarded the MSC label as of 2012; • Salmon spawning river monitoring employing high-tech methodologies (satellite sensing of salmon habitats NetMap, juvenile fish counting technology); • Salmon spawning habitats conservation on rivers Langra and Bolshaya: anti-poaching posts on access roads, complex monitoring of the river basin.	H

11	Save the Salmon Together	2012	The project continued educational activities promoting sustainable use of salmon fish resources that began under the Sakhalin Salmon Initiative. Among the main achievements: • Development of a website offering children interactive games and quizzes, as well as the "Droplet" and "Salmon Watch" educational programmes that became well-known on Sakhalin; • "How Ivan Saved the Wonder Fish", a Sakhalin Puppet Theatre stage performance included into the theatre's regular repertoire as of June 2013; • Organization of the thematical summer camp for children dedicated to salmon conservation (around 500 participated); • Training for 60 schoolteachers to spread knowledge on salmon conservation among children; • Publication of salmon conservation book (around 500 copies), posters, leaflets, etc. As a result of the project more than 10,000 schoolchildren participated in various educational programmes, forums, camps, etc.	H
12	Financing of modernization of two fish nursery plants as a compensation of potential damage to fishing resources	2004-2018	In accordance with the "*Summary Assessment of Damage to Aquatic Life in the Course of Construction and Operation of Facilities under Sakhalin II Project Phase 2 TEOC for the Integrated Development of Piltun-Astokhskoye and Lunskoye License Areas*" the Company funded modernization of two salmon hatchery (Taranayisky and Yasnomorsky plants). The total amount of investment to offset the damage was around USD 11 million.	H
13	Financing of a fish nursery factories	2004-2006	In 2003-2006 the Company co-financed two PS (pink salmon) nursery factories construction in Korsakovskiy district (Igrivaya river and Mramornaya river). The factories annual fish fry release is around 5 million fries.	H

14	Publication of information on ST and PS in the book available for general public – “Rivers of Sakhalin Island”.	2012	The book summarizes information on the biology and ecology of the species and highlights illegal fishing as a major threat for the Sakhalin taimen and Pacific salmon. The book is written in simple language intelligible for general readers and helps to raise awareness among the local population of the need to conserve river ecosystems. Electronic version of the book Link	L
15	Participation in dialogue with the authorities, scientific community, NGOs and public on the Sakhalin taimen decline issue.	2011 - 2019 (BG function period)	The Biodiversity Group was initiated by Sakhalin Energy in 2011 as a platform for raising dialogue with authorities, scientific community and NGOs on biodiversity issues of the industry including protection of the Sakhalin taimen. During meetings dedicated to the ST protection issues, Sakhalin Energy was presenting its monitoring reports highlighting illegal fishing threat to the species and encouraging the authorities to take action to protect the Sakhalin taimen.	L
Number of Preventative measures: High/Medium/Low				7/0/0
Number of Remedial measures: High/Medium/Low				6/0/2

Table 2. Value legend

Value	**High (H)**	**Medium (M)**	**Low (L)**
Preventative measures: Avoidance and Mitigation	No recorded significant adverse impact on the species	Medium recorded adverse impact on the species	Notable recorded adverse impact on the species
Remedial measures: Additional Conservation Opportunities	Significant gain in the species conservation	Medium gain in the species conservation	Low gain in the species conservation

APPENDIX 2 - CONSERVATION MANAGEMENT PLAN: STELLER'S SEA EAGLE

Species	**Steller's sea eagle (SSE)[14]**
Illustration	
CHA Ecologically Appropriate Areas of Analysis (EAAAs, previously named Discreet Management Units / DMUs)	EAAA # 2 - Inner Lagoons (including areas between lagoons) EAAA # 6 - The terrestrial area from Chaivo Spit to Aniva Bay along the pipeline

[14] All measures covered in this CMP are equally applicable to the White-tailed eagle (WTE), as this species has a joint nesting stock with the Steller's sea eagle. The WTE can occupy the SSE nests and vice versa, i.e. nests are not differentiated between these species during monitoring. In the overall, the number of WTE birds in the monitoring territory is very low, up to 5 individuals are observed annually.

	(Sakhalin-2 project potential impact area is from Chaivo to Lunskiy bay)
Critical Habitat triggering criterion	Cr 2 - Endemic and/or restricted-range species Cr 4 - Endangered and/or unique ecosystems
Objective	To mitigate impact on the Steller's sea eagle arising from construction and production activities of the Company and implement additional conservation opportunities where applicable and possible, to deliver a net gain for biodiversity values in critical habitat, as required by the International Finance Corporation Performance Standard 6.
Current status in potential impact zone	The global population of the SSE is estimated at 1,830-1,900 breeding pairs (IUCN 2016), and the Sakhalin island population is estimated to be approximately 450-470 breeding pairs (Masterov, Romanov, 2014). Around 27 breeding pairs (SSE monitoring data 2020) occur within the Company potential impact zone, i.e. the Steller's sea eagle population that potentially can be affected by Sakhalin Energy operations represents approximately 5.7-6% of the island population and 1.42-1.48% of the global population of this species. This is recognized as a relatively significant number for a *vulnerable* species with a *decreasing* global population trend (IUCN Red List). Indexes of the Steller's sea eagle population dynamics modeled by the Sakhalin Energy contracted ornithologists indicated a potential gradual decline of SSE population over the long-term, both within the project potential impact zone and over the whole north-east region (Masterov, Romanov, 2014). However, long term monitoring (from 2004 to 2020) of SSE in the project potential impact zone does not confirm a decline of the species.
Potential impact by the project	The Environmental Impact Assessment 2005 (EIA 2005) assumed the following potential impacts on the SSE that could arise from Sakhalin Energy' construction and operation of the Onshore Processing Facility (OPF) and integrated onshore pipeline system: destruction of nesting trees (construction); ingress of human activity (physical presence) and generation of noise from machinery and equipment interrupting feeding and breeding of the SSE including rearing young/nests abandonment (construction mainly, at the operation phase noise generated by vehicles and/or helicopters is applicable); potential damage to aquatic habitat reducing number of prey causing

	feeding irregularities (construction - suspended sediments from the pipeline river crossings, operation - oil spills); induced public access to previously intact areas following roads construction (operation). The EIA suggested the mitigation measures outlined in the table 1 below to reduce the potential impacts on the SSE to ALARP (as low as reasonably practicable) and anticipated that residual impacts on the SSE following implementation of the mitigation measures would be temporary, localized and ***minor***, ***i.e. not significant***. The Environmental Impact Assessment for the Onshore Processing Facility Compression project conducted in 2016 (EIA OPF-C, 2016) did not consider the SSE as one of the major environmental receptors as there were no active SSE nests in the project potential influence area at the time of the assessment (and presently), therefore potential and residual impacts on the SSE were considered absent.
Residual impact by the project	To verify the conclusions of the EIA and check the effectiveness of the applied mitigation measures, the Company designed and has implemented an appropriate impact monitoring programme for the Steller's sea eagle, which has been executed since 2004. The long-term monitoring (2004 and ongoing as of issue date of this document) of the SSE, which is designed to compare the SSE population state in the potential impact zone and a reference area, identified fluctuations of different monitoring parameters (number of active nests, brood rate, etc.) within the different years and/or areas and did not reveal significant adverse impact on the SSE from the Company activities. The average brood rate between 2004 and 2020 varied from 0.9 to 1.7 chick per active nest in the potential impact zone and 0.8 to 1.7 chick per active nest in the reference zone. The overall average interannual brood rate is the same in the potential impact area and reference zone, i.e. 1.22 chick per active nest between 2004 and 2020. Therefore, the applied impact mitigation strategy is considered successful. **No significant residual impact** on the Steller's sea eagle species attributable to the Company activities has been identified.
Achievement of a net gain under IFC PS6	In addition to the effective mitigation measures implemented in line with the EIA, a

	number of **voluntary** additional actions for the benefit of the SSE species have been implemented by the Company. These measures qualify as Additional Opportunities (AO as per IFC PS6). The dimension and the achievements of these AOs, summarized below, are assessed as significant. • 135 metal protection sheaths were installed on trunks of the SSE nesting trees in 2005-2013 to protect them from bears' predation. Fifty out of total 135 protections were installed outside of the project impact area. Observations made by the third-party experts indicated this measure is quite effective for hatchlings protection (Masterov et al, 2016). This assumption is confirmed by the Company's assessment of the effectiveness of these protection measures, i.e. the number of offspring killed by bears decreased from 19.4% to 7.7% following installation of the protection sheaths on the SSE nesting trees in potential impact area. However, the number of hatchlings killed by bears has increased in recent years (31.3% in 2020), this could be due to the deteriorated condition of the protection sheaths as a considerable time period has passed since their installation. Therefore, the Company will be conducting an assessment of the state of the protection sheaths and undertaking necessary repair/installation of new protections based on the results of the assessment; • 22 perches for better observation of an area for SSE were installed in 2008 in the shoreline area of the project potential impact zone. Although it is not possible to quantify the positive impact of this measure for SSE vital functions, this measure is considered to be highly effective based on the observations made by the relevant specialists of Sakhalin Energy and its contractors. Therefore, in terms of application of AO to achieve a **net gain** in line with IFC PS6, Sakhalin Energy considers that **this has been demonstrated**. In addition to this, the Company will further undertake the repair/installation of new protection sheaths to defend the SSE offspring from bears' predation if confirmed by the results of the monitoring.

