EMPOWERING ALL TOWARD
INCLUSIVE GROWTH

Biodiversity Risk Assessment

2025

Biodiversity Risk Assessment

OR's Biodiversity Risk Assessment

Approach and Assessment Methodology

OR is committed to ensuring no net loss of biodiversity and ecosystems. To ensure this, OR conducts comprehensive biodiversity assessments to ensure minimal impacts on biodiversity and ecosystems and support conservation efforts. We use **location-specific approach** in assessing OR's impacts and dependencies on nature throughout the value chain, including **our own operations, adjacent areas, upstream activities, and downstream activities**. To achieve this, we utilize Nature Impact and Dependency Evaluation from ENCORE to analyze sector-level impacts and dependencies across the operations. We incorporate **dependency- and impact-related risks** and opportunities that arise from the risk assessment to ensure that OR has the readiness and plan in place to cope with the biodiversity-related issues.

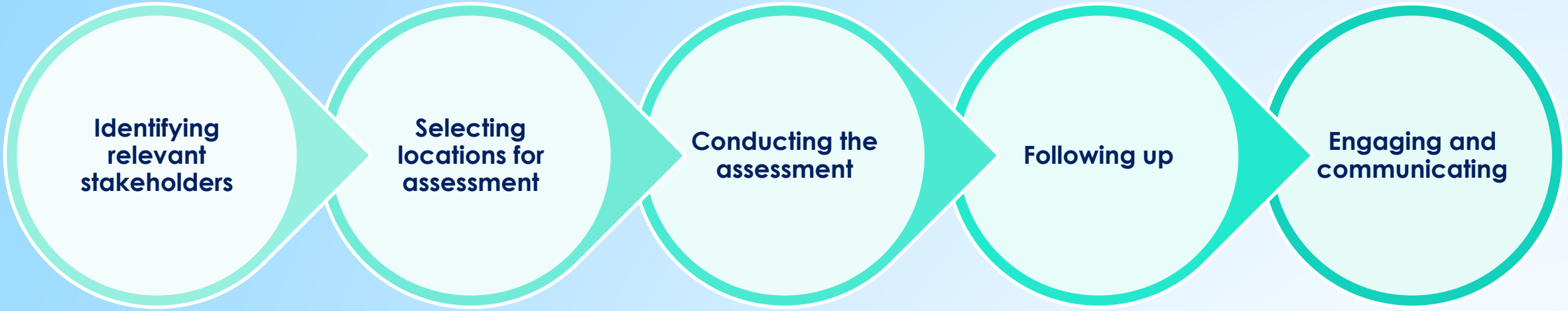
In addition, we apply WWF Biodiversity Risk Filter to **evaluate dependency-related biodiversity risks**. These filters help us assess the potential impacts of our operations on biodiversity and water resources, as well as identify opportunities for reducing our environmental footprint and improving our overall sustainability performance.

Integrated Biodiversity Risks into Company-wide Risk Management Processes

OR integrated the **identified biodiversity risks into our multi-disciplinary, company-wide risk management processes**. This approach will enable us to proactively address potential impacts on ecosystems, habitats, and species while fostering awareness and cross-functional collaboration. (See Identified Biodiversity Risk (Natural resource crisis and biodiversity loss: coffee beans), Impacts and Mitigation Actions in OR's Enterprise Risk Management: Risk Management (pttor.com))

OR's Biodiversity Risk Assessment

Methodologies and frameworks used for assessment



The scope includes the entire OR's value chain:

1. **Own operations and adjacent areas**
2. **Upstream operations**
3. **Downstream operations**

Selection criteria applied using location-specific approach

This consists of two separate frameworks:

1. Nature Impact and Dependency (I&D) Evaluation from **ENCORE**: to assess OR's impacts and dependencies on nature.
2. **WWF Biodiversity Risk Filter**: to assess and identify potential biodiversity risks.

Monitor and validate the mitigation hierarchy and disclose the progress of implementation according to **OR's Biodiversity Management Plan (BMP)**

Engage and communicate with stakeholders to operate business with identified biodiversity and deforestation risks

OR's Biodiversity Risk Assessment

Scope of Biodiversity Risk Assessment – Location-specific Approach

We consider the potential indirect impacts of our own operation activities on adjacent areas including nearby ecosystems, communities, and natural resources. Accordingly, We identify the following scope of study to be included in our assessment:

1. Own Operations or Direct Operations
We focus on assessing the direct impacts of our facilities, such as petroleum depots, PTT Stations, aviation depots, and Cafe Amazon roasting plants. **We applied a radius of 5 km to include adjacent areas to our own operations.**

1) Petroleum depots in all areas operated by OR (Oil and Gas Terminal) - 29 locations
2) Petroleum stations owned and operated by OR (COCO) are selected from high biodiversity areas - 10 stations
3) OR Warehouses (Lube DC and Lifestyle Business Distribution Center)
4) Factory in the Wang Noi area (Bakery factory, coffee roasting factory, mixed powder factory)
5) Amazon Coffee Processing Factory, Chiang Mai Province
6) LPG tank paint repair shops - 3 sites

2. Upstream Operations
We assess our significant upstream activities, which includes Critical and Strategic/Significant suppliers in the fiscal, focusing on Mobility business.

3. Downstream Operations
We assess representative customers from our commercial oil business group including jet fuel, industrial fuel, shipping fuel, transportation fuel, and special products).

