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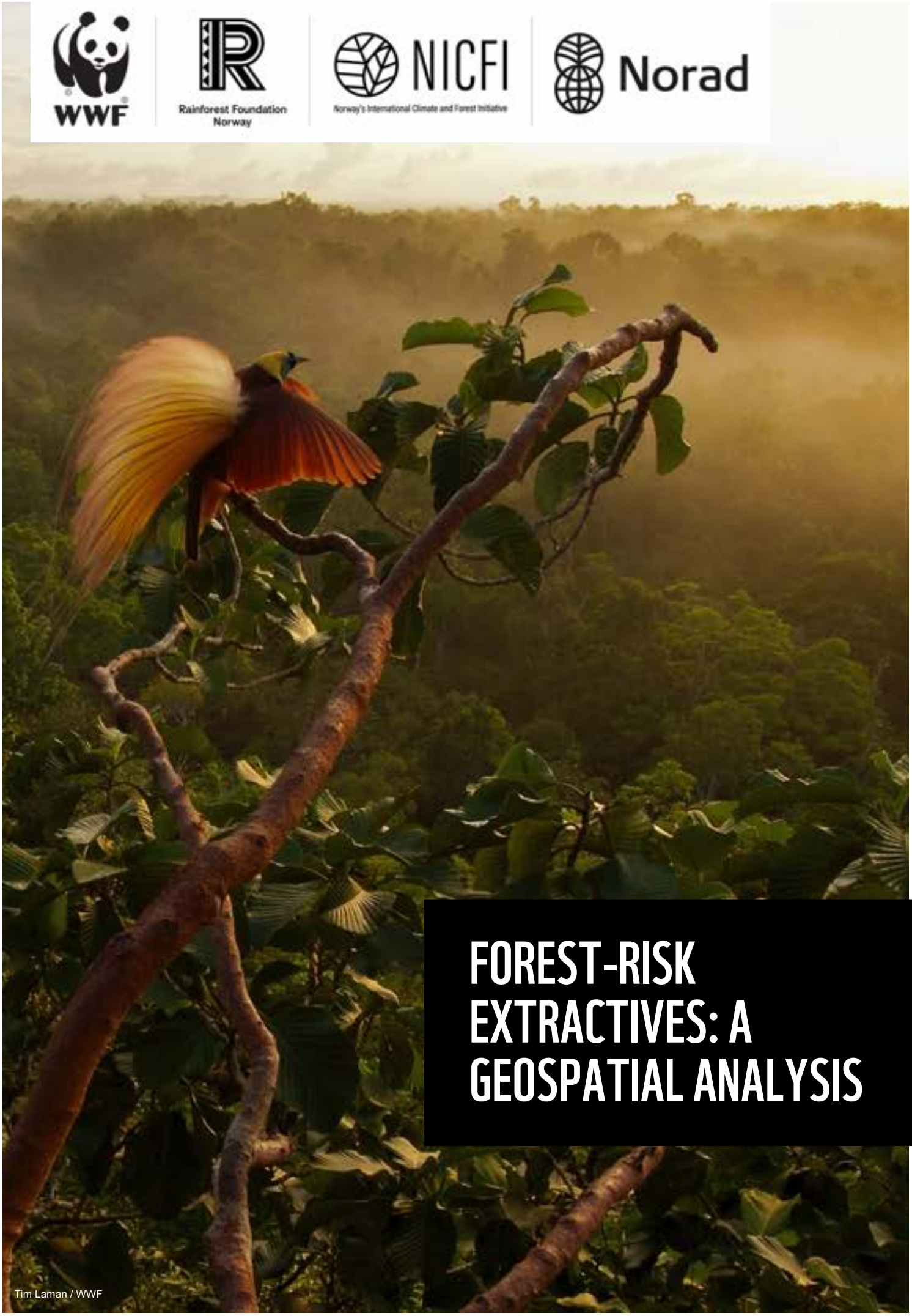

FOREST-RISK EXTRACTIVES: A GEOSPATIAL ANALYSIS

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RFN is a non-profit, non-governmental organization working towards the general objective where the world's large, contiguous rainforest areas are managed in ways that uphold biodiversity, forest ecosystem services and the human rights of indigenous and other forest-dependent peoples and communities. RFN has 35 years of experience working on rainforest protection and Indigenous Peoples and Local Communities rights across tropical forest landscapes, engaging with the public, private, and financial sector.

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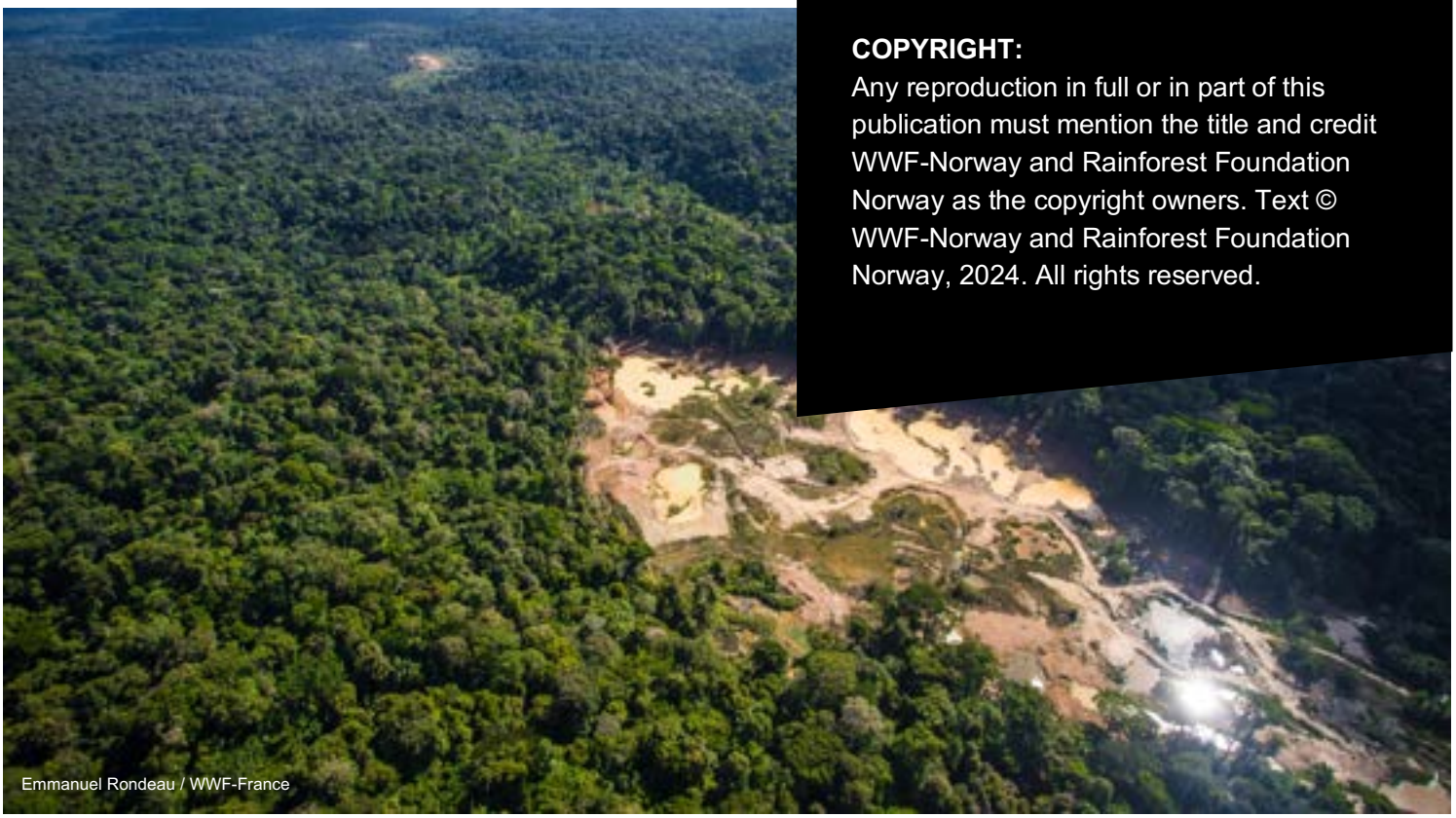

Emmanuel Rondeau / WWF-France

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EXECUTIVE SUMMARY

BACKGROUND

Extractive operations, commercial mining and oil and gas extraction, have an inherent and often unavoidable impact on the environment. Across all stages of extractive operations, from exploration to processing to decommissioning and rehabilitation, environmental risks are present, such as habitat loss and fragmentation, visual and noise disturbance, and pollution. Additional risks are generated by the infrastructure, (e.g., roads, railways, powerlines) created to support extractive operations, which in some cases, can have a significant environmental impact (Butt et al, 2013, Giljum et al, 2022).

As the world moves forward, pressures on the extractive sector are changing. As markets change, so do environmental concerns and impacts. For example, transition minerals such as lithium, cobalt, nickel, and rare earth minerals are seen as effectively essential for growth and innovation across industries such as clean energy, computing, transportation, and defence. Their increased demand is leading to new fears of expanding habitat destruction and disturbance, and significant pollution, in previously undeveloped habitat.

Forests, like any ecosystem, are damaged by extractive operations. The most apparent environmental impact of extractive activities is often linked to land use change and deforestation. Deforestation causes forest fragmentation, disturbs, and disrupts ecosystem processes which can cascade through ecosystems and create wider scale damage. Forests are critical ecosystems, indisputably vital for maintaining the health of the planet and are home to 80% of our terrestrial species (WWF, 2023). They play a key role in maintaining the global carbon cycle, acting as carbon sinks, capturing, and storing carbon dioxide.

Against a backdrop of growing recognition of the importance of nature and combating climate change, it is also evident that greater scrutiny is now being placed on how companies' impact and depend upon the natural world. This shift has led to new and upcoming mandatory reporting regulations such as the European Union's Corporate Sustainability Reporting Directive (CSRD) and voluntary reporting such as the Science Based Targets for Nature (SBTN) and Taskforce on Nature-Related Financial Disclosures (TNFD). Financial institutions now face the task of better understanding the 'nature exposure' of their investments. To illustrate the challenges and outline practical potential solutions, here we consider at a high-level one sector's interactions (the extractive sector) with forests.

The main objective of the study is to examine the '*forest exposure*' of all global mining and oil and gas terrestrial assets (mines, oil and gas wells, concessions, etc.), and link the results to parent company level for peer-to-peer comparison or for portfolio level consideration for investors and other financial actors. Using a global geospatial driven analysis, we assessed two commercial extractive asset datasets against forest related geospatial variables, (e.g., extent of forest cover, forest loss, etc.,).

Adriano Gambarini / WWF-Brazil

METHODOLOGY

In December 2023, World Wide Fund for Nature Norway (WWF-Norway) in collaboration with Rainforest Foundation Norway (RFN), completed a global geospatial assessment of two commercial extractive datasets against forest related variables, (e.g., extent of forest cover, forest loss, etc.,) to better understand the potential extent and exposure of these sectors, and their investors, to forest ecosystems. The geospatial assessment was run using Geographic Information System (GIS) software to consider 1) extractive data layers proximity with 2) 'forest' related data layers.

Extractive data was sourced from two commercial data providers.

- **S&P Global Metals and Mining** - providing mining concessions for 94 nations, and mining projects (mines) globally (S&P Global, 2023). Data sourced June 2023.
- **Enverus Oil and Gas** - providing oil and gas concessions (concessions) and wells (wells) for all countries globally (excluding the Lower 48 (mainland USA), and Russia). This dataset also in' 'surveying data' 'rigs' etc., excluded from this analysis (Enverus, 2023). Data sourced October 2023.

This creates four types of asset classes, which are defined as follows;

	DESCRIPTION
	Mining Projects / Mines: Commercial mining operations as defined in the S&P Global Metals and Mining dataset. Mines can be active, inactive, or at early-stage development.
	Mining Concessions[1]**:** Exploration and extraction 'claims' or 'concessions' are licenses granted by a state actor to companies or individuals to explore and or extract mineral resources from within a set area for a fixed period. Mining concession data is sourced from each individual state actor. There is minor variation between nations in the data standards, with some nations reporting using slightly differing terminology and with differing frequency.
	Oil and Gas Wells: Commercial oil and gas wells as defined within the Enverus dataset. Wells can be active, plugged and abandoned, or at early-stage development.
	Oil and Gas Concessions: Exploration and extraction 'concessions' are licences granted by a national state actor to companies or individuals to explore and or extract oil and or gas resources from within a set area for a fixed period. Oil and gas concession data is sourced from each individual state actor. There is minor variation between nations in data standards, with some nations reporting using slightly differing terminology and with differing frequency.

[1] Extractive concessions are a licence granted by a state actor to companies or individuals to explore and or extract resources from within a set area for a fixed period. Areas, particularly for oil and gas concessions can be huge. Any impact within them is likely to be limited to much smaller drill or mine site area and may not interact directly with environmental assets flagged within the concession area. However, their presence does represent a potential threat. To understand the extent of the threat, and any impact, each asset needs to be considered in detail on a case-by-case basis.

The four extractive datasets were individually assessed against the following comparison layers:

1. Above Ground Biomass (ABG)
2. Global Mangroves
3. Global Peatlands
4. Intact Forest Landscapes
5. Key Biodiversity Areas (Binary)
6. Mangrove Soil Organic Carbon Stock (SOCS)
7. Other Effective Area-Based Conservation Measures (ODOECM) (Binary)
8. Planted Trees
9. Protected Areas (Binary)
10. Protected Areas (Scored)
11. Tree Cover
12. Tree Cover Loss
13. Tropical Tree Cover
14. WWF Priority Ecoregions
15. World Administrative Boundaries (GADM)

Chris J. Ratcliffe / WWF-UK

GLOBAL RESULTS

The overall results of the assessment provide a high-level screening that should be viewed as a means to rapidly identify areas of different types of '*forest exposure*' across the extractive assets. The results provide insights that will help identify which regions / assets should be prioritized by financial institutions and civil society organizations (CSOs) for further environmental due diligence.

Significant interaction between extractive industries and forest ecosystems

- There is a high degree of proximity to forests between extractive assets, with nearly 21% of active commercial mines and 7.3% of commercial oil and gas wells found to have proximity with forests (i.e., within 1km). These figures drop to 7.7% and 0.66% respectively for interaction with 'tropical forests' with 1,173 mines and 2,659 wells being located within 1 km proximity of tropical forest canopy.
- In the Amazon, 183 mines (1.2%) and 4,658 (1.15%) oil and gas wells were identified.[2] For comparison, in the Congo similar levels of activity were defined with 167 mines (1.1%) and 1,603 (0.4%) oil and gas wells. Likewise in the Coral Triangle 157 mines (1.0%) and 777 (0.19%) oil and gas wells were identified.
- Several mining projects were found to have had direct spatial interaction with critical ecosystems, such as Key Biodiversity Areas (946, representing 6.18%), peatlands (2,050, representing 13.40%) and mangroves (22, representing 0.14%).
- Over 16% (66,405) of reported oil and gas wells, have some form of direct spatial interaction with protected areas, with relatively low number interacting with multiple high protected area designations (0.1%). A small number of oil and gas wells were found to had direct spatial interaction with mangroves (5,003, representing 1.24%), while the spatial interaction was markedly higher within Key Biodiversity Areas (23,315, representing 5.76%) and peatlands (47,428, representing 11.71%)

Concessions present a future threat to forests

- The extractive concession datasets, which arguably indicate areas of future development, outline a strong interaction, with 20.7% (258,473) of mining concessions and 1.09% (209) of oil and gas concessions overlapping to some extent with Intact Forest Landscapes, areas which were in 2020 large blocks of remaining forest.
- 4.6% (58,137) of active mining concessions, have some form of direct spatial interaction with protected areas, with only a small number interacting with multiple high protected area designations (0.07%).
- 43.5% of mining concessions and 6.8% of oil and gas concessions have significant interaction with forested areas with their area having a higher than 50% forest extent. This lowers to 1.6% and 5.3% respectively for interactions with tropical forests. A large proportion of mining concessions were also found to have a direct spatial relationship with peatlands (448,508, representing 35.97%).

[2] Note that most commercial oil and gas wells within the Amazon ecoregion are not within a 1km proximity of tropical forests. Most of the current oil and gas wells are found at the Western and Northern edges of the Amazon ecoregion (as defined by WWF) which has limited forest cover, as well as along the Amazon River.

- Since the 2021 Glasgow Leaders' Declaration on Forests and Land Use, pushing for the reversal and halting of deforestation by 2030, issuance of both mining and oil and gas concessions within forested areas continues. With roughly 280,000 mining concessions granted in 2022 and 2023, found to overlap ~130,000 Sq. Km of Protected Areas and over ~60,000 Sq. km of Intact Forest Landscapes.

APPLICATIONS FOR FINANCIAL INSTITUTIONS

The portfolios of four major Norwegian financial institutions, namely, Norges Bank Investment Management (NBIM), DNB Asset Management (DNB), Storebrand Asset Management (Storebrand) and KLP Kapitalforvaltning (KLP), were screened for exposure to forest-risk extractives. The portfolios of the four major investors were sourced from FactSet in November 2023 (FactSet, 2023). These financial institutions were selected to provide an overview of key stakeholders in the Norwegian finance sector, all of whom have put in place policies and measures for managing deforestation exposure and risks in their portfolios. The purpose of this section is twofold: first, it presents a data analysis that was previously unavailable to the selected Norwegian FIs, furthering possibilities for ESG risk assessments and targeted shareholder engagement. Second, the section serves as an illustrative example of the type of analysis, which is possible using the study's methodology, for other interested financial institutions. The four financial institutions, at time of assessment[3], had between 2,566 – 8,949 holdings, of which a small number (135 – 287 companies) were identified within the extractive analysis. This accounts for between 2.2 – 5.3% of the number of holdings, and between 4.0% to 8.4% of the equity, representing a value range of 1,552 – 40,129 million USD$ (Table 1).

Climate risk indicators	DNB	KLP	NBIM	Storebrand
Total No. of Holdings[4]	2,566	6,844	8,949	3,482
No. of 'Extractive Holdings' Assessed	135	287	199	138
% No. of Holdings	5.26	4.19	2.22	3.96
No. of Mining[5] Holdings Assessed	63	180	157	68
% Of EQ	1.07%	1.68%	0.98%	1.60%
Mkt Val (MM)	353.14	350.79	9,482.91	617.61
No. of Oil and Gas[6] Holdings Assessed	72	107	42	70
% Of EQ	5.76%	6.68%	3.19%	2.44%
Mkt Val (MM)	1,882.52	1,392.14	30,646.82	935.15
Total % of EQ Assessed	**6.83%**	**8.36%**	**4.17%**	**4.04%**
Total Mkt Val (MM)	**2,235.66**	**1,742.93**	**40,129.73**	**1,552.76**

Table 1 *– A table summarizing the number of holdings held by the four financial institutions and the number of 'extractive' holdings assessed within the assessment.*

[3] Holding data sourced 22 November 2023, FactSet 2023.
[4] Unique holdings as defined within source data – this includes sponsored ADR separations, etc.
[5] *'Mining Companies'* as defined by parent companies matched and identified within S&P Global Metal and Mining dataset, not by FactSet sectorial class (e.g. Non-Energy Minerals) or other delineation.
[6] *'Oil and Gas Companies'* as defined by parent companies matched and identified within Enverus dataset, not by FactSet sectorial class (e.g. Energy Minerals - Integrated Oil) or other delineation.

Climate risk indicators	DNB	KLP	NBIM	Storebrand
Total No. of 'Active' Mining Projects Assessed	1,023	2,161	1,877	947
Total Area of 'Active' Mining Projects Assessed	3,214	6,789	5,897	2,975
Total No. of 'Active' Mining Concessions Assessed	26,230	69,671	62,710	32,406
Total Area of 'Active' Mining Concessions Assessed	313,428	402,241	412,857	228,823
Total No. of 'Active' Oil and Gas Wells Assessed	71,033	75,517	65,212	83,861
Total Area of 'Active' Oil and Gas Wells Assessed	223,157	237,244	204,870	263,457
Total No. of 'Active' Oil and Gas Concessions Assessed	6,813	7,423	5,438	6,088
Total Area of 'Active' Oil and Gas Concessions Assessed	3,111,450	3,498,917	2,912,566	3,477,774

***Table 2** – A table summarizing the total number and area of assets, and total number and area of 'active' assets, as held within the identified holdings of the four financial institutions.*[7]

The assessment outlined a high-level portfolio 'forest exposure' for the four financial institutions. The assessment showed the following results against the comparison layers, sorted by asset type.

Mining projects

- Across the four financial institutions there is limited variation in terms of their total mining project exposure overlap with the key variables. The overlap with protected areas is 3.6% - 5.2% (106 – 317 Sq. Km), and Intact Forest Landscapes (1.6% - 2.9%).
- A relatively large percentage 5.6 – 7.0% (174 – 380 Sq. Km) of mining projects were identified as spatially overlapping Key Biodiversity Areas. The same is true for peatlands which have an overlap range of 6.5% – 11.9% (208 – 687 Sq. Km). All four financial institutions have an overlap greater than the global value for Key Biodiversity Areas (5.1%), while Storebrand (11.8%) and KLP (10%) have an overlap above the global value for peatlands (9.3%), in contrast to DNB (6.5%) and NBIM (8.7%).
- The four investors have approximately 12 – 18% of linked active mining projects (124 – 353 assets) spatially overlapping areas with tree cover >50%. This is significantly below the global value (21.5%).
- Within tropical forest the range is lower (6.6 – 8.6%), with DNB and Storebrand identified with 81 mining projects, and KLP identified with 150 sites in areas with tropical tree cover >50%. Storebrand has a greater proportion of mining projects (8.6%) overlapping tropical tree cover >50% than the global value (7.7%) and its peers (6.9% - 7.9%).

[7] There is overlap between the portfolios with the four financial institutions frequently holding equity within the same parent company. Subsequently, the portfolio results shown may duplicate values when reporting the results of the same parent company held by multiple financial institutions.

Mining concessions

- There is moderate variation in terms of the financial institutions' total exposure of mining concessions with the key comparison layers. Protected areas overlap, for example, has a percentage range of 12.3% - 14.2%, translating to an area range of ~28,200 – 53,800 Sq. Km of protected areas overlapped. All four institutions had overlaps with Protected Areas which exceed the global value (11.1%).
- Overall, 3.4 – 4.0% (~9,300 – 15,800 Sq. Km) of mining concessions were identified as spatially overlapping Key Biodiversity Areas. All four financial institutions have a reduced overlap compared with the global value for Key Biodiversity Areas (5.9%)
- Storebrand (5.2%) and KLP (6%) have an overlap with peatlands which exceeds the global value (5%).
- The results report a connection between mining concessions and forest cover, with 39.5 – 55.0% of active mining concessions held, having > 50% forest cover, a range of ~10,300 – 35,500 mining concessions.
- This figure drops dramatically for tropical forest, with 0.8 – 1.8% of concessions with >50% tropical forest cover, 452 – 536 active concessions. KLP (0.8%), NBIM (0.9%) and Storebrand (1.4%) have a smaller proportion of assets overlapping tropical tree cover >50% when compared against the global value (1.6%).
- In total, 2,544 unique active mining concessions granted post 01/01/2022 (6,538 repeated assets) were identified as held across the four financial institutions, covering an area of 93,029 Sq. Km (280,851 Sq. Km repeated area). Roughly 1.3 – 5.3% of the number of mining concessions, and 20.1 – 21.6% of the total area held was identified as granted since 2022.
- These post 2022 concessions overlapped protected areas, roughly by ~9,600 – 11,550 Sq. Km (13.9 – 20.2%) and overlapped Key Biodiversity Areas by ~720 – 1,600 Sq. Km, (1 – 1.9%)
- The range for the spatial interaction between post 2020 concessions and peatlands (817 – 1,302 Sq. Km, 1.2% - 1.7%) is considerably less than both the global value (9.25%) and the range found in the overall portfolios of the four financial institutions (3,6% - 6%)

Oil and gas wells

- There is similarity between the four financial institutions in terms of their total identified oil and gas wells spatial overlap with the key comparison layers. Protected areas overlap, for example, has a range of 5.4% - 6.1%, translating to an area range of ~11,100 – 16,100 Sq. km. This range is significantly below the global value (13.7%).
- For Intact Forest Landscapes the range is relatively limited, 0.03% - 0.04%, representing an area range of 81 - 91 Sq. Km. While 2.7 – 4.4% (~7,000 – 9000 Sq. Km) of the oil and gas wells are correlated with forest loss.
- A relatively large area 6,600 – 12,800 Sq. Km (3.3 – 4.9%) was identified as spatially overlapping Key Biodiversity Areas.
- 6,310 – 9,016 Sq. Km (2.4% – 3.6%%) of ‘active’ oil and gas wells were identified as spatially overlapping peatlands, with Storebrand (2.4%) being a notable outlier from the global value (3.6%).
- The results report a connection between oil and gas wells and forests, with 4.2 – 6.4% (3,376 – 4,188) of ‘active’ oil and gas wells held, having > 50% forest cover.
  This decreases for tropical forest, with 2.2 – 2.9% (1,858 – 1,865) of active oil and gas wells with >50% tropical forest cover.

- All four financial institutions have an overlap with >50% tropical tree cover significantly above the global value (0.7%), though below the global value for >50% forest cover (7.3%).
- Comparative to other asset types a proportionately large number of oil and gas wells were found to have a direct spatial interaction with areas with high mangrove soil carbon (1,649 - 1,793 sites 2.0 – 2.8%). All four financial institutions have an overlap above the global value (1.45%).

Oil and gas concessions

- Across the portfolios, oil and gas concessions overlap with protected areas varies between 4.2% - 5.4%, representing an area range of ~122,000 – 186,000 Sq. Km.
- The overlap with Intact Forest Landscapes is 0.7% - 1%, an area ~23,000 – 29,000 Sq. Km. While 0.5 – 0.7% of the oil and gas concessions are correlated with forest loss.
- Large areas, 86,000 – 101,000 Sq. Km (2.8 – 3.2%), were identified as spatially overlapping Key Biodiversity Areas. All four financial institutions have an overlap significantly below the global value for Key Biodiversity Areas (5.2%) and peatlands (2.7%).
- The results show a connection between oil and gas concessions and forests, with 2.6 – 4.0% (177 – 230) of 'active' oil and gas concessions held having > 50% forest cover.
- This decreases for tropical forest, with 1.7 – 2.6% (114 – 143) of concessions with >50% tropical forest cover. All four financial institutions have an overlap with >50% tropical tree cover significantly below the global value (5.34%).
- Across the portfolios, roughly 8.5 – 9.3% of the number of oil and gas concessions, and 8.8 – 11.7% of the total area held was identified as granted since 2022.
- Interaction with key comparison layers appears more limited when compared with mining concessions, with a range of ~12,400 – 20,200 Sq. Km (4.8 – 5.2%) of post 2022 concessions overlapping Protected areas. This range is below the global value (7.7%).
- Overlap with Key Biodiversity Areas is limited, representing ~2,200 – 5,200 Sq. Km, which is less than 0.8 – 1.3% of the area licenced in 2022 and well below the global value (5.2%). Intact Forest Landscapes have almost no overlaps.

The results outlined above provide a high-level overview for financial institutions of their portfolio holding's 'forest exposure'. While the results presented here are at portfolio level, the data generated is scalable, and can be viewed at asset, company, national, ecoregion, and portfolio level. This will allow financial institutions to identify specific assets for site-level screening; and/or companies for further engagement.

RECOMMENDATIONS AND GUIDANCE FOR FINANCIAL INSTITUTIONS

Here, we provide recommendations for how to 1) tackle portfolio exposure to forest-risk extractive assets, and 2) make use of the report methodology.

Recommendations for FIs to tackle forest-risk extractive holdings

1. **Investor commitments and policies** - Financial institutions should adopt and implement comprehensive and explicit environmental, social and governance (ESG) policies to eliminate deforestation, conversion and human rights abuse from all commodity supply chains, related land concessions, and real estate; linked to the financial institutions' investment practices.

2. **Risk assessments and monitoring** - Financial institutions should assess deforestation risk for all extractive assets held in investment portfolios and across all other operations, using all relevant tools including supply chain and asset location data.

3. **Company engagement** - Financial institutions should engage in dialogue with companies linked to forest-risk extractive assets, to ensure that companies avoid and reduce, with the ambition of eliminating, deforestation linked to extractive assets throughout their operations and value chains.

Guidance on how to use the report and data
RFN and WWF-Norway recommend a step-by-step screening process, which builds on the overarching recommendations for financial institutions to tackle forest-risk extractives; and provides tailored guidance within the scope of the research report and data.

The screening process should enable financial institutions to gain an overview of overall risk exposure, and to make a prioritization on company engagement. The four main steps are 1) high level screening, 2) prioritization according to forest comparison layers, 3) screening for recently acquired concessions, 4) company selection for shareholder engagement.

Step 1 – High-level screening
As a first step, financial institutions should replicate this report's methodology to gain an overview of their financial ties to companies holding forest-risk extractive assets. The overview can be used to inform the financial institution of its sector-level risk exposure for climate and nature risk relating to land-use-change.

Step 2 – Prioritization according to forest comparison layers
Once the high-level screening is completed, financial institutions should use the data to select companies in their portfolios with significant presence in forest areas for further engagement. As shown in the 'Methodology' section, the study has made use of 13 different comparison layers to ensure a comprehensive overview of the spatial correlation between forest ecosystems and extractive assets. RFN and WWF-Norway recommend financial institutions consider a broad selection of comparison layers to identify a range of spatial correlations between the extractive asset, and its interface with nature and the climate.

The report acknowledges that there may be instances where it is necessary to prioritize specific comparison layer data to gain a more granular understanding of particular risks and to align portfolio screening with specific engagement priorities. For example, financial institutions may need to focus on particular types of forest ecosystems or geographic areas to better assess and engage with their investee companies.

Considering this, the report suggests that the different comparison layers can be grouped to facilitate targeted analysis and decision-making, as follows:

Climate risk indicators	Biodiversity risk indicators	Cross-cutting indicators
Above Ground Biomass (ABG)	Key Biodiversity Areas	Intact Forest Landscapes
Global Peatlands	Protected Areas	Global Mangroves
Mangrove Soil Organic Carbon Stock	WWF Priority Ecoregions	Tree Cover
		Tropical Tree Cover
		Tree Cover Loss

Table 3 *– Important layers and indicators to manage biodiversity or climate-related risks in extractive assets.*

Step 3 – Screen for recently acquired concessions

Recently acquired forest-risk concessions, merit particular attention from financial institutions. Companies that have acquired concessions recently have done so in a broader socioenvironmental context of increased urgency to mitigate climate change and halt biodiversity loss. In addition, recently acquired concessions present opportunities for financial institutions to conduct pre-emptive company engagements.

Step 4 – Company selection for shareholder engagement

Finally, financial institutions should make a selection of investee companies that merit further assessment and engagement, to manage financial risks associated with forest-risk extractives. In line with the recommendations in steps 1-3, the selection should:

- Align with the financial institutions' sector-level risk exposure to forest-risk assets.
- Account for the most significant asset and company interactions with forest ecosystems, in line with the financial institutions' broader priorities for managing climate and nature-related risks.
- Pay particular attention to companies that have recently acquired concessions that interact with forests.

James Morgan / WWF

INTRODUCTION

1. INTRODUCTION

Extractive operations, commercial mining and oil and gas extraction, have an inherent and often inevitable impact on the environment. Across all stages of extractive operations, from exploration to processing to decommissioning and rehabilitation, environmental risks are present, such as habitat loss and fragmentation, visual and noise disturbance, and pollution. Additional risks are generated by the infrastructure, (e.g., roads, railways, powerlines) created to support extractive operations, which in some cases, can have a significant environmental impact (Butt et al, 2013, Giljum et al, 2022). These issues, alone or in combination with external additional pressures, can disrupt ecosystem processes and lead to severe ecosystem disturbance and degradation.

As the world moves forward, market demands on the extractive sector are changing. As markets change, so do environmental concerns and impacts. For example, transition minerals such as lithium, cobalt, nickel, and rare earth minerals are seen as effectively essential for growth and innovation across industries such as clean energy, computing, transportation, and defence. Their increased demand is leading to new fears of expanding habitat destruction and disturbance, and significant pollution, in previously undeveloped habitat.

Adding complexity to the situation is the renewal of competition between major powers, brought rapidly into focus with recent major geopolitical events. Due to the highly asymmetric location of mineral deposits, individual nations are often responsible for half the world production of a given mineral (e.g. nickel - Indonesia, lithium - Australia). Nation states, such as the USA and UK, and the EU, have responded by developing 'critical mineral strategies' to ensure the supply of minerals considered critical to their economies. Such protectionist measures are likely to widen the location of global mining exploration and extraction for these minerals to limit reliance on single nations thereby ensuring supply in the event of a changing geopolitical arena.

Unfortunately, the true extent of these evolving environmental concerns remains hard to define, due to an information shortfall on the specific activities of the extractive sector (Maus and Werner, 2024). **To begin to quantify the scale of some these issues, here we explore the spatial relationship between extractive assets globally and forest ecosystems.**

Forests are critical ecosystems, indisputably vital for maintaining the health of the planet. Ecologically significant, from the frozen boreal forests to tropical rainforests, they are home to 80% of our terrestrial species (WWF, 2023). They play a key role in maintaining the global carbon cycle, acting as carbon sinks, capturing, and storing carbon dioxide. Forests provide a long list of vital ecosystem services, from cleaning the air we breathe, to purifying water, to preventing soil erosion, to mangroves providing coastline storm surge protection. Forests also provide globally important resources, such as timber, medicine and sustain, directly or indirectly, millions of livelihoods (Oldekop et al, 2020).

Critically, forests are central in addressing climate change. Halting deforestation, degradation of forests and restoring their ecosystem services has the potential to contribute significantly to the global climate change mitigation required to meet the objectives of the Paris Agreement. In recognition of this, the Glasgow Leaders' Declaration on Forests and Land Use was launched in 2021 at the United Nations Climate Change Conference (COP26). There, 143 nations, representing 90% of the world's forests, signed the declaration, aimed to *'halt and reverse forest*

loss and land degradation by 2030 while delivering sustainable development and promoting inclusive rural transformation' (UN Climate Change Conference UK, 2021).

Forests, like any ecosystem, are damaged by extractive operations. Indeed, mining may already affect up to one third of the world's forest ecosystems, and 77% of all mines exist within a 50 km radius of Key Biodiversity Areas (WWF, 2023b). As extractive activities are set to continue and potentially increase in the coming years, the threats and impacts they create on deforestation and biodiversity loss must be better identified and understood.

The most apparent environmental impact of extractive activities is often linked to land use change and deforestation. Deforestation causes forest fragmentation, disturbs, and disrupts ecosystem processes which can cascade through ecosystems and create wider scale damage. For example, the removal of forest cover can lead to increased soil erosion. In turn, sedimentation in local streams and rivers impacts water quality and freshwater ecosystems, potentially disturbing ecological processes across the landscape. Supporting infrastructure from the extractive sector, such as roads and settlements, can further fragment and impact large areas of surrounding forest. Additionally, such infrastructure development has been documented to create localised social economic changes often in formerly remote areas, facilitating other threats such as increased deforestation, agricultural expansion, artisanal mining, illegal hunting, soil erosion and water pollution (Butt et al, 2019, Giljum et al, 2022).