Key references	• Biodiversity Action Plan, 2009 (publicly available, Sakhalin Energy - Biodiversity Action Plan) • Critical Habitat Assessment for Sakhalin-2 project (1000-S-90-P-0381-00-E) • Environmental Impact Assessment, 2003 (publicly available, Sakhalin Energy - Environmental impact assessment) • Environmental Impact Assessment, 2005 (publicly available, Sakhalin Energy - Environmental impact assessment) • Plan on impact mitigation to the nesting areas of the Steller's sea eagle and the White-tailed eagle in the course of construction, upgrade and operation of the Sakhalin-2 project facilities (1000-S-90-04-P-0356-00-R) • HSESAP, Biodiversity Standard, Appendix 1, Biodiversity Standard Overview (publicly available, Sakhalin Energy - Health, Safety, Environment and Social Action Plan, 2015) • HSESAP, HSE Monitoring and Reporting Standard, Appendix 6, HSE Monitoring Overview (publicly available, Sakhalin Energy - Health, Safety, Environment and Social Action Plan, 2015) • HSESAP, Biodiversity Standard, Appendix 5, Steller's Sea-Eagles and other Protected Birds (publicly available, Sakhalin Energy - Health, Safety, Environment and Social Action Plan, 2015) • System of Industrial Environmental Control and Local Monitoring, Volume 3 (internal document number: 0000-S-90-04-T-8078-03-R) • The Steller's sea eagle monitoring strategy (1000-S-90-04-T-0732-00-E) • River Crossing Strategy, 2005 (publicly available, Sakhalin Energy - River Crossing) • Oil Spills Prevention and Response Plans for the onshore and offshore assets (publicly available, Sakhalin Energy - Oil Spill Response Documentation) • Oiled Wildlife Response Plan (publicly available, Sakhalin Energy - Oil Spill Response Documentation) • The Steller's sea eagle book (publicly available, Link)

	• Report on Stellar Sea-eagle population monitoring 2004 – 2005 (0000-S-90-04-T-8022-00-R) • Assessment Of The State Of Health Of The Natural Population Of Steller's Sea Eagle (Haliaeetus Pelagicus) On The Northeastern Coast Of Sakhalin Island, 2004 (0000-S-90-04-T-7922-02-R) • Baseline Steller's Sea-Eagle (0000-S-90-04-P-7069-04-R) • Results of the monitoring program for the Steller's Sea Eagle (Haliaeetus Pelagicus) population on the northeastern coast of Sakhalin island in 2006 • Results of the monitoring program for the Steller's Sea Eagle (Haliaeetus Pelagicus) population on the northeastern coast of Sakhalin island in 2007 (0000-S-90-04-T-7026-00-R) • Results of the monitoring program for the Steller's Sea Eagle (Haliaeetus Pelagicus) population on the northeastern coast of Sakhalin island in 2008 (0000-S-90-04-T-0553-00-R) • Assessment of the Current Status of Nesting Sites of Sea Eagles in the Potential Impact Zone of the Sakhalin 2 Project in Spring 2009 (0000-S-90-04-T-8161-00-R) • SSE nest LUN-31 monitoring near OPF area during 2006 nesting period (000-S-90-04-T-8290-00-R) • Monitoring of the Steller's Sea Eagle (Haliaeetus Pelagicus) population on the northeastern part of Sakhalin in 2010 (1000-S-90-04-T-0073-00-R) • Monitoring of the Steller's Sea Eagle population at Lunskiy Bay and in the pipeline Potential Impact Zone on the northeastern part of Sakhalin in 2011 (0000-S-90-04-T-0406-00-R) • Monitoring of the sea eagle population in the nesting season of 2012 (1000-S-90-04-T-0074-00-R) • Monitoring of the Steller's Sea Eagle and White-Tailed Sea Eagle population in the nesting season of 2013 (1000-S-90-04-T-0186-00-R) • Monitoring of the Steller's Sea Eagle and White-Tailed Sea Eagle population in the nesting season of 2015 (1000-S-90-04-T-0279-00-R)

	• Monitoring of the Steller's Sea Eagle and White-Tailed Sea Eagle population in the nesting season of 2016 (1000-S-90-04-T-0809-00-R) • Monitoring of the Steller's Sea Eagle and White-Tailed Sea Eagle population in the nesting season of 2017 (1000-S-90-04-T-0872-00-R) • Monitoring of the Steller's Sea Eagle and White-Tailed Sea Eagle population in the nesting season of 2018 (6000-S-90-04-T-0078-00-R) • Monitoring of the Steller's Sea Eagle and White-Tailed Sea Eagle population in the nesting season of 2019 (SEIC-HS-03363) • Monitoring of the Steller's Sea Eagle and White-Tailed Sea Eagle population in the nesting season of 2020 (SEIC-HS-03201)

Table 1. Preventative, remedial and other measures delivered for the SSE and the outcomes

#	Action	Key dates	Main Outcomes	Value/ effectiveness
Preventative measures: Avoidance and Mitigation				
1	Pre-construction baseline data collection and identification of avoidance & mitigation measures for construction and operation phases.	2003-2004	Essential data was obtained clarifying SSE biology, ecology, abundance and distribution which helped to (i) improve knowledge about SSE among scientific society, (ii) identify possible impacts on SSE during construction and operational phases of the project, (iii) suggest impact avoidance & mitigation measures. The baseline studies enabled the Company to assess SSE population size, identify vulnerable nesting sites, distribution of nests along the projected pipeline route and important foraging areas.	H

2	Routing the onshore pipeline in the corridor avoiding the SSE's nesting trees	2005-2009	The pipeline Right of Way (RoW) was routed in a way to avoid the SSE's nesting trees, i.e. no nesting trees of the Steller's sea eagle were cut for the pipeline or OPF/OPF-C construction.	H
3	Planning of major construction works outside of SSE breeding period. Limitation of construction activities in protection zone including ban on any activities in the area within 350 m from all active nests.	Evergreen	Prior to the start of major onshore construction activities in SSE nesting areas in 2005 SEIC established protection zones for all active SSE nests within 1 km zone from construction sites. All SEIC activities in these zones were carefully monitored and regulated, any activities within 350 m buffer zone from active nests were prohibited: • vehicles movement in protection zones were limited (limit for maximum allowed number of cars, speed limit, prohibition of stops, prohibition of car horn signals); • prohibition of helicopter flights in 600 m from active nests; • prohibition of staff presence in buffer zone, in case of urgent production need personnel build special protection screens to hide people from birds to minimize birds' disturbance; • special attention is given to adequate waste management to minimize presence of crows (crows tend to destroy SSE nests/prey on eggs and hatchlings); • special attention to staff awareness about SSE to increase personal motivation in making efforts to protect SSE; • installation of special signs for public awareness about SSE to increase personal responsibility in SSE protection; • several active nests near the construction area were monitored by the experienced ornithologists on full time basis during birds breeding season to ensure compliance with no disturbance measures by the construction workers. These requirements are valid for all new construction activities.	H