Biodiversity Risk Assessment Boundary

Own Operation, Upstream and Downstream

No.	Sub-industries for risk assessment	Site Name
Adjacent Areas to OR Own Operations		
1	Oil, Gas & Consumable Fuels	Ayutthaya LPG Repair and Filling Plant
2	Oil, Gas & Consumable Fuels	Khon Kaen LPG Repair Plant
3	Oil, Gas & Consumable Fuels	Songkhla LPG Repair Plant
4	Food & Beverage Production	Café Amazon Roasting Plant
5	Food & Beverage Production	OR Bakery Factory
6	Food & Beverage Production	OR Dry Mix factory
7	Food & Beverage Production	Café Amazon Coffee Processing Factory (Chiangmai)
8	Food & Beverage Production	Distribution Center (Lifestyle Business)
9	Oil, Gas & Consumable Fuels	Distribution Center (Lubricant Business in Bang Pakong)
10	Oil, Gas & Consumable Fuels	Phra Khanong Petroleum Depot
11	Oil, Gas & Consumable Fuels	Lam Luk Ka Petroleum Depot
12	Oil, Gas & Consumable Fuels	Saraburi Petroleum Depot
13	Oil, Gas & Consumable Fuels	Bangchak Petroleum Depot
14	Oil, Gas & Consumable Fuels	Chiang Mai Petroleum Depot
15	Oil, Gas & Consumable Fuels	Den Chai Petroleum Depot
16	Oil, Gas & Consumable Fuels	Ubon Ratchathani Petroleum Depot
17	Oil, Gas & Consumable Fuels	Phitsanulok Petroleum Depot
18	Oil, Gas & Consumable Fuels	Phuket Petroleum Depot
19	Oil, Gas & Consumable Fuels	Sriracha Petroleum Depot
20	Oil, Gas & Consumable Fuels	Khonkaen Petroleum Depot

No.	Sub-industries for risk assessment	Site Name
21	Oil, Gas & Consumable Fuels	Lampang Petroleum Depot
22	Oil, Gas & Consumable Fuels	Nakhonsawan Petroleum Depot
23	Oil, Gas & Consumable Fuels	Surat Thani Petroleum Depot
24	Oil, Gas & Consumable Fuels	Surat Thani Petroleum Depot (No.2)
25	Oil, Gas & Consumable Fuels	Songkhla Petroleum Depot
26	Oil, Gas & Consumable Fuels	Khao Bo Ya Petroleum Depot
27	Oil, Gas & Consumable Fuels	Ban Rong Po Petroleum Depot
28	Oil, Gas & Consumable Fuels	U-Tapao Aviation Petroleum Depot
29	Oil, Gas & Consumable Fuels	Chiang Mai Aviation Petroleum Depot
30	Oil, Gas & Consumable Fuels	Chiang Rai Aviation Petroleum Depot
31	Oil, Gas & Consumable Fuels	Udon Thani Aviation Petroleum Depot
32	Oil, Gas & Consumable Fuels	Ubon Ratchathani Aviation Petroleum Depot
33	Oil, Gas & Consumable Fuels	Phuket Aviation Petroleum Depot
34	Oil, Gas & Consumable Fuels	Surat Thani Aviation Petroleum Depot
35	Oil, Gas & Consumable Fuels	Hat Yai Aviation Petroleum Depot
36	Oil, Gas & Consumable Fuels	Hua Hin Aviation Petroleum Depot
37	Oil, Gas & Consumable Fuels	Krabi Aviation Petroleum Depot
38	Oil, Gas & Consumable Fuels	Nakhon Si Thammarat Aviation Petroleum Depot
39	Agriculture (plant products)	Amazon Park at Lampang

Biodiversity Risk Assessment Boundary

Own Operation, Upstream and Downstream

No.	Sub-industries for risk assessment	Site Name
40	Oil, Gas & Consumable Fuels	PTT Station (Mai Khao, Phuket)
41	Oil, Gas & Consumable Fuels	PTT Station (Chaiya (Inbound))
42	Oil, Gas & Consumable Fuels	PTT Station (Jomtien Beach Intersection)
43	Oil, Gas & Consumable Fuels	PTT Station (Hua Hin)
44	Oil, Gas & Consumable Fuels	PTT Station (Bangna (Inbound))
45	Oil, Gas & Consumable Fuels	PTT Station (Minburi)
46	Oil, Gas & Consumable Fuels	PTT Station (Phitsanulok)
47	Oil, Gas & Consumable Fuels	PTT Station (Saraphi)
48	Oil, Gas & Consumable Fuels	PTT Station (Pak Chong)
49	Oil, Gas & Consumable Fuels	PTT Station (Phrai Bueng - Det Udom)
OR Upstream		
50	Metals & Mining	Maitree Industry Company Limited
51	Construction Materials	CIM Engineering (Thailand) Company Limited
52	Construction Materials	Chuen Siri Company Limited
53	Construction Materials	Rajchapleuk Engineering Company Limited
54	Oil, Gas & Consumable Fuels	Thai Lube Base Public Company Limited
55	Oil, Gas & Consumable Fuels	IRPC Public Company Limited
56	Oil, Gas & Consumable Fuels	SFC Excellence Company Limited

No.	Sub-industries for risk assessment	Site Name
57	Chemicals & Other Materials Production	White Group Public Company Limited
58	Chemicals & Other Materials Production	PTT Global Chemical Public Company Limited
59	Metals & Mining	Thai Metal Drum MFG. Public Company Limited
60	Metals & Mining	Soonthorn Metal Industries Company Limited
61	Metals & Mining	Saeng Thai Metal Drum Company Limited
62	Chemicals & Other Materials Production	Panjawattana Plastic Public Company Limited
63	Chemicals & Other Materials Production	BASF Thailand
OR Downstream		
64	Chemicals & Other Materials Production	Birla Carbon (Thailand) Public Company Limited
65	Electric Energy Production – Hydropower	Gulf JP UT Company Limited
66	Oil, Gas & Consumable Fuels	Petroleum Gas (Lumluka) Company Limited
67	Oil, Gas & Consumable Fuels	Great Talent Company Limited
68	Oil, Gas & Consumable Fuels	Verasuwan Company Limited

OR's Impact and Dependency Evaluation

Approach Overview

OR evaluated sector-level impact and dependency with the ENCORE tool. The tool requires that to assess impact and dependency scores, OR activities must be translated and categorized into sub-industries. Accordingly, OR addressed the following categories of industries to cover the whole value chain, including own operation and adjacent areas, upstream, and downstream activities. For Upstream, there are 8 selected sub-industries to be included in the study. In terms of own operation, OR considered sub-industry categories from mobility and lifestyle businesses (total 48 locations) that best describe the site operations. The five main direct operation activities are considered, including Oil & Gas Storage & Transportation, Construction & Engineering, Diversified Support Services, Automotive Retail, and Packaged Foods & Meats. For Downstream operations, the total of 6 downstream sub-industries are selected in the scope from 2 customer groups including corporate customers, distributors.