Against this backdrop of a growing recognition of the importance of nature and combating climate change, greater scrutiny is now being placed on how companies' impact and depend upon the natural world. This shift has led to new or upcoming mandatory reporting regulation such as the European Union's Corporate Sustainability Reporting Directive (CSRD) and voluntary reporting such as the Science Based Targets for Nature (SBTN) and Taskforce on Nature-Related Financial Disclosures (TNFD).

Financial institutions now face the task of better understanding the *'nature exposure'* of their investments. To illustrate the challenges and outline practical potential solutions, here we consider at a high-level one sector's interactions (the extractive sector) with forests. Specifically assessing, via a geospatial based analysis, the *'forest exposure'* of mining and oil and gas *terrestrial* assets, providing results aggregated at the portfolio level for four financial institutions.

The main objective of the study is thus to examine the '*forest exposure'* of all global mining and oil and gas terrestrial assets (mines, oil and gas wells, concessions, etc), and link the results to parent company level for peer-to-peer comparison or for portfolio level consideration for investors and other financial institutions. Using a global geospatial driven analysis, we assessed two commercial extractive asset datasets against forest related geospatial variables, (e.g., extent of forest cover, forest loss, etc.,). This involved an analysis of the spatial correlation of 2.41 million historic, current, and future extractive assets, paying particular attention to their exposure to tropical forest ecosystems.

The analysis was designed to provide a high-level overview of the extent of '*forest exposure'* for any given extractive asset. **It does not attempt to define the 'impact' or 'dependency' of these assets.** However, the technical approaches outlined here could be rapidly advanced further to provide more granular impact and dependencies insights into the 'forest exposure' and other nature or biodiversity variables. Due to the scale of assessment, a diverse range of additional useful insights can be drawn. Here we report on the main results.

METHODOLOGY

Karine Aigner / WWF

2. METHODOLOGY

2.1. OVERVIEW

In December 2023, World Wide Fund for Nature - Norway (WWF-Norway) in collaboration with Rainforest Foundation Norway (RFN), completed a global geospatial assessment of two commercial extractive datasets against forest related variables, (e.g., extent of forest cover, forest loss, etc.,) to better understand the potential extent and exposure of these sectors, and their investors, to forest ecosystems.

The large scale of the assessment created technical challenges, such as tracking and identifying the parent companies across nearly a quarter of a million unique holders. In total, the assessment considers 2.41 million extractive assets related to ~235,000 unique holders. Analysing 1,758,894 mining concessions, nearly 37,168 mines, across ~220,000 unique holders. And roughly 31,453 oil and gas concessions, 587,568 oil and gas wells, across ~15,000 unique holders.

It is important to note that while the assessment is global, it is not comprehensive. The commercial extractive datasets applied have data coverage gaps. For example, while the oil and gas datasets did provide data across 198 countries, oil and gas well data was inaccessible for some specific regions, notably mainland USA and mainland Russia. Mining projects have global coverage, but mining concession data covers 94 countries. Despite the assessment limitations this analysis arguably provides one of the most comprehensive assessments on the subject to date and highlights the pressing need for greater data transparency surrounding extractives operations.

A geospatial assessment was run using Geographic Information System (GIS) software to consider 1) extractive data layers proximity with 2) 'forest' related data layers. A detailed outline of the methodology used is provided below.

2.2. EXTRACTIVE LAYERS

Extractive data was sourced from two commercial data providers.

- **S&P Global Metals and Mining** - providing mining concessions for 94 nations, and mining projects (mines) globally (S&P Global, 2023). Data sourced June 2023.

- **Enverus Oil and Gas** - providing oil and gas concessions (concessions) and wells (wells) for all countries globally (excluding the Lower 48 (mainland USA), and Russia). This dataset also includes additional data such as 'farm-in' 'surveying data' 'rigs' etc., excluded from this analysis (Enverus, 2023). Data sourced October 2023.

This creates four types of asset classes, which are defined as follows;

	DESCRIPTION
	Mining Projects / Mines: Commercial mining operations as defined in the S&P Global Metals and Mining dataset. Mines can be active, inactive, or at early-stage development.
	Mining Concessions[8]**:** Exploration and extraction 'claims' or 'concessions' are licenses granted by a state actor to companies or individuals to explore and or extract mineral resources from within a set area for a fixed period. Mining concession data is sourced from each individual state actor. There is minor variation between nations in the data standards, with some nations reporting using slightly differing terminology and with differing frequency.
	Oil and Gas Wells: Commercial oil and gas wells as defined within the Enverus dataset. Wells can be active, plugged and abandoned, or at early-stage development.
	Oil and Gas Concessions: Exploration and extraction 'concessions' are licences granted by a national state actor to companies or individuals to explore and or extract oil and or gas resources from within a set area for a fixed period. Oil and gas concession data is sourced from each individual state actor. There is minor variation between nations in data standards, with some nations reporting using slightly differing terminology and with differing frequency.

[8] Extractive concessions are a licence granted by a state actor to companies or individuals to explore and or extract resources from within a set area for a fixed period. Areas, particularly for oil and gas concessions can be huge. Any impact within them is likely to be limited to much smaller drill or mine site area and may not interact directly with environmental assets flagged within the concession area. However, their presence does represent a potential threat. To understand the extent of the threat, and any impact, each asset needs to be considered in detail on a case-by-case basis.

These layers were processed to give all assets a spatial dimension. Specifically, mining projects (mines) and oil and gas wells were converted from single point location into polygons with a 1 Km radius, using the point location as the centroid. Mining and oil and gas concessions, already provided as polygons, required no conversion. A global polygon layer was generated for each of the four asset types, mining projects, mining concessions, oil and gas wells, and oil and gas concessions.

For each of the four datasets, each asset's area (Sq. Km) was defined in ArcGIS Pro 3.2 and added to the layers attribute table (*.CSV). Tables which provide critical information on the details of asset (type, holder, expiry dates etc.,). These tables were extracted and later integrated to provide perspective into a parent company's total known holdings against any reported 'forest exposure' variables. These four extractive global layers, and their full attribute tables, were then assessed against the comparison layers.

2.3. COMPARISON LAYERS

The four extractive datasets were individually assessed against the comparison layers.

The comparison layers were all converted into raster format and an area overlap analysis was run using Mollweide projection in ArcGIS Pro 3.2. In some cases, as detailed below, a few layers were pre-processed into new formats to support insight.

1. **Above Ground Biomass (AGB)** - Global layer reporting the Above Ground Biomass (AGB, Mg C ha−1) for the year 2010 at a ~25m resolution (Santoro et al., 2018). The global layer considers the growing stock volume (GSV, unit: m3/ha) with a set of Biomass Expansion and Conversion Factors (BCEF) following approaches to extend on ground estimates of wood density and stem-to-total biomass expansion factors to obtain a global raster dataset. This dataset was applied without edit. Data sourced July 2023.

2. **Global Mangroves** - This layer depicts the global extent and change of mangrove forests in the years 1996, 2007 - 2010 and 2015 – 2020 (Bunting et al., 2018). This dataset was applied without edit. The annual variation of this dataset was examined, and due to the similarity in results across years, only 2020 results are reported. Data sourced July 2023.

3. **Global Peatlands** - Composite layer from five original sources, Miettinen et al., 2016, Hastie et al., 2022, Crezee et al., 2022, Gumbricht et al., 2017 and Xu et al., 2018. The data was resampled to provide a global overview of peatlands and other organic soils at 30m resolution. All the original layers have differing methodologies, either in geographical area or definitions. For details see GFW, 2023. This dataset was applied without edit. The data was sourced July 2023.

4. **Intact Forest Landscapes** - Layer identifying the world's last remaining unfragmented forest landscapes large enough to retain all native biodiversity (Potapov et al., 2017). The data set is available for the years 2000, 2013, 2016, 2020, and all years are reported. This dataset was applied without edit. Data sourced July 2023.

5. **Key Biodiversity Areas (Binary)** - Polygon dataset from BirdLife International defining approximately 16,000 sites considered to be 'key' to biodiversity. These sites are not necessarily legally protected (BirdLife International, 2023). This dataset was converted into a raster layer, at a 30m resolution, to provide a binary value 0/1 to area extent of an extractive assets overlap with a 'KBA'. This means the specific attributes of KBA were not recorded. Data sourced July 2023.

6. **Mangrove Soil Organic Carbon Stock (SOCS)** - Global layer defining the distribution of mangrove soil carbon stocks (Mg C ha−1) within the top 1m of soil at 30m resolution for the year 2000 (Sanderman et al., 2018). This dataset was applied without edit. Data sourced July 2023.

7. **Other Effective Area-Based Conservation Measures (ODOECM) (Binary)** - The World Database on Other Effective Area-Based Conservation Measures (WDOECM) is a polygon dataset from International Union for Conservation of Nature (IUCN) and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) defining approximately 853 OECMs (IUCN and UNEP-WCMC, 2023b). This dataset was converted into a raster layer, at a 30m resolution. The OECMs polygons were then merged, to provide a binary value, 0/1, to area extent of an extractive assets overlap with a 'OECMs'. This means the specific attributes of OECMs is not recorded within the assessment. Data sourced September 2023.

8. **Planted Trees** - The Spatial Database of Planted Trees (SDPT) defines areas of planted forests and tree crops for selected countries (82) (notably incomplete for Canada, Russia and across Africa) (Harris et al., 2019). Used within the analysis to provide context, highlighting potential 'non-natural forest exposures', such as palm oil plantations. This dataset was applied, as is, without edit. Data sourced July 2023.

9. **Protected Areas (Binary)** - The World Database on Protected Areas (WDPA) is a polygon dataset from IUCN and UNEP-WCMC defining nearly 300,000 marine and terrestrial protected areas (IUCN and UNEP-WCMC, 2023). This dataset was converted into a raster layer, at a 30m resolution. The protected area (PAs) polygons were then merged, to provide a binary value, 0/1, to area extent of an extractive assets overlap with a 'PA'. The specific attributes of unique PAs are not recorded (See PAs Scored). Data sourced July 2023.

10. **Protected Areas (Scored)** - The World Database on Protected Areas (WDPA) is a polygon dataset from IUCN and UNEP-WCMC defining nearly 300,000 marine and terrestrial protected areas (IUCN and UNEP-WCMC, 2023). The protected area (PAs) polygons were scored by IUCN management categories, an attribute within the dataset. This was done to give some sense of the significance of the designation/s of the PA/s overlapped. Designations were given the following scoring.

IUCN Management Category	'Score'
World Heritage Sites	5
1a, 1b	4
II	3
III	2
IV - VI	1

Table 1 *– A table summarising the values used to score protected areas on their differing IUCN management categories.*

This dataset was converted into a raster layer, at a 30m resolution. Scores were summed where more than one PA polygon overlapped as PAs can and often do overlap the same spatial area. This gave a potential range in '0 – 28' score in 'PAs IUCN management categories significance'. To give some context to the possible 'significance' of extractive activity within PAs. Data sourced July 2023.

11. **Tree Cover** - Global layer defining areas of tree cover across all global land, excluding Antarctica and other Arctic islands, at approximately 30m resolution. It provides insight into likely areas of tree cover for the years 2000 and 2010 (Hansen et al., 2013b). The 'percent tree cover' is defined as the density of tree canopy coverage of the land surface. This dataset was applied without edit. Data sourced July 2023.

12. **Tree Cover Loss** - Global layer defining areas of tree cover loss across all global land, excluding Antarctica and other Arctic islands, at approximately 30m resolution. It provides insight into likely areas of 'forest loss' annually from 2001 – 2022 (Hansen et al., 2013). Tree cover is considered as vegetation greater than 5m in height and includes natural and planted trees. Loss includes both natural and non-natural removal or mortality of tree cover. The data use multiple different updated methodologies, comparison between years reported here should be considered with caution. This dataset was applied without edit. Data sourced July 2023, (Version 1.10).

13. **Tropical Tree Cover** - Layer defining for 2020 tree extent at the ten-meter scale and tree cover at the half hectare scale for the tropics (-23.44 to 23.44 latitude) (Brandt et al., 2023). This layer considers 'tree coverage' differently than other layers used within this assessment considering both height and crown diameter. Woody vegetation higher than 5 meters regardless of crown diameter, or between 3 and 5 meters with a minimum crown diameter of 5 meters is considered a tree. This definition is different from Hansen et al. (2013) which defines a tree as any vegetation at least 5 meters in height. The tropical tree cover dataset does not distinguish plantation trees from non-plantation trees. This dataset was applied without edit. Data sourced July 2023.

14. **WWF Priority Ecoregions** - Polygon layer defining the 35-priority marine and terrestrial ecoregions where WWF works in aiming to protect the world's most biodiverse places. Data sourced September 2023.

15. **World Administrative Boundaries (GADM)** - This dataset defines 400,276 administrative areas here used to define countries and non-sovereign territories. Data sourced September 2023.

Dataset	Coverage	Resolution	Update	Date of Content
Above Ground Biomass	Global	25m	N/a	2010
Global Mangroves	Global	1 ha	Unclear	1996-2016
Global Peatlands	Global	30m	N/a	Mixed – 2017 to 2022
Intact Forest Landscapes	Global	Polygons	Every 4-5 years	2000 / 2013 / 2016 / 2020
Key Biodiversity Areas (Binary)	Global	Polygons	Annual	2023
Mangrove Soil Carbon Density	Global	30m	Unclear	2020
Other Effective Area-Based Conservation Measure (Binary)	Global	Polygons	Annual	2023
Planted Trees	82 Countries	Polygons	N/a	2015
Protected Areas (Binary)	Global	Polygons	Quarterly	2023
Protected Areas (Scored)	Global	Polygons	Quarterly	2023
Tree Cover	Global	30m	N/a	2000 / 2010
Tree Cover Loss	Global	30m	Annual	2001-2022
Tropical Tree Cover Extent	Tropics (-23.44 to 23.44 latitude)	10m	2024	2020
World Administrative Boundaries (GADM)	Global	Polygons	Annual	2022
WWF Priority Ecoregions	Global	Polygons	N/a	2018

Table 2 *– A table summarising the comparison layers applied within the study.*

2.4. DATA AGGREGATION

The comparison layer overlaps of each of the four asset classes were exported as *.CSV and dissolved. This removed any record duplication, to report a single record per asset with a summed or aggregated value/s. Data was cleaned and formatted into standard values and metrics (e.g., Sq. Km)

Ownership data was cut from mining datasets and each unique holder was identified. Using company identifiers, private individuals (e.g., John Smith) were filtered out of the dataset. The resulting list (~70,000 company names) was run through FactSet (FactSet, 2023), using 'Name to Ticker' function to help trace parent company holdings of these assets.

To improve and refine results, the data was manually reviewed using FactSet, S&P Global, and other online resources following WWF 'Ownership tracing methodology' to verify data (WWF Internal Document, n.d.). A list of unique parent companies, and a second table of unique subsidiaries was generated. The holders of each mining asset (assets can and often have multiple holders), were extracted and a lookup table was developed for each asset class (e.g., mining projects and mining concessions), linking each subsidiary company with every case of partial ownership. The comparison data layer results were then assigned, via unique IDs to every unique mining asset.

Ownership data for the oil and gas datasets was extracted and each unique parent company and holder was identified. Parent companies were already listed within the source data and therefore were not significantly traced. Parent companies were given a unique ID, and linked to each subsidiary, each subsidiary was given a unique ID. A list of unique parent companies, and a second table of unique subsidiaries was generated. The holders of each oil and gas asset (assets can and often have multiple holders), were extracted and a lookup table for each asset class (e.g., wells and concessions) was developed linking each subsidiary company with every case of partial ownership. The comparison data layer results were then assigned, via unique IDs to every unique oil and gas asset.

Efforts were undertaken to clean the resulting ownership data structure across both mining and oil and gas datasets to remove misspellings and inconsistencies in the data. To help ensure the robustness of the results, filters were applied to remove data considered which could be interpreted as misleading, removing assets that had expired or inactive. Specifically, the data was filtered as follows.

- Mining Projects – Activity Status = 'Inactive', Development Stage = 'Closed'
- Mining Concessions – Status = 'Application', Expiry Date = 'Before 01/01/2024'
- Oil and Gas Wells – Tech Status = 'Plugged and Abandoned or Junked',
- Oil and Gas Concessions – Contract Status = 'Application or 'Open', Expiry Date = 'Before 01/01/2024'

2.5. PORTFOLIO SCREENING

The portfolios of four major Norwegian finance institutions, DnB Asset Management, KLP Kapitalforvaltning, Norges Bank Investment Management and Storebrand Asset Management, were sourced from FactSet in November 2023 (FactSet, 2023).

The names of parent companies within each investors' holdings were compared for similarity against the mining and oil and gas parent companies and matches were assigned the unique parent ID used within the analysis. Each table was checked manually, to help ensure connections were correct. Tables were generated outlining the specific asset holdings and its comparison layer scorings of all parent companies linked to each of the four financial institutions.

2.6. METHODOLOGY AND DATA LIMITATIONS

As with any major global GIS assessment there are limitations. Here we describe a few of the more critical considerations, which should be understood when considering results.

- **Extractive Asset Data Gaps** - It is important to note that while the assessment is global, it is not comprehensive. The commercial extractive datasets applied have data coverage gaps. For example, while the oil and gas datasets did provide data across 198 countries, oil and gas well data was inaccessible for some specific regions, notably mainland USA and mainland Russia. Mining projects have global coverage, but mining concession data covers some 94 countries.

- **Point Location** – A geospatial assessment relies on measuring the right area. Both mining projects and oil and gas wells were converted from point locations to a 1 km circle. Suitable for this type of high-level assessment, attempting to define at a coarse scale the extent of 'forest exposure'. However, since mines and oil and gas operations vary in size significantly, an improved method would be to define the exact boundaries of each assets area of operation. Methods have been proposed to define mine site areas (Maus et al., 2020, Maus and Werner, 2024), but no accurate global public dataset is yet available, refining or developing extractive operations boundaries was outside the scope and arguably the requirements of this study.

- **Incorrect Geolocation** – While the extractive datasets applied are highly robust, the specific locations of some assets may be incorrect. This ultimately means incorrect measurements are assigned to the asset, as they are simply measuring the wrong area. Since the geolocation error is rarely greater than 1 km, and since we're trying to define a high level the proximity of assets with forests this error is tolerable. Where often industrial assets within proximity (5km) with a conservation asset are flagged as a 'concern', with some publications considering assets within 20 km as a potential 'threat'.

- **Mining and Oil and Gas Concessions** – A concession is a licence granted by a state actor to companies or individuals to explore and or extract resources from within a set area for a fixed period. Areas, particularly for oil and gas concessions, can be huge. Any impact within them is likely to be limited to much smaller drill or mine site area and may not interact directly with environmental assets flagged within the concession area. However, their presence does represent a potential threat. To understand the extent of the threat, and any impact, each asset needs to be considered in detail on a case-by-case basis.

- **False Negatives** – A common error occurs when a physical asset (e.g., a mine) significantly predates the comparison layers. If, for example, a mine was established in the 1960s over a large area in rainforest, the 1980s onwards satellite imagery derived comparison layers applied will commonly report the values of the mine itself (e.g., 'open ground' or 'non-forest', etc.) unable to detect or report any change since the data they started with contains the physical asset already in situ. This error is present within this assessment, however, since we are effectively sampling larger areas than the physical

asset across all asset classes, interaction with approximate forest assets is likely to be captured.

- **Indigenous and Community Lands** – This assessment does not consider the spatial proximity of extractive assets with Indigenous lands, a valuable metric, as data rights could not be secured within the study's available timeframe. For more information about how mining operations overlap with Indigenous Peoples and Local Communities (IPLCs) territories, see Owen et al. (2023).

- **'Forests'** – The assessment makes use of Global Forest Watch, Tree Cover and Tropical Tree Cover layers (Hansen et al. 2013, Brandt et al. 2020). Both datasets do not distinguish between plantations and natural forests. Subsequently the area values of 'forest' and 'tropical forest' reported may in some cases be reporting non-natural forests (e.g. Oil Palm, Rubber, Eucalyptus etc.). Other potential technical deficiencies, such as higher uncertainty for specific scrub forest types, may bias results. While we do report on plantations via additional datasets, the results generated should be considered as a high-level global overview across millions of assets, not as precise verified insights. Further due diligence is required when considering results at a finer scale.

- **Technical GIS Errors** – Across the assessment, minor projection area calculation errors may be present. This is only likely to be relevant in the case of extremely small mining concessions (> 0.02 Sq. Km) when aggregated by the thousands. In this case projection area calculation errors may potentially become statistically significant.

- **Incorrect Assignment**
  Parent Company – It is vital that the correct assets are assigned to the correct subsidiary, then to the correct parent company. Otherwise, assets (and their results) not held by a parent company will be incorrectly included. Across the oil and gas data, there is robust assignment, as the parent company is accuracy defined within the source data itself. Across the mining datasets parent company ownership was not available, and assignment across tens of thousands of companies, subsidiaries, and private individuals was challenging. This creates two errors, 1) under-assignment, where not all assets, and/or subsidiaries were correctly identified and assigned to the parent 2) false assignment, where an incorrect, similarly named, or previously held asset, or subsidiary, is incorrectly assigned to the parent company.

  Porfilio Assignment – It is also possible, that incorrect parent company values are assigned at the portfolio level, due to the complexities of corporate structures.
  For example, 'Anglo American Platinum Limited' and 'Anglo American plc' are both listed as holdings within the portfolios assessed. Anglo American Platinum Limited is a subsidiary of Anglo-American plc. Should Anglo American plc results include Anglo American Platinum Limited results? If not, to what degree of certainty is there within the results on the correct separation and assignment of the thousands of subsidiaries affiliated to Anglo American and Anglo-American Platinum Limited? It was beyond this study to resolve these data aggregation challenges, subsequently we consider the company and portfolio results to have the following confidence risk:

	Mining Projects	Mining Concessions	Oil and Gas Wells	Oil and Gas Concessions
Risk of Incorrect Assignment – Asset to Parent Company	Medium	High	Low	Low
Risk of Missed Assignment – Asset to Parent Company	Low	High	Medium (Lacking global data)	Medium (Lacking global data)
Risk of Incorrect Assignment – Parent Company to Portfolio	Medium	Medium	Low	Low

- **Incomplete Review of 'Extractives' Across Portfolios -** It is important to reiterate, that while a comprehensive 'extractive sector' assessment has been attempted, in some cases the financial institutions *'extractive related'* holdings could not be linked to a parent company within the extractive analysis. More importantly still, the assessment is terrestrial only and does not consider marine extractive assets. Data gaps are present in the extractive dataset meaning not all assets are accounted. It considers four asset classes (mining projects, concessions, oil and gas wells and concessions) and does not include other or related extractive assets such as, refineries, pipelines, infrastructure, surveying efforts, etc. Nor does it consider 'historic' assets. It was also beyond the scope of the assessment to consider extractive related or dependent industries, such as oilfield service companies. Subsequently the analysis is not a comprehensive review of the total '*extractive exposure'* of these financial institutions' holdings but rather a detailed sample of their '*primary extractive holdings'* in relation to forest related variables.

BOX 1 - KEY ASSESSMENT CAVEATS

- Significant effort has been made to ensure the data, and results reported are reliable and consistent. However, the analysis has limitations, both within the methodology applied, and within the data used (See Methodology and Data Limitations).

  The data, results and any associated content is provided 'as is' and may contain error and/or bias.

- In no cases, within the data, results, or associated content are the authors, WWF-Norway, the Rainforest Foundation Norway and our data providers, inferring a position, opinion, or a providing a definition of the '*nature*' or '*environmental*' performance of any asset, company, financial institution, or any other relevant stakeholder.

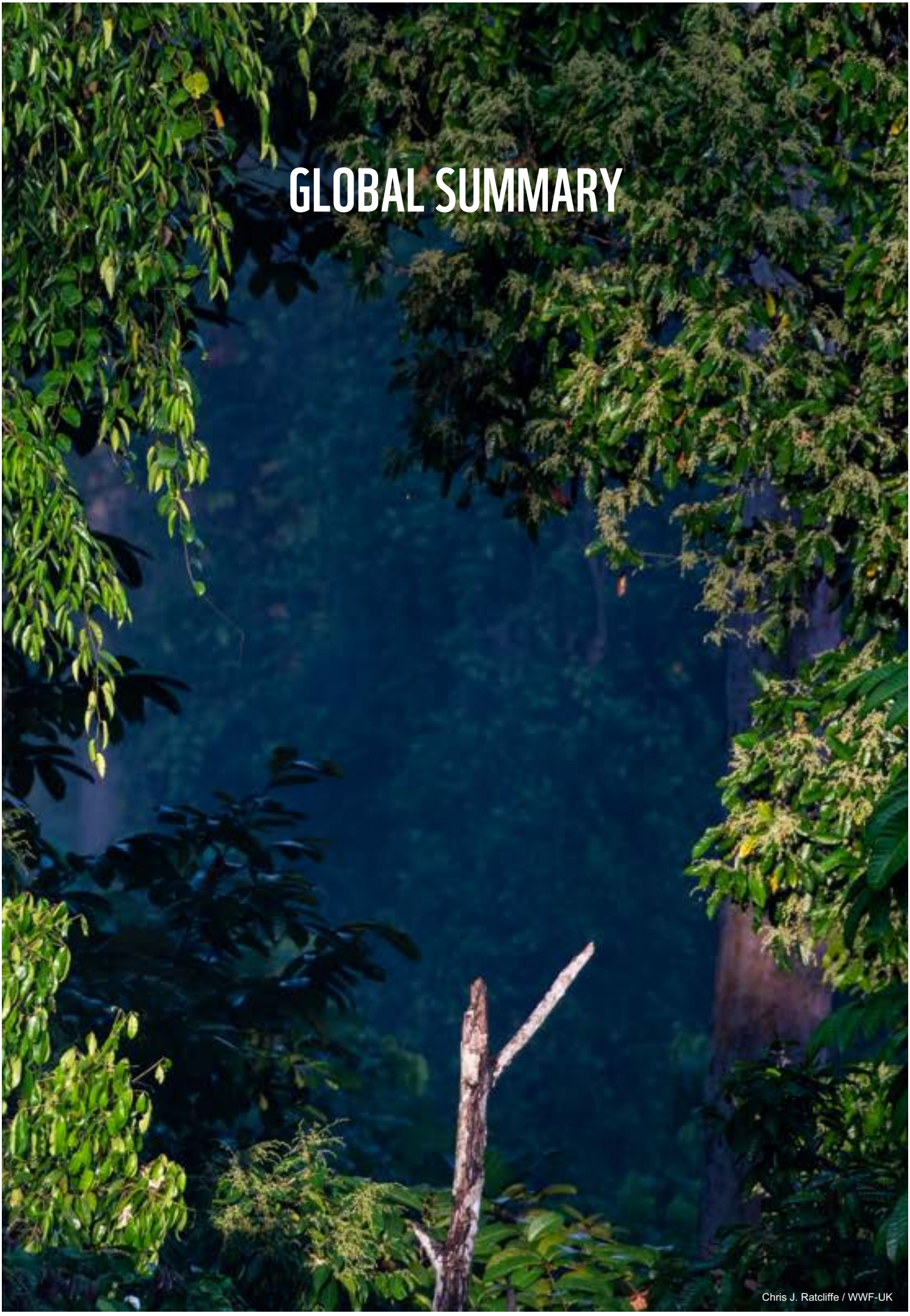
- Defining the *'impact'* or relationship of any physical asset with the natural world is a highly complex task. The data, results, and the associated content reported here is not sufficient to accurately define the '*impact'* of any asset, company, or portfolio and we make no attempt to do so, nor imply that we have done so.

- Results may incorrectly assign assets, as their associated 'values', to parent company, and or to a portfolio (See Methodology and Data Limitations). Results are illustrative only, and not an accurate definition of either asset, parent company or portfolio impact or exposure to '*forests*' or any other type of '*environmental*', '*nature'* variable or differentiational.

- The authors, WWF-Norway, the Rainforest Foundation Norway and our data providers disclaim all expressed and implied warranties, including implied warranties of merchantability and fitness for any particular use. In no event shall the authors, WWF-Norway and the Rainforest Foundation Norway or our data providers have any monetary liability of any kind whatsoever to recipient or to any user of the contents of this report or associated data.

- In all cases, further due diligence is required to verify results.

GLOBAL SUMMARY



Chris J. Ratcliffe / WWF-UK

3. GLOBAL RESULTS

In total, the global analysis considered over 2.4 million extractive assets (Table 3). For general application, here only the results for assets considered 'active' are reported, assets considered 'inactive,' (e.g., 'expired', 'closed', etc.) are not reported (Table 3). For more specific applications, users may wish to consider this data. Where for example, historic extractive assets can present ongoing environmental risks and impacts.

The overall results of the assessment provide a high-level screening that should be viewed as a means to rapidly identify areas of different types of '*forest exposure'* across the extractive assets. The results provide insights that will help identify which regions / assets should be prioritized by financial institutions and civil society organizations (CSOs) for further environmental due diligence.[9]

Here we report the global results by asset class and by geographic region. Financial Institution portfolio results, and parent company results are reported in the subsequent section.

	Mining Projects	Mining Concessions	Oil and Gas Wells	Oil and Gas Concessions
Total Number of Assets	37,168	1,758,894	587,568	31,453
Total Area of Assets (Sq, Km)	116,745	12,502,469	1,845,899	44,816,344
Total Number of 'Active' Assets	15,304	1,246,819	405,044	19,250
Total Area of 'Active' Assets (Sq, Km)	48,078	6,648,694	1,272,483	13,210,003

Table 3 *– A table summarizing the total number and area of assets across the four extractive asset classes considered within the assessment.*

[9] Key limitations of the analysis are outlined in the 'Methodology Limitations'.

Global Results – Summary

Table 4 *- A table providing a summary of all four extractive asset classes considering the number and area of assets against key comparison layers.*

	Mining Projects				Mining Concessions				Oil and Gas Wells				Oil and Gas Concessions			
	No. of 'Active' Mining Projects	% No. of 'Active' Mining Projects	Area of 'Active' Mining Projects	% Area of 'Active' Mining Projects	No. of 'Active' Mining Concessions	% No. of 'Active' Mining Concessions	Area of 'Active' Mining Concessions	% Area of 'Active' Mining Concessions	No. of 'Active' Oil and Gas Wells	% No. of 'Active' Oil and Gas Wells	Area of 'Active' Oil and Gas Wells	% Area of 'Active' Oil and Gas Wells	No. of 'Active' Oil and Gas Concessions	% No. of 'Active' Oil and Gas Concessions	Area of 'Active' Oil and Gas Concessions	% Area of 'Active' Oil and Gas Concessions
No. of Assets 'Active'	15,304	100.00	N/a	N/a	1,246,819	100.00	N/a	N/a	405,044	100.00	N/a	N/a	19,250	100.00	N/a	N/a
Area of Active Assets	N/a	N/a	48,079	100.00	N/a	N/a	6,648,694	100.00	N/a	N/a	1,272,483	100.00	N/a	N/a	13,210,003	100.00
Protected Areas	1,140	7.45	2,291	4.77	58,137	4.66	738,955	11.11	66,405	16.39	174,612	13.72	3,919	20.36	1,019,084	7.71
Mangroves	22	0.14	5	0.01	2,148	0.17	2,889	0.04	5,003	1.24	4,456	0.35	464	2.41	19,113	0.14
Key Biodiversity Areas	946	6.18	2,450	5.10	39,557	3.17	392,769	5.91	23,315	5.76	56,875	4.47	2,966	15.41	680,973	5.15
Other Effective Area-Based Conservation Measures	99	0.65	200	0.42	1,890	0.15	3,178	0.05	1,130	0.28	2,264	0.18	202	1.05	81,753	0.62
Intact Forest Landscapes 2000	924	6.04	2,371	4.93	307,663	24.68	408,148	6.14	956	0.24	1,003	0.08	254	1.32	255,597	1.93
Intact Forest Landscapes 2013	757	4.95	1,911	3.97	265,989	21.33	320,610	4.82	722	0.18	622	0.05	222	1.15	215,534	1.63
Intact Forest Landscapes 2016	732	4.78	1,854	3.86	262,944	21.09	307,683	4.63	708	0.17	589	0.05	214	1.11	210,577	1.59
Intact Forest Landscapes 2020	703	4.59	1,770	3.68	258,473	20.73	292,589	44.40	662	0.16	493	0.04	209	1.09	206,084	1.56
Peatlands	2,050	13.40	4,446	9.25	448,508	35.97	329,704	4.96	47,428	11.71	45,422	3.57	3,588	18.64	356,066	2.70
Planted Trees	739	4.83	631	1.31	35,165	2.82	64,091	0.96	26,724	6.60	37,390	2.94	2,200	11.43	129,708	0.98
Forest Loss Total Area (2001 to 2022)	9,596	62.70	3,014	6.27	535,766	42.97	389,607	5.86	175,531	43.34	47,849	3.76	7,736	40.19	245,515	1.86
Protected Areas Scored 1	862	5.63	1,787	3.72	48,324	3.88	641,818	9.65	64,036	15.81	167,598	13.17	3,627	18.84	823,211	6.23
Protected Areas Scored 2	29	0.19	35	0.07	1,364	0.11	7,118	0.11	591	0.15	76	0.01	202	1.05	6,128	0.05
Protected Areas Scored 3	125	0.82	204	0.42	9,185	0.74	47,039	0.71	1,808	0.45	2,742	0.22	490	2.55	95,600	0.72
Protected Areas Scored 4	147	0.96	209	0.43	5,015	0.40	32,598	0.49	1,835	0.45	3,372	0.26	395	2.05	92,558	0.70
Protected Areas Scored 5	22	0.14	36	0.07	835	0.07	3,727	0.06	618	0.15	452	0.04	96	0.50	1,071	0.01
Protected Areas Scored 6	0	0.00	0	0.00	10	0.00	1	0.00	394	0.10	0	0.00	30	0.16	55	0.00
Protected Areas Scored 7	0	0.00	0	0.00	68	0.01	13	0.00	395	0.10	0	0.00	49	0.25	17	0.00
Protected Areas Scored 8	0	0.00	0	0.00	12	0.00	129	0.00	397	0.10	0	0.00	25	0.13	13	0.00

Table 5 - *A table providing a summary of all four extractive asset classes considering the number and area of assets against key comparison layers (2).*

	Mining Projects		Mining Concessions		Oil and Gas Wells		Oil and Gas Concessions	
	No. of 'Active' Mining Projects	%	No. of 'Active' Mining Concessions	%	No. of 'Active' Oil and Gas Wells	%	No. of 'Active' Oil and Gas Concessions	%
Total Active Assets	15,304	100.00	1,246,819	100.00	405,044	100.00	19,250	100.00
Above Ground Biomass (Mg C ha^{-1})	11,564	75.56	1,059,487	84.98	208,117	51.38	9,736	50.58
Above Ground Biomass > 100 Mg C Ha-1	1,913	12.50	331,508	26.59	26,428	6.52	950	4.94
Mangrove Soil Organic Carbon Stock (Mg C ha^{-1})	32	0.21	2,138	0.17	5,864	1.45	445	2.31
Mangrove Soil Organic Carbon Stock > 100 Mg C Ha^{-1}	32	0.21	2,131	0.17	5,864	1.45	445	2.31
Tropical Tree Cover (Mean) (0.1 -100)	3,390	22.15	46,452	3.73	10,321	2.55	3,072	15.96
Tropical Tree Cover > 50%	1,173	7.66	20,328	1.63	2,659	0.66	1,027	5.34
Tree Cover 2000 (Mean) (0.1 -100)	12,295	80.34	1,074,702	86.20	210,662	52.01	10,006	51.98
Tree Cover 2000 > 50%	3,686	24.09	557,438	44.71	34,314	8.47	1,430	7.43
Tree Cover 2010 (Mean) (0.1 -100)	11,555	75.50	1,071,792	85.96	210,192	51.89	9,824	51.03
Tree Cover 2010 > 50%	3,287	21.48	543,024	43.55	29,470	7.28	1,310	6.81

3.1. MINING

3.1.1. MINING PROJECTS

In total 37,168 mining projects across 162 countries were assessed. Of these, 15,304 were considered 'active' covering an area of 48,078 Sq. Km (Table 4).[10]

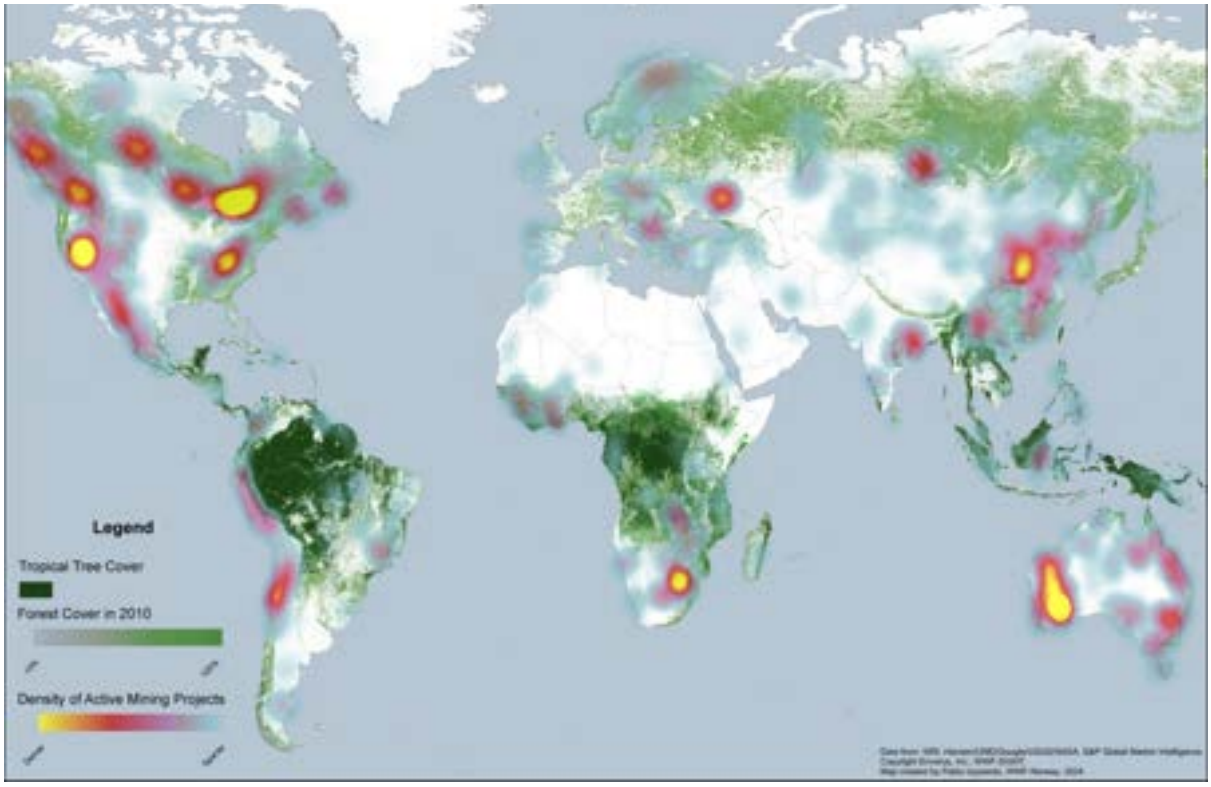


Figure 2 *– A map showing the density of global of active mining projects against the distribution of tropical tree cover and forest cover.*

- Globally, 4.59% (703) of active mining projects (15,304) have some form of direct spatial relationship with Intact Forest Landscapes.
- Approximately, 21% of active mining projects have an interaction in areas with (>50%) tree cover, and 7.66% with (>50%) tropical tree cover extent.
- 7.45% (1140) of active mines, have some form of direct spatial interaction protected areas, with only a minor number interacting with multiple high protected area designations (0.14%).
- Several mining projects were found to have had direct spatial interaction with critical ecosystems, such as Key Biodiversity Areas (946, representing 6.18%), peatlands (2,050, representing 13.40%) and mangroves (22, representing 0.14%) (Table 4).
- 62.7% of the mining projects are related to forest loss activities, the forest loss in the period 2001-2022 sums to 3,014 Sq. Km, equivalent to 6.3% of the active mining projects area (Table 4).