4	Regular monitoring of SSE in the potential impact area and reference zone to clarify potential impact on SSE by SEIC and propose additional mitigation measures if required: quantification of breeding pairs, individual birds and hatchlings; mapping of nests; assessment of nests' condition; identification of anthropogenic and natural impact on SSE including SE activities and bears' predation.	Annually	Indexes of the Steller's sea eagle population dynamics modeled by the Sakhalin Energy contracted ornithologists forecasted a gradual 1.6% decline per year of SSE population over the long-term for the whole north-east Sakhalin region due to general increasing anthropogenic pressure in the north, bears' predation and ongoing salmon decline (Masterov, Romanov, 2014). However, long term monitoring (from 2004 to 2020) of the SSE in the project potential impact zone does not confirm a decline of the species. Instead, the results show random fluctuations of different monitoring parameters (number of active nests, brood rate, etc.) within the different years and/or areas. The average brood rate between 2004 and 2020 varied from 0.9 to 1.7 chick per active nest in the potential impact zone and 0.8 to 1.7 chick per active nest in the reference zone. The overall average interannual brood rate is the same in the potential impact area and reference zone, i.e. 1.22 chick per active nest between 2004 and 2020.	H
5	Hydrocarbons/chemicals spill prevention.	Evergreen	To minimize the risk of hydrocarbon/chemicals spill pollution, the Company developed a number of actions that were implemented and followed at the design and construction phases of the project. The Company continues to follow relevant spill prevention practices during the operation phase (please refer to the Conservation Management Plan for the Sakhalin Taimen and Pacific salmon and Oil Spills Prevention and Response Plans). In addition to this, Sakhalin Energy developed an Oiled Wildlife Response Plan that covers the following main components of response, including for SSE: required Oiled Wildlife Response (OWR) capabilities and resources, response procedures (including coordination of actions with third-parties). There were no significant hydrocarbon/chemical spills from Company activities in the areas of SSE habitat during the project's construction and operation phases.	H

6	Mitigation of the induced access impact.	2004-2009	To minimize the impact of increased public access leading to increased disturbance for the SSE and possible hunting and poaching (salmon SSE prey) in previously intact habitat as a result of the assets/roads construction, the following actions were developed and followed: • Routing of the RoW close to existing access networks and infrastructure (e.g. roads, railway and transmission lines), i.e. no new access is constructed; • Fencing/barriers on newly constructed roads; • Removal of the temporary access roads following construction finalization, minimizing the number of permanent roads; • Development and implementation of a no hunting, fishing or gathering policy applicable to the Company employees and contractors. Providing relevant awareness trainings to the employees and contractors.	H
Remedial measures: Restoration				
7	Restoration of SSE habitat.	2005-2009	As a part of the pipeline construction works to minimize the impact on the watercourses possibly arising from the increase in suspended sediments and chemical leaks, the Company developed and implemented relevant river crossings mitigation and restoration measures. These measures are of particular importance for the Steller's sea eagle as adverse impact on rivers would negatively influence salmon and other fish species – the main prey of SSE. Sakhalin Energy has made over 1000 pipeline crossings of watercourses, all of them were timely reinstated. The Company conducts annual environmental monitoring of watercourses crossings (about 30 watercourses per year). Results of the monitoring show that hydrological and hydrochemical parameters on the watercourses in the project impact zone are within Maximum Permissible Concentrations and adverse impact on salmon species caused by the Company's operations has not been identified. For more details, please	H

			refer to the Conservation Management Plan for the Sakhalin Taimen and Pacific salmon.	
Remedial measures: Additional Conservation Opportunities				
8	Wrapping of nesting trees with metal covers at Chaivo spit to protect eggs and hatchlings from bears' predation.	2005-2013	The estimated number of eggs/hatchlings loss due to bears' predation in north-eastern Sakhalin during 2004-2013 is around 20% (Masterov et al, 2016). In 2005 – 2013, while performing SSE monitoring in the project influence and control zone, Sakhalin Energy's contractor installed 135 metal protection sheaths on the trunks of SSE nesting trees: 84 in Chaivo area, 1 in Lunskiy area, 50 outside of the project potential impact zone. Metal protection sheaths limit a bears' ability to climb a tree and is considered to be an effective measure, although it does not provide full security as some bears still can overcome metal protections (usually on short trees and/or on trees with low branches). Based on sample observations by third party specialists such metal protections reduced bears' predation by 5.6 times in the control sampling area (Masterov et al, 2016).	H
9	Construction of artificial nests.	2008	In 2008 SE built two artificial nesting platforms for SSE, however, none of the platforms were observed being used by the birds. Presumably this is due to the fact that north-east of Sakhalin is rich in natural nesting sites and materials suitable for SSE and birds prefer to use natural ones rather than artificial.	L

10	Construction of artificial perches.	2008	In 2008 SEIC built 12 artificial feeding posts for SSE at Chaivo spit and about 10 along the shoreline in the vicinity of the OPF to increase the area of observation while a bird is on a perch and thus increase the rate of prey catches of SSE. This measure proved to be successful based on the observations by the Company and third-party specialists as the SSE birds actively use such feeding posts.	H
11	Oiled Wildlife Rehabilitation Programme (including provision of training for third parties).	2005 until present	Sakhalin Energy has been training personnel and third parties under the Oiled Wildlife Rehabilitation Programme since 2005. The programme was developed in cooperation with the International Fund for Animal Welfare (IFAW) and the International Bird Rescue Research Centre (IBRRC), taking into consideration Sakhalin avifauna and severe climate. The programme is available for participation to all Company and contractors' employees engaged in oil spill response. The Company also periodically invites for the training partners from other local oil and gas companies as well as government officials and veterinarians. The training includes two response modules: theoretical training in the classroom and the development of practical skills in the field on the shore area of Aniva Bay. The practical training includes repelling from spill areas, capturing and transportation of oiled birds, and cleaning and stabilisation of birds in the rehabilitation centre for oiled wild animals. The rehabilitation centre is located in the Prigorodnoye production complex. This is the first such centre in Russia and the only one in the Pacific Region. As of 2020 there are more than 500 people from 30 organisations, mainly operating on Sakhalin, including representatives of government bodies, oil and gas companies and veterinarians, that have been trained through the Oiled Wildlife Rescue Programme over the years. Altogether, this is a significant pool of trainees able to provide help for the wildlife species, including the SSE, in the case of an oil spill, not only within the Company, but also outside of it. In 2020, Sakhalin Energy published an Oiled Wildlife Rescue Field Guide for	L

			rescuers and volunteers.	
12	Publication of a book on SEE available to the general public.	2012	The book summarizes valuable information about SSE, monitoring and mitigation measures of SEIC to protect the species and minimize impact on SSE. It is written in simple language, intelligible for general readers, and helps in raising awareness in the local population of the need to conserve the SSE and protect their habitat and prey base.	L
Number of Preventative measures: High/Medium/Low				**6/0/0**
Number of Remedial measures: High/Medium/Low				**3/0/3**

Table 2. Value legend

Value	**High (H)**	**Medium (M)**	**Low (L)**
Preventative measures: Avoidance and Mitigation	No recorded significant adverse impact on the species	Medium recorded adverse impact on the species	Notable recorded adverse impact on the species
Remedial measures: Additional Conservation Opportunities	Significant gain in the species conservation	Medium gain in the species conservation	Low gain in the species conservation

APPENDIX 3 - CONSERVATION MANAGEMENT PLAN: GRAY WHALE

Species	**Gray whale (GW)**
Illustration	
CHA Ecologically Appropriate Areas of Analysis (EAAAs, previously named Discreet Management Units / DMUs)	EAAA # 1 - North-East Shelf Zone
Critical Habitat triggering criterion	Cr 1 - Critically Endangered or Endangered species Cr 3 - Migrating and/or congregatory species