About the ENCORE tool

The Explore Natural Capital Opportunities, Risks and Exposure (**ENCORE**) was developed by the Natural Capital Finance Alliance in partnership with UNEP-WCMC. It provides a qualitative assessment of activities' biodiversity impacts and dependencies at the sub-industry level based on scientific expertise. The methodology used in ENCORE to come up with impact and dependency scores is as follows:

Explore ENCORE

IMPACTS SCORES

Obj: Assess the sector's contribution to 12 impact driver categories (see slide #9)

12

- Land/water/sea use change
- Resource exploitation
- Climate change
- Pollution
- Invasive species and Others

Method: Scientific literature review and expert assessment of materiality

Frequency	Timeframe	Severity
High, Medium, Low	<1y, 1-3y, >3y	High, Medium, Low

- 5, 4: The production process impacts natural capital with a high frequency, high severity and short timeframe
- 3: The production process impacts natural capital with a moderate frequency, severity and timeframe
- 2, 1: The production process impacts natural capital with a low frequency, low severity and long timeframe

DEPENDENCY SCORES

Obj: Assess the sector's dependency on 21 ecosystem services categories (see slide #10)

21

- Direct physical input
- Enables production process
- Mitigates direct impact
- Protection from disruption

Method: Scientific literature review and expert assessment of materiality

Disruption of ecosystem services →

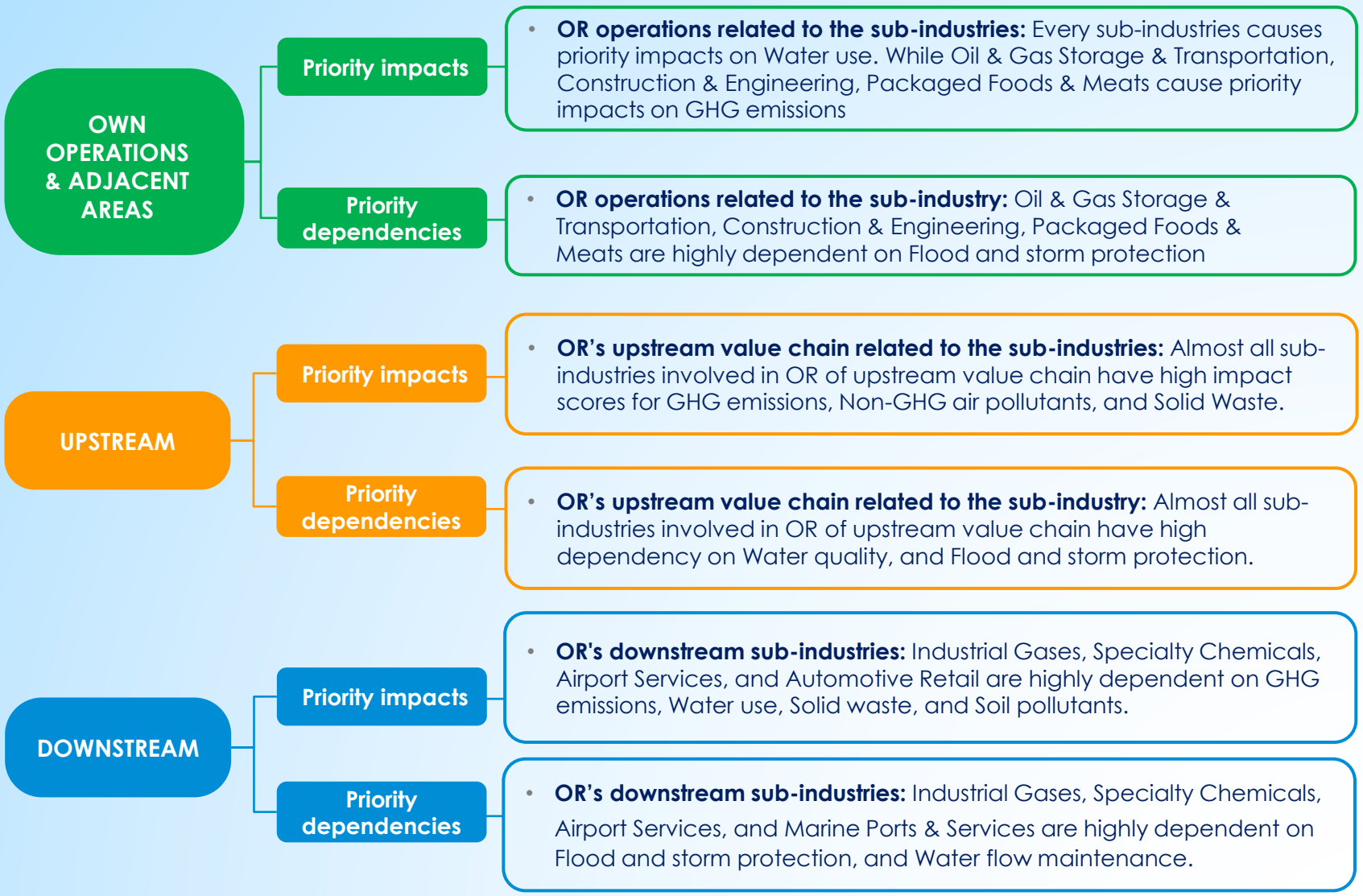
- Significance of process functionality loss (Severe, Moderate, Low)
- Significance of financial loss (Severe, Moderate, Low)