[10] This area value is the result of the method applied. Since mining projects within the source data had no spatial dimension, each was assigned a 1 Km radius, resulting in each mine having an 'area' value equal to 3.14 Sq Km (See the Methodology and Methodology Limitations).

3.1.2. MINING CONCESSIONS

In total 1,758,894 mining concessions across 94 countries were assessed. Of these, 1,246,819 were considered ‘active’ covering an area of 6,648,694 Sq. Km (Table 4).

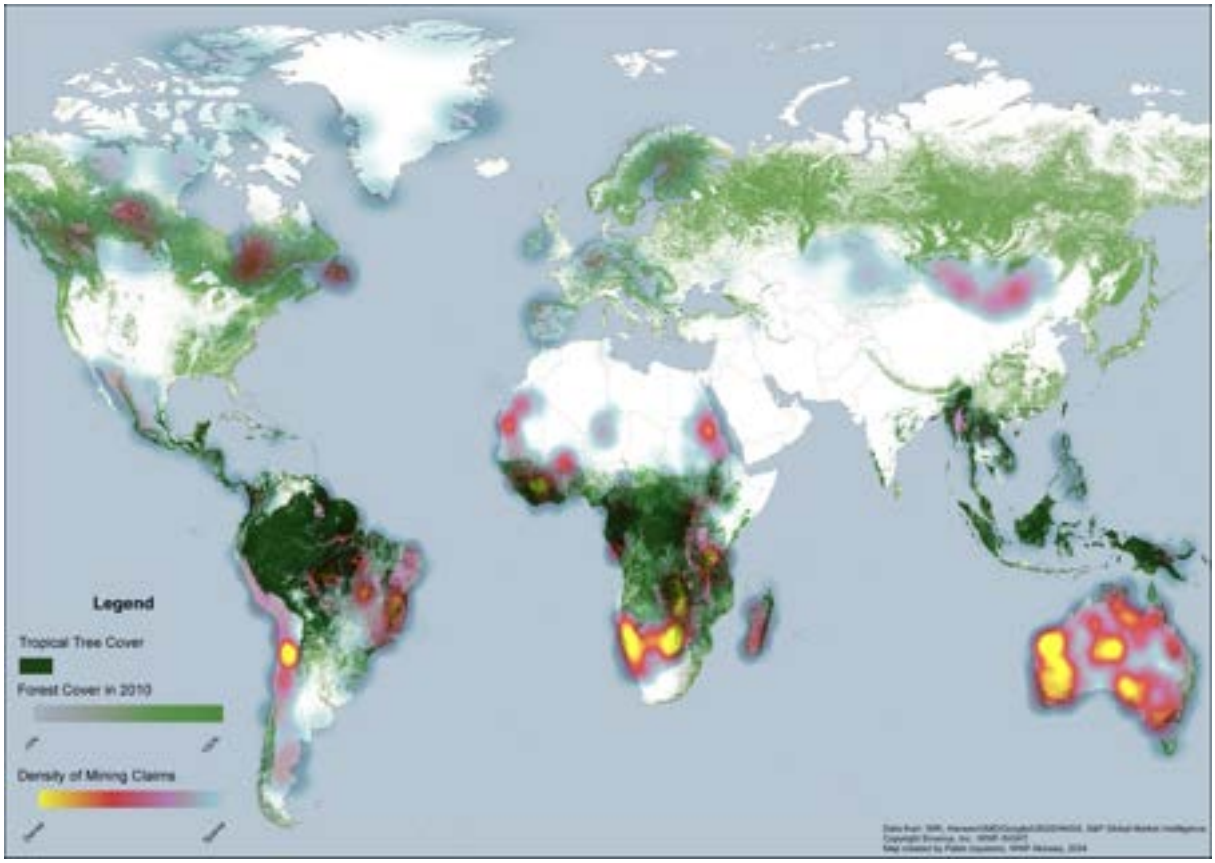


Figure 3 *– A map showing the density of global of active terrestrial mining concessions against the distribution of tropical tree cover and forest cover.*

- Overall, 20% (258,473) of active mining concessions (1,246,819) assessed have some form of direct spatial relationship with Intact Forest Landscapes.
- Approximately, 43% have an interaction in areas with (>50%) tree cover, and 1.63% with (>50%) tropical tree cover extent.
- 4.6% (58,137) of active mining concessions, have some form of direct spatial interaction protected areas, with only a small number interacting with multiple high protected area designations (0.07%).
- A small number of mining concessions were found to have direct spatial interaction with mangroves (2,148, representing 0.17%) while a significant number interact with Key Biodiversity Areas (39,557, representing 3.17%).
- A large proportion of mining concessions were found to have a direct spatial relationship with peatlands (448,508, representing 35.97%). (Table 4).
- 43% of the mining concessions are correlated with forest loss activities, which sum to approximately 390,000 Sq. Km of forest loss in the period 2001-2022, equivalent to 5.86% of the active mining concessions area (Table 4).

3.2. OIL AND GAS

Jiri Rezac / WWF-UK

3.2.1. OIL AND GAS WELLS

In total 587,568 oil and gas wells across 135 countries were assessed. Of these, 405,044[11] were considered 'active' or 'completed', covering an area of 1,272,483 Sq. Km (Table 4).[12]

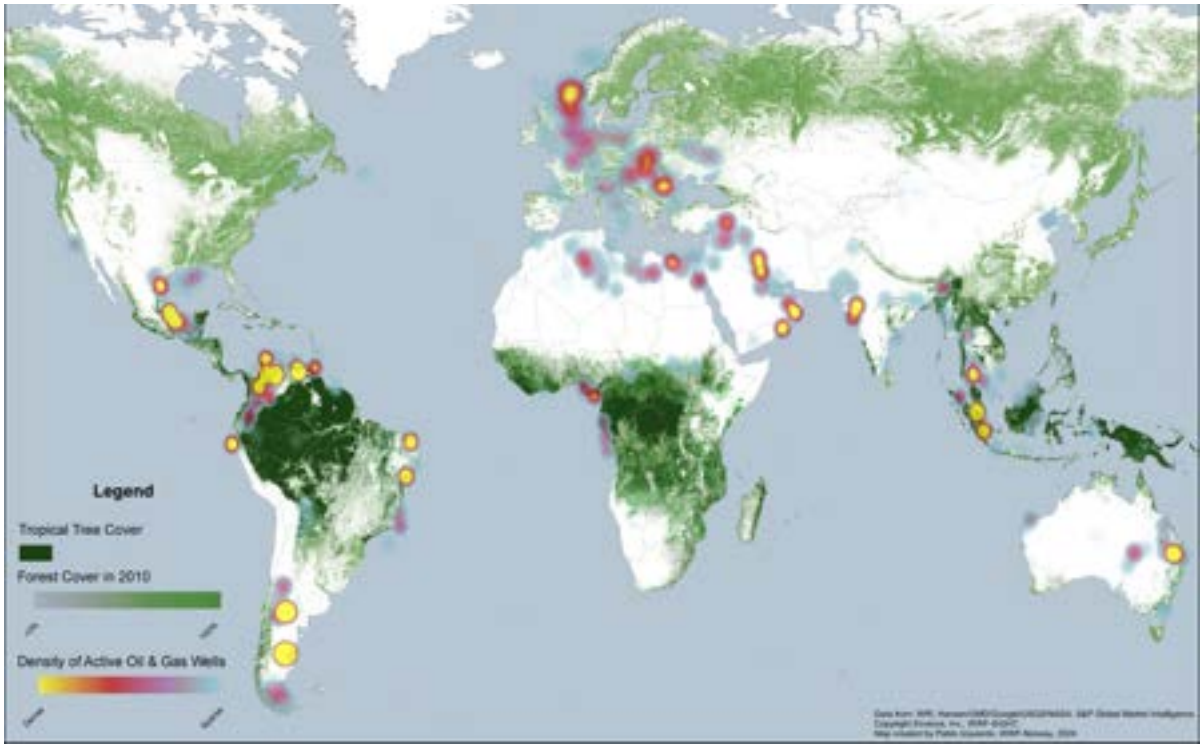


Figure 4 *– A map showing the density of global of active terrestrial oil and gas wells against the distribution of tropical tree cover and forest cover.*

- Overall, 0.16% (662) of active oil and gas wells (405,044) have some form of direct spatial relationship with Intact Forest Landscapes.
- Approximately, 7% have an interaction in areas with (>50%) tree cover, and 0.66% with (>50%) tropical tree cover extent.
- Over 16% (66,405) of reported oil and gas wells, have some form of direct spatial interaction protected areas, with relatively low number interacting with multiple high protected area designations (0.1%).
- A small number of oil and gas wells were found to had direct spatial interaction with mangroves (5,003, representing 1.24%), while the spatial interaction was markedly higher within Key Biodiversity Areas (23,315, representing 5.76%) and peatlands (47,428, representing 11.71%).
- 43% of the oil and gas wells are correlated with forest loss activities, which sum to approximately 48,000 Sq. Km of forest loss in the period 2001-2022, equivalent to 3.76% of the area of active oil and gas wells. (Table 4).

[11] This figure includes 'marine' oil and gas assets, due to many overlapping both marine and terrestrial areas.
[12] This area value is the result of the method applied. Since oil and gas wells within the source data had no spatial dimension, each was assigned a 1 Km radius, resulting in each well having an 'area' value equal to 3.14 Sq. Km. (See the Methodology and Methodology Limitations).

3.2.2. OIL AND GAS CONCESSIONS

In total 31,453 oil and gas concessions across 177 countries were assessed. Of these, 19,250[13] were considered 'active', covering an area of 13,210,003 Sq. Km (Table 4).

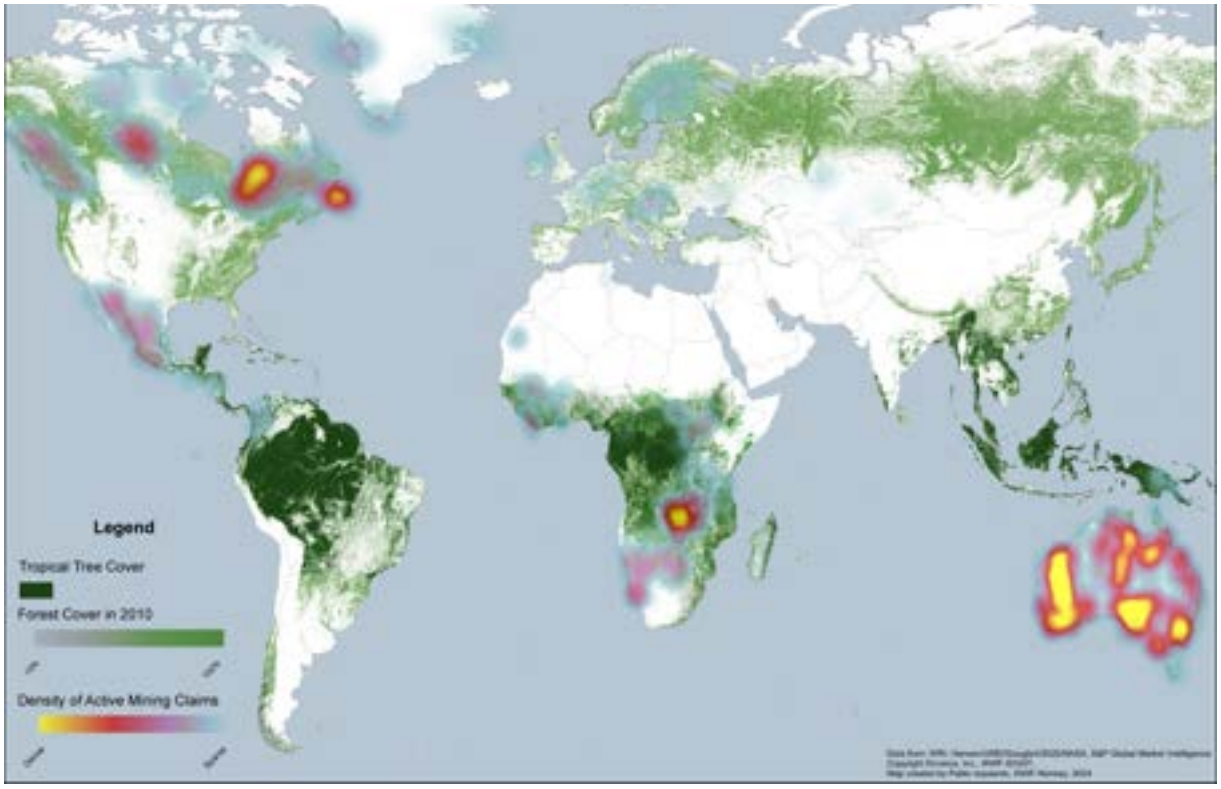


Figure 5 *– A map showing the density of global of active terrestrial oil and gas concessions against the distribution of tropical tree cover and forest cover.*

- Globally, 1.09% (209) of active oil and gas concessions (19,250) have some form of direct spatial relationship with Intact Forest Landscapes.
- Approximately, 6.81% have an interaction in areas with (>50%) tree cover, and 5.34% with (>50%) tropical tree cover extent.
- Over 20% (3,919) of reported oil and gas concessions, have some form of direct spatial interaction with protected areas, with lower numbers interacting with multiple high protected area designations (2.05 - 0.13%).
- A small number of oil and gas concessions were found to had direct spatial interactions with critical ecosystems, such as mangroves (464, representing 2.41%) while the spatial interaction was higher within Key Biodiversity Areas (2,966, representing 15.41%) and peatlands (3,588, representing 18.64%) (Table 4).
- 40% of the oil and gas concessions are associated to forest loss activities, which sum to approximately 245,515 Sq. Km of forest loss in the period 2001-2022, equivalent to 1.86% of the active oil and gas concessions area (Table 4).

[13] This figure includes 'marine' oil and gas assets, due to many overlapping both marine and terrestrial areas.

Appendix A provides reports on additional results and tables generated through the data analysis. Specifically, Appendix A reports on:

- The presence of 'active' extractive assets within WWF priority ecoregions.
- The presence of 'active' extractive assets overlapping forest ecosystems by country
- The presence of 'active' extractive assets found within areas with differing tree cover (2010) and tropical tree cover, by global region.
- Mining concessions – Issuance 2022 and 2023
- Oil and gas concessions – Issuance 2022 and 2023

GLOBAL RESULTS: SUMMARY

The analysis presented in this section provides an overview of the extent and range of extractive operations within forest ecosystems. While there are limitations to the approach, it arguably provides a useful, and improvable, methodology outlining in broad brush strokes the scale of the issue. Offering a baseline for more precise environmental due diligence by financial actors and private companies, from which, these stakeholders can identify and refine engagement priorities.

Overall, there is a high degree of proximity to forests between extractive assets, with nearly 21% of active commercial mines and 7.3% of commercial oil and gas wells found to have proximity with forests (i.e., within 1km). These figures drop to 7.7% and 0.66% respectively for interaction with 'tropical forests. With 1,173 mines and 2,659 wells being located within 1 km proximity of tropical forest canopy.

In the Amazon[14], 183 mines (1.2%) and 4,658 (1.15%) oil and gas wells were identified. For comparison, in the Congo similar levels of activity were defined with 167 mines (1.1%) and 1,603 (0.4%) oil and gas wells. Likewise in the Coral Triangle 157 mines (1.0%) and 777 (0.19%) oil and gas wells were identified.

The extractive concession datasets, which arguably indicate areas of future development, outline a similar strong interaction, with 20.7% (258,473) mining concession and 1.09% (209) of oil and gas concessions overlapping to some extent with Intact Forest Landscapes, areas which were in 2020 large blocks of remaining forest. More broadly, 43.5% of mining concessions and 6.8% of oil and gas concessions have significant interaction with forested areas with their area having a higher than 50% forest extent. This lowers to 1.6% and 5.3% respectively for interactive with tropical forests.

Interestingly within the Amazon, 28,661 mining concessions (2.3%) and 182 oil and gas concessions (0.95%) covering 407,397 Sq. Km and 124,230 Sq. Km were identified.
For comparison, in the Congo similar levels of activity were defined with 1,128 mining

[14] Note that most commercial oil and gas wells within the Amazon ecoregion are not within a 1km proximity of tropical forests. Most of the current oil and gas wells are found at the Western and Northern edges of the Amazon ecoregion, which has limited forest cover, as well as along the Amazon River.

concessions (0.09%) and 109 (0.6%) oil and gas concessions covering 168,581 Sq. Km and 264,722 Sq. Km respectively. Likewise in the Coral Triangle 2,479 mining concessions (0.2%) and 49 (0.25%) oil and gas concessions were identified, covering 40,157 Sq. Km and 154,170 Sq. Km. (See Appendix A, Table A).

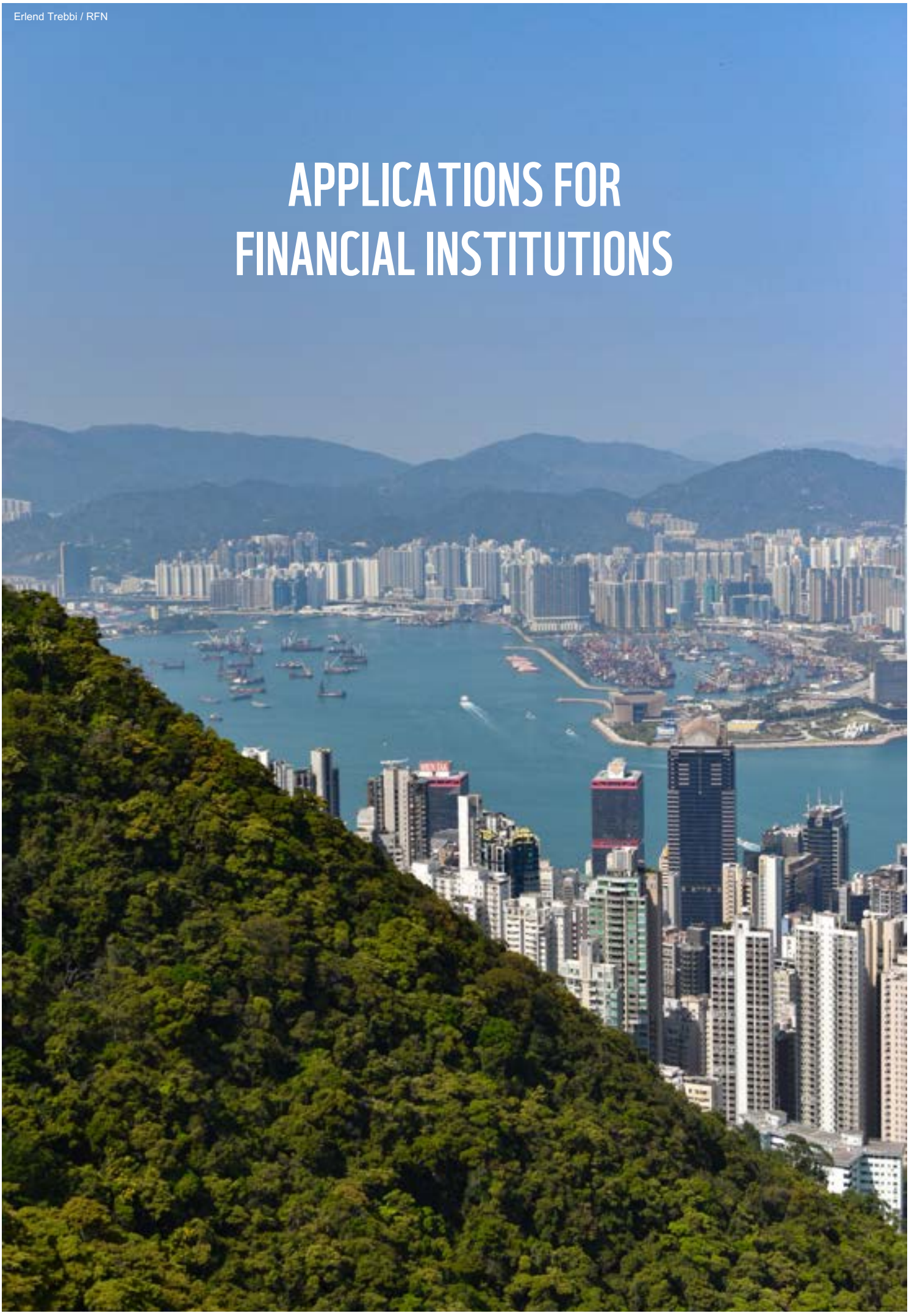
Since the 2021 Glasgow Leaders' Declaration on Forests and Land Use, pushing for the reversal and halting of deforestation by 2030, issuance of both mining and oil and gas concessions within forested areas continues. With roughly 290,000 mining concessions granted in 2022 and 2023, found to overlap ~130,000 Sq. Km of protected areas and over ~60,000 Sq. km of Intact Forest Landscapes. Within these areas nearly 1,500 Sq. Km of forest loss occurred in 2022. (See Appendix A, Table N).

The mining dataset outlines the granting of a number of mining concessions within Key Biodiversity Areas (37,333), peatlands (115,604), and mangroves (146) since 2022. The data indicates a significant spatial relationship between Intact Forest Landscapes and new mining concessions granted in Canada (56,644) and Papua New Guinea (2,906).

Within the ~1,000 oil and gas concessions identified as awarded in 2022 and 2023 over 70,000 Sq. Km were in protected areas, 5,140 Sq. Km in Intact Forest Landscapes. In these areas 533 Sq. Km of forest loss occurred in 2022. The oil and gas dataset shows that a large number of recently issued concessions overlap with Key Biodiversity Areas (33,760), peatlands (13,789) and mangroves (779). (See Appendix A, Table P).

The analysis on recently issued oil and gas concessions provides several interesting results at national level. The is a significant overlap between oil and gas concessions and protected areas (955) and peatlands (2,653) in Colombia, protected areas (348), Key Biodiversity Areas (635) and peatlands (5,278) in Indonesia, and Key Biodiversity Areas (641) in the Democratic Republic of the Congo (DRC). Interestingly the lack of spatial overlap between new concessions and Intact Forest Landscapes in the case of Colombia and the DRC, indicates that these concessions are not located within forest ecosystems, while the reverse is true for Indonesia. (See Appendix A, Table O).

It is important to reflect that due to data gaps in country coverage for the concession data and the lack clarity on issuance dates across the extractive datasets, with some licenses not recording a 'grant' or 'award' date, the figures outlined in this assessment are likely to be a significant underestimate.



APPLICATIONS FOR FINANCIAL INSTITUTIONS

4. APPLICATIONS FOR FINANCIAL INSTITUTIONS

The results so far provide a high-level screening that should be viewed as a means to rapidly identify potential '*forest exposure'* across the extractive sectors to help prioritise further due diligence.[15] In the next section, we present a case study demonstrating four financial institutions' exposure to forest-risk extractive assets.

4.1. PORTFOLIO OVERVIEW

In this section we report the portfolio results for four major Norwegian financial institutions, Norges Bank Investment Management (NBIM), DNB Asset Management (DNB), Storebrand Asset Management (Storebrand) and KLP Kapitalforvaltning (KLP). The portfolios of the four major investors were sourced from FactSet in November 2023 (FactSet, 2023).

These financial institutions were selected to provide an overview of key stakeholders in the Norwegian finance sector, all of whom have put in place policies and measures for managing deforestation exposure and risks in their portfolios. The purpose of this section is twofold: first, it presents a data analysis that was previously unavailable to the selected Norwegian FIs, furthering possibilities for ESG risk assessments and targeted shareholder engagement. Second, the section serves as an illustrative example of the type of analysis, which is now possible through the study, for other interested financial institutions.

The names of parent companies within each investors' holdings were compared for similarity against the mining and oil and gas parent companies, matches were assigned the unique parent ID used within the analysis.[16] Tables were generated outlining the specific asset holdings and the comparison layer scorings of all parent companies linked to each of the four financial institutions. Each table was checked manually, to help ensure connections were correct.

The four financial institutions, at time of assessment[17], had between 2,566 – 8,949 holdings, of which a small number (135 – 287 companies) were identified within the extractive analysis. This accounts for between 2.2 – 5.3% of the number of holdings, and between 4.0% to 8.4% of the equity, representing a value range of 1,552 – 40,129 million USD$. In all cases the value of the oil and gas holdings assessed for the four investors was significantly higher (2.4% - 6.7%) than the value of mining holdings assessed (1.0% - 1.7%) (Table 6).

[15] Key limitations of the analysis are outlined in the 'Methodology and Data Limitations'.
[16] This process is outlined in Section 2.3 and 2.4
[17] Holding data sourced 22 November 2023, FactSet 2023.

	DNB	KLP	NBIM	Storebrand
Total No. of Holdings[18]	2,566	6,844	8,949	3,482
No. of 'Extractive Holdings' Assessed	135	287	199	138
% No. of Holdings	5.26%	4.19%	2.22%	3.96%
No. of Mining[19] Holdings Assessed	63	180	157	68
% Of EQ	1.07%	1.68%	0.98%	1.60%
Mkt Val (MM)	353.14	350.79	9,482.91	617.61
No. of Oil and Gas[20] Holdings Assessed	72	107	42	70
% Of EQ	5.76%	6.68%	3.19%	2.44%
Mkt Val (MM)	1,882.52	1,392.14	30,646.82	935.15
Total % of EQ Assessed	**6.83%**	**8.36%**	**4.17%**	**4.04%**
Total Mkt Val (MM)	**2,235.66**	**1,742.93**	**40,129.73**	**1,552.76**

***Table 6** - A table summarizing the number of holdings held by the four financial institutions and the number of 'extractive' holdings assessed within the assessment.*

Significant to the results, there is overlap between the four financial institutions 'extractive' holdings, with frequently more than one financial institution holding equity within the same parent company. Subsequently, the portfolio results reported here include this duplication when aggregating portfolio results that include the same parent companies.

	Mining		Oil and Gas	
	No.	%	No.	%
No. of Holdings held by one financial institution	106	43.80	69	47.92
No. of Holdings held by two financial institutions	76	31.40	23	15.97
No. of Holdings held by three financial institutions	30	12.40	32	22.22
No. of Holdings held by four financial institutions	30	12.40	20	13.89
Total No. Unique Holdings[21]	242		144	

***Table 7** – A table showing the repeat of the 'extractive' holdings assessed across the four portfolios.*

[18] Unique holdings as defined within source data – this includes sponsored ADR separations, etc.
[19] *'Mining Companies'* as defined by parent companies matched and identified within S&P Global Metal and Mining dataset, not by FactSet sectorial class (e.g. Non-Energy Minerals) or other delineation.
[20] *'Oil and Gas Companies'* as defined by parent companies matched and identified within Enverus dataset, not by FactSet sectorial class (e.g. Energy Minerals - Integrated Oil) or other delineation.
[21] Unique holdings as defined within source data – this includes sponsored ADR separations, etc.

4.2. MINING

4.2.1. MINING PROJECTS – OVERVIEW

In total, 2,522 unique active mining projects (6,008 repeated assets)[22] were identified as held across the four financial institutions covering an area of 7,923 Sq. Km[23] (18,875 Sq. Km repeated area). These assets had the following area overlaps (Sq. Km) with the key comparison layers (Appendix B1, Table Q).

	DNB	%	KLP	%	NBIM	%	SB	%
No. of Active Mining Projects	1,023	n/a	2,161	n/a	1,877	n/a	947	n/a
Mining Projects Area	3,214	100.00	6,789	100.00	5,897	100.00	2,975	100.00
Protected Areas	165	5.13	317	4.68	305	5.18	106	3.55
Mangroves	0	0.00	0	0.00	0	0.00	0	0.00
Key Biodiversity Areas	224	6.96	380	5.59	353	5.98	174	5.84
Other Effective area-based Conservation Measures Areas (OECMs)	30	0.93	33	0.49	33	0.56	30	1.01
Intact Forest Landscapes 2000	90	2.79	277	4.08	205	3.47	112	3.76
Intact Forest Landscapes 2013	60	1.87	213	3.14	143	2.43	84	2.82
Intact Forest Landscapes 2016	55	1.71	202	2.97	136	2.30	81	2.71
Intact Forest Landscapes 2020	52	1.61	196	2.89	133	2.25	78	2.61
Peatlands	208	6.47	687	10.12	515	8.73	353	11.88
Protected Areas	37	1.14	82	1.21	89	1.51	38	1.29
Mangroves	204	6.35	438	6.45	394	6.68	222	7.46
Planted Trees	131	4.06	243	3.58	242	4.11	80	2.69
Forest Loss Total Area (2001 to 2022)	3	0.09	3	0.04	3	0.05	3	0.10
Protected Areas Scored 1	3	0.09	21	0.31	20	0.34	3	0.10
Protected Areas Scored 2	18	0.57	38	0.56	32	0.54	13	0.43
Protected Areas Scored 3	10	0.30	10	0.14	6	0.10	6	0.22
Protected Areas Scored 4	0	0.00	0	0.00	0	0.00	0	0.00
Protected Areas Scored 5	0	0.00	0	0.00	0	0.00	0	0.00
Protected Areas Scored 6	0	0.00	0	0.00	0	0.00	0	0.00
Protected Areas Scored 7	165	5.13	317	4.68	305	5.18	106	3.55
Protected Areas Scored 8	0	0.00	0	0.00	0	0.00	0	0.00

***Table 8** – A table summarizing the area overlaps (Sq. Km) of active mining projects, identified as held in the holdings of the four financial institutions, with key comparison layers.*

[22] The four financial institutions frequently hold equity in the same companies.

[23] This area value is the result of the method applied. Since mining projects within the source data had no spatial dimension, each was assigned a 1 Km radius, resulting in each mine having an 'area' value equal to 3.14 Sq Km (See the Methodology and Methodology Limitations).

Across the four financial institutions there is limited variation in terms of their total mining project exposure to overlap with the key variables. The overlap with protected areas is 3.6% - 5.2% (106 – 317 Sq. Km), and Intact Forest Landscapes (1.6% - 2.9%), giving the latter an area range of 52 –196 Sq. Km (Table 9). Of note is the overlap value for protected areas for assets held by Storebrand (3,55%) which is significantly below the global value[24] (4,8%) and its peers (4.7% – 5.2%).