	Cr 4 - Endangered and/or unique ecosystems Cr 5 - Key evolutionary processes
Objective	To avoid and mitigate impact on Gray whales arising from construction and production activities and implement additional conservation opportunities where applicable and possible, to deliver a net gain for biodiversity values in critical habitat, as required by the IFC Performance Standard 6.
Current status in potential impact zone	The latest population assessment as of 2019 for the Sakhalin Gray whales feeding aggregate is 219-245 individuals, and the rate of growth of that feeding aggregate is approximately 4.3-5.4% a year.
Potential impact by the project	Potential impacts: noise and physical disturbance (offshore operations including construction and seismic activities, support vessels, helicopters' flights), hydrocarbon pollution and vessel strikes.
Residual impact by the project	Project-wide EIAs (2003, 2005), Western Gray Whale Technical EIA (2003) and Seismic EIAs (2010, 2012, 2015, 2018) predicted **no significant measurable residual impact** on the Sakhalin GWs and this has been confirmed by the relevant long-term impact mitigation and monitoring programmes (1997 – 2020). The mitigation hierarchy applied is shown in Table 1 below.
Achievement of a net gain under IFC PS6	The Company has implemented mitigation measures (i.e. the Mitigation Hierarchy application), developed with the guidance of the Western Gray Whales Advisory Panel. To date, no significant measurable residual impact was identified for the Gray whales. The population of the GW in the feeding aggregate is growing steadily 4.3-5.4% a year. In addition to the effectiveness of the mitigation measures implemented in line with the EIAs, a number of scientific research projects are **voluntarily** implemented by the Company as part of the Joint Program to enhance the scientific knowledge of the GW in support of its conservation. These projects qualify as Additional Opportunities (AO) as per the IFC PS6. The dimension and the achievements of this program, summarized below,

	are significant. • Five integrated programs were carried out: Photo ID, Satellite tagging, Distribution project, Benthic Assessment project and Genetic project; • Stakeholders' involvement: ~12 universities, 5 RF government agency and ~50 researchers involved; • Around 256 scientific papers have been published including 43 International Whaling Commission papers and 62 peer reviewed papers (as of October 2021); • Change of the understanding that Sakhalin gray whales are not an isolated population as previously assumed, but the part of a larger population of the GW or a sub-population; • Accumulated knowledge allowed to reassess species vulnerability from 'critically endangered' to 'endangered'; • Total financial commitment to JP by Sakhalin Energy from 2002 to 2020 is in the order of 20 million USD. In terms of application of AO to achieve a **net gain** in line with IFC PS6, Sakhalin Energy considers that **this has been demonstrated**. However, to contribute further to the conservation of the GW, the Company will continue working with its partners and authorities to contribute to ghost fishing nets removal.
Key references	• Biodiversity Action Plan, 2009 (publicly available, Sakhalin Energy - Biodiversity Action Plan) • Critical Habitat Assessment for Sakhalin-2 project (1000-S-90-P-0381-00-E) • Critical Habitat Assessment (Sakhalin-2 project). Offset Strategy for Gray Whales (1000-S-90-P-0301-00-E) • Environmental Impact Assessment, 2003 (publicly available, Sakhalin Energy - Environmental impact assessment) • Environmental Impact Assessment, 2005 (publicly available, Sakhalin Energy - Environmental impact assessment) • Technical Western Gray Whale Environmental Impact Assessment, 2003 (publicly available, Sakhalin Energy - Environmental impact assessment)

	• The International ESHIA, 4D seismic survey at Piltun-Astokh and Lunskoye, June 2015 (publicly available, Sakhalin Energy - Environmental impact assessment) • Comparative Environmental Analysis of the Piltun Astokh Field Pipeline Route Options (publicly available, Sakhalin Energy - Environmental impact assessment) • Environmental Impact Assessment Report South Piltun Site Survey, June 2012 (publicly available, Sakhalin Energy - Environmental impact assessment) • The International ESHIA for 2018 4D seismic surveys, June 2018 (publicly available, Sakhalin Energy - Environmental impact assessment) • Sakhalin Energy position paper for protection of the Western Gray Whales, 2003 (publicly available, Sakhalin Energy - Gray Whales) • Marine Mammal Protection Plan (publicly available, Sakhalin Energy - Gray Whales) • Marine Mammal Observation Programme Reports 2009-2019 (publicly available, Sakhalin Energy - Gray Whales) • Joint Gray Whale Monitoring Programme Reports 2012-2019 (publicly available, Sakhalin Energy - Gray Whales) • Summary of the Joint Okhotsk-Korean Gray Whale Monitoring Program Findings, Sakhalin, Russian Federation, 2002-2010 (publicly available, Sakhalin Energy - Gray Whales) • Integrated Analysis: Assessment of Whale Distribution Linkages to Benthic Prey and Acoustic Sound Levels for the Okhotsk-Korean Gray Whale Population Monitoring Program off the North-East Coast of Sakhalin Island (2014) (publicly available, Sakhalin Energy - Gray Whales) • Reports from research programme on Western Gray Whales (publicly available, Sakhalin Energy - Gray Whales) • HSESAP, Marine Environment Protection Standard, Appendix 6, Marine Mammals Specification, (publicly available, Sakhalin Energy - Health, Safety, Environment and Social Action Plan, 2015) • Noise Mitigation Strategy (5025-S-90-04-T-0020-00-P1) • Aviation Operations Manual (0000-S-90-01-M-0028-00-E) • Oil Spills Prevention and Response Plan for Piltun-Astokh Offshore Operations (publicly available, Sakhalin Energy - Oil Spill Response Documentation)

	"Gray Whales. The Sakhalin Story." (publicly available, Sakhalin Energy - List of publications)

Table 1: Preventative, remedial and other measures delivered for the GW and the outcomes

#	Action	Key dates	Main outcomes	Value/ effectiveness
Preventative measures: Avoidance and Mitigation				
1	Pre-construction baseline data collection and identification of mitigation / avoidance measures for construction and operation phases.	1997-2003	Essential data clarifying GW biology, ecology, abundance and distribution which helped to (i) improve knowledge about GW among scientific communities, (ii) identify magnitude of Sakhalin Energy impact on GW during construction and operational phases, (iii) suggest for impact avoidance & mitigation measures.	H
2	Avoidance during construction	2004-2006	Company re-routed offshore pipeline approximately 20 km south direction in comparison with the originally planned route. This re-routing was done to avoid GW Piltun main feeding area. The additional cost incurred was approximately **300 million USD**. In addition to this, Sakhalin Energy conducted the noisiest construction works (platform and pipeline installation) at the beginning and end of the feeding season when GWs are fewest and suspended all noisy works if a whale was spotted within a designated distance defined in the EIA/MMP.	H
3	Mitigation of collision risk	1997 – to date	**1. Establishment of protection zones** To mitigate a risk of vessels' collision with whales Sakhalin Energy established protection	H

			zones in GW feeding grounds and migration corridors. The protection zones are defined based on maximum densities or frequencies of whales' occurrence. Protection zones requirements are mandatory for all Sakhalin Energy vessels. Deviations from these routes inside of protection zones are allowed only for safety/emergency purposes. **2. Coordination of vessel's routes.** Vessels' traffic corridors have been established for Sakhalin Energy vessels along the east coast of Sakhalin island. All Company affiliated vessels are required to keep within the designated 4 km-wide corridors (with exemption for safety/emergency/GW data gathering reasons) from May through November (early, peak and late season of GW presence and abundance in the north east Sakhalin waters). In addition to the vessels' traffic corridors a platform safety zone with a radius of 5 km has been identified around all three platforms. Vessels without an affiliation with Sakhalin Energy should avoid entering this zone, which is guarded by standby vessels. **3. Control of vessels' speed limit** Sakhalin Energy established speed limits mandatory for all vessels involved in the offshore activities of the Company in the north-east of Sakhalin waters (with exemption for safety/emergency reasons). The Company uses various vessels with different technical characteristics to support its offshore activities. The detailed thresholds of vessels' speed limits for each type of the vessel/offshore activity are provided in the MMPP. **4. Employment of Marine Mammals Observers** Trained MMOs are present on all key vessels with a high probability of a whale encounter involved in Sakhalin Energy offshore activities along the east coast of Sakhalin. MMOs on board continuously watch for GW to alert vessel's crew in case of a GW close encounter so thus the crew can take precautionary measures to avoid a GW strike. Crew members on all vessels irrespective of MMOs presence receive relevant awareness training to avoid GW strikes and minimize disturbance. **5. Setting up safe distance between a vessel and a whale**	