- 5, 4: The service is critical and irreplaceable in the production process
- 3: Most of the time the production process can take place with limited (but not with full) disruption of the service
- 2, 1: Most of the time the production process can take place even with full disruption of the service

OR's Impact and Dependency Evaluation

The conducted work is aligned with the requirements of the TNFD and SBTN frameworks. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has identified 5 impact drivers of nature change and biodiversity loss. These include climate change, land/freshwater/ocean use change, Resource use/replenishment, Pollution/pollution removal, and Invasive alien species introduction/removal. In terms of dependencies, the Common International Classification of Ecosystem Services (CICES) has developed a framework for classifying ecosystem services and environmental assets into 4 groups, consisting of Direct physical input, Enables production process, Mitigate direct impact, and Protection from disruption.

Based on the impact and dependencies study for OR own operations and adjacent areas, upstream and downstream activities using the ENCORE tool. The diagram shows impacts and dependencies (I&D) across OR's value chain. The I&D considers scenarios without mitigation measures in place to ensure that the long list is exhaustive and comprehensive to the potential impact and dependency on nature of the business. It provides a **reliable identification of OR material biodiversity impacts and dependencies at the sector level**.



OR's WWF Biodiversity Risk Filter (BRF)

Approach Overview

OR applied a four-step process to identify nature-related risks across our value chain, consisting of own operations and adjacent areas, upstream, and downstream operations. Accordingly, we identified 7 industry categories in addressing OR's nature-related risk.

01

Collect and confirm input

The locations is chosen based on the conditions outlined in the proposal and reviewed by OR.

The 68 sites include:

- 49 sites from own operation
- 14 sites from upstream
- 5 sites from downstream

02

Confirm industry categories

Key in data including location of the site and business categories. The categories include:

Own Operation

1. Agriculture (plant products)
2. Oil, Gas & Consumable Fuels
3. Food & Beverage Production

Upstream

1. Chemicals & Other Materials Production
2. Construction Materials
3. Metals & Mining
4. Oil, Gas & Consumable Fuels

Downstream

1. Oil, Gas & Consumable Fuels
2. Chemicals & Other Materials Production
3. Electric Energy Production - Hydropower

Total 7 industry categories is confirmed by OR

03

Identify nature-related risk level

- Identify and access OR's nature-related risk using the WWF Risk Filter
- Study and summarise the result from the WWF tool, identify risks areas that relevant to OR businesses and make appropriate adjustments according to the results from Impact & Dependency Evaluation.

04

Map risk categories and identify financial impact

Map the identified nature-related risks with the TNFD risk category and the company's risk profiles as well as identify potential financial impact (and other related enterprise risks) for each risks

OR's WWF Biodiversity Risk Filter (BRF)

Methodology: WWF Biodiversity Risk Filter

WWF biodiversity risk filter (WWF BRF) is the tool used to assess the potential risks from companies and their value chain as a location-specific approach. The tool evaluates a range of factors based on the location of the operations, including threatened species, ecosystems, and protected areas. The WWF BRF consists of four sequential processes as follows:

1 Scoping the assessment	2 Collecting location-specific company and supply chain data	3 Assessing biodiversity-related risks	4 Aggregating biodiversity risk to the company and portfolio level

• Identifying industry materiality
  ○ Dependencies
  ○ Impacts
• Identifying the site to assess through the company value chain
	• Specifying site's location
	• Classifying industry
		• Calculating scape risk (risk score per indicator)
		• Calculating site-level risk (overall risk score)
		• Identifying biodiversity risks
			• Interpreting the risk assessment results
			• Integrating the identified biodiversity risks into multi-disciplinary company-wide risk management processes

In 2023 - 2024, OR conducted WWF Biodiversity Risk Filter (BRF) to assess and prioritize water and biodiversity-related risks, as well as their associated dependency risks. These dependencies represent aspects of nature's contributions to people, which a person or organization relies on to function. Such dependencies might include water flow and quality regulation, regulation of hazards like floods and fires, pollination, and carbon sequestration. The BRF is spatially explicit, web-based tools that use a location-specific approach to screen operational and supply chain vulnerabilities. By identifying potential physical, regulatory, and reputational risks linked to biodiversity, these tools equip companies and financial institutions with the understanding needed to evaluate and formulate suitable response strategies, thus mitigating biodiversity risks within their operations and investments.

OR's WWF Biodiversity Risk Filter (BRF)

Methodology: Risk Matrix Across Value Chain

The Risk Matrix shows standard result generated from the WWF Biodiversity Risk Filter, which generates Risk level by the category of Industry identified across the value chain. The figure below shows an example of the identified risk level generated by the tool.