6.4 – 7.5%, 204 – 438 Sq. Km of the mining projects are correlated with forest loss activities, the range being above the global value of 6,3%. No mining projects were significantly spatially linked to mangrove forested areas. However, a relatively large percentage 5.6% – 7.0% (174 – 380 Sq. Km) of mining projects were identified as spatially overlapping Key Biodiversity Areas. (Table 9). The same is true for peatlands which have an overlap range of 6.5% – 11.9% (208 – 687 Sq. Km).

All four financial institutions have an overlap greater than the global value for Key Biodiversity Areas (5.1%), while Storebrand (11.8%) and KLP (10%) have an overlap above the global value for peatlands (9.3%), in contrast to DNB (6.5%) and NBIM (8.7%).

		DNB		KLP		NBIM		Storebrand	
		No. of Mining Projects	% of No. of Mining Projects overlapped	No. of Mining Projects	% of No. of Mining Projects overlapped	No. of Mining Projects	% of No. of Mining Projects overlapped	No. of Mining Projects	% of No. of Mining Projects overlapped
No. of Active Mining Projects Assessed		1,023	100.00	2,161	100.00	1,877	100.00	947	100.00
Above Ground Biomass (Mg C ha–1)	>0.1	698	68.23	1,534	70.99	1,325	70.59	699	73.81
	>100	85	8.31	196	9.07	199	10.60	89	9.40
Mangrove Soil Organic Carbon Stock (Mg C ha–1)	>0.1	0	0.00	2	0.09	2	0.11	1	0.11
	>100	0	0.00	2	0.09	2	0.11	1	0.11
Tropical Tree Cover (Mean) (0.1 -100)	>0.1%	324	31.67	518	23.97	452	24.08	272	28.72
	>50%	81	7.92	150	6.94	124	6.61	81	8.55
Tropical Tree 200 (Mean) (0.1 -100)	>0.1%	784	76.64	1,685	77.97	1,454	77.46	768	81.10
	>50%	154	15.05	399	18.46	370	19.71	191	20.17
Tropical Tree 2010 (Mean) (0.1 -100)	>0.1%	701	68.52	1,532	70.89	1,329	70.80	700	73.92
	>50%	124	12.12	353	16.34	330	17.58	169	17.85

Table 9 *– A table summarizing the number of active mining projects, identified as held in the holdings of the four financial institutions, overlapping with key comparison layers.*

The results report a range of spatial interaction of mining projects assets within forest and tropical forest across the four holdings (Table 10). The four investors have approximately 12 – 18% of linked active mining projects (124 – 353 assets) spatially overlapping areas with tree cover >50%. This is significantly below the global value[25] of 21.5%. Within tropical forest the range is lower (6.6 – 8.6%), with DNB and Storebrand identified with 81 mining projects,

[24] For global values see Tables 4 and 5.
[25] For global values see Tables 4 and 5.

and KLP identified with 150 sites, in areas with tropical tree cover >50%. Storebrand has a greater proportion of assets (8.6%) overlapping tropical tree cover >50% than the global value (7.7%) and its peers. A very small number of mining projects were found to have direct spatial interaction with areas with high mangrove soil carbon (1 - 2 sites 0.09 – 0.11%).

4.2.2. MINING CONCESSIONS – OVERVIEW

In total, 71,144 unique active mining concessions (191,017 repeated assets) were identified as held across the four financial institutions, covering an area of 454,753 Sq. Km (1,357,349 Sq. Km repeated area). These assets had the following area overlaps (Sq. Km) with key comparison layers (Appendix B1, Table Q).

	DNB	%	KLP	%	NBIM	%	SB	%
No. of Active Mining Concessions Assessed	26,230	n/a	69,671	n/a	62,710	n/a	32,406	n/a
Mining Concessions Area Assessed	313,428	100.00	402,241	100.00	412,857	100.00	228,823	100.00
Protected Areas	44,456	14.18	53,036	13.19	53,878	13.05	28,220	12.33
Mangroves	202	0.06	202	0.05	215	0.05	32	0.01
Key Biodiversity Areas	10,710	3.42	15,551	3.87	15,883	3.85	9,293	4.06
Other Effective area-based Conservation Measures Areas (OECMs)	25	0.01	29	0.01	21	0.01	42	0.02
Intact Forest Landscapes 2000	22,428	7.16	33,422	8.31	29,548	7.16	15,731	6.87
Intact Forest Landscapes 2013	13,294	4.24	23,030	5.73	19,917	4.82	7,645	3.34
Intact Forest Landscapes 2016	12,415	3.96	22,007	5.47	18,920	4.58	6,981	3.05
Intact Forest Landscapes 2020	10,952	3.49	20,178	5.02	17,357	4.20	5,638	2.46
Peatlands	11,260	3.59	24,249	6.03	18,869	4.57	11,938	5.22
Planted Trees	1,497	0.48	2,238	0.56	2,329	0.56	1,464	0.64
Forest Loss Total Area (2001 to 2022)	19,587	6.25	26,650	6.63	24,415	5.91	18,024	7.88
Protected Areas Scored 1	38,576	12.31	43,532	10.82	44,012	10.66	22,790	9.96
Protected Areas Scored 2	232	0.07	252	0.06	274	0.07	239	0.10
Protected Areas Scored 3	670	0.21	3,935	0.98	3,884	0.94	1,603	0.70
Protected Areas Scored 4	4,874	1.55	5,215	1.30	5,628	1.36	3,500	1.53
Protected Areas Scored 5	101	0.03	101	0.03	78	0.02	89	0.04
Protected Areas Scored 6	0	0.00	0	0.00	0	0.00	0	0.00
Protected Areas Scored 7	0	0.00	0	0.00	0	0.00	0	0.00
Protected Areas Scored 8	0	0.00	0	0.00	0	0.00	0	0.00
Protected Areas	44,456	14.18	53,036	13.19	53,878	13.05	28,220	12.33
Mangroves	202	0.06	202	0.05	215	0.05	32	0.01

Table 10 *– A table summarizing the area overlaps (Sq. Km) of active mining concessions, identified as held in the holdings of the four financial institutions, with key comparison layers.*

There is moderate variation in terms of the financial institutions' total exposure of mining concessions overlap with the key comparison layers. Protected areas overlap, for example, has a percentage range of 12.3% - 14.2%, translating to an area range of ~28,200 – 53,800 Sq. Km of protected areas overlapped. All four institutions had overlaps with Protected Areas which exceed the global value[26] (11.1%).

For Intact Forest Landscapes, the range is 2.5% - 5.0%, representing an area difference of ~5,600 to 20,100 Sq. Km while 5.9 – 7.8% of the mining concessions are within areas with forest loss. Overall, 3.4 – 4.0% (~9,300 – 15,800 Sq. Km) were identified as spatially overlapping Key Biodiversity Areas (Table 11). All four financial institutions have a reduced overlap compared with the global value for Key Biodiversity Areas (5.9%), while Storebrand (5.2%) and KLP (6%) have an overlap which exceeds the global value for peatlands (5%).

		DNB		KLP		NBIM		Storebrand	
		No. of Mining Concessions	% of No. of Mining Concessions overlapped	No. of Mining Concessions	% of No. of Mining Concessions overlapped	No. of Mining Concessions	% of No. of Mining Concessions overlapped	No. of Mining Concessions	% of No. of Mining Concessions overlapped
Total No. of Active Mining Concessions Assessed		26,230	100.00	69,671	100.00	62,710	100.00	32,406	100.00
Above Ground Biomass (Mg C ha–1)	>0.1	19,212	73.24	60,140	86.32	52,611	83.90	26,145	80.68
	>100	3,295	12.56	11,172	16.04	10,379	16.55	4,991	15.40
Mangrove Soil Organic Carbon Stock (Mg C ha–1)	>0.1	65	0.25	67	0.10	70	0.11	58	0.18
	>100	65	0.25	67	0.10	70	0.11	58	0.18
Tropical Tree Cover (Mean) (0.1 -100)	>0.1%	629	2.40	725	1.04	731	1.17	580	1.79
	>50%	479	1.83	536	0.77	534	0.85	452	1.39
Tropical Tree 200 (Mean) (0.1 -100)	>0.1%	19,861	75.72	61,149	87.77	53,626	85.51	26,830	82.79
	>50%	10,204	38.90	35,395	50.80	31,633	50.44	18,306	56.49
Tropical Tree 2010 (Mean) (0.1 -100)	>0.1%	19,274	73.48	60,700	87.12	53,070	84.63	26,301	81.16
	>50%	10,359	39.49	35,589	51.08	31,735	50.61	17,827	55.01

Table 11 *– A table summarizing the number of active mining concessions, identified as held in the holdings of the four financial institutions, overlapping with key comparison layers.*

The results report a connection between mining concessions and forest cover, with 39.5 – 55.0% of active mining concessions held, having > 50% forest cover, a range of ~10,300 – 35,500 mining concessions. This figure drops dramatically for tropical forest, with 0.8 – 1.8% of concessions with >50% tropical forest cover, 452 – 536 active concessions. KLP (0.8%), NBIM (0.9%) and Storebrand (1.4%) have a smaller proportion of assets overlapping tropical tree cover >50% when compared against the global value[27] (1.6%). A small number of mining concessions were found to have a direct spatial interaction with areas with high mangrove soil carbon (58 – 70 sites 0.1 – 0.3%).

[26] For global values see Tables 4 and 5.
[27] For global values see Tables 4 and 5.

4.3. OIL AND GAS

4.3.1. OIL AND GAS WELLS – OVERVIEW

In total, 113,221 unique active oil and gas wells (295,623 repeated assets) were identified as held across the four financial institutions, covering an area of 355,694 Sq. Km (928,728 Sq. Km repeated area). These assets had the following area overlaps (Sq. Km) with key comparison layers (Appendix B1, Table Q).

	DNB	%	KLP	%	NBIM	%	SB	%
Total No. of 'Active' Oil and Gas Wells Assessed	71,033	n/a	75,517	n/a	65,212	n/a	83,861	n/a
Total Area of 'Active' Oil and Gas Wells Assessed	223,157	100.00	237,244	100.00	204,870	100.00	263,457	100.00
Protected Areas	12,172	5.45	12,806	5.40	11,159	5.45	16,157	6.13
Mangroves	2,046	0.92	2,054	0.87	2,055	1.00	1,784	0.68
Key Biodiversity Areas	10,963	4.91	11,181	4.71	6,687	3.26	12,877	4.89
Other Effective area-based Conservation Measures Areas (OECMs)	90	0.04	115	0.05	293	0.14	267	0.10
Intact Forest Landscapes 2000	154	0.07	154	0.06	145	0.07	139	0.05
Intact Forest Landscapes 2013	98	0.04	98	0.04	91	0.04	93	0.04
Intact Forest Landscapes 2016	97	0.04	97	0.04	91	0.04	93	0.04
Intact Forest Landscapes 2020	91	0.04	91	0.04	84	0.04	81	0.03
Peatlands	7,791	3.49	8,456	3.56	9,016	4.40	6,310	2.39
Planted Trees	4,413	1.98	4,489	1.89	6,063	2.96	2,656	1.01
Forest Loss Total Area (2001 to 2022)	8,009	3.59	8,127	3.43	9,002	4.39	6,987	2.65
Protected Areas Scored 1	11,870	5.32	12,435	5.24	10,964	5.35	15,564	5.91
Protected Areas Scored 2	0	0	21	0.01	0	0	0	0
Protected Areas Scored 3	205	0.09	248	0.10	96	0.05	214	0.08
Protected Areas Scored 4	95	0.04	99	0.04	98	0.05	97	0.04
Protected Areas Scored 5	0	0	0	0	0	0	0	0
Protected Areas Scored 6	0	0	0	0	0	0	0	0
Protected Areas Scored 7	0	0	0	0	0	0	0	0
Protected Areas Scored 8	0	0	0	0	0	0	0	0
Protected Areas	12,172	5.45	12,806	5.40	11,159	5.45	16,157	6.13
Mangroves	2,046	0.92	2,054	0.87	2,055	1.00	1,784	0.68

Table 12 *– A table summarizing the area overlaps (Sq. Km) of active oil and gas wells, identified as held in the holdings of the four financial institutions, with key comparison layers.*

There is similarity between the four financial institutions in terms of their total identified oil and gas wells spatial overlap with the key comparison layers. Protected areas overlap, for example, has a range of 5.4% - 6.1%, translating to an area range of ~11,100 – 16,100 Sq. km. This range is significantly below the global value[28] (13.7%). For Intact Forest Landscapes the range is relatively limited, 0.03% - 0.04%, representing an area range of 81 - 91 Sq. Km. While 2.7 – 4.4% (~7,000 – 9000 Sq. Km) of the oil and gas wells are correlated with forest loss. A number of oil and gas wells (1,784 – 2,055) were linked spatially to mangrove forested areas with all four financial institutions above the global value (0.35%). A relatively large area 6,600 – 12,800 Sq. Km (3.3% – 4.9%) was identified as spatially over-lapping Key Biodiversity Areas (Table 13). NBIM (3.3%) is the only financial institution to have an overlap which meaningfully deviates from the global value (4.5%). 6,310 – 9,016 Sq. Km (2.4% – 3.6%%) was identified as spatially over-lapping peatlands, with Storebrand (2.4%) being a notable outlier from the global value (3.6%).

		DNB		KLP		NBIM		Storebrand	
		No. of Oil and Gas Wells	% of No. of Oil and Gas overlapped	No. of Oil and Gas Wells	% of No. of Oil and Gas overlapped	No. of Oil and Gas Wells	% of No. of Oil and Gas overlapped	No. of Oil and Gas Wells	% of No. of Oil and Gas overlapped
Total No. of 'Active' Oil and Gas Wells Assessed		71,033	100.00	75,517	100.00	65,212	100.00	83,861	100.00
Above Ground Biomass (Mg C ha–1)	>0.1	36,893	51.94	39,071	51.74	40,961	62.81	39,575	47.19
	>100	2,777	3.91	2,852	3.78	3,018	4.63	2,879	3.43
Mangrove Soil Organic Carbon Stock (Mg C ha–1)	>0.1	1,793	2.52	1,792	2.37	1,793	2.75	1,649	1.97
	>100	1,793	2.52	1,792	2.37	1,793	2.75	1,649	1.97
Tropical Tree Cover (Mean) (0.1 -100)	>0.1%	8,659	12.19	8,638	11.44	8,635	13.24	8,627	10.29
	>50%	1,858	2.62	1,865	2.47	1,864	2.86	1,860	2.22
Tropical Tree 200 (Mean) (0.1 -100)	>0.1%	33,911	47.74	36,093	47.79	39,486	60.55	36,937	44.05
	>50%	4,269	6.01	4,376	5.79	5,667	8.69	4,617	5.51
Tropical Tree 2010 (Mean) (0.1 -100)	>0.1%	37,191	52.36	39,381	52.15	41,205	63.19	39,728	47.37
	>50%	3,376	4.75	3,463	4.59	4,188	6.42	3,475	4.14

Table 13 *– A table summarizing the number of active oil and gas wells, identified as held in the holdings of the four financial institutions, with key comparison layers.*

The results report a connection between oil and gas wells and forests, with 4.1 – 6.4% (3,376 – 4,188) of 'active' oil and gas wells held, having > 50% forest cover. This decreases for tropical forest, with 2.2 – 2.9% (1,858 – 1,865) of active oil and gas wells with >50% tropical forest cover. All four financial institutions have an overlap with >50% tropical tree cover significantly above the global value[29] (0.7%), though below the global value for >50% forest cover (7.3%). Comparative to other asset types a proportionately large number of oil and gas wells were found to have a direct spatial interaction with areas with high mangrove soil carbon (1,649 - 1,793 sites 2.0% – 2.8%). Here we find all four financial institutions having an overlap above the global value (1.45%)

[28] For global values see Tables 4 and 5.
[29] For global values see Tables 4 and 5.

4.3.2. OIL AND GAS CONCESSIONS – OVERVIEW

In total, 8,203 unique active oil and gas concessions (25,762 repeated assets) were identified as held across the four financial institutions, covering an area of 4,532,561 Sq. Km (13,004,681 Sq. Km repeated area). These assets had the following area overlaps (Sq. Km) with key comparison layers (Appendix B1, Table Q).

	DNB	%	KLP	%	NBIM	%	SB	%
Total No. of 'Active' Oil and Gas Concessions Assessed	6,813	n/a	7,423	n/a	5,438	n/a	6,088	n/a
Total Area of 'Active' Oil and Gas Concessions Assessed	3,113,353	100.00	3,500,742	100.00	2,912,126	100.00	3,478,460	100.00
Protected Areas	168,782	5.42	185,569	5.30	121,752	4.18	169,801	4.88
Mangroves	3,977	0.13	3,787	0.11	3,642	0.13	2,790	0.08
Key Biodiversity Areas	85,950	2.76	100,693	2.88	93,677	3.22	101,076	2.91
Other Effective area-based Conservation Measures Areas (OECMs)	19,707	0.63	21,815	0.62	25,866	0.89	25,462	0.73
Intact Forest Landscapes 2000	27,384	0.88	34,162	0.98	34,355	1.18	29,529	0.85
Intact Forest Landscapes 2013	24,489	0.79	30,348	0.87	31,213	1.07	27,223	0.78
Intact Forest Landscapes 2016	23,899	0.77	29,755	0.85	30,570	1.05	26,687	0.77
Intact Forest Landscapes 2020	23,004	0.74	28,851	0.82	29,359	1.01	26,376	0.76
Peatlands	44,781	1.44	55,491	1.59	43,066	1.48	43,734	1.26
Planted Trees	6,369	0.20	7,891	0.23	9,035	0.31	6,863	0.20
Forest Loss Total Area (2001 to 2022)	14,847	0.48	20,439	0.58	21,178	0.73	21,927	0.63
Protected Areas Scored 1	159,112	5.11	173,285	4.95	112,444	3.86	156,921	4.51
Protected Areas Scored 2	74	0.00	181	0.01	72	0.00	99	0.00
Protected Areas Scored 3	5,750	0.18	7,561	0.22	6,082	0.21	8,582	0.25
Protected Areas Scored 4	3,845	0.12	4,517	0.13	3,034	0.10	3,867	0.11
Protected Areas Scored 5	3	0.00	28	0	119	0	243	0.01
Protected Areas Scored 6	0	0	0	0	0	0	0	0
Protected Areas Scored 7	3	0	3	0	3	0	2	0
Protected Areas Scored 8	0	0	0	0	0	0	0	0
Protected Areas	168,782	5.42	185,569	5.30	121,752	4.18	169,801	4.88
Mangroves	3,977	0.13	3,787	0.11	3,642	0.13	2,790	0.08

Table 14 *– A table summarizing the area overlaps (Sq. Km) of active oil and gas concessions, identified as held in the holdings of the four financial institutions, with key comparison layers.*

Across the portfolios, oil and gas concessions overlap with protected areas varies between 4.2% - 5.4%, representing an area range of ~122,000 – 186,000 Sq. Km. This range is

equivalent to 38 – 57% of the land area of Norway and 2 – 3 times the total extent of Norway's own protected areas, though the range does lie below the global value[30] of 7.7%.[31]

The overlap with Intact Forest Landscapes is 0.7% - 1%, an area ~23,000 – 29,000 Sq. Km (Table 15), with the range being below the global value of 1.6%. While 0.5 – 0.7% of the oil and gas concessions are correlated with forest loss. A relatively small number of oil and gas concessions (2,790– 3,977) were linked spatially to mangrove forested areas.

Large areas, 86,000 – 101,000 Sq. Km (2.8 – 3.2%), were identified as spatially overlapping Key Biodiversity Areas. All four financial institutions had an overlap significantly below the global value for Key Biodiversity Areas (5.2%) and peatlands (2.7%). (Table 4).

		DNB		KLP		NBIM		Storebrand	
		No. of Oil and Gas Concessions	% of No. of Oil and Gas Concessions overlapped	No. of Oil and Gas Concessions	% of No. of Oil and Gas Concessions overlapped	No. of Oil and Gas Concessions	% of No. of Oil and Gas Concessions overlapped	No. of Oil and Gas Concessions	% of No. of Oil and Gas Concessions overlapped
Total No. of 'Active' Oil and Gas Concessions Assessed		71,033	100.00	75,517	100.00	65,212	100.00	83,861	100.00
Above Ground Biomass (Mg C ha–1)	>0.1	2,254	33.08	2,654	35.75	2,068	38.03	1,850	30.39
	>100	180	2.64	239	3.22	213	3.92	212	3.48
Mangrove Soil Organic Carbon Stock (Mg C ha–1)	>0.1	58	0.85	48	0.65	47	0.86	44	0.72
	>100	58	0.85	48	0.65	47	0.86	44	0.72
Tropical Tree Cover (Mean) (0.1 -100)	>0.1%	290	4.26	414	5.58	367	6.75	375	6.16
	>50%	114	1.67	129	1.74	139	2.56	143	2.35
Tropical Tree 200 (Mean) (0.1 -100)	>0.1%	2,095	30.75	2,507	33.77	1,921	35.33	1,879	30.86
	>50%	201	2.95	300	4.04	256	4.71	254	4.17
Tropical Tree 2010 (Mean) (0.1 -100)	>0.1%	2,287	33.57	2,687	36.20	2,097	38.56	1,878	30.85
	>50%	177	2.60	217	2.92	221	4.06	230	3.78

Table 15 *– A table summarizing the number of active oil and gas concessions, identified as held in the holdings of the four financial institutions, with key comparison layers.*

The results show a connection between oil and gas concessions and forests, with 2.6 – 4.0% (177 – 230) of 'active' oil and gas concessions held having > 50% forest cover. This is significantly below the global value[32] (6.8%). This range decreases for tropical forest, with 1.7 – 2.6% (114 – 143) of concessions with >50% tropical forest cover. All four financial institutions have an overlap with >50% tropical tree cover significantly below the global value (5.34%). A small number of oil and gas wells were found to have a direct spatial interaction with areas with high mangrove soil carbon (44 - 58 sites, representing 0.7 – 0.9%).

[30] For global values see Tables 4 and 5.
[31] Norway's land area is approximately 325,288 Sq. Km, with terrestrial protected area coverage listed as 57,619 Sq. Km (UNEP-WCMC, 2024)
[32] For global values see Tables 4 and 5.

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4.4. CONCESSIONS – GRANTED POST 2022

Here we consider oil and gas and mining concessions which have been recently acquired or re-acquired by parent companies held by the FIs, since the 1st January 2022. Recently acquired concessions should be subject to a heightened level of scrutiny as they can help financial institutions evaluate an investee's intention of making efforts to address climate change and biodiversity loss. These concessions were granted following the adoption and signing of key international agreements, including the Glasgow Leaders' Declaration on Forests and Land Use and the Kunming-Montreal Global Biodiversity Framework.

4.4.1 MINING CONCESSIONS

In total, 2,544 unique active mining concessions granted post 01/01/2022 (6,538 repeated assets) were identified as held across the four financial institutions, covering an area of 93,029 Sq. Km (280,851 Sq. Km repeated area). These assets had the following area overlaps (Sq. Km) with key comparison layers (Figure 0).

	DNB	%	KLP	%	NBIM	%	SB	%
No. of Active Mining Concessions Assessed	26,230	n/a	69,671	n/a	62,710	n/a	32,406	n/a
Mining Concessions Area Assessed	313,428	100.00	402,241	100	412,857	100	228,823	100
Total No. of 'Active' Mining Concessions Post 2022 Assessed	1,399	5.33	2,378	3.41	2,333	3.72	428	1.32
Total Area of 'Active' Mining Concessions Post 2022 Assessed	67,495	21.53	82,780	20.58	83,081	20.12	47,495	20.76
Protected Areas	10,967	16.25	11,462	13.85	11,548	13.90	9,600	20.21
Mangroves	0	0.00	0	0.00	0	0.00	0	0.00
Key Biodiversity Areas	726	1.08	1,601	1.93	1,541	1.85	717	1.51
Other Effective area-based Conservation Measures Areas (OECMs)	0	0.00	1	0.00	0	0.00	1	0.00
Intact Forest Landscapes 2000	374	0.55	687	0.83	647	0.78	100	0.21
Intact Forest Landscapes 2013	374	0.55	631	0.76	618	0.74	100	0.21
Intact Forest Landscapes 2016	374	0.55	631	0.76	617	0.74	100	0.21
Intact Forest Landscapes 2020	373	0.55	629	0.76	616	0.74	100	0.21
Peatlands	1,008	1.49	1,302	1.57	1,021	1.23	817	1.72
Planted Trees	11	0.02	39	0.05	28	0.03	11	0.02
Forest Loss Total Area (2001 to 2022)	1,124	1.67	1,603	1.94	811	0.98	938	1.97
Forest Loss Total Area (2022)	52	0.08	82	0.10	21	0.02	43	0.09
Protected Areas Scored 1	7,872	11.66	8,214	9.92	8,299	9.99	6,516	13.72
Protected Areas Scored 2	0	0.00	0	0.00	19	0.02	0	0.00
Protected Areas Scored 3	73	0.11	194	0.23	195	0.23	63	0.13
Protected Areas Scored 4	2,937	4.35	2,967	3.58	2,969	3.57	2,937	6.18
Protected Areas Scored 5	84	0.12	84	0.10	65	0.08	84	0.18

Table 16 *– A table summarizing the area overlaps (Sq. Km) of active mining concessions granted since 01/01/2022, identified as held in the holdings of the four financial institutions, with key comparison layers.*

Across the portfolios, roughly 1.3 – 5.3% of the number of mining concessions, and 20.1 – 21.6% of the total area held was identified as granted since 2022. These post 2022 concessions overlapped protected areas, roughly by ~9,600 – 11,550 Sq. Km (13.9 – 20.2%) and overlapped Key Biodiversity Areas by ~720 – 1,600 Sq. Km, (1 – 1.9%).

Intact Forest Landscapes report more limited overlaps (100 – 629 Sq. Km, 0.2 – 0.8%).
The range for overlaps with peatlands (817 – 1,302 Sq. Km, 1.2% - 1.7%) is considerably less than both the global value[33] (9.25%) and the range found in the overall portfolios of the four financial institutions (3,6% - 6%).

Finally, it is important to note that not all mining concessions report a 'grant' date, those which do are often biased by country, subsequently results may not fully capture all concessions licensed or relicensed since 2022.

[33] For global values see Tables 4 and 5.

4.4.2. OIL AND GAS CONCESSIONS (POST 2022)

In total, 712 unique active oil and gas concessions granted since 2022 (2,288 repeated assets) were identified as held across the four financial institutions, covering an area of 419,734 Sq. Km (1,341,799 Sq. Km repeated area). These assets had the following area overlaps (Sq. Km) with key comparison layers (Table 18).

	DNB	%	KLP	%	NBIM	%	SB	%
Total No. of 'Active' Oil and Gas Concessions Assessed	6,813	n/a	7,423	n/a	5,438	n/a	6,088	n/a
Total Area of 'Active' Oil and Gas Concessions Assessed	3,113,353	100.00	3,500,742	100.00	2,912,126	100.00	3,478,460	100.00
Total No. of 'Active' Oil and Gas Concessions Post 2022 Assessed	623	9.14	687	9.26	461	8.48	517	8.49
Total Area of 'Active' Oil and Gas Concessions Post 2022 Assessed	340,549	10.94	408,143	11.66	257,254	8.83	335,853	9.66
Protected Areas	17,294	5.08	20,209	4.95	12,394	4.82	17,372	5.17
Mangroves	89	0.03	89	0.02	18	0.01	89	0.03
Key Biodiversity Areas	2,656	0.78	5,160	1.26	2,236	0.87	4,836	1.44
Other Effective area-based Conservation Measures Areas (OECMs)	0	0.00	171	0.04	1,438	0.56	1,438	0.43
Intact Forest Landscapes 2000	105	0.03	105	0.03	0	0.00	105	0.03
Intact Forest Landscapes 2013	3	0.00	3	0.00	0	0.00	3	0.00
Intact Forest Landscapes 2016	3	0.00	3	0.00	0	0.00	3	0.00
Intact Forest Landscapes 2020	3	0.00	3	0.00	0	0.00	3	0.00
Peatlands	328	0.10	3,160	0.77	578	0.22	747	0.22
Planted Trees	149	0.04	786	0.19	115	0.04	121	0.04
Forest Loss Total Area (2001 to 2022)	562	0.17	1,200	0.29	819	0.32	869	0.26
Forest Loss Total Area (2022)	20	0.01	51	0.01	30	0.01	32	0.01
Protected Areas Scored 1	16,815	4.94	19,725	4.83	12,287	4.78	16,893	5.03
Protected Areas Scored 2	0	0.00	0	0.00	0	0.00	0	0.00
Protected Areas Scored 3	471	0.14	471	0.12	110	0.04	471	0.14
Protected Areas Scored 4	10	0.00	16	0.00	0	0.00	10	0.00

Table 17 *– A table summarizing the area overlaps (Sq. Km) of active oil and gas concessions granted since 01/01/2022, identified as held in the holdings of the four financial institutions, with key comparison layers.*

Across the portfolios, roughly 8.5 – 9.3% of the number of oil and gas concessions, and 8.8 – 11.7% of the total area held was identified as granted since 2022. Interaction with key comparison layers appears more limited, with a range of ~12,400 – 20,200 Sq. Km (4.8 – 5.2%) of post 2022 concessions overlapping protected areas. This range is below the global value[34] (7.7%).

Overlap with Key Biodiversity Areas is more limited, representing ~2,200 – 5,200 Sq. Km, which is less than 0.8 – 1.3% of the area licenced in 2022, and well below the global value (5.2%). Intact Forest Landscapes have almost no overlaps.

It is important to note that not all oil and gas concessions report a 'grant' date and subsequently results may not fully capture all concessions licensed or relicensed since 2022.

[34] For global values see Tables 4 and 5.

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4.5 ASSET LEVEL EXAMPLES

Site-level screenings are essential for gaining a deeper understanding of an asset's potential environmental impact. High-level screenings can identify the spatial proximity of an asset to environmentally sensitive areas, but they are unable to determine the extent of the assets impacts and dependencies on its surrounding environment. To do this, more detailed analysis is required.

In this section, we provide a series of asset-level examples to illustrate the level of granular analysis that can be conducted with the data.

4.5.1 MINING PROJECTS / ASSET LEVEL EXAMPLES

The table below (Table 19) outlines two examples of mining projects which were identified as within areas with high '*forest exposure'.*

Parent Company	Property Name	% Owner-ship	Country	Key Biodiversity Area Overlap (%)	Intact Forest Landscape 2020 Area Overlap (%)	Forest Loss Total Area % (2001 to 2022)	Above Ground Biomass (Mg C ha−1) (Normalised Mean) (0 - 100)	Tropical Tree Cover (Mean) (0 -100
Nickel Industries Limited	Siduarsi	100%	Indonesia	100	100	1	58	97
Tongling Nonferrous Metals Group Co., Ltd. Class A	Mirador	70%	Ecuador	100	0	64	50	49

Nickel Industries Limited, target outline mine site ‘Siduarsi’ located in the forests of West Papua, Indonesia (Figure 6). The mine site is shown as being within the Key Biodiversity Area, ‘Foya’, having a 100% overlap with Intact Forest Landscape 2020, and high (97%) exposure to tropical forest cover. Additionally, the site is within the protected area, ‘Memberamo Foja’ (not shown). This mine is yet to be developed.

Figure 6 *– A map showing location and surrounding of the mine, target outlined, Siduarsi in Indonesia.*

Tongling Nonferrous Metals Group, operate the ‘Mirador’ mine in the Amazon rainforest, south Ecuador, overlapping the Key Biodiversity Area, ‘Cordillera del Cóndor’ and bordering a protected area (not shown). With significant surrounding tropical tree cover 50%, note how the mine site itself reduces the forest cover % (Figure 7).

Figure 7 – *A map showing the mine, Mirador, in Ecuador overlap with the Key Biodiversity Area, ‘Cordillera del Cóndor’.*

4.5.2 MINING CONCESSIONS / ASSET LEVEL EXAMPLES

Anglo American plc, via its subsidiary Anglo-American Niquel Brasil Ltda was identified as holding multiple mining concessions within the Brazilian Amazon rainforest, four are highlighted here (Table 20). These connected four concessions overlap with the Key Biodiversity Area 'Cristalino / Serra do Cachimbo' and border the protected area 'Parque Estadual Cristalino' not shown (Figure 8).

Concession ID	Holder	Country	Key Biodiversity Area Overlap (%)	Intact Forest Landscape 2020 Area Overlap (%)	Forest Loss Total Area % (2001 to 2022)	Above Ground Biomass (Mg C ha−1) (Normalised Mean) (0 - 100)	Tropical Tree Cover (Mean) (0 -100
BRAEP866952/2017	ANGLO AMERICAN NIQUEL BRASIL LTDA	Brazil	100	0	6	28	94
BRAEP866953/2017	ANGLO AMERICAN NIQUEL BRASIL LTDA	Brazil	100	0	17	23	76
BRAEP866942/2017	ANGLO AMERICAN NIQUEL BRASIL LTDA	Brazil	100	0	0	31	96
BRAEP866943/2017	ANGLO AMERICAN NIQUEL BRASIL LTDA	Brazil	100	16	4	30	98

Table 18 *- A table summarizing four 'forest exposed' mining concessions identified as held by Anglo American in the Brazilian Amazon.*

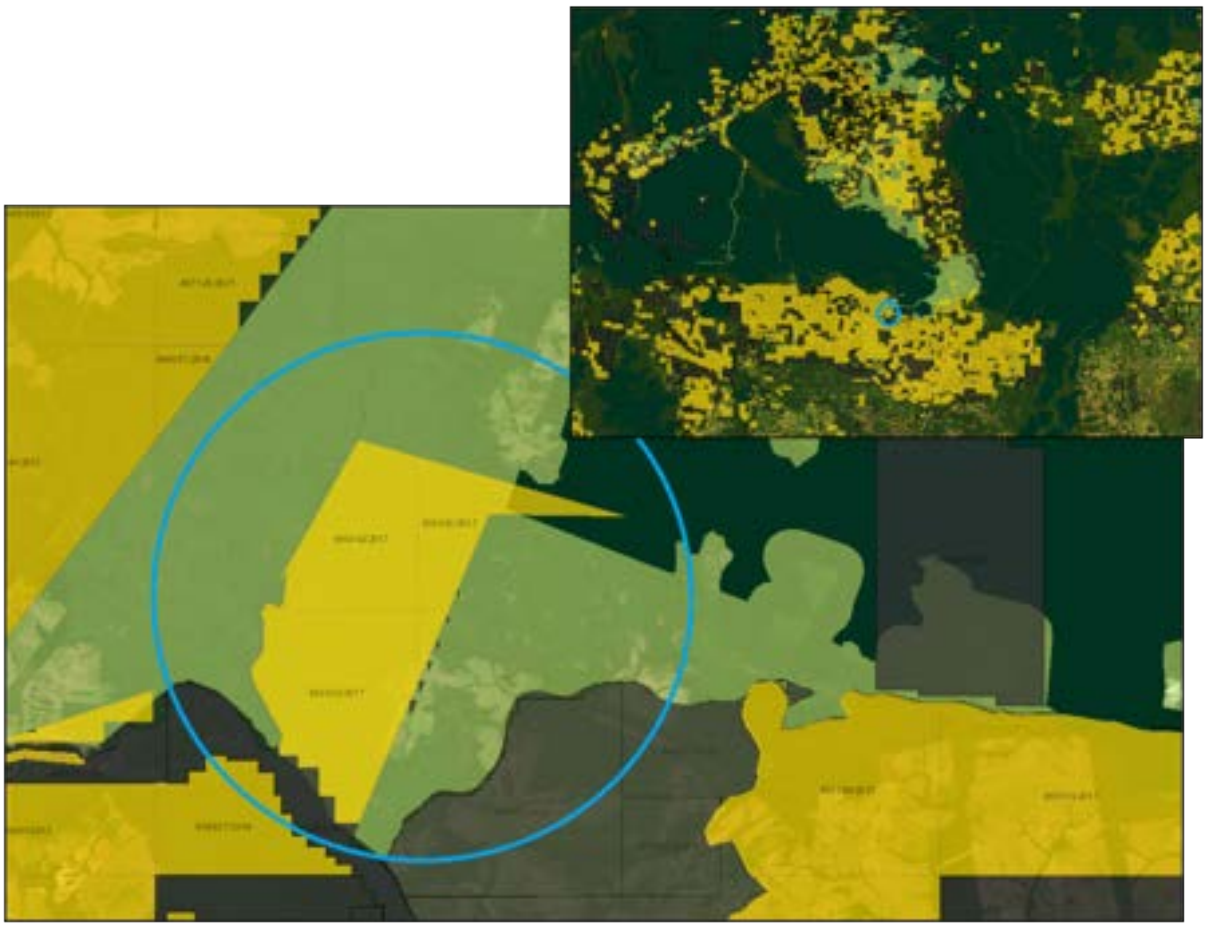

Figure 8 – *Maps showing four 'forest exposed' mining concessions, identified as held by Anglo American in the Amazon rainforest.*

4.5.3 OIL AND GAS WELLS / ASSET LEVEL EXAMPLES

Repsol was identified as holding two oil and gas wells deep in the Ecuadorian Amazon in a Key Biodiversity Area, Gran Yasuní neighbouring the Yasuní National Park. These sites were determined to have high Intact Forest cover (90-100%) (Figure 9).