			All Company's transiting vessels shall attempt to maintain a minimum of 1,000 m distance from observed GW. No whale collision has been registered to date, which supports the effectiveness of the MMPP in terms of avoidance of the collision risk. Approximately **32** collision mitigation measures (vessel stop, slow-down, course adjustment) have been taken as a part of the MMOs work over the period 2015-2019 in relation to GW.	
4	Mitigation of noise disturbance risk	1997 – to date	To mitigate the risk of whales' disturbance by noise generated by SEIC production activities, the Company developed and implemented a number of mitigation measures described below: **1. Conduct noisy operations outside of peak season** If feasible (schedule, weather and safety related), offshore activities that have the potential to impact whales on their feeding grounds are scheduled outside of the peak season (i.e. outside of August-September). **2. Use of noise minimization techniques** Contractors are requested to use equipment and procedures that minimize noise. E.g. use of special enclosures, mufflers, sound-isolation mounts, tuned propellers and drive shafts, and shrouds on propellers, along with minimal use of thrusters. **3. Conduct acoustic modeling** Acoustic footprint of offshore activities close to the whale feeding area are predicted with acoustic models prior to offshore activities that have the potential to significantly impact whales on their feeding grounds and tested against noise impact criteria. For example, Lunskoye acoustic monitoring program in 2004 yielded a catalogue of source level measurements of vessels involved in pipe laying activities, which were then used to identify suitable vessels and operational regimes to minimize sound emissions for work conducted subsequently in Piltun. **4. Employment of Marine Mammals Observers**	H

			MMOs observe the area in the vicinity of an operating vessel (e.g. seismic) for 30 minutes prior to commencement of operations that have the potential to cause GW hearing impairment. In case a GW is observed during operations in the vicinity of the vessel the works are suspended until the whale moves to a safe distance. **5. Control of aircrafts permitted altitude** Aircraft and drones maintain a minimum altitude as high as circumstances allow over the gray whale feeding area. The minimum altitude is 100 m (10 m for drones). No significant changes in GW behavior have been recorded by the MMOs to date.	
5	Mitigation of oil spill risk	1997 – to date	The Company pays special attention to the oil spill risk recognizing it as one of the major potential threats to the environment arising from hydrocarbons exploration operations. There have been no oil spill incidents in the GW feeding area during the whole duration of the Sakhalin-2 project. Detailed prevention and response actions are provided in the Oil Spill Prevention and Response Plan for Piltun-Astokh Offshore Operations. Among other actions, the Plan establishes details of booms deployment to prevent oil spreading to areas where whales have been sighted, regulates response vessels speed limits and prohibits use of dispersants in the vicinity of GWs and their feeding grounds.	H

6	Mitigation of major construction and production offshore works, including seismic	1997 – to date	During seismic surveys particular attention is given to minimization of noisy activities. For seismic or any other major offshore activities, the Company develops a Monitoring and Mitigation Plan, which separately covers all mitigation measures undertaken by Sakhalin Energy during such activities, including: • scheduling of all noisy activities outside of main GW feeding period (August through September); • noise modelling for seismic surveys in accordance with seismic source and seismic plan; • minimization of seismic area for reduction of potential impact on whales; • management of control zones (“A” zones – seismic area with a noise levels potentially causing whale behavioral disruptions). Should a whale enter this zone seismic operations may be suspended (mother calf pair – mandatory shutdown, adult whale – operations are suspended if the animal shows signs of anxiety); • management of exclusion zones (seismic area with a noise levels potentially causing hearing impairment of a whale). Should a whale enter this zone all seismic operations are mandatory suspended. The number of occasions noise mitigation measures (seismic operations shutdowns, suspended start of seismic operations) were initiated by the MMOs in relation to GW during the past two seismic surveys (2015, 2018) was approximately **11**. The Company prepares environmental impact assessments (EIAs) and obtains relevant approvals by RF authorities for all major offshore activities, including seismic.	H
Remedial measures: Additional Conservation Opportunities				
7	Initiation of RF MNRE Interdepartmental	2009 - 2019	In 2009 Sakhalin Energy and ENL initiated the foundation of the Interdepartmental Working Group of the WGW under Ministry of Natural Resources management (MNR IWG). The group functions as a platform where hydrocarbon exploration operators of	M

	Working Group of the WGW		Sakhalin shelf, authorities, scientists and NGOs could jointly discuss results of monitoring, suggest practices for Sakhalin GW protection and coordinate GW protection activities.	
8	Conducting research studies jointly with ENL (Joint Program): general	2002 – to date	Accumulated knowledge enabled scientific society to gain valuable data on GW biology, ecology, abundance, distribution, etc. More than 140 scientific papers were published since 2003. This outstanding example of a joint marine mammals' protection project can be used by the industry as an example for the protection of other vulnerable marine species. The data gained as a result of the joint program enabled IUCN to reassess GW vulnerability and change the status from 'critically endangered' to 'endangered'.	H
8.1	Joint Program (JP): Satellite Tag Project	2010-2011	Three GW tagged on Sakhalin in 2010-2011 travelled from Sakhalin to a bay in Southern California, Mexico and returned to coastal Sakhalin waters in following seasons. That changed the assumed GW population paradigm allowing the reasonable assumption that Sakhalin gray whales (Sakhalin feeding aggregation) are not an isolated population, as it was considered previously (Lang 2021 and Breuniche-Olsen 2021).	H
8.2	Joint Program (JP): Distribution Project	2003 – to date	The project studies GWs distribution and interannual changes in feeding areas. Results of GW distribution studies allowed to distinguish two GW feeding areas (Piltun and Morskoy). In addition to this, based on studies supported by the Company, another feeding territory of GW was confirmed in Kamchatka peninsula waters.	H
8.3	Joint Program (JP): Photo ID project	2002 – to date	Long-term work enabled identification and cataloguing of 332 individual GW on Sakhalin (as of 2020). The number of GW is increasing, the reproduction rate is stable. Cross-comparison of Sakhalin and Mexican photo ID catalogues identified more than 50 matches of whales. This supported the suggestion made based on the satellite tagging project – Sakhalin feeding aggregation of GW is not an isolated population and is a part of a larger pacific population of GW.	H
8.4	Joint Program (JP): Benthic Assessment Project	2002 - 2016	The composition, distribution, abundance and variability of benthic prey communities have been studied and environmental capacity of feeding areas were estimated, therefore dependence of GW distribution on benthic prey distribution and abundance has	H

			been confirmed. No impact on benthic communities from company operations was identified.	
8.5	Joint Program (JP): Genetic Project	2013-2020	As a part of this project genetic analyses of biopsy samples of 71 Sakhalin GWs to identify Sakhalin GW population attribution and their historical demography were undertaken. The results also did not confirm genetic isolation of Sakhalin GWs from pacific population.	H
9	GW impact mitigation and risk management sharing program	Evergreen	The Companies (Sakhalin Energy and ENL) shared their practices of GW monitoring with another hydrocarbon exploration company (Gazprom Neft) with a purpose to combine collected monitoring data by all three companies into joint database (photo ID and distribution in Morskoy area). As a result, it substantially enhanced the overall Sakhalin GW Photo ID and distribution projects, and as consequence enriched knowledge about Sakhalin GW aggregation. In addition to this, SE shared with Gazprom Neft its practices and experience of GW mitigation measures undertaken during seismic and offshore operation which were used by Gazprom Neft when planning and conducting the similar activities (seismic survey, exploration drilling) on Ayashsky license area.	M
10	Actions to avoid GW entanglement with ghost fishing gears: support to Fishery and RF Authorities	Evergreen	Company regularly informs RF authorities about abandoned ghost fishing gears and GWs entangled in nets in Sakhalin GW feeding area spotted during distribution and Photo-ID surveys.	L
11	Publication of a book on Sakhalin GW available to general public.	2013	The book summarizes valuable information about GW, monitoring and mitigation measures of Sakhalin Energy to protect the species and minimize impact on GW. It is written in simple language intelligible for general readers and helps raise awareness in the local population of the need to conserve the GW and protect their habitat and prey base.	L