Physical Risk

#	BRF Indicators	Impact/ Dependency	Industry: Agriculture (plant products)	Chemicals & Other Materials Production	Construction Materials	Electric Energy Production – Hydropower	Food & Beverage Production	Metals & Mining	Oil, Gas & Consumable Fuels
Physical Risk									
Provisioning Services									
1.1	Water Scarcity	Dependency	5	4	5	5	5	5	4
1.2	Forest Productivity and Distance to Markets	Dependency	ND	ND	4	ND	ND	4	4
1.3	Limited Wild Flora & Fauna Availability	Dependency	1	1	1	ND	3	ND	ND
1.4	Limited Marine Fish Availability	Dependency	ND	ND	ND	ND	ND	ND	ND
Regulating & Supporting Services - Enabling									
2.1	Soil Condition	Dependency	5	ND	ND	ND	ND	ND	ND
2.2	Water Condition	Dependency	4	3	2	3	4	2	2
2.3	Air Condition	Dependency	3	2	2	1	2	3	3
2.4	Ecosystem Condition	Dependency	2	ND	ND	ND	ND	ND	ND
2.5	Pollination	Dependency	4	ND	ND	ND	ND	ND	ND
Regulating Services - Mitigating									
3.1	Landslides	Dependency	5	4	4	4	4	4	4
3.2	Wildfire Hazard	Dependency	4	3	3	3	3	3	3
3.3	Plant/Forest/Aquatic Pests and Diseases	Dependency	4	ND	ND	ND	4	ND	ND
3.4	Herbicide Resistance	Dependency	4	ND	ND	ND	ND	ND	ND
3.5	Extreme Heat	Dependency	5	3	3	3	3	4	4
3.6	Tropical Cyclones	Dependency	5	4	4	4	4	4	4
Cultural Services									
4.1	Tourism Attractiveness	Dependency	ND	ND	ND	ND	ND	ND	ND
Pressures on Biodiversity									
5.1	Land, Freshwater and Sea Use Change	Impact	5	1	1	5	1	5	5
5.2	Tree Cover Loss	Impact	5	1	5	4	1	5	5
5.3	Invasives	Impact	3	ND	2	2	2	2	2
5.4	Pollution	Impact	5	5	5	4	4	5	5

Reputational Risk

#	BRF Indicators	Impact/ Dependency	Industry: Agriculture (plant products)	Chemicals & Other Materials Production	Construction Materials	Electric Energy Production – Hydropower	Food & Beverage Production	Metals & Mining	Oil, Gas & Consumable Fuels
Scape Reputational Risk									
Environmental Factors									
6.1	Protected/Conserved Areas	Impact	5	3	3	4	3	5	5
6.2	Key Biodiversity Areas	Impact	4	2	2	3	2	4	4
6.3	Other Important Delineated Areas	Impact	4	2	2	4	2	4	4
6.4	Ecosystem Condition	Impact	4	2	2	4	2	4	4
6.5	Range Rarity	Impact	3	1	1	3	1	3	3
Socioeconomic Factors									
7.1	Indigenous Peoples (IPs); Local Communities (LCs) Lands and Territories	Impact	5	3	3	5	3	5	5
7.2	Resource Scarcity: Food - Water - Air	Impact	3	1	1	1	2	2	2
7.3	Labor/Human Rights	Impact	4	2	2	2	2	4	4
7.4	Financial Inequality	Impact	2	2	2	2	2	2	2
Additional Reputational Factors									
8.1	Media Scrutiny	Dependency	5	4	4	2	5	5	4
8.2	Political Situation	Dependency	3	2	2	3	3	3	3
8.3	Sites of International Interest	Dependency	3	2	2	3	2	3	3
8.4	Risk Preparation	Dependency	2	2	2	2	2	2	2

How to Read the Risk Matrix

- The risk matrix was generated using the **WWF Biodiversity Risk Filter (BRF)**, and the indicator number and name follow the BRF structure.
- Indicator names with a green background are **physical risks**, while indicator names with a yellow background are **reputational (transition) risks**.
- **Dependency risks** refer to ecosystem services the chosen industry relies on, whereas **impact risks** are related to the impacts the industry causes on biodiversity.
- Average risk scores read as such:
  - **1**: very low
  - **2**: low
  - **3**: medium
  - **4**: high
  - **5**: very high
  - **ND**: this indicator is not applicable to this sector

OR's WWF Biodiversity Risk Filter (BRF)

Methodology: Risk category mapping with Impact & Dependency

WWF Biodiversity Risk Filter tool assesses two types of biodiversity-related business risk:

1) Physical risk: A company's operations and value chain may face physical risk if they are located in land- and seascapes that experience a decline in ecosystem services; and heavily dependent upon these ecosystem services or increase pressures on biodiversity with their activities

2) Reputational Risk: A company may face reputational risk if stakeholders and local communities perceive that it does not conduct business in a sustainable and responsible fashion with respect to biodiversity.

Physical risk

Risk	I/D
Scape Physical Risk	
1. Provisioning Services	
• Water Scarcity	Dependency
2. Regulating & Supporting Services - Enabling	
• Soil Condition*	Dependency
• Water Condition	Dependency
• Air Condition	Dependency
• Ecosystem Condition*	Dependency
• Pollination*	Dependency
3. Regulating Services - Mitigating	
• Fire Hazard	Dependency
• Plant/Forest/Aquatic Pests and Diseases*	Dependency
• Herbicide Resistance*	Dependency
• Extreme Heat	Dependency
• Tropical Cyclones	Dependency
5. Pressures on Biodiversity	
• Land, Freshwater and Sea Use Change	Impact
• Tree Cover Loss	Impact
• Invasives	Impact
• Pollution	Impact

Remark: *Applies to the Agriculture (plant products) Industry (Amazon Park Lampang) only.

Reputational risk

Risk	I/D
Scape Reputational Risk	
6. Environmental Factors	
• Protected/Conserved Areas	Impact
• Key Biodiversity Areas	Impact
• Other Important Delineated Areas	Impact
• Ecosystem Condition	Impact
• Range Rarity	Impact
7. Socioeconomic Factors	
• Resource Scarcity: Food - Water – Air	Impact
• Labor/Human Rights	Impact
8. Additional Reputational Factors	
• Media Scrutiny	Dependency
• Political Situation	Dependency
• Sites of International Interest	Dependency

OR's Risk Assessment Results

Results Overview

OR has conducted biodiversity and ecosystem risk assessments on its own operations and adjacent areas, upstream, and downstream operations across the value chain. The WWF Biodiversity Risk Filter assessment is based on OR's sites' geographic locations and their industry sectors. The result generated from the tool addressed two types of potential risks for OR including:

1) Scape Physical Risk

The identified physical risks are Fire Hazard, Extreme heat, Tropical cyclones, Land, Freshwater and Sea Use Change, after considering OR's mitigation process in place. The risks are considered as having potential financial impacts on the OR own operations and value chain in the scenario that nature's regulating and supporting services are no longer available due to the deteriorating of natural ecosystem services and functions. This is for example, adjacent areas of fire-prone regions could be affected by Fire Hazard risks, resulting in damaging stations, infrastructures, and disrupting operations.