Well ID	Well name	Operator	Country	Key Biodiversity Area Overlap (%)	Intact Forest Landscape 2020 Area Overlap (%)	Forest Loss Total Area % (2001 to 2022)	Above Ground Biomass (Mg C ha−1) (Normalised Mean) (0 - 100)	Tropical Tree Cover (Mean) (0 -100
2026002850	Dabo 1	Repsol	Ecuador	100	90	0	281	0
2026001524	Dabo Sur 1	Repsol	Ecuador	100	100	1	305	0

Table 19 *- A table summarizing two 'forest exposed' oil and gas wells, identified as held by Repsol in the Ecuadorian Amazon.*

Figure 9 – *Maps showing two 'forest exposed' oil and gas wells (red and grey dots in blue circle), identified as held by Repsol in the Amazon rainforest.*

4.5.4 OIL AND GAS CONCESSIONS / ASSET LEVEL EXAMPLES

Rosneft was identified as holding three oil and gas concessions deep in the Amazon, while not in Key Biodiversity Areas, they had very high Intact Forest, and Tropical Tree cover overlap (98%+) (Figure 10).

Concession ID	Operator	Country	Key Biodiversity Area Overlap (%)	Intact Forest Landscape 2020 Area Overlap (%)	Forest Loss Total Area % (2001 to 2022)	Above Ground Biomass (Mg C ha−1) (Normalised Mean) (0 - 100)	Tropical Tree Cover (Mean) (0 -100
2018000796	Rosneft	Brazil	0	100	0	35	100
2018000797	Rosneft	Brazil	0	99	0	35	99
2018000803	Rosneft	Brazil	0	100	0	35	98
2018000796	Rosneft	Brazil	0	100	0	35	100

Table 20 *- A table summarizing three 'forest exposed' forest oil and gas concessions, identified as held by Rosneft in the Amazon rainforest.*

Figure 10 *– Maps showing three 'forest exposed' oil and gas concessions (highlighted in blue circle), identified as held by Rosneft in the Amazon rainforest.*

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RECOMMENDATIONS AND GUIDANCE FOR FINANCIAL INSTITUTIONS

5. RECOMMENDATIONS AND GUIDANCE FOR FINANCIAL INSTITUTIONS

5.1. RECOMMENDATIONS FOR FIS TO TACKLE FOREST-RISK EXTRACTIVE HOLDINGS

Here, we provide recommendations for how financial institutions can 1) tackle portfolio exposure to forest-risk extractive assets, and 2) make use of the report methodology.

1. Investor commitments and policies

Financial institutions should adopt and implement comprehensive and explicit environmental, social and governance (ESG) policies to eliminate deforestation, conversion and human rights abuse from all commodity supply chains, related land concessions, and real estate; linked to the financial institutions' investment practices.

Building on the recommendations of The High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities (HLEG), which state that financial institutions should eliminate agricultural commodity-driven deforestation from their investment and credit portfolios by 2025, as part of their net zero plans; **financial institutions should broaden the scope of their zero-deforestation policies to include extractive industries and value chains**.

2. Risk assessments and monitoring

Financial institutions should assess deforestation risk for all extractive assets held in investment portfolios and across all other operations.

The forest-risk extractives risk assessments should include both companies involved in extractive industries, as well as all commercial stakeholders along relevant supply chains. Risk assessments should consider both large industrial-scale assets (direct forest exposure), as well as risks associated with artisanal and small-scale mining (exposure through supply chains).

The risk assessment should inform investors' understanding of extractive companies' current and potential impacts on nature, climate, and human rights, by scrutinizing the location of extractive assets in relation to forest ecosystems, the status of the extractive operations (e.g., new or ongoing), and the extractive companies' policies on nature, climate and human rights.

Risk assessments for forest-risk extractives should scrutinize the following variables and indicators:

- **Asset location*:*** A complete list of extractive assets held by companies, the geographic locations of the assets, as well as any active operations, including those of any subsidiary or affiliate companies. Such concession and project site data can be sourced from company disclosures, and third-party service providers.

- **Overlap with forest ecosystems and Indigenous Territories:** A geospatial analysis of the extent to which companies' extractive assets and active operations overlap with forest ecosystems and Indigenous Territories. The analysis should include, but not be limited to

the following areas: (1) Intact Forest Landscapes[35], (2) peatlands[36], (3) World Heritage Sites[37], (4) protected areas[38], (5) Indigenous Territories.[39]

- **Recently acquired forest-risk concessions:** Particular attention should be paid to companies that have recently acquired new extractive concessions that overlap with forest ecosystems, as an indicator of future nature and climate risk and impact.

- **Indirect deforestation risk:** Risk assessments should consider the risk of both direct deforestation (from expansion of an existing project or the development of a concession) and indirect deforestation (from infrastructure developments related to the extractive operation).

3. Company engagement

Financial institutions should engage in dialogue with companies linked to forest-risk extractive projects, to ensure that companies avoid and reduce, with the ambition of eliminating, deforestation linked to extractive assets throughout their operations and value chains.

Specifically, investors should ask companies to:

- **Adopt policy commitments:** Company policies on forest-risk extractives should take a clear stance on avoiding and reducing, with the ambition of eliminating, deforestation linked to extractive assets throughout their operations and value chains with 2030 as a target date. Companies should set clear science-based targets for nature, in line with the SBTN[40] framework. Moreover, extractive companies should avoid engaging in any new extractive operations in forested areas.

- **Disclose asset location:** In line with the TNFD LEAP[41] approach, companies should locate their interface with nature, by disclosing a full list of company assets and operations including geospatial location data.

- **Conduct environmental and social impact assessments:** Companies should conduct environmental and social impact assessments before commencing operations in forested areas. The assessments should be transparent, open to multiple stakeholders, and third-party on-site audited, while building on baseline land-use and biodiversity data.

- **Adoption of the mitigation hierarchy:** The mitigation hierarchy states that companies should avoid, minimize, restore, and compensate nature and biodiversity impacts, with a clear and strong emphasis on avoiding and minimizing the conversion of natural and primary rainforests. Companies should adopt the mitigation hierarchy with the further ambition of eliminating deforestation from their extractive operations.

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[35] https://intactforests.org/
[36] https://data.globalforestwatch.org/datasets/gfw::global-peatlands/about
[37] https://whc.unesco.org/en/list/
[38] https://www.protectedplanet.net/en/thematic-areas/wdpa?tab=WDPA
[39] Note that in this study Indigenous Terrorities were not included as an overlap, due to challenges in securing data rights within the study's available timeframe – see 'Methodology Limitations'.
[40] https://sciencebasedtargetsnetwork.org/take-action-now/take-action-as-a-company/what-you-can-do-now/
[41] https://tnfd.global/publication/additional-guidance-on-assessment-of-nature-related-issues-the-leap-approach/

Where companies show inadequate prevention and mitigation measures, financial institutions should take escalatory measures towards the companies, including voting, filing shareholder resolutions, placing companies under observation, or as a last resort, divestment and exclusion. The acquisition, by companies, of new concessions for extractive operations in forested areas should be subject to close scrutiny.

5.2. GUIDANCE ON HOW TO USE THE REPORT AND DATA

RFN and WWF-Norway recommend a step-by-step screening process, which builds on the overarching recommendations for financial institutions to tackle forest-risk extractives; and provides tailored guidance within the scope of the research report and data.

The screening process should enable financial institutions to gain an overview of overall risk exposure, and to make a prioritization on company engagement. The four main steps are 1) high level screening, 2) prioritization according to forest comparison layers, 3) screening for recently acquired concessions, 4) company selection for shareholder engagement.

Step 1 – High-level screening
As a first step, financial institutions should follow the report's methodology to gain an overview of their financial ties to companies holding forest-risk extractive assets. RFN and WWF-Norway recommend that financial institutions include all 13 comparison layers included within the report methodology, as well as including additional layers (such as on Indigenous Territories) where possible.

Done correctly the data will provide an overview of 'forest exposure' through a range of variables chosen by the financial institution, such as:

- Number of companies holding forest-risk extractive assets, grouped into mining and oil & gas sectors, that the financial institution is exposed to.
- Number of unique forest-risk assets that the financial institution is exposed to.
- Total area covered by forest-risk assets that the financial institution is exposed to.
- Percentage of forest-risk extractive companies in relation to the financial institution's total equity portfolio.
- Market value data for the forest-risk extractive companies.

Step 2 – Prioritization according to forest comparison layers
Once the high-level screening is completed, financial institutions should use the data to select companies in their portfolios with significant presence in forest areas for further engagement. As shown in the 'Methodology' section, the study has made use of 13 different comparison layers to ensure a comprehensive overview of the spatial correlation between forest ecosystems and extractive assets. RFN and WWF-Norway recommend financial institutions consider a broad selection of comparison layers to identify a range of spatial correlations between the extractive asset, and its interface with nature and the climate.

RFN and WWF-Norway acknowledge that there may be instances where it is necessary to prioritize specific comparison layer data to gain a more granular understanding of particular risks and to align portfolio screening with specific engagement priorities. For example, financial institutions may need to focus on particular types of forest ecosystems or geographic areas to better assess and engage with their investee companies.

Considering this, the report suggests that the different comparison layers can be grouped to facilitate targeted analysis and decision-making, as follows:

Climate risk indicators	Biodiversity risk indicators	Cross-cutting indicators
Above Ground Biomass (ABG)	Key Biodiversity Areas	Intact Forest Landscapes
Global Peatlands	Protected Areas	Global Mangroves
Mangrove Soil Organic Carbon Stock	WWF Priority Ecoregions	Tree Cover
		Tropical Tree Cover
		Tree Cover Loss

Table 21 *– Important layers and indicators to manage biodiversity or climate-related risks in extractive assets.*

Step 3 – Screen for recently acquired concessions

Recently acquired forest-risk concessions, defined as post 2022 in this report, merit particular attention from financial institutions. Companies that have acquired concessions recently have done so in a broader socioenvironmental context of increased urgency to mitigate climate change[42] and halt biodiversity loss[43], and with more stringent demands from financial institutions leading in ESG through their portfolio management[44].

In addition, recently acquired concessions present opportunities for financial institutions to conduct pre-emptive company engagements. In other words, shareholders may be able to speak with investee companies about forest-risk assets that have not yet begun development, and where there has not yet been any social or environmental impact on the ground.

Step 4 – Company selection for shareholder engagement

Finally, financial institutions should make a selection of investee companies that merit further assessment and engagement, to manage financial risks associated with forest-risk extractives. In line with the recommendations in steps 1-3, the selection should:

- Align with the financial institutions' sector-level risk exposure to forest-risk assets.
- Account for the most significant asset and company interactions with forest ecosystems, in line with the financial institutions' broader priorities for managing climate and nature-related risks.
- Pay particular attention to companies that have recently acquired concessions that interact with forests.

[42] https://webarchive.nationalarchives.gov.uk/ukgwa/20230418175226/https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/
[43] https://www.cbd.int/gbf
[44] https://www.gfanzero.com/

BOX 2 - GOING FURTHER – SITE-LEVEL SCREENINGS

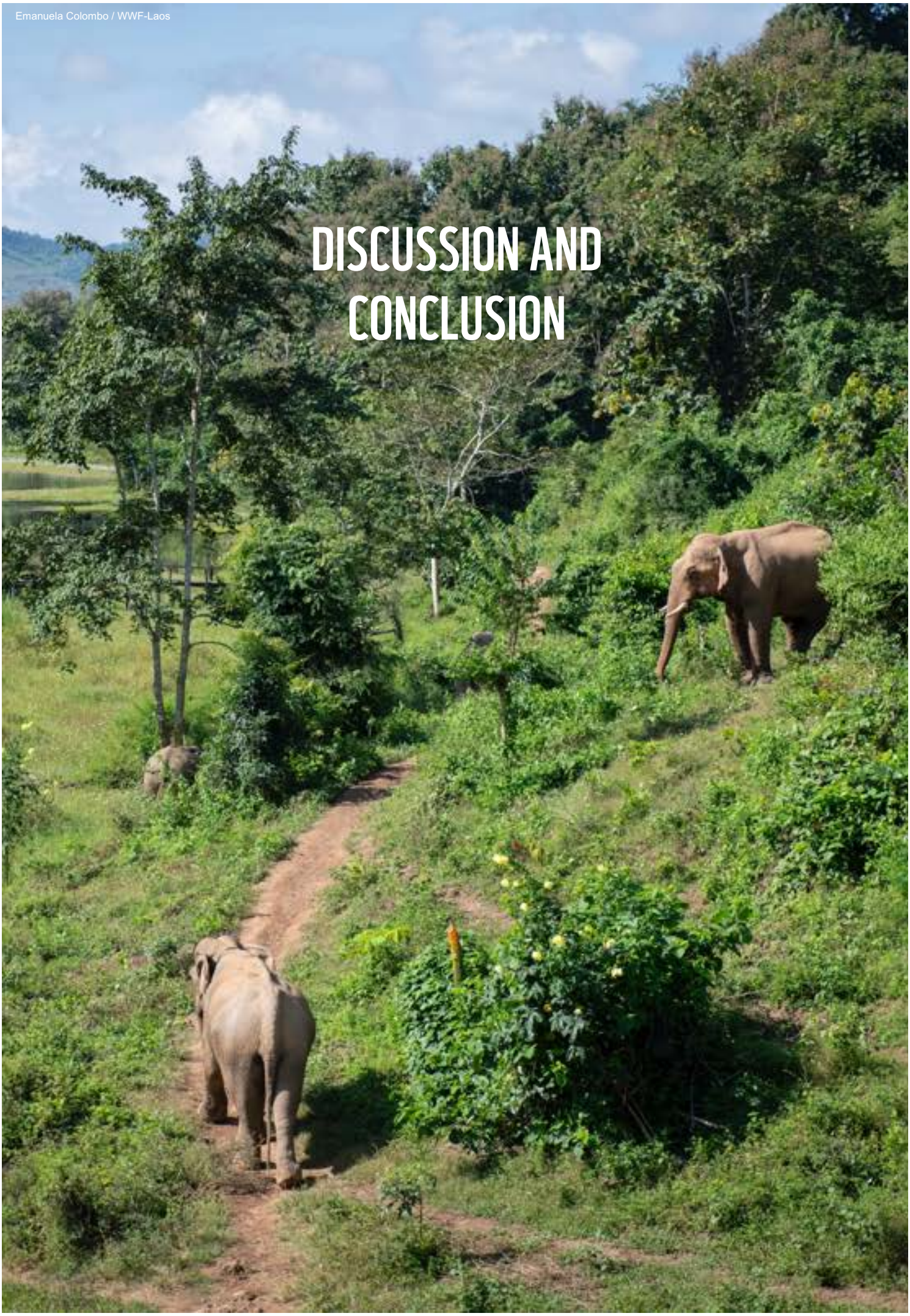
While the results outlined here, arguably represent one of the first publicly reported global extractive screenings, they are a ‘high-level screening’. They are the first step. After completing an initial high-level screening more steps are required to really understand what is going on with potentially high-risk assets.

High-level screenings - are asset data screenings that define the spatial proximity to various spatially defined variables. Importantly, they do not, as sometimes communicated, define an asset’s *‘nature impact*’. Spatial correlation is not spatial causation. Being close to a protected area does not meaningfully infer direct, indirect or cumulative impacts. Understanding an asset’s causation, it’s probable impact or dependencies requires significantly more detailed work. This can be accomplished through site-level screenings.

What then, if you want to understand the nature impact of thousands of assets held by one parent company? This is the frontier of current methods, involving connecting field data with remote sensing data (i.e. often satellite data). This should be combined with detailed data on the asset type, its operation and the ecosystems it interacts with. The latter can include data from the site itself (e.g. water usage, noise, light pollution) and any other data (e.g. grey literature, environmental fines, media, government agencies, regulatory reporting).

This should not be confused with site-level environmental impact assessments (EIAs), or other such granular singular focused site-level insights. The data produced per site, must still be achievable at scale, across multiple landscapes and geographies to provide comparable results. For example, within a high-level screening you might identify which palm oil plantations are potentially exposed to deforestation. More detailed site-level assessments then follow to understand in greater detail the likely exposure and the nature impact implications of any assigned deforestation (e.g. fragmentation, species, sedimentation, pollution etc.).

While there are many commercial or non-commercial solutions that claim to robustly define ‘*nature impact’* we are not currently aware of any solutions that currently have that capability at regional or global scale. Although the pace of development has rapidly increased within the last year, and we can expect the gap to close, significant technical challenges and complexities remain.


Emanuela Colombo / WWF-Laos

DISCUSSION AND CONCLUSION

6. DISCUSSION AND CONCLUSION

In response to the nature crisis, the global community reached consensus on a 'Paris Agreement for Nature' in 2022 by adopting the Kunming-Montreal Global Biodiversity Framework, pushing to reverse global biodiversity loss by 2030, and achieve a nature positive world by 2050. One result of the growing recognition of the importance of nature has seen private sector experiencing increased pressure to define and regulate project, company and portfolio level impacts and dependencies on the natural world. This includes new and upcoming mandatory reporting regulations such as the European Union's Corporate Sustainability Reporting Directive (CSRD) and voluntary reporting such as the Science Based Targets for Nature (SBTN) and Taskforce on Nature-Related Financial Disclosures (TNFD).

Unlike the recent rise of '*climate change'* reporting, '*nature'* reporting remains a significant technical challenge, with *'nature'* metrics unfamiliar, often still in development, or applicable only for certain situations. While TNFD and others have provided a vision of what corporate-level nature reporting might look like, the actual technical 'how' remains vague, with no widely agreed technical standards for specific data methodologies for 'nature reporting'. Arguably, major investors have the greatest challenge ahead, with the task of defining, not just one company, but the nature exposure of potentially thousands of parent companies to gain clarity on the implications of their investments. For such actors the complexity, noise and confusion within the current conversation must make the task appear unachievable.

So what do, and don't the results mean?
The results show *correlation, not causation.* They show the proximity of assets to spatial layers chosen for their potential relevancy to '*forest exposure'*. They do not consider other '*nature'* or '*social'* variables of interest, such as endangered species or Indigenous lands. They are only one lens to consider the assets potential '*nature exposure'.* They do not define what the assets are doing, or have done, in terms of direct, indirect or cumulative impacts on the natural world.

The results do not account for the exceptions, such as protected areas which allow extractive operations, or boundaries which have been carefully redrawn to exclude and allow mining operations (e.g. Ranger Mine, Kakadu National Park, Australia). They do not readily use the available attribute data, or third-party data and models to understand at a more nuanced and accurate level the nature impacts or dependencies of these assets. Further, due to data gaps within the asset datasets and the complexities in correctly assignment (i.e. linking each asset to parent company and then portfolio) the results do not perfectly capture every asset held by each extractive parent company. They do not provided results for every extractive related company (e.g. oil and gas service companies) each financial institution is exposed to across their portfolios.[45]

[45] Key limitations of the analysis are outlined in the 'Methodology and Data Limitations'

Why are the results important?
Because they demonstrate a viable route forward for financial institutions – showing that with the right data high-level screenings for entire sectors can be achieved. Providing useful comparable results, across hundreds of companies or aggregated to the portfolio level, allowing FIs to make direct peer to peer comparisons. Driven by a data approach that is data and model agnostic and can be rapidly improved and adjusted. The high-level screening can be supplemented by site-level screenings, as and when a higher level of granularity is required (Box 2).

Traditionally, the data solutions presented to financial institutions, as examples as how to meet reporting standards are better aligned to project level screenings or corporate screenings. Promoted NGO offerings such as Integrated Biodiversity Assessment Tool (IBAT) or WWF Biodiversity Risk Filter, run '*on the fly'*, meaning they work online, running the analysis in the cloud once the user uploads data. To ensure an output, users are limited in how many locations they can upload in one go, commonly limited to 1,000 per assessment. While this is not an issue for most project-level screening users, this is an issue for investors considering hundreds of major companies. The analysis presented here, for example, considers over 2.41 million assets.

What is the way forward?
As we move forward, fixed '*on the fly'*, online approaches will become increasingly untenable, with FIs likely needing to see individual company results in the context of the overall results for the sector. This will require an analysis of many tens of millions of assets across individual sectors, requiring a customised analysis, that is adaptable to different industries, user priorities and perspectives, emerging data, and developments.

High-level sector screenings are well positioned to meet this need. As outlined within the document they already can, when the asset and ownership data is available:

- Provide comparable, consistent pre-processed tabular data, defining spatial overlaps for each unique asset. These results can be aggregated to parent company and/or portfolio, enabling direct peer to peer comparison at multiple levels.
    - Peer to peer comparison although simplistic, has utility. While it is often difficult and time-consuming to define the full scope of the nature impacts of an asset, it's potentially simpler, as a first step, to compare '*exposure*' to key variables between assets as a rough means to rapidly approximate likely *'exposure'* differences. This can act as an effective basis to identify high-risk assets and select engagement priorities.

- The software and models behind the assessment can be rapidly adjusted to changing priorities and technical advancements. Being entirely data and model agnostic, the datasets and models can be adjusted and refined, as needed. New spatial data, which is constantly emerging, can be integrated and more sophisticated models applied.

- There is no substantial technical limit or bound as to what comparison layers are applied. GIS experts, including the WWF-SIGHT team[46], frequently run hundreds of comparison layers against asset data to consider different angles, priorities. These include 'framing' data layers – layers which help qualify the results of other layers (e.g. extent of mining presence within the landscape).

In the immediate future, high-level sector screenings will be further improved. Here we can consider the following:

- **Data Refinement** – Future sectoral screenings will inevitably get better at harnessing the data available. Within this assessment for example, attribute data on mining commodity type, ecosystem types, dates, depth of oil and gas drilling, volumes of fluid used, etc., could be applied to refine results. It's likely we'll see the rise of the inclusion of additional data via AI driven approaches (e.g. geospatial, corporate reporting, ground data) to triangulate and radically refine nature related insights.

- **Production Factors** - Although production results are not reported within this study, when accurate site level production data is available it will likely become a key feature of high-level screenings, as production provides important context in determining nature impact. Presently, if we asked which mines have the highest area of habitat clearance, we would simply define the world's largest open pit mines. However, a more insightful question might be – which mine per commodity type (e.g. coal, bauxite, gold) has the lowest yield per Sq. Km of habitat cleared?

- **Landscape Adjusted Impact / Dependencies** - Although beyond the scope of this study, the impacts of assets will be factored against local, regional, and global realities. This includes assets influence on national nature recovery planning efforts (See WWF, 2023).

- **Improved Visualisation** – Ideally results should be considered alongside a mapping platform which allows the user to rapidly click through thousands of locations, search for assets and visually inspect them in relation to key datasets and against time-lapsed satellite imagery (to see within 30 seconds how the asset has interacted with the environment within the last 30 years).

Why aren't sector-wide high-level screenings already available?
As has been demonstrated by this study, there is no technical barrier stopping the development of tailored nature screenings for use by financial institutions. Indeed, those with access to asset databases, such as S&P Global are developing data offerings in this space (UNEP-WCMC, 2023).

The major obstacle stopping wider development of high-level asset screening is the availability of robust asset data, accurately defining the location, ownership, and key attributes of assets. Few global asset databases exist at an accuracy level robust enough to support sectoral nature

[46] The WWF-SIGHT team supported in development of this report. See more at https://wwf-sight.org/

screenings and the few sectors which are available have had their datasets developed for a different market (e.g. oil and gas business intelligence). This is because of the sheer data volumes involved and the maintenance burden in ensuring asset data is up to date.

Fortunately, there are efforts underway, such as Ordinance Survey, Unilever, Esri UK, Deloitte and Planet Labs program to develop standards and asset databases (OS, 2022). While regulatory developments such as TNFD's push towards asset location disclosure could help normalise asset disclosure as a fundamental business practice.

If robust sectoral asset databases can be developed there is no reason why more and more accurate sectoral nature screening insights cannot be achieved. In showcasing these results, we hope to demonstrate that meaningful large scale nature insights are within grasp, and to emphasize the importance of a robust bedrock of asset and corporate ownership data, to provide a clear route for financial institutions to understand at scale '*nature*'.

GLOSSARY

Term	Explanation
Forest	The analysis reported here draws upon a wide range of open 'forest' related geospatial datasets each of which have been developed based upon differing methodologies and standards of how 'forests' is defined. The use of multiple datasets in combination is expected to triangulate at a 'high-level' the averaged probable 'forest exposure' of a given asset. Where possible, we define forests, following the definition of the Food and Agriculture Organization (FAO). FAO defines forest as, '*a land area of more than 0.5 ha, with a tree canopy cover of more than 10%, which is not primarily under agricultural or other specific non-forest land use. In the case of young forests or regions where tree growth is climatically suppressed, the trees should be capable of reaching a height of 5 m in situ, and of meeting the canopy cover requirement* (FAO, 1998; FRA 2000).'
Mining Projects / Mines	Commercial mining operations as defined in the S&P Global Metals and Mining dataset. Mines can be active, inactive, or at early-stage development.
Mining Concessions	Exploration and extraction 'claims' or 'concessions' are licences granted by a state actor to companies or individuals to explore and or extract mineral resources from within a set area for a fixed period. Mining concession data is sourced from each individual state actor. There is minor variation between nations in the data standards, with some nations reporting using slightly differing terminology and with differing frequency.
Oil and Gas	Commercial oil and gas wells as defined within the Enverus dataset. Wells can be active, plugged and abandoned, or at early-stage development.
Oil and Gas Concessions	Exploration and extraction 'concessions' are licences granted by a national state actor to companies or individuals to explore and or extract oil and or gas resources from within a set area for a fixed period. Oil and gas concession data is sourced from each individual state actor. There is minor variation between nations in data standards, with some nations reporting using slightly differing terminology and with differing frequency.

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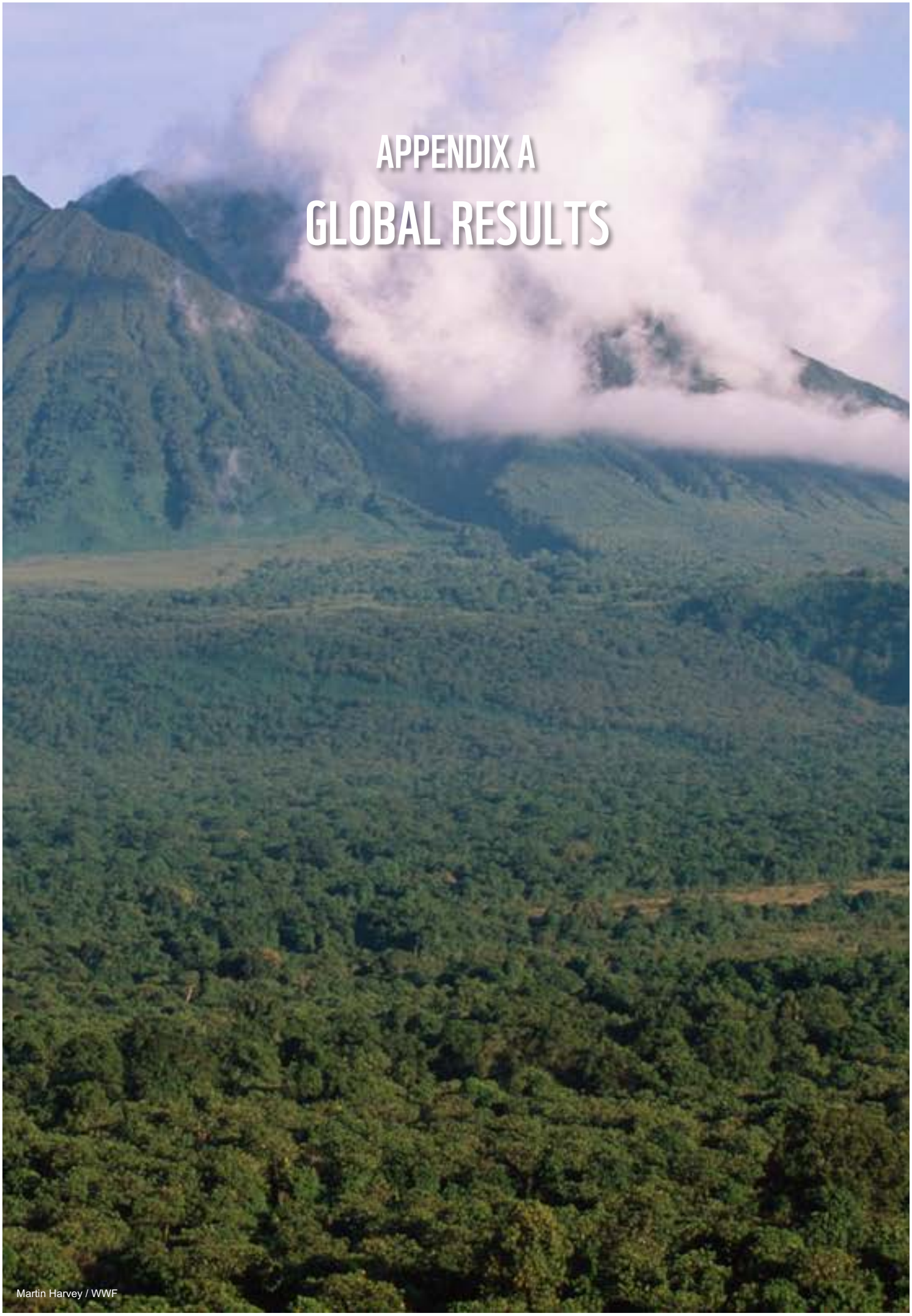
APPENDIX A
GLOBAL RESULTS



Martin Harvey / WWF

Table A – WWF Priority Ecoregions

A table providing a summary of all four extractive asset classes considering the number and area of assets against WWF Priority Ecoregions.