12	Sakhalin Energy contribution to National GW Conservation Strategy and RF MNRE Cetacean Section of Expert Working Group (functional successor of IWG with enhanced remit)	2020-2021	The Strategy is being created by the Cetacean Section of the Expert Working Group established by RF Ministry of Natural Resources and Ecology, which includes a Sakhalin Energy representative. The Sakhalin GW population has been included into the priority list of rare and endangered species that require immediate implementation of protection and restoration measures. The Strategy is a mandatory document in accordance with the Road Map of the Federal Project "Biodiversity Conservation and Environmental Tourism Development" (part of National Project "Ecology"). Sakhalin Energy prepared and submitted concept proposals and comments on the Strategy draft. IUCN representatives also participated in the meetings, provided relevant advice and expressed support for the overall Strategy development process. The Strategy and the follow-up Action Plan are intended to address all the natural and anthropogenic threats (from all industrial activities such as oil and gas, fishery, marine transport, tourism, etc.) and provide a risk assessment; establish the roles and responsibilities of involved parties (scientists, authorities, business, NGOs, etc.); issue rules and guidelines (methodologies) for developing avoidance and mitigation measures; suggest approaches and parameters for monitoring indicators of population state and the effectiveness of Strategy implementation.	L (Strategy draft) to H (Strategy issue)
Other measures: Independent scientific advice				
13	Western Gray Whales Advisory Panel (WGWAP)	2005 – 2021	In response to concerns of Russian and international conservation community and the report of IUCN-convened Independent Scientific Review Panel (ISRP 2005), the Company and its Lenders requested that IUCN establish the Western Gray Whales Advisory Panel which IUCN has convened and managed since then. The main purpose of the WGWAP is to provide independent scientific advice and recommendations to the Company and other stakeholders aimed at minimization of anthropogenic impact on gray whales. The Company has been operating successfully with no measurable harm to gray whales or any other marine mammals over many years, aided by the guidance and recommendations from experts of the WGWAP. This unique relationship between the industry and scientific/conservation communities formed the basis for a number of innovative, multi-disciplinary scientific papers and reports.	H

Number of Preventative measures: High/Medium/Low	**6/0/0**
Number of Remedial measures: High/Medium/Low	**6/3/2**
Number of Other measures: High/Medium/Low	**1/0/0**

Table 2. Value legend

Value	High (H)	Medium (M)	Low (L)
Preventative measures: Avoidance and Mitigation	No recorded significant adverse impact on the species	Medium recorded adverse impact on the species	Notable recorded adverse impact on the species
Remedial measures: Additional Conservation Opportunities	Significant gain in the species conservation	Medium gain in the species conservation	Low gain in the species conservation
Other measures: Independent scientific advice	Significant gain in the species conservation	Medium gain in the species conservation	Low gain in the species conservation

APPENDIX 4 – LISTS OF FLORA AND FAUNA

Species of marine mammals of the Sea of Okhotsk

##	**English common name**	***Latin name***	IUCN Red List	RF Red book	Sakhalin Red book	
Cetaceans						
1	Bowhead whale	*Balaena mysticetus*	(EN)	1		c
2	Minke whale	*Balaenoptera acutorostrata*	(LC)			s
3	Sei whale	*Balaenoptera borealis*	(EN)	3		s
4	Gray whale	*Eschrichtius robustus*	(EN)	1		s
5	Fin whale	*Balaenoptera physalus*	(VU)	4		s
6	North Pacific Right whale	*Eubalaena japonica*	(EN)	1		s
7	Cachalot/Sperm Whale	*Physeter macrocephalus*	(VU)			s
8	Pygmy sperm whale	*Kogia breviceps*	(DD)			s
9	Beluga whale	*Delphinapterus leucas*	(NT)			c
10	Killer whale	*Orcinus orca*	(DD)	4*		s
11	Northern Right Whale Dolphin	*Lissodelphis borealis*	(LC)			s
12	Striped Dolphin	*Stenella coeruleoalba*	(LC)			s
13	Dall's porpoise	*Phocoenoides dalli*	(LC)			s
14	Bottlenose dolphin	*Tursiops truncatus*	(LC)			sp
15	Pacific White-sided Dolphin	*Lagenorhynchus obliquidens*	(LC)			s
16	Short-beaked Common Dolphin	*Delphinus delphis*	(LC)			s
17	Harbour Porpoise	*Phocoena phocoena*	(LC)	4		s
18	Cuvier's Beaked Whale	*Ziphius cavirostris*	(LC)	2		s
19	Baird's Beaked Whale	*Berardius bairdii*	(LC)			s
Pinnipeds						

20	Ringed seal	*Phoca hispida*	(LC)			c
21	Bearded seal	*Erignathus barbatus*	(LC)			c
22	Harbour seal	*Phoca vitulina*	(LC)			
23	Ribbon seal	*Histriophoca fasciata*	(LC)			
24	Spotted seal	*Phoca largha*	(LC)			
25	Northern fur seal	*Callorhinus ursinus*	(VU)			S
26	Steller's sea lion	*Eumetopias jubatus*	(NT)	3	5	s
Mustelids						
27	Sea otter	*Enhydra lutris*	(EN)	2	5	c

*Far East population of the carnivorous killer whale

Species of fish present at different life stages in the water area of North-East shelf of Sakhalin Island

Latin name	Status in IUCN Red List	Status in RF Red Book	Status in Sakhalin Oblast Red Book	Global AOO	Global Population	% AOO / Population	frequency of occurrence
Rajidae	-	-	-				
Bathiraja parmifera	-	-	-				-
Bathiraja smirnovi	-	-	-				7,1
Gadidae	-	-	-				
Eleginus gracilis	-	-	-				7,1
Gadus macrocephalus	-	-	-				14,3
Theragra chalcogramma	-	-	-				96,4
Hexagrammidae	-	-	-				
Hexagrammus stelleri	-	-	-				-

Latin name	Status in IUCN Red List	Status in RF Red Book	Status in Sakhalin Oblast Red Book	Global AOO	Global Population	% AOO / Population	frequency of occurrence
Cottidae	-	-	-				
Gymnocantus detrisus	-	-	-				10,7
Triglops jordani	-	-	-				28,6
Melletes papillio	-	-	-				60,7
Myoxocephalus brandti	-	-	-				-
M.polyacanthocephalus	-	-	-				42,9
M.jaok	-	-	-				39,3
M.stelleri	-	-	-				7,1
Gymnocantus pistiliger	-	-	-				14,3
Hemilepidotus gilberti	-	-	-				7,1
Taurocottus bergi	-	-	-				14,3
Enophris diceraus	-	-	-				-
Hemitrepteridae	-	-	-				
Blepsias bilobus	-	-	-				3,6
Agonidae	-	-	-				
Percis japonicus	-	-	-				10,7
Podothecus gilberti	-	-	-				17,9
Osmeridae	-	-	-				
Mallotus villosus	-	-	-				71,4

Latin name	Status in IUCN Red List	Status in RF Red Book	Status in Sakhalin Oblast Red Book	Global AOO	Global Population	% AOO / Population	frequency of occurrence
Clupeidae	-	-	-				
Clupea pallasi	-	-	-				7,1
Cyclopteridae	-	-	-				
Eumicrotremus schmidti	-	-	-				10,7
Psychrolutidae	-	-	-				
Psichrolutus paradoxis	-	-	-				-
Liparidae	-	-	-				
Liparis ochotensis	-	-	-				28,6
L.tesselatus	-	-	-				3,6
Zoarcidae	-	-	-				
Lycodes tanakai	-	-	-				25
Ammodytidae	-	-	-				
Ammodytes hexapterus	-	-	-				21,4
Stichaedae	-	-	-				
Opistrocentrus zonope	-	-	-				-
Pleuronectidae	-	-	-				
Glyptocephalus stelleri	-	-	-				14,3
Hippoglossus stenolepis	-	-	-				7,1

Latin name	Status in IUCN Red List	Status in RF Red Book	Status in Sakhalin Oblast Red Book	Global AOO	Global Population	% AOO / Population	frequency of occurrence
Hippoglosoides robustus	-	-	-				17,9
Limanda aspera	-	-	-				-
L.sakhalinensis	-	-	-				75
L.proboscideus	-	-	-				46,4
Platichthys stellatus	-	-	-				25
Petromizontidae	-	-	-				
Lethenteron japonica	-	-	-				3,6