			Potential Financial Impacts	Mitigation Measures
Scape Physical Risk	Regulating & Supporting Services - Enabling	**Fire Hazard**	• Threat of wildfires **damaging stations** and **disrupting operations** in fire-prone regions. • Wildfires can **destroy crops, orchards, and infrastructure** like processing facilities.	• Develop wildfire prevention, management plan, and response protocol/procedure • Assess likelihood and risk factors for wildfire within the site locations
		Extreme Heat	• Heat waves can **increase energy/cooling costs**, impact employee productivity, and potentially disrupt transportation logistics. • **Damage crops**, **reduce yields**, **increase water demands**, and **impact livestock feed supplies**.	• Provide sufficient drinking water and shading for at risk equipment and workers • Assess heat exposure risk for workers in different roles/shifts
		Tropical Cyclones	• Storm damage to station infrastructure, **disrupted fuel supplies**, **disrupted distribution networks**, and **losses from product spoilage**.	• Monitor weather condition and update from Meteorological Department • Establish flooding & strong winds response plan with suppliers • OR has Business Continuity Management (BCM) and Business Continuity Planning (BCP) in place which provides trainings covering transportation of materials to customers.
	Pressures on Biodiversity	**Land, Freshwater and Sea Use Change**	• **Restrictions on new station development** or **operating locations** due to environmental regulations. • **Restrictions on water access** or **agricultural land use** can constrain growth and sourcing options.	• Monitor the environmental regulations to ensure compliance practices • Implement water reduction programs

Note: As nature risks are linked with I&D, therefore, the I&D result is used to adjust the risk level generated from the WWF tool.

OR's Risk Assessment Results

Results Overview

2) Scape Reputational Risk

In terms of the reputational risk, only one potential high risk is identified considering output from WWF Risk Assessment Result, which is Media Scrutiny. This is to highlight the importance of addressing negative publicity and damage to brand perception regarding the organization's impacts on nature. The identified risks illustrate potential consumer boycotts or divestment campaigns, increased costs for public relations and crisis management, if the risks have not been considered and addressed appropriately. Therefore, it is important the OR acknowledge the risk and prepare mitigation and monitoring plan accordingly to prevent, reduce, and manage the potential risk.

The remaining reputational risks are at medium level, which concern Protected/Conserved Areas, Key Biodiversity Areas, and Labor/Human Rights risks. These identified risks are potential financial impacts that can emerge from operating businesses, which require human labors and expanding on operational areas. However, All 100% OR own operations are assessed and ensured that the areas are build on only already modified habitat/land area and never convert from natural habitat/land. In addition, OR actively promote labor/human rights, and are committed to conducting business in accordance with human rights principles, in line with applicable laws, regulations, and international standards. OR consistently ensure that all employees are entitled to equal treatment, with the right to express their opinions and avenues complaint channels in case of any improper treatment. For more information, please visit our website: Human Rights (pttor.com).

			Potential Financial Impacts	Mitigation Measures
Scape Reputational Risk	Environmental Factors	Protected/ Conserved Areas	• **Limitations on construction and expansion** in areas with high biodiversity, potential legal challenges, costs for environmental impact assessments and mitigation. • **Costs for environmental impact assessments and mitigation measures**.	• Avoid locating operations in or near protected/conserved areas and KBAs, provide sufficient buffer zone in case where the sites are located near areas that might be classified as such at a later time to reduce risk of disruption. OR conduct Environmental Impact Assessment (EIA) and Biodiversity assessment before construction. • Engage with local stakeholders, biodiversity experts, civil societies ahead of any major activity.
		Key Biodiversity Areas		
	Socioeconomic Factors	Labor/Human Rights	• Reputational risks, potential **legal action** for labor rights violations, costs associated with ensuring fair labor practices and worker safety.	• Conduct human rights due diligence and human rights impact assessment on a regular basis - focusing on workers as rightsholder. • OR's stakeholders which are affected rights holders can make complaints or report human rights and environmental-related issues through OR Contact Center via telephone number 1365, social media, and website OR Contact Center.
	Additional Reputational Factors	Media Scrutiny	• Negative publicity and **damage to brand reputation**, potential consumer boycotts or divestment campaigns, increased costs for public relations and crisis management.	• Early engagement with community leaders, civil society, and the media, ahead of any major activity that may be interpreted as having real or perceived impacts on nature.

Note: As nature risks are linked with I&D, therefore, the I&D result is used to adjust the risk level generated from the WWF tool.