	No. of 'Active' Mining Projects	%	No. of 'Active' Mining Concessions	%	No. of 'Active' Oil and Gas Wells	%	No. of 'Active' Oil and Gas Concessions	%	Area of 'Active' Mining Projects (Sq. Km)	%	Area of 'Active' Mining Concessions (Sq. Km)	%	Area of 'Active' Oil and Gas Wells (Sq. Km)	%	Area of 'Active' Oil and Gas Concessions (Sq. Km)	%
Outside WWF Areas	10,789	70.50	765,563	61.40	292,322	72.17	13,402	69.62	33,895	70.50	4,001,838	60.19	918,357	72.17	9,135,986	69.16
African Rift Lakes	46	0.30	5,324	0.43	9	0.00	13	0.07	145	0.30	32,815	0.49	28	0.00	104,076	0.79
Altai-Sayan Montane Forests	64	0.42	454	0.04		0.00	1	0.01	201	0.42	18,194	0.27		0.00	4,763	0.04
Amazon and Guianas	183	1.20	28,661	2.30	4,658	1.15	182	0.95	575	1.20	407,397	6.13	14,634	1.15	124,230	0.94
Amur-Heilong	191	1.25	401	0.03	13	0.00	15	0.08	600	1.25	8,911	0.13	41	0.00	161,439	1.22
Atlantic Forests	107	0.70	55,709	4.47	8,644	2.13	185	0.96	336	0.70	255,855	3.85	27,156	2.13	23,681	0.18
Borneo	136	0.89	1422	0.11	1,136	0.28	78	0.41	427	0.89	45,177	0.68	3,569	0.28	166,037	1.26
Cerrado-Pantanal	63	0.41	28,969	2.32	28	0.01	18	0.09	198	0.41	299,024	4.50	88	0.01	40,358	0.31
Chihuahuan Desert	191	1.25	5,876	0.47	6,182	1.53	97	0.50	600	1.25	65,812	0.99	19,421	1.53	10,406	0.08
Choco-Darién	25	0.16	775	0.06	12	0.00		0.00	79	0.16	10,482	0.16	38	0.00		0.00
Coastal East Africa	48	0.31	8,973	0.72	107	0.03	15	0.08	151	0.31	18,332	0.28	336	0.03	41,779	0.32
Congo Basin	167	1.09	1,128	0.09	1,603	0.40	109	0.57	525	1.09	168,581	2.54	5,036	0.40	264,722	2.00
Coral Triangle	157	1.03	2,479	0.20	777	0.19	49	0.25	493	1.03	40,157	0.60	2,441	0.19	154,170	1.17
Eastern Himalayas	27	0.18		0.00	2,403	0.59	126	0.65	85	0.18		0.00	7,549	0.59	42,632	0.32
Madagascar	34	0.22	1,514	0.12	40	0.01	2	0.01	107	0.22	25,234	0.38	126	0.01	17,658	0.13
Mediterranean	213	1.39	8,893	0.71	11,540	2.85	696	3.62	669	1.39	36,364	0.55	36,254	2.85	466,177	3.53
Mekong Complex	232	1.52	558	0.04	3,115	0.77	110	0.57	729	1.52	131,966	1.98	9,786	0.77	319,205	2.42
Miombo Woodlands	96	0.63	6,074	0.49	3	0.00	27	0.14	302	0.63	166,464	2.50	9	0.00	119,872	0.91
Namib-Karoo-Kaokoveld	78	0.51	593	0.05	1	0.00	2	0.01	245	0.51	44,218	0.67	3	0.00	12,323	0.09
New Guinea and offshore islands	33	0.22	199	0.02	240	0.06	37	0.19	104	0.22	12,188	0.18	754	0.06	28,533	0.22
Northern Great Plains	48	0.31	272	0.02		0.00		0.00	151	0.31	8,045	0.12		0.00		0.00
Orinoco River and Flooded Forests	7	0.05	954	0.08	9,455	2.33	291	1.51	22	0.05	2,028	0.03	29,704	2.33	94,946	0.72
Southeast Rivers and Streams	71	0.46	411	0.03		0.00		0.00	223	0.46	197	0.00		0.00		0.00
Southern Chile	17	0.11	9,522	0.76	1	0.00	6	0.03	53	0.11	23,405	0.35	3	0.00	31,645	0.24
Southwest Australia	448	2.93	8,412	0.67	140	0.03	43	0.22	1,407	2.93	211,809	3.19	440	0.03	35,216	0.27
Southwest Pacific	38	0.25	3,013	0.24	3	0.00	1	0.01	119	0.25	21,463	0.32	9	0.00	960	0.01
Sumatra	46	0.30	980	0.08	24,606	6.07	158	0.82	145	0.30	14,031	0.21	77,302	6.07	126,401	0.96
West Africa	86	0.56	1,372	0.11	13	0.00	7	0.04	270	0.56	131,761	1.98	41	0.00	26,207	0.20
Western Ghats	14	0.09	0	0.00	328	0.08	25	0.13	44	0.09		0.00	1,030	0.08	16,670	0.13
Yangtze Basin	340	2.22	0	0.00	368	0.09	95	0.49	1,068	2.22		0.00	1,156	0.09	47,683	0.36

Table B – Country[47] / Mining Projects (1)

A table summarizing by country, 'active' mining project area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Mining Projects	Area of 'Active' Mining Projects	Protected Areas Overlapped	Mangroves Overlapped	Key Bio-diversity Areas	OECDs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped
Argentina	201	631	162	0	68	0	3	0	1	0	135	0	1	26	0
Australia	2,453	7,706	517	0	299	0	4	8	33	228	326	4	98	84	1
Bangladesh	2	6	0	0	0	0	0	1	0	0	0	0	0	0	0
Botswana	70	220	25	0	26	0	0	2	0	0	19	0	0	6	0
Brazil	338	1,062	135	0	116	0	6	4	10	137	131	0	3	1	0
Burkina Faso	60	188	11	0	3	0	0	0	0	5	11	0	0	0	0
Cambodia	11	35	18	0	16	0	0	0	5	9	18	0	0	0	0
Cameroon	16	50	0	0	0	0	0	1	0	2	0	0	0	0	0
Canada	2,710	8,514	44	0	54	9	1,543	4,093	0	975	10	0	23	8	0
Chile	312	980	28	0	67	0	1	2	4	7	22	0	1	3	0
China	1,862	5,850	68	0	192	0	13	71	0	123	68	0	0	0	0
Colombia	102	320	26	0	24	12	4	4	1	25	21	0	5	0	0
Côte d'Ivoire	54	170	22	0	3	0	0	0	0	34	22	0	0	0	0
Cuba	7	22	0	0	0	0	0	0	0	2	0	0	0	0	0
Dem. Rep. Congo	104	327	13	0	1	0	1	2	0	81	10	0	3	0	0
Dominican Republic	13	41	0	0	0	0	0	0	0	6	0	0	0	0	0
Ecuador	56	176	7	0	56	0	7	1	0	7	7	0	0	0	0
Egypt	10	31	6	0	3	0	0	0	0	0	3	0	3	0	0
Eritrea	9	28	0	0	6	0	0	0	0	0	0	0	0	0	0
Ethiopia	14	44	6	0	12	0	0	0	0	1	0	0	6	0	0
Gabon	20	63	6	0	0	0	2	1	0	2	6	0	0	0	0
Ghana	56	176	16	0	7	0	0	0	0	41	9	7	0	0	0
Greece	16	50	7	0	3	0	0	0	0	2	7	0	0	0	0
Guatemala	9	28	0	0	5	0	0	0	0	3	0	0	0	0	0
Guinea	39	123	28	0	8	0	0	0	0	16	28	0	0	0	0
Guyana	25	79	0	0	0	0	1	4	0	11	0	0	0	0	0
Honduras	6	19	3	0	0	0	0	0	0	1	3	0	0	0	0
Hungary	5	16	1	0	0	0	0	0	1	0	1	0	0	0	0
India	397	1,247	3	0	29	0	0	3	40	19	3	0	0	0	0
Indonesia	256	804	20	0	77	0	13	29	113	282	8	0	0	9	3
Iran	40	126	13	0	10	0	0	0	0	0	13	0	0	0	0
Italy	7	22	6	0	4	0	0	0	3	0	6	0	0	0	0
Jamaica	9	28	6	0	12	0	0	0	0	1	3	0	0	3	0
Japan	16	50	2	0	0	0	0	0	18	2	1	0	1	0	0
Jordan	5	16	0	0	0	0	0	0	0	0	0	0	0	0	0
Kazakhstan	144	452	61	0	17	0	0	0	0	1	54	0	6	0	0
Kenya	9	28	1	0	1	0	0	1	0	2	1	0	0	0	0
Kyrgyzstan	32	101	6	0	3	0	0	0	0	0	6	0	0	0	0
Laos	8	25	0	0	0	0	0	0	0	11	0	0	0	0	0
Lesotho	7	22	19	0	0	0	0	0	0	0	19	0	0	0	0
Liberia	14	44	0	0	9	0	0	0	0	12	0	0	0	0	0
Madagascar	34	107	6	0	10	0	0	1	0	17	3	0	3	0	0
Malawi	12	38	0	0	6	0	0	0	0	2	0	0	0	0	0

[47] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

Table C – Country[48] / Mining Projects (2)

A table summarizing by country, 'active' mining project area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Mining Projects	Area of 'Active' Mining Projects	Protected Areas Overlapped	Mangroves Overlapped	Key Bio-diversity Areas	OECDs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped
Malaysia	19	60	0	0	9	0	0	1	24	22	0	0	0	0	0
Mali	66	207	7	0	3	0	0	0	0	13	7	0	0	0	0
Mauritania	19	60	0	0	9	0	0	0	0	0	0	0	0	0	0
Mauritius	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	488	1,533	91	0	407	0	0	0	2	14	78	0	0	0	13
Mongolia	84	264	9	0	3	0	0	13	0	1	3	0	3	3	0
Montenegro	3	9	0	0	0	0	0	0	0	1	0	0	0	0	0
Morocco	32	101	31	0	6	22	0	0	0	0	31	0	0	0	0
Mozambique	36	113	6	0	10	0	0	0	0	7	6	0	0	0	0
Myanmar	15	47	0	0	3	0	0	0	1	4	0	0	0	0	0
Namibia	84	264	116	0	33	0	0	0	0	0	88	0	26	0	0
Nauru	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
New Caledonia	7	22	0	0	3	0	0	0	0	3	0	0	0	0	0
New Zealand	57	179	64	0	4	0	3	1	11	13	37	22	5	0	0
Nicaragua	23	72	9	0	0	0	0	0	0	9	9	0	0	0	0
Niger	11	35	0	0	0	0	0	0	0	0	0	0	0	0	0
Nigeria	13	41	3	0	0	0	0	0	0	3	3	0	0	0	0
Norway	35	110	1	0	3	0	0	2	0	7	0	0	0	0	0
Oman	10	31	0	0	0	0	0	0	0	0	0	0	0	0	0
Pakistan	12	38	3	0	3	0	0	0	0	0	3	0	0	0	0
Panama	5	16	4	0	6	0	0	0	0	3	4	0	0	0	0
Papua New Guinea	50	157	6	0	38	0	27	1	0	12	6	0	0	0	0
Paraguay	4	13	0	0	0	0	0	0	0	1	0	0	0	0	0
Peru	309	971	9	0	42	0	3	1	0	7	6	0	0	3	0
Philippines	95	298	52	0	77	17	0	3	54	24	48	0	4	0	0
Portugal	22	69	8	0	6	0	0	1	24	15	5	0	0	3	0
Rep. Of the Congo	11	35	3	0	5	0	3	0	0	4	0	0	0	3	0
Romania	23	72	12	0	12	0	0	0	0	2	12	0	0	0	0
Rwanda	3	9	0	0	0	0	0	0	3	0	0	0	0	0	0
Saudi Arabia	22	69	20	0	0	0	0	0	0	0	19	0	0	1	0
Senegal	25	79	3	0	3	0	0	0	0	2	0	0	3	0	0
Sierra Leone	16	50	4	0	3	0	0	0	0	16	4	0	0	0	0
South Africa	449	1,411	34	0	167	131	0	0	32	28	29	0	0	5	0
Sudan	7	22	0	0	0	0	0	0	0	0	0	0	0	0	0
Suriname	8	25	0	0	3	0	0	0	0	10	0	0	0	0	0
Tanzania	67	210	23	0	13	0	0	0	0	13	23	0	0	0	0
Thailand	9	28	3	0	3	0	0	0	0	2	0	0	0	3	0
Uganda	10	31	5	0	0	0	0	0	0	1	5	0	0	0	0
Ukraine	205	644	13	0	8	0	0	0	4	3	13	0	0	0	0
Uruguay	7	22	0	0	4	0	0	0	3	2	0	0	0	0	0
Venezuela	11	35	16	0	9	0	0	1	0	3	16	0	0	0	0
Vietnam	32	101	3	0	1	0	0	4	20	16	3	0	0	0	0
Zambia	82	258	38	0	6	0	0	1	0	27	31	0	6	0	0
Zimbabwe	70	220	14	0	0	0	0	0	0	7	14	0	0	0	0

[48] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

Table D – Country[49] / Mining Concessions (1)

A table summarizing by country, 'active' mining concession area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Mining Concessions	Area of 'Active' Mining Concessions	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped
Argentina	18,560	296,730	43,925	0	22,615	0	1,137	193	104	569	34,214	441	1,415	7,763	54
Australia	36,173	1,809,801	169,048	533	58,897	0	5,223	2,335	5,522	34,819	135,254	4,001	20,646	9,022	164
Benin	108	25,150	3,738	0	928	0	0	4	0	1,508	3,738	0	0	1	0
Bolivia	6,794	16,845	1,808	0	2,417	0	366	84	0	533	1,809	0	0	0	0
Botswana	287	65,421	4,699	0	10,722	0	0	15	0	4	2,652	0	0	2,048	0
Brazil	126,373	1,136,944	113,629	1,079	78,355	0	46,199	12,879	13,241	143,402	106,686	535	2,502	3,748	64
Bulgaria	127	2,329	1,077	0	539	0	0	17	87	33	1,077	0	1	0	0
Burkina Faso	174	16,943	309	0	2	0	0	21	0	137	308	0	0	1	0
Cambodia	99	22,182	14,045	7	8,156	0	26	346	1,988	5,285	10,899	32	3,110	3	2
Canada	760,074	626,803	3,249	0	3,344	1,089	184,605	281,264	0	66,314	2,001	24	632	588	15
Chile	77,831	179,110	5,841	0	5,872	0	842	351	1,646	4,270	5,090	90	479	167	0
Colombia	6,093	28,171	1,523	1	2,465	1,805	1,629	752	135	2,171	1,198	0	325	1	0
Costa Rica	584	392	301	0	198	0	0	6	11	36	300	0	0	1	0
Côte d'Ivoire	552	56,327	4,894	16	44	0	0	210	44	8,516	4,844	0	44	7	0
Cyprus	112	163	107	0	26	0	0	0	0	2	107	0	0	0	0
Czech Republic	962	1,110	129	0	67	0	0	2	3	56	127	1	1	0	0
Dominican Republic	135	1,832	180	0	70	0	0	4	0	154	72	13	90	5	0
DRC	756	30,748	1,791	0	555	0	1,774	260	20	3,868	1,514	0	214	62	0
Ecuador	5,910	18,341	1,306	0	6,001	0	1,495	157	72	526	1,240	0	41	23	0
Eritrea	37	17,707	4,395	0	2,186	0	0	0	0	0	3,798	0	597	0	0
Ethiopia	316	37,902	8,163	0	8,074	0	55	62	0	384	3,527	0	4,225	411	0
Finland	811	16,753	145	0	82	0	39	5,017	0	2,652	69	0	1	28	48
France	160	8,483	1,227	0	349	0	0	52	1,035	163	1,224	0	0	2	1
French Guiana	106	1,434	266	0	35	0	501	23	0	41	261	0	0	5	0
Gabon	50	59,072	6,824	1	2,004	0	15,534	1,362	0	1,185	6,537	0	0	286	0
Germany	6,501	40,862	18,399	0	3,494	0	0	605	126	1,562	18,298	3	9	89	0
Ghana	1,378	9,904	1,031	1	709	0	0	85	26	2,173	665	366	0	0	0
Guatemala	324	3,852	58	0	520	0	0	18	17	246	27	18	0	13	0
Guinea	528	109,461	18,090	387	1,891	0	0	664	0	17,167	18,031	0	1	1	60
Guyana	8,374	23,148	31	0	103	0	10,578	1,157	0	350	31	0	0	0	0
Honduras	315	1,915	104	0	34	0	0	5	56	235	48	0	47	10	0
Hungary	526	21,841	4,141	0	2,901	0	0	478	3,014	793	3,914	0	1	226	0
Indonesia	6,598	91,005	669	473	8,330	0	2,678	6,185	13,517	24,637	362	0	232	75	0
Ireland	404	13,945	974	0	309	0	0	2,716	2,619	339	974	0	0	0	0

[49] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

Table E – Country[50] / Mining Concessions (2)

A table summarizing by country, 'active' mining concession area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Mining Concessions	Area of 'Active' Mining Concessions	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped	Protected Areas Scored 6 Overlapped	Protected Areas Scored 7 Overlapped	Protected Areas Scored 8 Overlapped
Kazakhstan	389	31,603	2,190	0	3,068	0	980	0	0	28	2,119	0	70	0	0	0	0	0
Laos	414	63,908	5,955	0	8,146	0	6	492	0	14,851	5,668	0	288	0	0	0	0	0
Liberia	162	21,569	2,603	43	8,380	0	241	618	148	3,562	2,604	0	0	0	0	0	0	0
Madagascar	1,530	25,269	1,571	75	1,542	0	23	285	0	2,899	1,434	0	135	1	2	0	0	0
Mali	379	27,603	843	0	501	0	0	9	0	682	844	0	0	0	0	0	0	0
Mexico	17,720	193,273	19,682	70	41,936	0	19	278	971	1,394	16,210	9	93	458	2,915	0	1	0
Mongolia	3,134	74,960	286	0	535	0	0	1,993	0	19	193	0	69	24	1	0	0	0
Myanmar	45	45,875	1,747	0	2,794	0	1,923	239	586	3,228	324	0	1,424	0	0	0	0	0
Namibia	830	103,537	31,600	0	11,668	0	0	18	0	7	28,812	0	2,787	1	0	0	0	0
New Caledonia	2,720	5,695	1,680	51	960	0	0	171	0	142	1,587	0	4	74	14	0	0	0
New Zealand	855	14,308	3,931	0	646	0	1,007	45	1,567	1,317	2,316	1,506	107	1	1	1	0	0
Nicaragua	277	10,303	3,559	0	1	0	17	32	0	1,874	3,559	0	0	0	0	0	0	0
Niger	154	49,044	7,809	0	5,379	56	0	0	0	0	7,810	0	0	0	0	0	0	0
Nigeria	234	2,937	474	0	12	0	0	2	0	160	474	0	0	0	0	0	0	0
Norway	1,406	10,683	285	0	156	0	124	588	0	483	114	0	4	157	11	0	0	0
Panama	240	1,009	140	1	191	0	7	5	0	75	125	0	14	0	0	0	0	0
Papua New Guinea	226	15,700	209	72	2,246	0	3,567	527	0	342	209	0	0	0	0	0	0	0
Peru	36,208	148,388	1,901	0	8,955	1	2,618	643	103	1,586	1,870	1	1	30	0	0	0	0
Philippines	1,105	12,405	838	21	2,949	226	11	123	2,159	683	734	0	95	9	0	0	0	0
Poland	6,716	9,665	3,322	0	1,302	0	0	704	4	563	3,267	6	1	50	0	0	0	0
Portugal	1,386	5,058	717	0	553	0	0	14	1,466	471	717	0	0	0	0	0	0	0
Rwanda	473	951	0	0	65	0	0	1	151	26	0	0	0	0	0	0	0	0
Serbia	621	6,721	322	0	640	0	0	0	100	73	306	0	16	0	0	0	0	0
Sierra Leone	907	3,415	507	9	206	0	0	30	0	1,158	507	0	0	0	0	0	0	0
South Sudan	58	50,134	837	0	4,405	0	0	93	0	380	444	0	393	0	0	0	0	0
Spain	11,351	35,541	7,019	0	11,402	0	0	89	12,658	2,054	6,596	26	59	104	236	0	0	0
Sudan	191	228,440	1,200	1	4,942	0	0	34	0	22	1,200	0	0	0	0	0	0	0
Sweden	814	10,851	424	0	14	0	66	1,696	0	1,650	190	0	2	95	138	0	0	0
Tanzania	23,132	48,634	9,023	27	5,532	0	3	188	0	2,372	8,917	0	83	23	0	0	0	0
Tunisia	126	2,719	252	0	283	0	0	32	0	15	252	0	0	0	0	0	0	0
Ukraine	344	3,228	162	0	18	0	0	84	13	36	135	0	0	23	4	0	0	0
Uruguay	1,087	1,528	87	0	185	0	0	9	62	29	87	0	0	0	0	0	0	0
USA (Alaska)	46,558	18,228	165	0	874	0	4,015	585	0	940	144	0	0	22	0	0	0	0
Zambia	2,509	203,058	71,178	0	11,164	0	0	1,201	0	14,493	65,883	0	5,040	251	0	0	0	0
Zimbabwe	142	128,365	37,451	0	9,086	2	0	78	0	2,891	34,196	0	1,414	1,841	0	0	0	0

[50] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

Table F – Country[51] / Oil and Gas Wells (1)

A table summarizing by country, 'active' oil and gas wells area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Oil and Gas Wells	Area of 'Active' Oil and Gas Wells	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas Overlapped	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped	Protected Areas Scored 6 Overlapped	Protected Areas Scored 7 Overlapped	Protected Areas Scored 8 Overlapped
Afghanistan	55	173	9	0	13	0	0	2	0	0	9	0	0	0	0	0	0	0
Algeria	7,273	22,849	31	0	13	908	0	0	0	0	31	0	0	0	0	0	0	0
Angola	2,090	6,566	231	5	231	0	0	0	0	154	0	0	231	0	0	0	0	0
Argentina	52,920	166,253	7,561	0	3,428	0	8	119	6	136	7,128	0	0	50	0	0	0	0
Australia	20,065	63,036	7,678	1	2,956	0	4	76	37	1,000	4,613	15	153	2,888	9	0	0	0
Austria	25	79	2	0	3	0	0	3	8	1	2	0	0	0	0	0	0	0
Bahrain	1,568	4,926	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Bangladesh	173	543	0	0	0	0	0	246	0	11	0	0	0	0	0	0	0	0
Barbados	269	845	2	0	18	0	0	0	0	2	1	1	0	0	0	0	0	0
Belarus	24	75	3	0	3	0	0	3	0	7	0	0	0	0	3	0	0	0
Belize	44	138	0	0	9	0	0	0	0	31	0	0	0	0	0	0	0	0
Bolivia	1,304	4,097	795	0	194	0	21	51	0	770	794	0	0	0	0	0	0	0
Botswana	42	132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brazil	21,616	67,909	2,196	272	183	0	28	590	1,288	4,085	2,187	0	0	8	0	0	0	0
Brunei	1,515	4,760	43	0	430	0	0	194	0	49	0	0	0	44	0	0	0	0
Bulgaria	594	1,866	1,032	0	419	0	0	4	14	7	1,026	0	0	0	6	0	0	0
Cameroon	697	2,190	28	1	0	0	0	2	0	4	13	0	12	3	0	0	0	0
Canada	1,292	4,059	60	0	1,030	6	28	876	0	153	25	11	7	15	0	0	0	0
Chad	896	2,815	76	0	0	0	0	0	0	159	76	0	0	0	0	0	0	0
Chile	1,378	4,329	103	0	71	0	0	6	0	0	98	0	4	0	0	0	0	0
China	2,207	6,933	3	0	50	0	0	24	0	15	3	0	0	0	0	0	0	0
Colombia	15,269	47,969	2,499	3	1,186	1,319	3	3,861	1,107	3,680	2,466	0	5	31	0	0	0	0
Congo	873	2,743	20	1	33	0	0	3	0	178	20	0	0	0	0	0	0	0
Congo (Dem Rep)	206	647	174	1	0	0	0	2	0	31	173	0	0	0	0	0	0	0
Cote D'Ivoire	162	509	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Croatia	137	430	32	0	31	0	0	0	5	4	32	0	0	0	0	0	0	0
Cuba	46	145	1	3	8	0	0	10	0	2	0	0	1	0	0	0	0	0
Czech Republic	65	204	28	0	5	0	0	0	1	6	28	0	0	0	0	0	0	0
Denmark	614	1,929	3	0	0	0	0	0	62	1	3	0	0	0	0	0	0	0
Ecuador	2,702	8,489	1,194	0	1,839	0	151	353	57	1,617	48	0	1,062	31	54	0	0	0
Egypt	9,081	28,529	2,696	0	4,013	0	0	230	0	4	2,697	0	0	0	0	0	0	0
Equatorial Guinea	166	522	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
France	3,606	11,329	1,404	0	587	0	0	64	1,052	286	1,404	0	0	0	0	0	0	0
Gabon	1,720	5,404	3,374	130	1,542	0	0	353	0	222	3,374	0	0	0	0	0	0	0
Germany	3,164	9,940	2,195	0	977	0	0	2,109	11	105	2,079	0	0	116	0	0	0	0
Ghana	148	465	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greece	46	145	141	0	143	0	0	0	0	0	141	0	0	0	0	0	0	0
Guatemala	89	280	182	0	227	0	0	2	0	75	20	2	124	36	0	0	0	0
Guyana	120	377	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	5,179	16,270	1,687	0	502	0	0	79	1,926	509	1,671	2	1	12	0	0	0	0
India	15,947	50,099	0	3	398	0	0	3,721	2,203	279	0	0	0	0	0	0	0	0
Indonesia	28,424	89,297	785	920	453	0	1	19,972	27,283	22,738	760	0	23	3	0	0	0	0
Iran	4,258	13,377	6	0	338	0	0	55	0	0	6	0	0	0	0	0	0	0
Iraq	3,861	12,130	471	0	647	0	0	53	0	0	471	0	0	0	0	0	0	0
Ireland	28	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Israel	476	1,495	105	0	369	0	0	2	0	2	105	0	0	0	0	0	0	0
Italy	4,146	13,025	950	0	1,315	0	0	10	473	72	804	0	75	72	0	0	0	0
Jordan	619	1,945	8	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0

[51] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

Table G – Country[52] / Oil and Gas Wells (2)

A table summarizing by country, 'active' oil and gas wells area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Oil and Gas Wells	Area of 'Active' Oil and Gas Wells	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas Overlapped	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped	Protected Areas Scored 6 Overlapped	Protected Areas Scored 7 Overlapped	Protected Areas Scored 8 Overlapped
Kenya	34	107	3	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Kuwait	2,982	9,368	719	0	10	0	0	0	0	0	712	0	7	0	0	0	0	0
Libya	6,222	19,547	0	0	59	0	0	0	0	0	0	0	0	0	0	0	0	0
Lithuania	20	63	14	0	2	0	0	2	0	2	11	0	0	2	0	0	0	0
Madagascar	40	126	0	1	9	0	0	1	0	6	0	0	0	0	0	0	0	0
Malaysia	721	2,265	24	0	0	0	0	6	4	4	15	0	9	0	0	0	0	0
Mauritania	36	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	27,455	86,252	1,150	744	8,847	0	0	2,754	68	4,808	770	0	0	0	380	0	0	0
Moldova	34	107	104	0	107	0	0	0	0	1	104	0	0	0	0	0	0	0
Morocco	490	1,539	50	0	8	20	0	0	0	10	50	0	0	0	0	0	0	0
Mozambique	140	440	0	0	144	0	0	0	0	32	0	0	0	0	0	0	0	0
Myanmar	1,481	4,653	0	0	727	0	0	148	3	2	0	0	0	0	0	0	0	0
Netherlands	1,880	5,906	668	0	585	0	0	953	8	11	637	0	1	31	0	0	0	0
New Zealand	472	1,483	26	0	207	0	9	16	30	34	7	9	9	0	0	0	0	0
Niger	41	129	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Nigeria	6,072	19,076	925	2,191	93	0	0	4,442	51	669	925	0	0	0	0	0	0	0
Norway	5,526	17,360	6	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
Oman	14,889	46,775	7	0	7,578	0	0	0	0	0	7	0	0	0	0	0	0	0
Pakistan	1,928	6,057	507	0	351	0	0	48	2	0	501	0	7	0	0	0	0	0
Papua New Guinea	157	493	6	0	30	0	45	13	0	16	6	0	0	0	0	0	0	0
Peru	7,139	22,428	72	1	111	0	141	269	0	123	72	0	0	0	0	0	0	0
Philippines	46	145	0	0	3	2	0	1	20	1	0	0	0	0	0	0	0	0
Poland	4,053	12,733	4,698	0	1,915	0	0	406	29	396	4,691	0	0	6	0	0	0	0
Romania	6,286	19,748	1,805	0	1,683	0	0	0	1,349	124	1,805	0	0	0	0	0	0	0
Russia	146	459	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Senegal	34	107	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0
Serbia	105	330	24	0	52	0	0	0	0	1	24	0	0	0	0	0	0	0
Slovakia	413	1,297	212	0	203	0	0	10	1	20	212	0	0	0	0	0	0	0
South Africa	149	468	3	0	110	9	0	0	2	1	3	0	0	0	0	0	0	0
South Sudan	892	2,802	188	0	147	0	0	4	0	17	188	0	0	0	0	0	0	0
Spain	197	619	370	0	384	0	0	0	97	8	370	0	0	0	0	0	0	0
Sudan	729	2,290	0	0	0	0	0	8	0	1	0	0	0	0	0	0	0	0
Suriname	479	1,505	1,160	0	1,151	0	2	362	0	67	1,161	0	0	0	0	0	0	0
Syria	4,479	14,071	0	0	795	0	0	1	0	0	0	0	0	0	0	0	0	0
Taiwan	237	745	0	0	6	0	0	0	0	19	0	0	0	0	0	0	0	0
Tanzania	52	163	49	2	19	0	0	2	0	7	49	0	0	0	0	0	0	0
Thailand	10,086	31,686	0	0	290	0	0	364	19	42	0	0	0	0	0	0	0	0
Timor-Leste	47	148	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Trinidad & Tobago	3,915	12,299	3,213	7	325	0	0	26	0	606	2,531	0	683	0	0	0	0	0
Tunisia	648	2,036	14	0	45	0	0	0	0	0	14	0	0	0	0	0	0	0
Turkey	3,209	10,081	0	0	1,119	0	0	27	22	29	0	0	0	0	0	0	0	0
Uganda	100	314	166	0	128	0	0	6	0	3	14	24	128	0	0	0	0	0
Ukraine	3,654	11,479	817	0	220	0	0	403	10	176	750	8	59	0	0	0	0	0
United Arab Emirates	22	69	9	0	3	0	0	0	0	0	9	0	0	0	0	0	0	0
United Kingdom	7,635	23,986	5,485	0	442	0	0	194	97	50	5,486	0	0	0	0	0	0	0
United States	12,579	39,518	788	0	4,813	0	49	776	0	20	779	0	0	9	0	0	0	0
Venezuela	47,417	148,965	113,436	169	440	0	0	1,093	42	4,130	113,295	0	134	7	0	0	0	0
Vietnam	547	1,718	27	0	0	0	0	8	0	0	27	0	0	0	0	0	0	0
Yemen	242	760	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0

[52] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

Table H – Country[53] / Oil and Gas Concessions (1)

A table summarizing by country, 'active' oil and gas concession area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Oil and Gas Concessions	Area of 'Active' Oil and Gas Concessions	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas Overlapped	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped	Protected Areas Scored 6 Overlapped	Protected Areas Scored 7 Overlapped	Protected Areas Scored 8 Overlapped
Algeria	332	181,990	4,097	0	13,806	24,353	0	202	0	1,901	2,763	0	243	1,091	0	0	0	0
Angola	179	131,607	8,692	215	6,703	0	0	242	0	982	1,346	0	7,346	0	0	0	0	0
Argentina	462	428,892	13,159	0	18,364	0	2,323	1,116	535	6,076	11,815	123	411	379	0	0	0	0
Australia	1,176	858,562	186,046	217	17,277	0	376	772	3,649	7,444	164,184	2,375	11,646	7,821	3	0	9	6
Austria	346	5,814	847	0	952	0	0	15	1,171	130	833	0	0	14	0	0	0	0
Azerbaijan	25	15,973	337	0	1,613	0	0	172	0	2	0	0	235	102	0	0	0	0
Bangladesh	51	100,553	4,092	554	8,687	0	0	34,813	24	2,777	2,943	0	955	12	180	0	0	0
Bolivia	89	47,777	11,679	0	6,168	0	9,657	127	0	2,965	11,679	0	0	0	0	0	0	0
Botswana	31	70,422	25,784	0	24,615	0	0	3	0	4	969	0	12	24,801	0	0	0	0
Brazil	658	186,593	599	39	1,848	0	3,684	559	1,162	13,340	591	0	0	8	0	0	0	0
Brunei	27	20,800	8	0	57	0	0	47	0	31	0	0	0	8	0	0	0	0
Cameroon	24	3,365	919	134	0	0	81	148	0	7	0	0	612	306	0	0	0	0
Canada	854	175,391	1,186	0	3,202	13,424	1,885	33,472	0	10,065	493	50	361	279	2	0	3	0
Chad	26	1,847	0	0	0	0	0	1	0	83	0	0	0	0	0	0	0	0
China	693	929,578	5,408	2	16,400	0	0	3,688	0	875	1,831	0	3,577	0	0	0	0	0
Colombia	412	173,021	3,780	4	3,622	19,431	3,183	9,118	2,730	11,977	3,412	0	324	42	0	0	0	0
Congo	56	31,898	16,085	10	5,104	0	12,970	13,471	0	811	16,015	0	14	57	0	0	0	0
Cote D'Ivoire	29	20,614	224	14	122	0	0	508	136	1,070	217	0	7	0	0	0	0	0
Croatia	66	16,610	3,951	0	3,250	0	0	0	362	336	3,951	0	0	0	0	0	0	0
Cuba	28	39,524	2,138	497	1,478	0	0	750	0	649	1,780	6	75	206	20	53	0	0
Ecuador	71	44,333	10,106	7	15,968	0	13,463	2,661	63	3,264	3,265	0	5,999	816	25	0	0	0
Egypt	525	185,408	11,080	0	6,990	0	0	2,412	0	17	9,314	1,762	3	3	0	0	0	0
Equatorial Guinea	24	18,618	47	0	0	0	0	4	0	1	0	0	47	0	0	0	0	0
France	59	3,913	478	0	134	0	0	32	281	89	477	0	0	1	0	0	0	0
Gabon	80	55,655	18,842	229	4,700	0	1,631	2,265	0	436	18,802	0	0	38	0	0	0	0
Georgia	30	42,130	2,424	0	7,741	0	609	0	9	60	583	21	1,538	278	4	0	1	0
Germany	172	14,620	4,458	0	2,034	0	0	1,691	9	187	3,675	0	0	783	0	0	0	0
Guatemala	29	8,091	3,524	0	3,601	0	114	41	145	2,571	3,132	189	71	132	0	0	0	0
Hungary	313	25,389	4,679	0	3,087	0	0	491	4,593	970	4,317	0	7	356	0	0	0	0
India	727	341,480	256	100	7,145	0	0	12,278	12,692	3,325	249	0	6	0	0	0	0	0
Indonesia	435	505,460	11,090	4,528	17,002	0	5,175	50,982	70,914	64,362	6,581	731	3,044	736	0	0	0	0
Iran	138	804,078	43,584	103	44,121	0	0	1,821	0	9	33,381	0	964	9,241	0	0	0	0

[53] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

Table I – Country[54] / Oil and Gas Concessions (2)

A table summarizing by country, 'active' oil and gas concession area overlap (Sq. Km) with key comparison layers. Reporting results for selected countries.

Country	No. of 'Active' Oil and Gas Concessions	Area of 'Active' Oil and Gas Concessions	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas Overlapped	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped	Protected Areas Scored 6 Overlapped	Protected Areas Scored 7 Overlapped	Protected Areas Scored 8 Overlapped
Iraq	57	85,556	3,746	0	4,904	0	0	343	2	2	3,698	0	0	47	0	0	0	0
Italy	129	13,413	558	0	1,253	0	0	1	316	44	373	0	43	141	1	0	0	0
Kazakhstan	450	304,727	39,694	0	9,005	0	0	8,444	0	128	39,696	0	0	0	0	0	0	0
Libya	222	339,429	0	0	5,631	0	0	19	0	0	0	0	0	0	0	0	0	0
Malaysia	206	380,513	20,573	1,588	7,525	0	521	5,806	16,053	12,081	9,831	0	2,221	8,521	1	0	0	0
Mexico	526	178,739	2,310	255	9,020	0	0	2,700	502	6,843	1,975	0	0	0	335	0	0	0
Morocco	86	133,461	970	0	13,282	24,326	0	14	0	144	970	0	0	0	0	0	0	0
Mozambique	24	87,056	1,835	84	3,989	0	0	95	0	2,625	1,833	0	0	0	0	0	0	0
Myanmar	46	284,605	11,807	1,091	36,156	0	6,596	11,162	753	3,074	10,371	0	1,437	0	0	0	0	0
Namibia	43	274,043	18,194	0	230	0	0	3	0	109	18,024	0	106	65	0	0	0	0
Netherlands	200	29,417	6,984	0	6,429	0	0	2,857	102	72	6,570	0	59	356	0	0	0	0
New Zealand	34	8,219	102	0	433	0	0	7	39	33	21	81	0	0	0	0	0	0
Niger	67	34,712	8,333	0	0	30	0	0	0	0	8,335	0	0	0	0	0	0	0
Nigeria	193	101,172	6,961	6,478	2,086	0	0	13,242	351	3,669	6,875	0	0	86	0	0	0	0
Norway	980	96,285	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Oman	31	216,675	8,796	1	27,316	0	0	27	0	0	8,505	0	0	291	0	0	0	0
Pakistan	190	127,410	14,454	16	4,591	0	0	841	26	30	12,986	0	1,465	0	0	0	0	0
Papua New Guinea	40	104,043	3,316	481	15,216	0	12,505	3,780	0	1,339	3,316	0	0	0	0	0	0	0
Peru	29	48,502	1,679	5	3,643	0	16,721	3,808	0	487	1,679	0	0	0	0	0	0	0
Philippines	25	87,668	2,013	32	445	189	0	1,003	4,473	874	2,013	0	0	0	0	0	0	0
Poland	221	42,716	17,090	0	7,436	0	0	1,918	38	1,948	16,977	0	0	113	0	0	0	0
Romania	268	58,546	7,529	0	6,441	0	0	0	2,964	341	7,529	0	0	0	0	0	0	0
Serbia	31	404	26	0	40	0	0	0	2	2	26	0	0	0	0	0	0	0
Slovakia	27	2,520	904	0	757	0	0	13	5	59	898	0	0	0	5	0	0	0
South Africa	27	178,994	3,081	0	3,698	0	0	8	62	69	3,082	0	0	0	0	0	0	0
Syria	99	110,606	0	0	10,315	0	0	89	0	68	0	0	0	0	0	0	0	0
Thailand	118	115,825	7,827	0	2,674	0	0	453	353	1,282	148	0	6,273	1,401	0	0	2	0
Trinidad & Tobago	105	21,966	694	13	462	0	0	34	0	96	615	0	78	0	0	0	0	0
Tunisia	68	32,202	2,430	0	1,693	0	0	32	0	2	2,429	0	0	0	0	0	0	0
Turkey	473	284,828	3,128	0	23,950	0	0	279	334	580	3,129	0	0	0	0	0	0	0
Ukraine	446	115,193	10,499	0	1,775	0	0	822	160	1,091	9,896	40	184	371	7	0	0	0
United Arab Emirates	34	104,875	22,599	69	15,566	0	0	70	0	0	22,295	0	296	7	0	0	0	0
United Kingdom	905	46,533	12,963	0	875	0	0	382	384	104	12,965	0	0	0	0	0	0	0
United States	3,696	70,810	7,080	0	4,371	0	73	259	0	44	7,078	0	0	0	1	0	0	0
Venezuela	222	91,598	28,215	78	4,317	0	37	879	65	4,340	27,635	60	463	55	2	0	0	0
Vietnam	74	276,713	1,521	10	37	0	0	17	9	1	1,502	0	0	19	0	0	0	0

[54] The values reported here, are aggregated to the 'nation' / 'country' as stated within the source data, the actual spatial definition of these areas varies between these datasets.