Protected species of birds found in northeast Sakhalin

№	Species	IUCN (2021)	Red book of Russia (2001)	New list of protected animals of Russia (2020)*	Red book of Sakhalin (2016)
1	*Aegolius funereus*	LC			3
2	*Anas falcata*	NT		2	2
3	*Aquila chrysaetos*	LC	3	3	3
4	*Brachyramphus perdix*	NT	3		3
5	*Calidris acuminata*	LC			3
6	*Botaurus stellaris*	LC			3
7	*Bubo bubo*	LC	2	3	3
8	*Calidris tenuirostris*	EN		2	

9	*Calidris alpina actites*		1	2	1
10	*Calidris ferruginea*	NT		2	3
11	*Calidris subminuta*	LC			3
12	*Cygnus bewicki*	LC	3		5
13	*Cygnus cygnus*	LC			5
14	*Eurynorhynchus pygmeus*	CR	1	1	1
15	*Falco peregrinus*	LC	2	3	2
16	*Falco rusticolus*	LC	2	2	2
17	*Falco subbuteo*	LC			3
18	*Gallinago hardwickii*	LC	3		7
19	*Gavia arctica*	LC		2	
20	*Haematopus ostralegus*	NT	4	2	3
21	*Haliaeetus albicilla*	LC	3	5	3
22	*Haliaeetus pelagicus*	VU	3	3	2
23	*Ixobrychus eurhythmus*	LC			3
24	*Larus glaucescens*	LC	3		3
25	*Limicola falcinellus*	LC			3
26	*Limosa limosa*	NT			3
27	*Numenius madagascariensis*	EN	2	2	2
28	*Nyctea scandiaca*	VU			3
29	*Ocyris (Emberiza) aureolus*	CR		2	2
30	*Ocyris (Emberiza) rusticus*	VU		2	
31	*Pandion haliaetus*	LC	3	3	3
32	*Phalaropus lobatus*	LC			3
33	*Philomachus pugnax*	LC			3

34	*Sterna albifrons*	LC	2	2	3
35	*Sterna camtschatica (aleutica)*	VU	3	3	3
36	*Tetrao parvirostris*	LC			2
37	*Tringa ochropus*	LC			3

Protected species of birds noted around OPF/OPF-C

№	Species	IUCN (2021)	Red book of the Russian Federation (2001)	New list of protected animals of Russia (2020)	Red book of Sakhalin (2016)
1	*Aegolius funereus*	LC			3
2	*Aix galericulata*	LC	3	5	5
3	*Anas falcata*	NT		2	2
4	*Anas poecilorhyncha*	LC			3
5	*Cygnopsis cygnoides*	VU	1	1	1
6	*Bombycilla japonica*	NT			3
7	*Brachyramphus perdix*	NT	3		3
8	*Bubo bubo*	LC	2	3	3
9	*Calidris alpina actites*		1	2	1
10	*Calidris subminuta*	LC			3
11	*Calidris tenuirostris*	EN		2	
12	*Calidris ferruginea*	NT		2	3
13	*Gavia arctica*	LC		2	
14	*Cygnus cygnus*	LC			5
15	*Falcipennis falcipennis*	NT	2	2	2
16	*Falco peregrinus*	LC	2	3	2

17	*Falco subbuteo*	LC			3
18	*Gallinago hardwickii*	LC	3		7
19	*Glaucidium passerinum*	LC			3
20	*Haematopus ostralegus*	NT	4	2	3
21	*Haliaeetus albicilla*	LC	3	5	3
22	*Haliaeetus pelagicus*	VU	3	3	2
23	*Larus glaucescens*	LC	3		3
24	*Limosa limosa*	NT			3
25	*Numenius madagascariensis*	EN	2	2	2
26	*Ocyris (Emberiza) aureolus*	CR		2	2
27	*Ocyris (Emberiza) rusticus*	VU		2	
28	*Pandion haliaetus*	LC	3	3	3
29	*Phalaropus lobatus*	LC			3
30	*Sterna camtschatica (aleutica)*	VU			3
31	*Strix nebulosa*	LC			3
32	*Surnia ulula*	LC			3
33	*Tetrao parvirostris*	LC			2
34	*Tringa ochropus*	LC			3

Protected species of birds noted along the Pipeline

№	Вид (лат.)	IUCN (2021)	Red book of the Russian Federation (2001)	New list of protected animals of Russia (2020)	Red book of Sakhalin (2016)
1	*Accipiter gularis*	LC			3
2	*Aegolius funereus*	LC			3

3	*Aix galericulata*	LC	3	5	5
4	*Anas falcata*	NT		2	2
5	*Anas poecilorhyncha*	LC			3
6	*Bombycilla japonica*	NT			3
7	*Botaurus stellaris*	LC			3
8	*Brachyramphus perdix*	NT	3		3
9	*Bubo bubo*	LC	2	3	3
10	*Bubulcus ibis*	LC	3		6
11	*Calidris acuminata*	LC			3
12	*Calidris subminuta*	LC			3
13	*Calidris tenuirostris*	EN		2	
14	*Circus spilonotus*	LC			3
15	*Coturnix japonica*	NT			3
16	*Cygnopsis cygnoides*	VU	1	1	1
17	*Cygnus bewicki*	LC	3		5
18	*Cygnus cygnus*	LC			5
19	*Egretta intermedia*	LC	3		3
20	*Falcipennis falcipennis*	NT	2	2	2
21	*Falco subbuteo*	LC			3
22	*Gallicrex cinerea*	LC	4		6
23	*Gallinago hardwickii*	LC	3		7
24	*Gavia adamsi*	NT	3	3	3
25	*Glaucidium passerinum*	LC			3
26	*Haliaeetus albicilla*	LC	3	5	3

27	*Haliaeetus pelagicus*	VU	3	3	2
28	*Larus glaucescens*	LC	3		3
29	*Limosa limosa*	NT			3
30	*Numenius madagascariensis*	EN	2	2	2
31	*Ocyris aureolus*	CR		2	2
32	*Ocyris rusticus*	VU		2	
33	*Pandion haliaetus*	LC	3	3	3
34	*Passer rutilans (cinnamomeus)*	LC			3
35	*Phalaropus lobatus*	LC			3
36	*Schoeniclus (Emberiza) schoeniclus*	LC			3
37	*Sphenurus sieboldii*	LC			3
38	*Sterna camtschatica (aleutica)*	VU			3
39	*Strix nebulosa*	LC			3
40	*Surnia ulula*	LC			3
41	*Tetrao parvirostris*	LC			3
42	*Tringa ochropus*	LC			3
43	*Zosterops japonicus*	LC			3

Protected species of birds noted around Prigorodnoye production complex

№	Вид (лат.)	IUCN (2021)	Red book of the Russian Federation (2001)	New list of protected animals of Russia (2020)	Red book of Sakhalin (2016)
1	*Accipiter gularis*	LC			3

2	*Aix galericulata*	LC	3	5	5
3	*Anas falcata*	NT		2	2
4	*Anas poecilorynchа*	LC			3
5	*Brachyramphus perdix*	NT	3		3
6	*Calidris acuminata*	LC			3
7	*Calidris subminuta*	LC			3
8	*Casmerodius albus*	LC			6
9	*Casmerodius modestus*	LC			6
10	*Cygnus bewickii*	LC	3		5
11	*Cygnus cygnus*	LC			5
12	*Egretta garzetta*	LC			6
13	*Egretta intermedia*	LC	3		3
14	*Falco subbuteo*	LC			3
15	*Gallicrex cinerea*	LC	4		6
16	*Gallinago hardwickii*	LC	3		7
17	*Gavia adamsii*	NT	3	3	3
18	*Gavia arctica*	LC		2	
19	*Haliaeetus albicilla*	LC	3	5	3
20	*Haliaeetus pelagicus*	VU	3	3	2
21	*Himantopus himantopus*	LC	3		6
22	*Ixobrychus eurhythmus*	LC			3
23	*Larus glaucescens*	LC	3		3
24	*Limosa limosa*	NT			3
25	*Numenius madagascariensis*	EN	2	2	2
26	*Ocyris (Emberiza) aureolus*	CR		2	2

27	*Passer rutilans*	LC			3
28	*Phalacrocorax capillatus*	LC			3
29	*Phalaropus lobatus*	LC			3
30	*Schoeniclus (Emberiza) schoeniclus*	LC			3
31	*Treron sieboldii*	LC			3
32	*Tringa ochropus*	LC			3
33	*Zosterops japonicus*	LC			3

Protected species of the vegetation in the potential impact zone of Sakhalin Energy onshore assets: pipeline RoW, LNG/OET, OPF/OPF-C.