OR's Integrated Biodiversity Risks

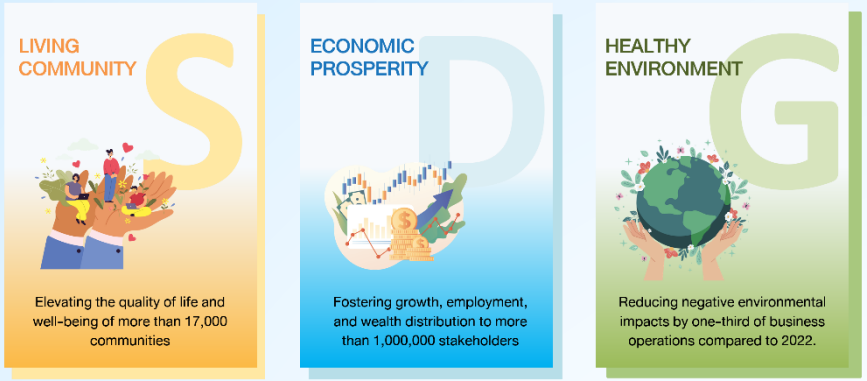
OR considered Biodiversity Risks as one of the materiality issue, as addressed in OR's Enterprise Risk Management (Please see: Materiality Assessment (pttor.com)). According to the WWF Biodiversity Risks results, OR will ensure that the identified risks are integrated into OR's holistic company-wide risk management processes. This is to emphasize and mitigate the identified significance risk level categories across the value chain, including 1) Physical Risks on Fire Hazard, Extreme heat, Tropical cyclones, Land, Freshwater and Sea Use Change; 2) Scape Reputation Risks includes Protected/conserved Areas, Key Biodiversity Areas, Labor/Human rights, and Media scrutiny, across the value chain. By integrating the nature-risks into our management processes, we will be able to mitigate impacts and reduce dependencies of our businesses on nature and biodiversity, resulting in lowering organizational risks across the business operations towards OR's 2030 goals.

เกณฑ์การประเมินความเสี่ยง (Risk Criteria)

Criteria	Impact								Risk Heat Map			
	Financial		Non-Financial									
	OPEX	EBITDA	Operation & Process Effectiveness	Technology	Compliance (Laws & Regulations)	Stakeholder X Reputation	Safety	Environment	1 Rare	2 Unlikely	3 Possible	4 Likely
4 Extreme	> 0.5%	> 5%	เกิดความล่าช้าจากการดำเนินงาน >10% จากปัจจัยที่ควบคุมได้	การนำหรือไม่นำเทคโนโลยีมาใช้ในการดำเนินงาน ส่งผลกระทบต่อกระบวนงานหลัก ทำให้ข้อมูลรั่วไหลออกสู่ภายนอกองค์กร และก่อให้เกิดความเสียหาย	ไม่ปฏิบัติตามกฎหมาย หรือกฎระเบียบ หรือ มีความผิดทางวินัย หรือ มีความผิดเกี่ยวกับการทุจริต	เกิดความไม่พึงพอใจ จนอาจเกิดการประท้วงหรือฟ้องร้ององค์กร และต่อต้านการใช้สินค้าและบริการของ OR	เกิดอันตรายถึงชีวิตหรือทุพพลภาพ	ไม่สอดคล้องกับข้อกำหนดและกฎหมายด้านสิ่งแวดล้อม เกิดอันตรายมลภาวะที่ต้องอาศัยหน่วยงานภายนอกช่วยในการฟื้นฟู	E3	E4	E5	E6
3 High	(0.25% - 0.5%]	(2.5% - 5%]	เกิดความล่าช้าจากการดำเนินงาน >10% จากปัจจัยที่ควบคุมไม่ได้	การนำหรือไม่นำเทคโนโลยีมาใช้ในการดำเนินงาน ส่งผลกระทบต่อกระบวนงานหลัก ทำให้ข้อมูลรั่วไหลออกสู่ภายนอกองค์กร และไม่ก่อให้เกิดความเสียหาย	ปฏิบัติไม่สอดคล้องกฎระเบียบของหน่วยงานหรือ กระทำผิดวินัยค่อนข้างร้ายแรง ส่งผลกระทบต่อกระบวนการหลัก เกิดการหยุดชะงัก	เกิดความไม่พึงพอใจโดยแสดงความคิดเห็นผ่านทางโซเชียลมีเดีย และเลิกใช้สินค้าและบริการของ OR	ได้รับบาดเจ็บต้องหยุดรักษาและถูกจำกัดลักษณะงาน	ไม่สอดคล้องกับข้อกำหนดและกฎหมายด้านสิ่งแวดล้อม เกิดอันตรายหรือมลภาวะแต่สามารถฟื้นฟูเองได้	M3	H4	E1	E2
2 Medium	(0.125% - 0.25%]	(1.25% - 2.5%]	เกิดความล่าช้าจากการดำเนินงาน ไม่เกิน 10% จากปัจจัยที่ควบคุมได้	การนำหรือไม่นำเทคโนโลยีมาใช้ในการดำเนินงาน อาจส่งผลกระทบต่อกระบวนงานหลัก	ปฏิบัติไม่สอดคล้องกฎระเบียบขององค์กร หรือกระทำผิดวินัยปานกลาง ส่งผลกระทบต่อกระบวนการหลัก แต่ดำเนินงานต่อได้	เกิดความไม่พึงพอใจโดยดำเนินการร้องเรียนต่อองค์กร และลดการใช้สินค้าและบริการของ OR	ได้รับบาดเจ็บต้องหยุดรักษาแต่ไม่ถูกจำกัดลักษณะงาน	ไม่สอดคล้องกับข้อกำหนดทางด้านสิ่งแวดล้อมอย่างมาก จนส่งผลต่อการดำเนินธุรกิจ	L3	M2	H2	H3
1 Low	≤ 0.125%	≤ 1.25%	เกิดความล่าช้าจากการดำเนินงาน ไม่เกิน 10% จากปัจจัยที่ควบคุมไม่ได้	การนำหรือไม่นำเทคโนโลยีมาใช้ในการดำเนินงาน อาจส่งผลกระทบต่อกระบวนการปฏิบัติงานทั่วไป	ปฏิบัติไม่สอดคล้องกฎระเบียบขององค์กร หรือกระทำผิดวินัยเล็กน้อย ส่งผลกระทบต่อกระบวนการทั่วไป	เกิดความไม่พึงพอใจโดยมีการเสนอแนะเพื่อปรับปรุง และยังคงใช้สินค้าและบริการของ OR	ได้รับบาดเจ็บเล็กน้อยและทำการปฐมพยาบาล	ไม่สอดคล้องกับข้อกำหนดทางด้านสิ่งแวดล้อมเล็กน้อย	L1	L2	M1	H1