***Table J – Tropical and Non-Tropical Forests – Mining** projects*

A table showing by global region the number of mining projects found within areas with differing tree cover (2010) and tropical tree cover.

Region	No. of 'Active' Mining Projects	No. of 'Active' Mining Projects with No Tree Cover (Mean) (0)	%	No. of 'Active' Mining Projects Tree Cover 2010 (Mean) (0.1 - 29.99)	%	No. of 'Active' Mining Projects Tree Cover 2010 (Mean) (30 - 59.99)	%	No. of 'Active' Mining Projects Tree Cover 2010 (Mean) (60 - 100)	%	No. of 'Active' Mining Projects with No Tropical Tree Cover (Mean) (0)	%	No. of 'Active' Mining Projects Tropical Tree Cover (Mean) (0.1 - 29.99)	%	No. of 'Active' Mining Projects Tropical Tree Cover (Mean) (30 - 59.99)	%	No. of 'Active' Mining Projects Tropical Tree Cover (Mean) (60 - 100)	%
Africa	1,596	205	12.84	1,094	68.55	223	13.97	74	4.64	313	19.61	753	47.18	309	19.36	221	13.85
Americas	6,375	1,413	22.16	1,869	29.32	1,225	19.22	1,868	29.30	5,524	86.65	286	4.49	271	4.25	294	4.61
Asia	3,315	1,047	31.58	1,619	48.84	362	10.92	287	8.66	2,486	74.99	243	7.33	275	8.30	311	9.38
Europe	1,432	52	3.63	888	62.01	325	22.70	167	11.66	1,432	100.00	0	0.00	0	0.00	0	0.00
Oceania	2,586	1,032	39.91	1,324	51.20	86	3.33	144	5.57	2,159	83.49	259	10.02	93	3.60	75	2.90
Total	**15,304**	**3,749**	**24.50**	**6,794**	**44.39**	**2,221**	**14.51**	**2,540**	**16.60**	**11,914**	**77.85**	**1,541**	**10.07**	**948**	**6.19**	**901**	**5.89**

Table K – Tropical and Non-Tropical Forests - Mining Concessions

A table showing by global region the number of mining concessions found within areas with differing tree cover (2010) and tropical tree cover.

Region	No .of 'Active' Mining Concessions	No. of 'Active' Mining Concessions with No Tree Cover (Mean) (0)	%	No. of 'Active' Mining Concessions Tree Cover 2010 (Mean) (0 - 29.99)	%	No. of 'Active' Mining Concessions Tree Cover 2010 (Mean) (30 - 59.99)	%	No. of 'Active' Mining Concessions Tree Cover 2010 (Mean) (60 - 100)	%	No. of 'Active' Mining Concessions with No Tropical Tree Cover (Mean) (0)	%	No. of 'Active' Mining Concessions Tropical Tree Cover (Mean) (0 - 29.99)	%	No. of 'Active' Mining Concessions Tropical Tree Cover (Mean) (30 - 59.99)	%	No. of Mines Tropical Tree Cover (Mean) (60 - 100)	%
Africa	6	765	0.06	3,889	0.31	2,439	0.20	642	0.05	7,318	0.59	152	0.01	108	0.01	157	0.01
Americas	1,064,199	140,385	11.26	272,041	21.82	235,023	18.85	416,750	33.43	1,038,105	83.26	6,914	0.55	9,284	0.74	9,896	0.79
Asia	11,617	3,542	0.28	2,775	0.22	1,880	0.15	3,420	0.27	11,617	0.93	0	0.00	0	0.00	0	0.00
Europe	16,670	2,433	0.20	8,290	0.66	3,329	0.27	2,618	0.21	16,670	1.34	0	0.00	0	0.00	0	0.00
Oceania	39,802	16,100	1.29	19,982	1.60	2,401	0.19	1,319	0.11	39,802	3.19	0	0.00	0	0.00	0	0.00
Total	**1,246,819**	**175,027**	**14.04**	**355,930**	**28.55**	**268,652**	**21.55**	**447,210**	**35.87**	**1,200,367**	**96.27**	**16,465**	**1.32**	**14,301**	**1.15**	**15,686**	**1.26**

Table L – Tropical and Non-Tropical Forests - Oil and Gas Wells

A table showing by global region the number of oil and gas wells found within areas with differing tree cover (2010) and tropical tree cover.

Region	No. of 'Active' Oil and Gas Wells	No. of 'Active' Oil and Gas Wells with No Tree Cover (Mean) (0)	%	No. of 'Active' Oil and Gas Wells Tree Cover 2010 (Mean) (0.1 - 29.99)	%	No. of 'Active' Oil and Gas Wells Tree Cover 2010 (Mean) (30 - 59.99)	%	No. of 'Active' Oil and Gas Wells Tree Cover 2010 (Mean) (60 - 100)	%	No. of 'Active' Oil and Gas Wells with No Tropical Tree Cover (Mean) (0)	%	No. of 'Active' Oil and Gas Wells Tropical Tree Cover (Mean) (0.1 - 29.99)	%	No. of 'Active' Oil and Gas Wells Tropical Tree Cover (Mean) (30 - 59.99)	%	No. of 'Active' Oil and Gas Wells Tropical Tree Cover (Mean) (60 - 100)	%
Africa	39,082	28,747	7.10	7,094	1.75	2,309	0.57	932	0.23	37,362	9.22	449	0.11	335	0.08	936	0.23
Americas	196,075	78,376	19.35	90,198	22.27	16,393	4.05	11,108	2.74	187,477	46.29	4,104	1.01	3,482	0.86	1,012	0.25
Asia	101,541	65,179	16.09	20,078	4.96	9,752	2.41	6,532	1.61	101,541	25.07	0	0.00	0	0.00	0	0.00
Europe	47,606	16,088	3.97	25,240	6.23	4,324	1.07	1,954	0.48	47,606	11.75	0	0.00	0	0.00	0	0.00
Oceania	20,740	6,462	1.60	13,613	3.36	480	0.12	185	0.05	20,740	5.12	0	0.00	0	0.00	0	0.00
Total	**405,044**	**194,852**	**48.11**	**156,223**	**38.57**	**33,258**	**8.21**	**20,711**	**5.11**	**394,726**	**97.45**	**4,553**	**1.12**	**3,817**	**0.94**	**1,948**	**0.48**

Table M – Tropical and Non-Tropical Forests - Oil and Gas Concessions

A table showing by global region the number of oil and gas concessions found within areas with differing tree cover (2010) and tropical tree cover.

Region	No. of 'Active' Oil and Gas Concessions	No. of 'Active' Oil and Gas Concessions with No Tree Cover (Mean) (0)	%	No. of 'Active' Oil and Gas Concessions Tree Cover 2010 (Mean) (0.1 - 29.99)	%	No. of 'Active' Oil and Gas Concessions Tree Cover 2010 (Mean) (30 - 59.99)	%	No. of 'Active' Oil and Gas Concessions Tree Cover 2010 (Mean) (60 - 100)	%	No. of 'Active' Oil and Gas Concessions with No Tropical Tree Cover (Mean) (0)	%	No. of 'Active' Oil and Gas Concessions Tropical Tree Cover (Mean) (0.1 - 29.99)	%	No. of 'Active' Oil and Gas Concessions Tropical Tree Cover (Mean) (30 - 59.99)	%	No. of 'Active' Oil and Gas Concessions Tropical Tree Cover (Mean) (60 - 100)	%
Africa	2,228	1,642	8.53	424	2.20	113	0.59	49	0.25	1,832	9.52	158	0.82	127	0.66	111	0.58
Americas	7,314	3,011	15.64	3,055	15.87	591	3.07	657	3.41	5,656	29.38	588	3.05	688	3.57	382	1.98
Asia	4,131	2,188	11.37	1,597	8.30	166	0.86	180	0.94	3,205	16.65	530	2.75	139	0.72	257	1.34
Europe	4,322	1,898	9.86	1,988	10.33	338	1.76	98	0.51	4,322	22.45	0	0.00	0	0.00	0	0.00
Oceania	1,255	687	3.57	522	2.71	15	0.08	31	0.16	1,164	6.05	57	0.30	5	0.03	29	0.15
Total	**19,250**	**9,426**	**48.97**	**7,586**	**39.41**	**1,223**	**6.35**	**1,015**	**5.27**	**16,179**	**84.05**	**1,333**	**6.92**	**959**	**4.98**	**779**	**4.05**

Table N – Issuance 2022 and 2023 - Mining Concessions

A table showing by country the number and area of mining concessions issued in the years 2022 and 2023 where award dates are recorded, and any overlap with key comparison layers. Reporting results for selected countries only where one or more concession was issued within areas of interest.

Country	No. of Mining Concessions Awarded 22 and 23	Area of Mining Concessions Awarded 22 and 23	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Forest Loss Total Area 2022 Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped
Argentina	172	4,582	843	0	1,254	0	0	0	0	4	0	822	21	0	0	0
Australia	5,179	648,823	58,096	65	21,902	0	1,602	514	2,074	13,450	131	48,649	1,893	4,939	2,569	66
Botswana	37	12,367	242	0	1,173	0	0	1	0	1	0	242	0	0	0	0
Burkina Faso	3	295	3	0	0	0	0	0	0	0	0	3	0	0	0	0
Canada	273,973	198,483	735	0	1,213	417	56,644	108,170	0	23,157	833	118	12	183	415	12
Colombia	407	1,034	14	0	64	177	0	16	2	143	8	14	0	0	0	0
Cook Islands	3	52,180	52,464	0	0	0	0	0	0	0	0	52,463	0	0	0	0
DRC	1	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ecuador	46	14	0	0	1	0	0	1	0	1	0	0	0	0	0	0
Finland	268	15,445	133	0	46	0	29	4,652	0	2,481	148	67	0	1	25	41
France	11	1,065	291	0	135	0	0	14	260	12	1	288	0	0	1	1
French Guiana	36	256	49	0	0	0	126	1	0	4	1	49	0	0	0	0
Germany	1	14	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Greenland	10	3,691	2,681	0	0	0	0	0	0	0	0	0	0	0	2,681	0
Ireland	67	2,528	224	0	70	0	0	575	858	62	2	224	0	0	0	0
Liberia	64	8,362	220	18	3,047	0	168	268	71	1,686	130	220	0	0	0	0
Mali	127	7,789	230	0	13	0	0	3	0	183	10	231	0	0	0	0
Namibia	243	22,608	6,203	0	89	0	0	0	0	2	1	6,086	0	117	0	0
New Zealand	87	5,266	919	0	24	0	214	9	417	298	14	383	535	2	0	0
Norway	571	5,093	140	0	80	0	124	313	0	209	14	43	0	0	91	6
Papua New Guinea	105	13,754	2	59	2,053	0	2,906	416	0	264	26	2	0	0	0	0
Paraguay	1	299	0	0	0	0	0	0	0	9	0	0	0	0	0	0
Peru	1,577	7,242	52	0	339	0	191	9	6	36	2	52	0	0	0	0
Rwanda	55	43	0	0	0	0	0	0	8	0	0	0	0	0	0	0
Sierra Leone	863	563	54	0	0	0	0	2	0	161	8	53	0	0	0	0
Solomon Islands	15	589	0	2	211	0	14	24	6	47	2	0	0	0	0	0
South Sudan	30	27,430	275	0	3,557	0	0	47	0	321	10	24	0	252	0	0
Sweden	123	2,729	92	0	1	0	0	407	0	465	28	45	0	0	11	36
Tanzania	5,433	15,326	3,143	2	1,607	0	3	121	0	845	41	3,121	0	20	2	0
Zambia	121	7,269	2,476	0	453	0	0	40	0	562	46	2,372	0	104	0	0
Total	**289,629**	**1,065,170**	**129,582**	**146**	**37,333**	**594**	**62,021**	**115,604**	**3,703**	**44,403**	**1,457**	**115,572**	**2,461**	**5,617**	**5,794**	**163**

Table O - Issuance 2022 and 2023 - Oil and Gas Concessions (1)

A table showing by country the number and area of oil and gas concessions issued in the years 2022 and 2023 where award dates are recorded, and any overlap with key comparison layers. Reporting results for selected countries.

Country	No. of Oil and Gas Concessions Awarded 22 and 23	Area of Oil and Gas Concessions Awarded 22 and 23	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Forest Loss Total Area 2022 Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped
Afghanistan	1	4,931	3	0	0	0	0	30	0	0	0	3	0	0	0	0
Albania	2	21	6	0	0	0	0	0	0	0	0	6	0	0	0	0
Algeria	26	10,332	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angola	34	27,898	5,617	124	5,251	0	0	168	0	367	8	0	0	5,617	0	0
Argentina	9	1,929	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Australia	41	125,834	24,656	72	270	0	3	61	69	774	34	17,783	822	399	5,650	2
Austria	2	288	8	0	68	0	0	0	163	10	0	8	0	0	0	0
Bolivia	4	5,944	395	0	68	0	37	13	0	325	26	395	0	0	0	0
Botswana	5	5,070	1,855	0	1,724	0	0	0	0	0	0	74	0	0	1,781	0
Brazil	79	15,606	27	3	8	0	0	4	307	341	19	27	0	0	0	0
Cambodia	1	7,355	3,975	135	3,200	0	0	462	426	1,424	59	522	0	3,452	0	0
Cameroon	8	716	61	0	0	0	0	0	0	0	0	0	0	61	0	0
Canada	2	1,602	0	0	0	0	0	0	0	0	0	0	0	0	0	0
China	53	34,919	0	0	3,829	0	0	332	0	145	12	0	0	0	0	0
Colombia	40	31,254	955	0	234	2,257	0	2,653	861	1,198	40	956	0	0	0	0
Congo	9	1,659	452	10	1,137	0	0	95	0	84	3	452	0	0	0	0
Congo (Dem Rep)	2	647	0	0	641	0	0	36	0	0	0	0	0	0	0	0
Cote D'Ivoire	11	9,454	0	0	0	0	0	6	0	1	0	0	0	0	0	0
Croatia	1	16	11	0	10	0	0	0	0	0	0	11	0	0	0	0
Ecuador	2	1,325	640	0	1,335	0	973	84	1	5	0	0	0	639	0	0
Egypt	38	6,559	1,209	0	5	0	0	4	0	0	0	1,210	0	0	0	0
Equatorial Guinea	4	3,710	0	0	0	0	0	1	0	0	0	0	0	0	0	0
France	1	17	17	0	0	0	0	0	17	9	0	17	0	0	0	0
Gabon	3	848	631	0	0	0	0	0	0	0	0	631	0	0	0	0
Germany	8	489	160	0	7	0	0	20	1	5	0	161	0	0	0	0
Ghana	1	1,903	0	0	0	0	0	0	0	0	0	0	0	0	0	0
India	75	64,889	0	12	187	0	0	2,190	1,670	403	31	0	0	0	0	0
Indonesia	21	119,396	348	220	635	0	1,017	5,278	8,948	6,768	218	331	0	0	17	0
Italy	1	81	12	0	4	0	0	0	1	0	0	12	0	0	0	0
Kazakhstan	50	41,837	1,710	0	1,990	0	0	928	0	0	0	1,710	0	0	0	0
Malaysia	26	138,027	7,587	69	2,514	0	0	154	6	28	1	6,823	0	754	10	0

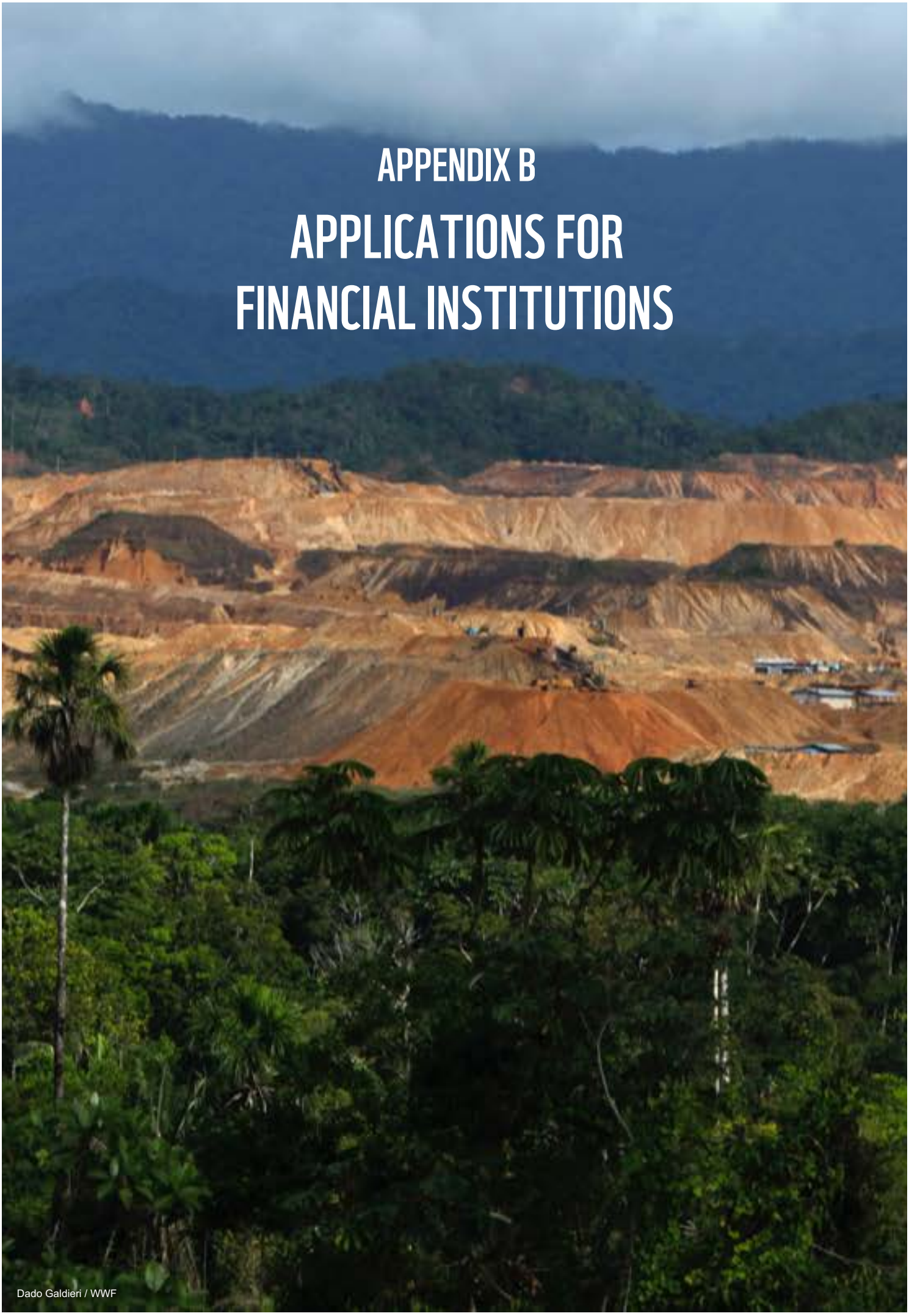
Table P - Issuance 2022 and 2023 - Oil and Gas Concessions (2)

A table showing by country the number and area of oil and gas concessions issued in the years 2022 and 2023 where award dates are recorded, and any overlap with key comparison layers. Reporting results for selected countries.

Country	No. of Oil and Gas Concessions Awarded 22 and 23	Area of Oil and Gas Concessions Awarded 22 and 23	Protected Areas Overlapped	Mangroves Overlapped	Key Biodiversity Areas	OECMs Overlapped	Intact Forest Landscapes 2020 Overlapped	Peatlands Overlapped	Planted Trees Overlapped	Forest Loss Total Area (2001 to 2022) Overlapped	Forest Loss Total Area 2022 Overlapped	Protected Areas Scored 1 Overlapped	Protected Areas Scored 2 Overlapped	Protected Areas Scored 3 Overlapped	Protected Areas Scored 4 Overlapped	Protected Areas Scored 5 Overlapped
Mauritania	2	6,422	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	1	850	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mongolia	1	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Morocco	30	48,617	86	0	191	119	0	6	0	99	11	86	0	0	0	0
Namibia	6	44,908	531	0	0	0	0	0	0	27	0	531	0	0	0	0
Netherlands	9	692	122	0	138	0	0	0	0	0	0	121	0	0	0	0
New Zealand	2	444	0	0	0	0	0	0	2	3	0	0	0	0	0	0
Niger	5	20,599	5,561	0	0	30	0	0	0	0	0	5,562	0	0	0	0
Nigeria	50	5,114	82	134	0	0	0	226	6	48	8	82	0	0	0	0
Norway	206	23,059	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oman	5	5,843	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pakistan	15	21,011	812	0	331	0	0	64	6	0	0	813	0	0	0	0
Papua New Guinea	1	510	8	0	37	0	0	22	0	21	0	8	0	0	0	0
Peru	1	5,126	0	0	26	0	3,110	317	0	68	6	0	0	0	0	0
Philippines	1	7,728	25	0	170	0	0	419	2,798	679	36	25	0	0	0	0
Qatar	6	1,475	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Russia	4	3,863	0	0	0	0	0	145	0	369	10	0	0	0	0	0
Seychelles	2	9,706	9,770	0	0	0	0	0	0	0	0	9,769	0	0	0	0
Somalia	7	35,117	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Africa	2	247	39	0	163	0	0	2	1	7	0	39	0	0	0	0
Suriname	3	4,458	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Thailand	3	34,952	148	0	0	0	0	0	0	0	0	148	0	0	0	0
Timor-Leste	1	2,247	965	0	1,006	0	0	12	0	71	2	964	0	0	0	0
Trinidad & Tobago	3	3,993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tunisia	7	7,907	736	0	241	0	0	16	0	0	0	736	0	0	0	0
Turkey	63	24,130	9	0	7,374	0	0	24	43	87	6	9	0	0	0	0
Uganda	2	1,852	513	0	768	0	0	14	0	23	2	82	424	7	0	0
Ukraine	4	365	35	0	3	0	0	0	0	9	0	32	1	2	0	0
United Arab Emirates	1	2,102	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uruguay	4	60,670	0	0	101	0	0	0	0	0	0	0	0	0	0	0
Venezuela	1	595	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Zimbabwe	2	2,996	673	0	93	0	0	0	0	36	1	674	0	0	0	0
Total	**1,014**	**1,070,030**	**70,461**	**779**	**33,760**	**2,406**	**5,140**	**13,789**	**15,328**	**13,443**	**533**	**50,822**	**1,247**	**10,933**	**7,459**	**2**

APPENDIX B

APPLICATIONS FOR FINANCIAL INSTITUTIONS



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APPENDIX B.1 – OVERVIEW OF FINANCIAL INSTITUTIONS' HOLDINGS

Table Q

A table summarizing the total number and area of assets, and total number and area of 'active' assets, as held within the identified holdings of the four financial institutions.[55]

	DNB	KLP	NBIM	Storebrand
Total No. of 'Active' Mining Projects Assessed	1,023	2,161	1,877	947
Total Area of 'Active' Mining Projects Assessed	3,214	6,789	5,897	2,975
Total No. of 'Active' Mining Concessions Assessed	26,230	69,671	62,710	32,406
Total Area of 'Active' Mining Concessions Assessed	313,428	402,241	412,857	228,823
Total No. of 'Active' Oil and Gas Wells Assessed	71,033	75,517	65,212	83,861
Total Area of 'Active' Oil and Gas Wells Assessed	223,157	237,244	204,870	263,457
Total No. of 'Active' Oil and Gas Concessions Assessed	6,813	7,423	5,438	6,088
Total Area of 'Active' Oil and Gas Concessions Assessed	3,111,450	3,498,917	2,912,566	3,477,774

APPENDIX B.2 – ADJUSTING RESULTS BY OWNERSHIP

Although not reported in this document, it is possible to adjust results by '% of ownership' both at the portfolio level (e.g. % of equity held within the portfolio) and, or, at the parent company level (e.g.% of ownership in each asset). Allowing ownership % to be factored within the results.

Table R - Adjusting Results by Ownership

Results can be adjusted by % of equity (orange cells) a given financial institution holds in a parent company.

Company Name	EQ %Port	EQ %Port Chg [6M]	Mkt Val (MM)	Mkt Val Chg (MM) [6M]	%OS	Position (000)	Position Chg (000) [6M]
29Metals Ltd Ord	0.000117	0.00	1	0	0.47	3,330	0
Aeris Resources Ltd Ord	0.000207	0.00	2	0	2.94	20,340	0
African Rainbow Minerals Ltd Ord	0.002480	0.00	24	0	1.18	2,641	0
Agnico Eagle Mines Ltd Com	0.039297	-0.02	15	-2	0.06	304	-48
Alamos Gold Inc Cl A	0.005798	0.00	56	0	1.03	4,091	0

[55] There is overlap between the portfolios with the four financial institutions frequently holding equity within the same parent company. Subsequently, the portfolio results shown may duplicate values when reporting the results of the same parent company held by multiple financial institutions.

Table S – Adjusting Results by Ownership

Results can be adjusted by % of ownership (orange cells) a given parent company holds in an asset.

Parent Company	Ownership %	List of Owners (S&P)	Property Name
Aeris Resources Limited	100.00%	Aeris Resources Limited (Owner) 100%	Tritton
Aeris Resources Limited	30.00%	Helix Resources Limited (Venturer) 70%; Aeris Resources Limited (Venturer) 30%	Canbelago
African Rainbow Minerals Limited	100.00%	African Rainbow Minerals Limited (Owner) 100%	Bokoni
African Rainbow Minerals Limited	54.00%	African Rainbow Minerals Limited (Venturer) 54%; Impala Platinum Holdings Limited (Venturer) 46%	Two Rivers
African Rainbow Minerals Limited	26.01%	Glencore plc (Venturer) 73.99%; African Rainbow Minerals Limited (Venturer) 26.01%	Goedgevonden
African Rainbow Minerals Limited	50.00%	African Rainbow Minerals Limited (Venturer) 50%; Assore Limited (Venturer) 50%	Nchwaning/Gloria

APPENDIX B.2 PARENT COMPANY - OVERVIEW

Here we report a sample of results aggregated to parent level. Reporting a random sample of companies listed within the one or multiple of the four financial institutions portfolios.bResults are divided by the asset type (e.g. mining project, mining concessions), reporting the overlaps (number and area) of aggregated ‘active’ assets with the key comparison layers. Results aggregate all identified ownership stakes (>0.1%) to each unique parent company. Subsequently, results include repeated asset values when ownership is held across multiple parent companies. Results may contain error (See methodology and data limitations).

Table T – Parent Companies – Mining Projects

Here, as illustrative, we report a sample of results aggregated to parent company, considering mining projects against key comparison layers. The table summarizes by parent company, the area (Sq. Km) of active mining projects overlapping key variables.

Parent Company	FI/s	No. of Mining Projects Assessed	Area of Mining Projects Assessed	Protected Areas	%	Mangroves	%	Key Biodiversity Areas	%	OECMs	%	Intact Forest Landscapes 2020	%	Peatlands	%	Planted Trees	%	Forest Loss Total Area (2001 to 2022)	%	Protected Areas Scored 1	%	Protected Areas Scored 2	%	Protected Areas Scored 3	%	Protected Areas Scored 4	%	Protected Areas Scored 5	%
Agnico Eagle Mines Limited	KLP, NBIM, Storebrand	66	207	5	2.22	0	0.00	5	2.28	0	0.00	6	3.03	89	43.06	0	0.00	19	9.39	4	1.93	0	0.00	0	0.00	1	0.28	0	0.00
Alamos Gold Inc.	KLP, NBIM	24	75	0	0.03	0	0.00	5	6.67	0	0.00	0	0.00	34	45.58	2	2.04	3	3.38	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Alpha Metallurgical Resources, Inc.	NBIM	35	110	3	2.67	0	0.00	0	0.29	0	0.00	0	0.00	1	0.64	0	0.00	15	13.26	3	2.67	0	0.00	0	0.00	0	0.00	0	0.00
Anglo American plc	DNB, KLP, NBIM	51	160	12	7.32	0	0.00	15	9.31	9	5.62	0	0.00	5	2.92	0	0.25	4	2.80	9	5.68	0	0.00	0	0.00	0	0.03	3	1.61
Antofagasta plc	DNB, KLP, NBIM, Storebrand	21	66	0	0.00	0	0.00	3	4.75	0	0.00	6	9.51	0	0.40	0	0.13	1	1.45	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Argonaut Gold Inc.	NBIM	15	47	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	15	32.61	0	0.00	2	4.41	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
BHP Group Ltd	DNB, KLP, NBIM	72	226	3	1.41	0	0.00	6	2.78	0	0.00	0	0.09	10	4.48	0	0.00	5	2.10	3	1.40	0	0.00	0	0.00	0	0.00	0	0.00
Cameco Corporation	DNB, KLP, NBIM, Storebrand	24	75	3	4.16	0	0.00	3	4.18	0	0.00	0	0.07	29	38.62	0	0.00	18	23.42	3	4.17	0	0.00	0	0.00	0	0.00	0	0.00
Coeur Mining, Inc.	KLP, NBIM	11	35	0	0.00	0	0.00	9	27.34	0	0.00	9	27.24	3	9.04	0	0.00	2	4.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Eldorado Gold Corporation	KLP, Storebrand	19	60	1	2.10	0	0.00	6	10.46	0	0.00	0	0.00	22	36.78	0	0.00	6	10.17	1	2.11	0	0.00	0	0.00	0	0.00	0	0.00
Fortescue Metals Group Ltd	DNB, KLP, NBIM, Storebrand	18	57	0	0.00	0	0.00	3	5.60	0	0.00	0	0.00	0	0.00	0	0.00	0	0.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Fresnillo plc	DNB, NBIM, Storebrand	31	97	0	0.00	0	0.00	31	31.55	0	0.00	0	0.00	0	0.00	0	0.00	1	0.57	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Gold Fields Limited	DNB, KLP, NBIM, Storebrand	24	75	3	4.19	0	0.00	0	0.00	0	0.00	3	4.16	13	16.64	0	0.16	5	6.93	0	0.00	3	3.98	0	0.00	0	0.00	0	0.00
Hecla Mining Company	KLP, NBIM	23	72	1	1.06	0	0.00	0	0.00	0	0.00	8	11.25	13	17.33	0	0.00	3	3.95	0	0.00	0	0.00	0	0.00	1	1.09	0	0.00
Hochschild Mining plc	KLP, NBIM	13	41	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.68	3	6.82	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Hudbay Minerals Inc	KLP, NBIM	20	63	3	5.02	0	0.00	1	1.49	0	0.00	3	4.99	24	38.42	0	0.00	1	1.20	3	5.01	0	0.00	0	0.00	0	0.01	0	0.00
IAMGOLD Corporation	KLP, NBIM	23	72	6	8.75	0	0.00	3	4.36	0	0.00	0	0.00	23	32.05	0	0.00	6	7.70	6	8.74	0	0.00	0	0.00	0	0.00	0	0.00
IGO Limited	DNB, KLP, NBIM, Storebrand	36	113	19	17.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	1.11	7	6.56	16	14.56	0	0.00	0	0.00	3	2.41	0	0.00
Impala Platinum Holdings Limited	DNB, KLP, NBIM, Storebrand	21	66	0	0.00	0	0.00	3	4.65	7	10.61	0	0.00	33	49.98	0	0.00	7	9.98	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Kinross Gold Corporation	KLP, NBIM, Storebrand	26	82	3	3.34	0	0.00	3	3.82	0	0.00	9	11.52	15	18.01	0	0.00	5	6.01	3	3.33	0	0.00	0	0.00	0	0.00	0	0.00
New Gold Inc.	KLP, Storebrand	4	13	0	0.00	0	0.00	3	24.24	0	0.00	0	0.00	6	49.87	0	0.00	1	8.29	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Newmont Corporation	DNB, KLP, NBIM, Storebrand	86	270	8	2.99	0	0.00	12	4.60	0	0.00	24	8.83	44	16.39	3	0.96	16	5.84	8	2.98	0	0.00	0	0.00	0	0.00	0	0.00
Northern Star Resources Ltd	DNB, KLP, NBIM, Storebrand	34	107	6	5.90	0	0.00	0	0.00	0	0.00	0	0.04	0	0.00	0	0.00	1	1.25	3	2.95	0	0.00	3	2.81	0	0.00	0	0.00
Rio Tinto Limited	DNB, KLP, NBIM	87	273	28	10.39	0	0.00	12	4.44	0	0.00	5	1.73	23	8.51	3	0.99	18	6.67	25	9.24	0	0.00	0	0.00	3	1.16	0	0.00
Seabridge Gold Inc	KLP	7	22	2	8.55	0	0.00	0	0.00	0	0.00	16	71.01	0	0.00	0	0.00	0	0.20	0	0.00	0	0.00	0	0.00	2	8.46	0	0.00
South32 Ltd.	DNB, KLP, NBIM	23	72	9	13.11	0	0.00	3	4.37	0	0.00	0	0.00	1	1.70	0	0.00	6	7.88	6	8.73	0	0.00	0	0.00	3	4.35	0	0.00
Sumitomo Metal Mining Co., Ltd.	DNB, KLP, NBIM, Storebrand	22	69	0	0.00	0	0.00	0	0.19	0	0.00	4	5.62	10	13.78	3	3.76	3	4.58	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Victoria Gold Corp.	KLP	8	25	0	0.00	0	0.00	0	0.00	0	0.00	3	12.48	3	12.42	0	0.00	2	6.69	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Table U – Parent Companies – Mining Projects (2)

Here, as illustrative, we report a sample of results aggregated to parent company, considering mining projects against key comparison layers.
The table summarizes by parent company, the number of active mining projects overlapping key variables.