##	English name	Latin name	Location	Federal (RF Red Book)	Local (Sakhalin Oblast Red Book)
	Flowering plants				
1	Japanese spikenard	*Aralia cordata*	*RoW, LNG/OET*	*V (2)*	*I (4)*
2	Japanese angelica-tree	*Aralia elata*	*RoW, LNG/OET*	*n/a*	*R (3)*
3	Large-flowered lady's slipper	*Cypripedium macranthum*	*RoW*	*R (3)*	*R (3)*
4	Gray's umbrella-leaf	*Diphylleia grayi*	*RoW*	*R (3)*	*R (3)*
5	Sakhalin ephippianthus	*Ephippianthus sachalinensis*	*RoW*	*I (4)*	*R (3)*
6	Climbing hydrangea	*Hydrangea petiolaris*	*RoW, LNG/OET*	*R (3)*	*R (3)*
7	Hooded neottianthe	*Neottianthe cucullata*	*RoW*	*R (3)*	*R (3)*
8	Woodland peony	*Paeonia obovata*	*RoW, LNG/OET*	*R (3)*	*R (3)*
9	Kamchatka fringed orchid	*Platanthera camtschatica*	*RoW, LNG/OET*	*R (3)*	*R (3)*
1	Ophrys-like fringed	*Platanthera*	*RoW,*	*R (3)*	*V (2)*

##	English name	Latin name	Location	Federal (RF Red Book)	Local (Sakhalin Oblast Red Book)
0	orchid	*ophrydioides*	*LNG/OET*		
11	Japanese pogonia	*Pogonia japonica*	*OPF/OPF-C*	*R (3)*	*R (3)*
12	Tatewaki's pasqueflower	*Pulsatilla tatewakii*	*RoW*	*n/a*	*R (3)*
13	Small's trillium	*Trillium smallii*	*RoW*	*n/a*	*R (3)*
	Gymnosperm				
14	Glehn's spruce	*Picea glehnii*	*RoW, LNG/OET*	*R (3)*	*V (2)*
15	Japanese yew	*Taxus cuspidata*	*RoW, LNG/OET*	*R (3)*	*R (3)*
	Ferns				
16	Wright's filmy fern	*Mecodium wrightii*	*RoW*	*V (2)*	*V (2)*
	Lichens				
17	False Sato's bryocaulon	*Bryocaulon pseudosatoanum*	*RoW, OPF/OPF-C*	*R (3)*	*R (3)*
18	Redwood coccocarpia	*Coccocarpia erythroxyli*	*RoW*	*R (3)*	*V (2)*
19	Fragile hypogymnia	*Hypogymnia fragillima*	*RoW*	*R (3)*	*R (3)*
20	Hypogymnia hypotrypa	*Hypogymnia hypotrypa*	*RoW*	*n/a*	*V (2)*
21	Subtle icmadophila	*Icmadophila japonica*	*RoW, OPF/OPF-C*	*R (3)*	*V (2)*
22	Hildenbrand's leptogium	*Leptogium hildenbrandii*	*RoW*	*R (3)*	*R (3)*
23	Tree lungwort	*Lobaria pulmonaria*	*RoW, OPF/OPF-C, LNG/OET*	*V (2)*	*R (3)*
24	Perforated menegazzia	*Menegazzia terebrata*	*RoW, LNG/OET*	*R (3)*	*R (3)*
25	Ornate nephromopsis	*Nephromopsis ornata*	*RoW*	*R (3)*	*V (2)*

##	English name	Latin name	Location	Federal (RF Red Book)	Local (Sakhalin Oblast Red Book)
26	Limbate sticta	*Sticta limbata*	*RoW, OPF/OPF-C*	*R (3)*	*V (2)*
27	Shattered usnea	*Usnea diffracta*	*RoW*	*n/a*	*V (2)*

Species of fish present at different life stages in the water area of the Prigorodnoye production complex within the 30-40 m isobath

Family	№	Species	Ecology of species	Status
Clupeidae	1	*Clupea pallasii*	marine	common
Engraulidae	2	*Engraulis japonicas*	marine	common
Salmonidae	3	*Oncorhynchus gorbuscha*	anadromous	mass
	4	*O. masu*	anadromous	common
	5	*O. keta*	anadromous	mass
	6	*Salvelinus curilus*	anadromous	rare
	7	*S. leucomaenis*	anadromous	common
Osmeridae	8	*Osmerus dentex*	anadromous	mass
	9	*Hypomesus olidus*	anadromous	common
	10	*H. japonicas*	marine	mass
	11	*H. nipponensis*	anadromous	common
	12	*Mallotus villosus*	marine	mass
Salangidae	13	*Salangichthys microdon*	marine	common
Cyprinidae	14	*Tribolodon hakonensis*	anadromous	common
	15	*T. brandti* *	anadromous	common
Gasterosteidae	16	*Gasterosteus aculeatus*	anadromous	mass
	17	*Pungitius sinensis*	euryhaline, diadromous, полуanadromous	common
Gadidae	18	*Eleginus gracilis***	marine	mass
	19	*Theragra chalcogramma*	marine	common

Family	№	Species	Ecology of species	Status
Mugilidae	20	*Mugil soiuy*	euryhaline, diadromous	rare
	21	*M. cephalus*	marine	unit
Zoarcidae	22	*Zoarces elongatus*	marine litoral	common
Stichaeidae	23	*Pholidapus dybowskii*	marine litoral	common
	24	*Ernogrammus hexagrammus*	marine litoral	rare
	25	*Stichaeus grigorjewi*	marine litoral	rare
	26	*S. nozawae*	marine litoral	rare
	27	*Opisthocentrus ocellatus*	marine litoral	common
Trichodontidae	28	*Arctoscopus japonicus*	marine	common
Pholididae	29	*Rhodymenichthys dolichogaster*	marine litoral	rare
	30	*Acantholumpenus mackayi*	marine litoral	rare
	31	*Pholis picta*	marine litoral	common
Ammoditidae	32	*Ammodytes hexapterus***	marine litoral	common
	33	*Hypoptychus dybowskii*	marine litoral	rare
Liparidae	34	*Liparis ochotensis****	marine litoral	rare
Hexagrammidae	35	*Hexagrammos stelleri*	marine	common
	36	*Pleurogrammus azonus*	marine	common
	37	*H. lagocephalus*	marine	rare
	38	*H. octogrammus*	marine	rare
Sebastidae	39	*Sebastes taczanowskii*	marine	mass
	40	*Sebastes minor*	Marine, litoral	rare
Agonidae	41	*Occella dodecahedron*	marine	common
	42	*Podothecus gilberti*	marine	common
	43	*Brachyopsis segaliensis*	marine	common
Cottidae	44	*Megalocottus platycephalus*	euryhaline, diadromous	common
	45	*Myoxocephalus jaok*	marine	common
	46	*M. brandtii*	marine	common
	47	*M. polyacanthocephalus*	marine	common
	48	*M. stelleri*	marine	rare
	49	*Gymnacanthus pistilliger*	marine	rare

Family	№	Species	Ecology of species	Status
	50	*Enophrys diceraus*	marine	rare
	51	*Hemilepidotus gilberti*)	marine	rare
	52	*H. jordani*	marine	rare
	53	*Melletes papilio*	marine	rare
Hemitripteridae	54	*Hemitripterus villosus*	marine	rare
	55	*Blepsias bilobus*	marine	rare
	56	*B. cirrhosus*	marine	rare
Cyclopteridae	57	*Aptocyclus ventricosus*	marine	rare
	58	*Eumicrotremus asperrimus*	Marine, litoral	rare
Tetraodontidae	59	*Takifugu porphyreus*	marine	rare
Pleuronectidae	60	*Platichthys stellatus*	euryhaline, diadromous	mass
	61	*Limanda aspera*	marine	mass
	62	*Pleuronectes (Limanda) punctatissimus*	marine	common
	63	*Limanda sakhalinensis*	marine	common
	64	*Pleuronectes (Pseudopleuronectes) schrenki*	marine	common
	65	*Pleuronectes (Liopsetta) obscurus******	marine	common
	66	*Hippoglossoides robustus*	marine	rare