Criteria	Likelihood			
	1 ยากที่จะเกิด (Rare)	2 ไม่น่าจะเกิด (Unlikely)	3 เป็นไปได้ที่จะเกิด (Possible)	4 น่าจะเกิด (Likely)
ความถี่โดยเฉลี่ย	คาดว่าเหตุการณ์นี้อาจจะเกิดขึ้นได้เมื่อเกิดสภาพการณ์ผิดปกติเท่านั้น มีโอกาสเกิดน้อยกว่า 10% ภายในระยะเวลา 12 เดือนข้างหน้า	คาดว่าเหตุการณ์นี้อาจจะเกิดขึ้นได้ในบางเวลาเท่านั้น มีโอกาสเกิด 10 – 50% ภายในระยะเวลา 12 เดือนข้างหน้า	คาดว่าเหตุการณ์นี้อาจจะเกิดขึ้นได้ในสภาพการณ์ส่วนใหญ่มีโอกาสเกิด 50-90% ภายในระยะเวลา 12 เดือนข้างหน้า	คาดว่าเหตุการณ์นี้มีโอกาสเกิดขึ้นสูงมากในทุกสถานการณ์ มีโอกาสเกิดเหตุการณ์มากกว่า 90% ภายในระยะเวลา 12 เดือนข้างหน้า

OR's Enterprise Risk Criteria



OR's 2030 Goals

13. Environmental Management (GRI 303, GRI 304, GRI 306, GRI 307)

- Environmental Management & Policy
- Operational Eco Efficiency
- Water Management
- Air Quality Management
- Biodiversity
- Food Loss & Food Waste

OR's Integrated Biodiversity Risks as materiality issue

Biodiversity Management Plan (BMP)
And
No Net Loss (NNL)/Net Positive Impact (NPI) Target Setting

OR's Biodiversity Management Plan (BMP) & NNL/NPI Target Setting

Approach Overview

OR followed a three-step approach in identifying OR's No Net Loss (NNL) and Net Positive Impact (NPI) on nature and biodiversity. The process starts with considering ALL 100% of OR's own operation sites and areas to ensure that the result reflect the total impact of OR on nature and ecosystems. Therefore, we consider all 275 sites of OR's own operation in this study. After that, we screen the sites with the high importance areas identified by international and national standards, including Protected Area (PA), Key Biodiversity Areas (KBA), Alliance for Zero Extinction (AZE), Ramsar Sites for wetlands, and World Heritage Convention (WHC). After that, we applied Habitat Hectare Calculations which considered the past land coverage of the area to account for the total impact that the company has on the actual land area on the ground, using geographic information systems (GIS). Finally, OR can consider the result analysis to calculate the potential of the organization in target setting towards NNL/NPI in the near future.

01

Site Screening

Screen OR's operational sites to identify those located near high biodiversity value sites:

- Protected Area (PA)
- Key Biodiversity Area (KBA)
- Alliance for Zero Extinction (AZE)
- Ramsar Sites
- World Heritage Convention (WHC)

02

Habitat Hectare Calculations

The residual impact on high-risk sites will be quantified using residual impact habitat hectare calculations.

03

NNL/NPI Target Setting

Considering the findings from the habitat hectare calculations and timeframes outlined in scientific publications, the NNL/NPI Target will be established for OR.

OR's NNL/NPI Target Setting

Approach

In 2023 – 2024, **the total number of 275 OR sites** are assessed to determine the sites that fall under the High Biodiversity Value, including IUCN Category I-VI Protected Area (PA), Key Biodiversity Area (KBA), Alliance for Zero Extinction (AZE), Ramsar Sites, and World Heritage areas.

OR is committed to understanding and mitigating our impacts and dependencies on Nature and Biodiversity. According to the assessment results, we plan to set up targets for achieving No Net Loss (NNL) and Net Positive Impact (NPI) on biodiversity. OR is determined minimize adverse impacts and enhance biodiversity across our own operational impacts to nature.

Habitat Hectares = [Area of Habitat Type (A) x Habitat Condition Score (B)] /Benchmark Score

Number of sites	**275**
Habitat type	Modified habitat
Total area (Ha)	179.2 (1,120 rai)
Total impact area (Ha)	**89.6 (560 rai)**

To achieve the NNL/NPI target area, Biodiversity Management Actions were identified in accordance with international guideline including

Guidelines for planning and monitoring corporate biodiversity performance

and

Biodiversity Offsets a User Guide.

Condition	Definition	Score
Benchmark	Benchmark habitats in a mature condition with only native origin vegetation, a diversity of species of a mature or senescent state; and no sign of human disturbance (such as the presence of waste, vegetation removal).	1
Natural	Natural condition is defined as habitat largely of native origin, and/or where human activity has not essentially modified the primary ecological functions and species composition. Some disturbance is likely present such as vegetation removal, waste and minor introduction of invasive species.	0.75
Modified	Modified condition habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition	0.5
Degraded	Degraded condition is defined as significant conversion or degradation of the habitat such as the elimination or severe diminution of the integrity of a habitat caused by a major and/or long-term change in land or water use; or (ii) a modification that substantially minimizes the habitat's ability to maintain viable populations of its native species	0.25

Moving forward with strong determination and leaving no one behind

6 groups of OR stakeholders

***EMPOWERING ALL** TOWARD*
INCLUSIVE GROWTH

OR เติมเต็มโอกาส เพื่อทุกการเติบโต ร่วมกัน

Harnessing OR competencies to support, fulfill, and elevate

Sustainable growth with Living Community, Healthy Environment, and Economic Prosperity