Parent Company	FI/s	No. of Mining Concessions Assessed	Area of Mining Concessions Assessed	Protected Areas	%	Mangroves	%	Key Biodiversity Areas	%	OECMs	%	Intact Forest Landscapes 2020	%	Peatlands	%	Planted Trees	%	Forest Loss Total Area (2001 to 2022)	%	Protected Areas Scored 1	%	Protected Areas Scored 2	%	Protected Areas Scored 3	%	Protected Areas Scored 4	%	Protected Areas Scored 5	%
Agnico Eagle Mines Limited	KLP, NBIM, Storebrand	8,034	2,841	2	0.08	0	0.00	7	0.23	0	0.00	294	10.35	1,440	50.68	0	0.00	140	4.92	0	0.00	0	0.00	2	0.08	0	0.01	0	0.00
Alamos Gold Inc.	KLP, NBIM	4,299	1,543	9	0.60	0	0.00	0	0.00	0	0.00	157	10.19	1,175	76.19	0	0.00	72	4.69	0	0.00	0	0.00	9	0.60	0	0.00	0	0.00
Alpha Metallurgical Resources, Inc.	NBIM	595	812	13	1.58	0	0.00	0	0.03	0	0.00	0	0.00	0	0.06	0	0.01	81	9.98	13	1.55	0	0.03	0	0.00	0	0.00	0	0.00
Anglo American plc	DNB, KLP, NBIM	1,584	61,532	8,090	13.15	0	0.00	6,286	10.22	0	0.00	874	1.42	435	0.71	35	0.06	7,660	12.45	7,890	12.82	2	0.00	2	0.00	188	0.30	9	0.02
Antofagasta plc	DNB, KLP, NBIM, Storebrand	2,791	8,842	120	1.36	0	0.00	132	1.49	0	0.00	0	0.00	2	0.02	7	0.08	43	0.49	31	0.35	62	0.70	27	0.31	0	0.00	0	0.00
Argonaut Gold Inc.	NBIM	886	230	18	7.75	0	0.00	0	0.00	0	0.00	12	5.18	204	88.89	0	0.00	19	8.17	0	0.00	0	0.00	0	0.00	18	7.70	0	0.00
BHP Group Ltd	DNB, KLP, NBIM	1,085	29,841	5,106	17.11	0	0.00	164	0.55	0	0.00	1,268	4.25	31	0.10	6	0.02	778	2.61	5,074	17.00	0	0.00	17	0.06	15	0.05	1	0.00
Cameco Corporation	DNB, KLP, NBIM, Storebrand	566	6,898	91	1.32	0	0.00	0	0.00	0	0.00	1,368	19.83	3,955	57.34	0	0.00	1,886	27.35	0	0.00	0	0.00	91	1.32	0	0.00	0	0.00
Coeur Mining, Inc.	KLP, NBIM	771	511	9	1.69	0	0.00	60	11.79	0	0.00	382	74.70	27	5.36	0	0.00	1	0.23	9	1.68	0	0.00	0	0.00	0	0.00	0	0.00
Eldorado Gold Corporation	KLP, Storebrand	664	329	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	260	78.99	2	0.65	44	13.38	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Fortescue Metals Group Ltd	DNB, KLP, NBIM, Storebrand	601	43,599	8,754	20.08	0	0.00	791	1.81	0	0.00	0	0.00	1	0.00	0	0.00	375	0.86	8,311	19.06	157	0.36	54	0.12	174	0.40	56	0.13
Fresnillo plc	DNB, NBIM, Storebrand	1,108	4,873	288	5.91	0	0.00	119	2.44	0	0.00	118	2.41	15	0.30	127	2.61	362	7.42	288	5.90	0	0.00	0	0.00	0	0.00	0	0.00
Gold Fields Limited	DNB, KLP, NBIM, Storebrand	766	5,767	274	4.75	0	0.00	0	0.00	0	0.00	24	0.42	3	0.05	6	0.11	224	3.88	258	4.47	0	0.00	0	0.00	16	0.29	0	0.00
Hecla Mining Company	KLP, NBIM	11,479	2,753	2	0.07	0	0.00	0	0.00	0	0.00	2,474	89.87	433	15.72	0	0.00	124	4.49	2	0.07	0	0.00	0	0.00	0	0.00	0	0.00
Hochschild Mining plc	KLP, NBIM	778	2,187	0	0.02	0	0.00	0	0.00	0	0.00	0	0.00	7	0.33	395	18.08	1,269	58.06	0	0.02	0	0.00	0	0.00	0	0.00	0	0.00
Hudbay Minerals Inc	KLP, NBIM	2,013	2,320	1	0.02	0	0.00	110	4.74	0	0.00	499	21.52	1,672	72.06	0	0.00	121	5.21	0	0.00	0	0.00	0	0.00	1	0.02	0	0.00
IAMGOLD Corporation	KLP, NBIM	3,970	2,286	139	6.10	0	0.00	30	1.32	0	0.00	6	0.27	1,114	48.71	2	0.09	276	12.08	139	6.09	0	0.00	0	0.00	0	0.00	0	0.00
IGO Limited	DNB, KLP, NBIM, Storebrand	315	30,534	4,735	15.51	0	0.00	0	0.00	0	0.00	0	0.00	3	0.01	2	0.01	999	3.27	1,684	5.52	0	0.00	22	0.07	3,029	9.92	0	0.00
Impala Platinum Holdings Limited	DNB, KLP, NBIM, Storebrand	520	350	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	296	84.75	0	0.00	57	16.25	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Kinross Gold Corporation	KLP, NBIM, Storebrand	2,631	1,414	30	2.13	0	0.00	12	0.86	0	0.00	32	2.25	285	20.17	0	0.00	57	4.04	12	0.87	10	0.73	4	0.28	4	0.25	0	0.00
New Gold Inc.	KLP, Storebrand	1,167	545	17	3.11	0	0.00	22	4.04	1	0.19	5	1.00	279	51.31	0	0.00	81	14.83	14	2.65	0	0.00	1	0.27	1	0.20	0	0.00
Newmont Corporation	DNB, KLP, NBIM, Storebrand	3,842	14,857	2,312	15.56	0	0.00	543	3.65	19	0.13	1,689	11.37	1,777	11.96	5	0.03	377	2.54	1,986	13.37	6	0.04	281	1.89	39	0.26	0	0.00
Northern Star Resources Ltd	DNB, KLP, NBIM, Storebrand	996	6,352	883	13.91	0	0.00	0	0.00	0	0.00	182	2.87	0	0.00	0	0.00	5	0.08	834	13.12	0	0.00	41	0.64	10	0.15	0	0.00
Rio Tinto Limited	DNB, KLP, NBIM	3,892	59,262	11,790	19.89	171	0.29	267	0.45	2	0.00	4,176	7.05	1,648	2.78	96	0.16	2,527	4.26	10,338	17.44	0	0.00	58	0.10	1,381	2.33	12	0.02
Seabridge Gold Inc	KLP	1,821	1,462	1	0.07	0	0.00	0	0.00	0	0.00	987	67.52	8	0.52	0	0.00	9	0.59	0	0.00	0	0.00	0	0.00	1	0.07	0	0.00
South32 Ltd.	DNB, KLP, NBIM	1,691	4,412	21	0.47	0	0.00	0	0.00	0	0.00	220	4.99	98	2.22	89	2.02	248	5.61	0	0.00	0	0.00	21	0.47	0	0.01	0	0.00
Sumitomo Metal Mining Co., Ltd.	DNB, KLP, NBIM, Storebrand	3,549	2,364	293	12.37	0	0.00	5	0.21	0	0.00	297	12.56	839	35.50	1	0.05	172	7.28	292	12.37	0	0.00	0	0.00	0	0.00	0	0.00
Victoria Gold Corp.	KLP	4,447	807	0	0.00	0	0.00	20	2.42	0	0.00	390	48.34	211	26.21	0	0.00	48	5.91	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Table V – Parent Companies – Mining Concessions

Here, as illustrative, we report a sample of results aggregated to parent company, considering mining concessions against key comparison layers.

The table summarizes by parent company, the number of active mining concessions overlapping key variables about biomass, soil carbon and tree cover.

Parent Company	FI/s	No. of Mining Concessions Assessed	Area of Mining Concessions Assessed	Above Ground Biomass (> 0.1 Mg C ha−1)	Above Ground Biomass (> 100 Mg C Ha-1)	%	Mangrove Soil Organic Carbon Stock (> 0.1Mg C ha−1)	Mangrove Soil Organic Carbon Stock (> 100 Mg C ha−1)	%	Tropical Tree Cover (Mean) (0.1 -100)	Tropical Tree Cover (Mean) (> 50%)	%	Tree Cover 2000 (Mean) (0.1 -100)	Tree Cover 2000 (Mean) (> 50%)	%	Tree Cover 2010 (Mean) (0.1 -100)	Tree Cover 2010 (Mean) (> 50%)	%
Agnico Eagle Mines Limited	KLP, NBIM, Storebrand	8,034	2,841	7,960	1,668	20.76	0	0	0.00	0	0	0.00	7,980	6,773	84.30	7,985	6,533	81.32
Alamos Gold Inc.	KLP, NBIM	4,299	1,543	4,133	1,462	34.01	0	0	0.00	0	0	0.00	4,141	3,332	77.51	4,143	3,414	79.41
Alpha Metallurgical Resources, Inc.	NBIM	595	812	552	239	40.17	0	0	0.00	0	0	0.00	593	399	67.06	594	345	57.98
Anglo American plc	DNB, KLP, NBIM	1,584	61,532	924	472	29.80	0	0	0.00	456	373	23.55	958	552	34.85	920	494	31.19
Antofagasta plc	DNB, KLP, NBIM, Storebrand	2,791	8,842	110	26	0.93	0	0	0.00	0	0	0.00	231	24	0.86	108	30	1.07
Argonaut Gold Inc.	NBIM	886	230	882	168	18.96	0	0	0.00	0	0	0.00	885	782	88.26	884	787	88.83
BHP Group Ltd	DNB, KLP, NBIM	1,085	29,841	236	8	0.74	1	1	0.09	26	6	0.55	334	32	2.95	236	23	2.12
Cameco Corporation	DNB, KLP, NBIM, Storebrand	566	6,898	368	0	0.00	0	0	0.00	0	0	0.00	391	50	8.83	368	39	6.89
Coeur Mining, Inc.	KLP, NBIM	771	511	661	470	60.96	0	0	0.00	0	0	0.00	687	503	65.24	692	521	67.57
Eldorado Gold Corporation	KLP, Storebrand	664	329	625	147	22.14	0	0	0.00	0	0	0.00	648	535	80.57	651	533	80.27
Fortescue Metals Group Ltd	DNB, KLP, NBIM, Storebrand	601	43,599	352	1	0.17	1	1	0.17	0	0	0.00	417	0	0.00	340	0	0.00
Fresnillo plc	DNB, NBIM, Storebrand	1,108	4,873	857	311	28.07	0	0	0.00	0	0	0.00	823	238	21.48	861	296	26.71
Gold Fields Limited	DNB, KLP, NBIM, Storebrand	766	5,767	330	6	0.78	0	0	0.00	0	0	0.00	413	3	0.39	332	1	0.13
Hecla Mining Company	KLP, NBIM	11,479	2,753	10,716	1,035	9.02	0	0	0.00	0	0	0.00	10,656	3,496	30.46	10,883	3,855	33.58
Hochschild Mining plc	KLP, NBIM	778	2,187	778	552	70.95	0	0	0.00	0	0	0.00	778	507	65.17	778	532	68.38
Hudbay Minerals Inc	KLP, NBIM	2,013	2,320	1,902	154	7.65	0	0	0.00	0	0	0.00	1,951	1,170	58.12	1,941	1,083	53.80
IAMGOLD Corporation	KLP, NBIM	3,970	2,286	3,889	1,250	31.49	0	0	0.00	0	0	0.00	3,915	3,388	85.34	3,920	3,342	84.18
IGO Limited	DNB, KLP, NBIM, Storebrand	315	30,534	231	21	6.67	0	0	0.00	0	0	0.00	257	0	0.00	233	0	0.00
Impala Platinum Holdings Limited	DNB, KLP, NBIM, Storebrand	520	350	515	68	13.08	0	0	0.00	0	0	0.00	518	417	80.19	518	425	81.73
Kinross Gold Corporation	KLP, NBIM, Storebrand	2,631	1,414	2,270	189	7.18	0	0	0.00	0	0	0.00	2,342	2,073	78.79	2,334	2,014	76.55
New Gold Inc.	KLP, Storebrand	1,167	545	1,132	133	11.40	0	0	0.00	0	0	0.00	1,145	924	79.18	1,138	862	73.86
Newmont Corporation	DNB, KLP, NBIM, Storebrand	3,842	14,857	3,368	421	10.96	0	0	0.00	0	0	0.00	3,401	2,196	57.16	3,372	2,138	55.65
Northern Star Resources Ltd	DNB, KLP, NBIM, Storebrand	996	6,352	822	0	0.00	0	0	0.00	0	0	0.00	871	451	45.28	832	499	50.10
Rio Tinto Limited	DNB, KLP, NBIM	3,892	59,262	3,483	702	18.04	7	7	0.18	120	78	2.00	3,518	2,203	56.60	3,494	2,254	57.91
Seabridge Gold Inc	KLP	1,821	1,462	1,605	300	16.47	0	0	0.00	0	0	0.00	1,546	612	33.61	1,620	634	34.82
South32 Ltd.	DNB, KLP, NBIM	1,691	4,412	1,660	9	0.53	0	0	0.00	0	0	0.00	1,637	294	17.39	1,667	477	28.21
Sumitomo Metal Mining Co., Ltd.	DNB, KLP, NBIM, Storebrand	3,549	2,364	3,440	992	27.95	1	1	0.03	18	17	0.48	3,443	2,646	74.56	3,448	2,574	72.53
Victoria Gold Corp.	KLP	4,447	807	4,313	156	3.51	0	0	0.00	0	0	0.00	4,354	1,626	36.56	4,388	1,784	40.12

Table W - Parent Companies – Oil and Gas Wells (1)

Here, as illustrative, we report a sample of results aggregated to parent company, considering oil and gas wells against key comparison layers.
The table summarizes by parent company, the area (Sq. Km) of active oil and gas wells overlapping key variables.

Parent Company	FI/s	No. of Oil and Gas Wells Assessed	Area of Oil and Gas Wells Assessed	Protected Areas	%	Mangroves	%	Key Biodiversity Areas	%	OECMs	%	Intact Forest Landscapes 2020	%	Peatlands	%	Planted Trees	%	Forest Loss Total Area (2001 to 2022)	%	Protected Areas Scored 1	%	Protected Areas Scored 2	%	Protected Areas Scored 3	%	Protected Areas Scored 4	%
3R Petroleum	DNB	46	145	0	0.03	4	2.71	0	0.00	0	0.00	0	0.00	10	6.61	2	1.44	3	2.22	0	0.03	0	0.00	0	0.00	0	0.00
APA	DNB, KLP, Storebrand	590	1,854	12	0.63	0	0.00	6	0.34	0	0.00	0	0.00	0	0.00	0	0.00	1	0.06	8	0.44	0	0.00	0	0.00	3	0.16
BP	DNB, KLP, NBIM, Storebrand	6,481	20,361	1,642	8.07	180	0.88	1,077	5.29	13	0.06	0	0.00	285	1.40	33	0.16	301	1.48	1,642	8.07	0	0.00	0	0.00	0	0.00
Chevron	DNB, KLP, NBIM	13,222	41,538	1,739	4.19	270	0.65	1,203	2.90	23	0.06	7	0.02	3,286	7.91	2,357	5.68	2,392	5.76	1,684	4.05	0	0.00	6	0.01	48	0.12
CNOOC	Storebrand	1,484	4,662	8	0.17	0	0.00	4	0.10	2	0.04	0	0.00	4	0.09	0	0.00	0	0.01	5	0.10	0	0.00	3	0.06	0	0.00
ConocoPhillips	DNB, KLP	2,712	8,520	13	0.15	0	0.00	79	0.93	0	0.00	9	0.10	17	0.20	10	0.12	25	0.29	13	0.15	0	0.00	0	0.00	0	0.00
Ecopetrol	NBIM, Storebrand	5,972	18,762	1,253	6.68	1	0.01	791	4.22	202	1.08	3	0.01	1,600	8.53	627	3.34	1,438	7.67	1,247	6.65	0	0.00	2	0.01	6	0.03
Eni	DNB, KLP, NBIM, Storebrand	1,713	5,382	182	3.38	7	0.12	417	7.75	0	0.00	1	0.02	60	1.12	17	0.32	103	1.92	140	2.60	0	0.00	9	0.17	33	0.61
Equinor	DNB, KLP, Storebrand	1,426	4,480	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Exxon	DNB, KLP, NBIM	2,419	7,600	124	1.63	0	0.00	72	0.95	4	0.06	1	0.02	41	0.54	19	0.25	151	1.99	124	1.63	0	0.00	0	0.00	0	0.00
Frontera Energy	KLP	249	782	0	0.00	0	0.00	15	1.98	16	2.00	0	0.00	52	6.70	40	5.18	23	2.94	0	0.00	0	0.00	0	0.00	0	0.00
Gazprom	DNB, KLP	38	119	0	0.00	0	0.00	2	1.43	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Lukoil	KLP	16	50	4	8.25	0	0.00	4	8.25	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	4	8.25	0	0.00	0	0.00	0	0.00
MOL	DNB, KLP, NBIM, Storebrand	224	704	89	12.66	0	0.00	60	8.57	0	0.00	0	0.00	26	3.64	107	15.20	11	1.55	89	12.65	0	0.00	0	0.00	0	0.00
OMV	DNB, KLP, NBIM, Storebrand	181	569	188	33.14	0	0.00	262	46.09	0	0.00	0	0.00	0	0.00	3	0.60	0	0.06	189	33.15	0	0.00	0	0.00	0	0.00
Orlen	DNB, KLP, NBIM, Storebrand	260	817	244	29.88	0	0.00	152	18.64	0	0.00	0	0.00	22	2.65	1	0.07	26	3.15	244	29.86	0	0.00	0	0.00	0	0.00
Petrobras	DNB, KLP, NBIM, Storebrand	23,055	72,429	2,198	3.03	263	0.36	215	0.30	0	0.00	38	0.05	580	0.80	1,211	1.67	3,867	5.34	2,188	3.02	0	0.00	0	0.00	9	0.01
Petronas	DNB, KLP, Storebrand	86	270	22	8.17	0	0.00	16	5.83	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	22	8.17	0	0.00	0	0.00	0	0.00
Repsol	DNB, KLP, NBIM, Storebrand	628	1,973	334	16.93	0	0.00	624	31.64	47	2.40	34	1.74	38	1.93	19	0.94	53	2.69	268	13.57	0	0.00	66	3.35	0	0.00
Rosneft	KLP	9	28	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Royal Dutch Shell	DNB, KLP, NBIM, Storebrand	4,132	12,981	1,778	13.70	1,317	10.15	1,122	8.64	0	0.00	0	0.00	2,982	22.98	417	3.21	539	4.15	1,767	13.61	0	0.00	9	0.07	2	0.02
Santos	DNB, KLP, Storebrand	5,263	16,534	2,752	16.64	0	0.00	14	0.08	0	0.00	0	0.00	0	0.00	0	0.00	89	0.54	2,642	15.98	0	0.00	111	0.67	0	0.00
Sinopec	KLP, NBIM, Storebrand	1,019	3,201	354	11.07	12	0.37	18	0.57	0	0.00	0	0.00	36	1.14	0	0.00	11	0.34	352	11.00	0	0.00	0	0.00	0	0.00
Total Energies	DNB, KLP, NBIM, Storebrand	52	163	3	1.93	0	0.00	3	1.94	0	0.00	0	0.00	0	0.00	0	0.00	0	0.01	0	0.00	0	0.00	3	1.84	0	0.00
Tullow	KLP	181	569	75	13.20	0	0.00	42	7.46	0	0.00	0	0.00	12	2.08	0	0.00	1	0.24	11	1.93	21	3.69	43	7.56	0	0.00
Vår Energi	DNB, KLP, Storebrand	26	82	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Vermilion	KLP	67	210	34	16.21	0	0.00	5	2.36	0	0.00	0	0.00	26	12.36	18	8.35	7	3.28	31	14.71	0	0.00	0	0.00	3	1.43
YPF	Storebrand	24,424	76,730	4,216	5.50	0	0.00	2,458	3.20	0	0.00	5	0.01	85	0.11	3	0.00	96	0.12	3,882	5.06	0	0.00	9	0.01	44	0.06

Table X – Parent Companies – Oil and Gas Wells (2)

Here, as illustrative, we report a sample of results aggregated to parent company, considering oil and gas wells against key comparison layers.
A table summarizing by parent company, the number of active oil and gas wells overlapping key variables.

Parent Company	FI	No. of Oil and Gas Wells Assessed	Area of Oil and Gas Wells Assessed	Above Ground Biomass (>0.1 Mg C ha−1)	Above Ground Biomass (>100 Mg C Ha-1)	%	Mangrove Soil Organic Carbon Stock (>0.1Mg C ha−1)	Mangrove Soil Organic Carbon Stock (>100 Mg C ha−1)	%	Tree Cover 2000 (Mean) (0.1 -100)	Tree Cover 2000 (Mean) (> 50%)	%	Tree Cover 2010 (Mean) (0.1 -100)	Tree Cover 2010 (Mean) (> 50%)	%	Tropical Tree Cover (Mean (0.1 -100)	Tropical Tree Cover (Mean) (> 50%)	%
3R Petroleum	DNB	46	145	44	0	0.00	8	8	5.54	45	0	0.00	44	0	0.00	43	12	8.30
APA	DNB, KLP, Storebrand	590	1,854	11	0	0.00	0	0	0.00	11	0	0.00	11	0	0.00	0	0	0.00
BP	DNB, KLP, NBIM, Storebrand	6,481	20,361	4,100	200	0.98	118	118	0.58	2,056	267	1.31	4,111	263	1.29	0	0	0.00
Chevron	DNB, KLP, NBIM	13,222	41,538	4,491	357	0.86	143	143	0.34	4,472	748	1.80	4,571	675	1.63	8	4	0.01
CNOOC	Storebrand	1,484	4,662	15	0	0.00	0	0	0.00	17	0	0.00	15	0	0.00	0	0	0.00
ConocoPhillips	DNB, KLP	2,712	8,520	2,255	11	0.13	0	0	0.00	780	22	0.26	2,247	22	0.26	0	0	0.00
Ecopetrol	NBIM, Storebrand	5,972	18,762	5,969	376	2.00	1	1	0.01	5,968	971	5.18	5,969	658	3.51	0	0	0.00
Eni	DNB, KLP, NBIM, Storebrand	1,713	5,382	237	88	1.64	6	6	0.11	271	104	1.93	240	69	1.28	80	64	1.19
Equinor	DNB, KLP, Storebrand	1,426	4,480	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Exxon	DNB, KLP, NBIM	2,419	7,600	984	29	0.38	1	1	0.01	1,054	23	0.30	1,072	21	0.28	0	0	0.00
Frontera Energy	KLP	249	782	249	11	1.41	0	0	0.00	242	12	1.53	249	15	1.92	0	0	0.00
Gazprom	DNB, KLP	38	119	4	0	0.00	0	0	0.00	4	0	0.00	4	0	0.00	0	0	0.00
Lukoil	KLP	16	50	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
MOL	DNB, KLP, NBIM, Storebrand	224	704	182	2	0.28	0	0	0.00	195	1	0.14	182	0	0.00	0	0	0.00
OMV	DNB, KLP, NBIM, Storebrand	181	569	9	1	0.18	0	0	0.00	10	1	0.18	9	1	0.18	0	0	0.00
Orlen	DNB, KLP, NBIM, Storebrand	260	817	247	39	4.77	0	0	0.00	247	34	4.16	248	31	3.80	0	0	0.00
Petrobras	DNB, KLP, NBIM, Storebrand	23,055	72,429	17,530	281	0.39	687	687	0.95	17,643	1,752	2.42	17,511	1,015	1.40	8,190	1,468	2.03
Petronas	DNB, KLP, Storebrand	86	270	0	0	0.00	0	0	0.00	0	0	0.00	12	0	0.00	0	0	0.00
Repsol	DNB, KLP, NBIM, Storebrand	628	1,973	306	212	10.75	0	0	0.00	307	217	11.00	308	216	10.95	0	0	0.00
Rosneft	KLP	9	28	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Royal Dutch Shell	DNB, KLP, NBIM, Storebrand	4,132	12,981	2,599	953	7.34	826	826	6.36	2,596	669	5.15	2,628	621	4.78	328	310	2.39
Santos	DNB, KLP, Storebrand	5,263	16,534	2,952	204	1.23	0	0	0.00	3,264	0	0.00	2,961	0	0.00	0	0	0.00
Sinopec	KLP, NBIM, Storebrand	1,019	3,201	296	24	0.75	7	7	0.22	288	38	1.19	294	30	0.94	19	18	0.56
Total Energies	DNB, KLP, NBIM, Storebrand	52	163	2	0	0.00	0	0	0.00	0	0	0.00	2	0	0.00	0	0	0.00
Tullow	KLP	181	569	57	0	0.00	0	0	0.00	57	0	0.00	57	0	0.00	0	0	0.00
Vår Energi	DNB, KLP, Storebrand	26	82	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Vermilion	KLP	67	210	66	10	4.75	0	0	0.00	66	11	5.23	66	9	4.28	0	0	0.00
YPF	Storebrand	24,424	76,730	4,134	89	0.12	0	0	0.00	3,098	111	0.14	4,151	108	0.14	0	0	0.00

Table Y– Parent Companies – Oil and Gas Concessions (1)

Here, as illustrative, we report a sample of results aggregated to parent company, considering oil and gas concessions against key comparison layers.

A table summarizing by parent company, the area (Sq. Km) of active oil and gas concessions overlapping key variables.

Parent Company	FI/s	No. of Oil and Gas Concessions Assessed	Area of Oil and Gas Concessions Assessed	Protected Areas	%	Mangroves	%	Key Biodiversity Areas	%	OECMs	%	Intact Forest Landscapes 2020	%	Peatlands	%	Planted Trees	%	Forest Loss Total Area (2001 to 2022)	%	Protected Areas Scored 1	%	Protected Areas Scored 2	%	Protected Areas Scored 3	%	Protected Areas Scored 4	%	Protected Areas Scored 5	%	Protected Areas Scored 6	%	Protected Areas Scored 7	%
3R Petroleum	DNB	63	3,135	131	4.18	18	0.57	8	0.24	0	0.00	0	0.00	46	1.46	215	6.86	145	4.64	131	4.18	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
APA	DNB, KLP, Storebrand	212	63,022	3,001	4.76	0	0.00	977	1.55	0	0.00	0	0.00	6	0.01	0	0.00	403	0.64	2,311	3.67	0	0.00	30	0.05	661	1.05	0	0.00	0	0.00	0	0.00
BP	DNB, KLP, NBIM, Storebrand	511	266,849	4,286	1.61	133	0.05	4,293	1.61	11,099	4.16	3,916	1.47	4,287	1.61	120	0.04	1,734	0.65	4,260	1.60	19	0.01	8	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Chevron	DNB, KLP, NBIM	826	245,512	10,488	4.27	873	0.36	663	0.27	5,623	2.29	0	0.00	2,516	1.02	25	0.01	390	0.16	10,195	4.15	0	0.00	12	0.00	282	0.11	0	0.00	0	0.00	0	0.00
CNOOC	Storebrand	343	643,351	6,489	1.01	96	0.01	5,791	0.90	0	0.00	272	0.04	2,020	0.31	66	0.01	323	0.05	2,385	0.37	69	0.01	3,757	0.58	63	0.01	215	0.03	0	0.00	0	0.00
ConocoPhillips	DNB, KLP	784	112,963	696	0.62	39	0.03	1,526	1.35	110	0.10	1	0.00	710	0.63	47	0.04	39	0.03	674	0.60	0	0.00	0	0.00	23	0.02	0	0.00	0	0.00	0	0.00
Ecopetrol	NBIM, Storebrand	217	87,743	1,492	1.70	2	0.00	854	0.97	7,310	8.33	1,126	1.28	3,633	4.14	872	0.99	4,719	5.38	1,353	1.54	0	0.00	139	0.16	0	0.00	0	0.00	0	0.00	0	0.00
Eni	DNB, KLP, NBIM, Storebrand	518	403,935	32,482	8.04	2,453	0.61	16,116	3.99	2,949	0.73	12,927	3.20	19,429	4.81	356	0.09	1,728	0.43	32,191	7.97	0	0.00	95	0.02	198	0.05	0	0.00	0	0.00	0	0.00
Equinor	DNB, KLP, Storebrand	875	243,147	805	0.33	0	0.00	4	0.00	2,949	1.21	0	0.00	0	0.00	0	0.00	0	0.00	804	0.33	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Exxon	DNB, KLP, NBIM	809	374,597	14,125	3.77	101	0.03	8,320	2.22	0	0.00	2,625	0.70	5,067	1.35	39	0.01	534	0.14	12,955	3.46	0	0.00	4	0.00	1,164	0.31	0	0.00	0	0.00	3	0.00
Frontera Energy	KLP	69	17,199	552	3.21	0	0.00	1,818	10.57	1,426	8.29	0	0.00	530	3.08	105	0.61	1,425	8.28	387	2.25	91	0.53	36	0.21	38	0.22	0	0.00	0	0.00	0	0.00
Gazprom	DNB, KLP	72	105,347	4,136	3.93	0	0.00	1,701	1.61	0	0.00	232	0.22	4,429	4.20	0	0.00	357	0.34	1,592	1.51	0	0.00	2,297	2.18	248	0.24	0	0.00	0	0.00	0	0.00
Lukoil	KLP	37	66,958	2,940	4.39	0	0.00	1,016	1.52	0	0.00	0	0.00	1,446	2.16	1	0.00	45	0.07	2,836	4.24	0	0.00	0	0.00	104	0.15	0	0.00	0	0.00	0	0.00
MOL	DNB, KLP, NBIM, Storebrand	273	19,707	3,236	16.42	0	0.00	2,140	10.86	0	0.00	0	0.00	480	2.44	2,326	11.81	542	2.75	3,172	16.09	0	0.00	0	0.00	64	0.32	0	0.00	0	0.00	0	0.00
OMV	DNB, KLP, NBIM, Storebrand	286	60,286	2,391	3.97	0	0.00	2,771	4.60	0	0.00	0	0.00	3	0.00	471	0.78	69	0.11	2,298	3.81	0	0.00	79	0.13	14	0.02	0	0.00	0	0.00	0	0.00
Orlen	DNB, KLP, NBIM, Storebrand	346	48,664	15,065	30.96	0	0.00	6,927	14.23	0	0.00	0	0.00	1,377	2.83	34	0.07	1,755	3.61	15,058	30.94	0	0.00	0	0.00	6	0.01	0	0.00	0	0.00	0	0.00
Petrobras	DNB, KLP, NBIM, Storebrand	184	75,028	2,613	3.48	0	0.00	4,351	5.80	506	0.67	1,303	1.74	30	0.04	91	0.12	446	0.59	2,523	3.36	0	0.00	6	0.01	83	0.11	0	0.00	0	0.00	0	0.00
Petronas	DNB, KLP, Storebrand	194	266,934	13,097	4.91	71	0.03	11,126	4.17	0	0.00	0	0.00	2,573	0.96	575	0.22	726	0.27	11,938	4.47	0	0.00	1,147	0.43	10	0.00	0	0.00	0	0.00	0	0.00
Repsol	DNB, KLP, NBIM, Storebrand	548	84,818	3,743	4.41	0	0.00	4,565	5.38	2,170	2.56	1,440	1.70	3,330	3.93	2,298	2.71	4,652	5.49	3,583	4.22	0	0.00	126	0.15	33	0.04	0	0.00	0	0.00	0	0.00
Rosneft	KLP	23	36,154	6,207	17.17	0	0.00	1,813	5.01	0	0.00	4,581	12.67	2,701	7.47	1	0.00	1,731	4.79	6,207	17.17	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Royal Dutch Shell	DNB, KLP, NBIM, Storebrand	965	640,070	22,267	3.48	1,589	0.25	17,121	2.67	5	0.00	491	0.08	6,651	1.04	160	0.03	813	0.13	19,987	3.12	3	0.00	931	0.15	1,346	0.21	0	0.00	0	0.00	1	0.00
Santos	DNB, KLP, Storebrand	348	137,319	21,254	15.48	0	0.00	300	0.22	0	0.00	118	0.09	96	0.07	3	0.00	243	0.18	19,799	14.42	0	0.00	1,017	0.74	438	0.32	0	0.00	0	0.00	1	0.00
Sinopec	KLP, NBIM, Storebrand	400	255,121	3,976	1.56	25	0.01	12,434	4.87	0	0.00	4,861	1.91	1,911	0.75	21	0.01	502	0.20	2,100	0.82	0	0.00	1,506	0.59	345	0.14	25	0.01	0	0.00	0	0.00
Total Energies	DNB, KLP, NBIM, Storebrand	431	493,788	14,490	2.93	1,627	0.33	10,736	2.17	2,465	0.50	0	0.00	3,570	0.72	76	0.02	817	0.17	13,167	2.67	50	0.01	531	0.11	739	0.15	3	0.00	0	0.00	0	0.00
Tullow	KLP	29	35,842	3,971	11.08	0	0.00	0	0.00	0	0.00	1	0.00	406	1.13	0	0.00	152	0.42	3,972	11.08	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Vår Energi	DNB, KLP, Storebrand	302	30,902	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Vermilion	KLP	99	17,352	3,585	20.66	0	0.00	2,438	14.05	0	0.00	0	0.00	1,619	9.33	760	4.38	385	2.22	3,349	19.30	0	0.00	57	0.33	179	1.03	0	0.00	0	0.00	0	0.00
YPF	Storebrand	116	148,340	5,605	3.78	0	0.00	8,653	5.83	0	0.00	177	0.12	549	0.37	7	0.00	3,723	2.51	5,457	3.68	26	0.02	25	0.02	7	0.00	0	0.00	0	0.00	0	0.00

Table AA – Parent Companies – Oil and Gas Concessions (2)

Here, as illustrative, we report a sample of results aggregated to parent company, considering oil and gas concessions against key comparison layers.
A table summarizing by parent company, the number of active oil and gas concessions overlapping key variables.

Parent Company	FI/s	No. of Oil and Gas Concessions Assessed	Area of Oil and Gas Concessions Assessed	Above Ground Biomass (> 0.1 Mg C ha−1)	Above Ground Biomass (> 100 Mg C Ha-1)	%	Mangrove Soil Organic Carbon Stock (> 0.1Mg C ha−1)	Mangrove Soil Organic Carbon Stock (> 100 Mg C ha−1)	%	Tree Cover 2000 (Mean) (0.1 -100)	Tree Cover 2000 (Mean) (> 50%)	%	Tree Cover 2010 (Mean) (0.1 -100)	Tree Cover 2010 (Mean) (> 50%)	%	Tropical Tree Cover (Mean) (0.1 -100)	Tropical Tree Cover (Mean) (> 50%)	%
3R Petroleum	DNB	63	3,135	52	1	1.59	10	10	15.87	52	4	6.35	52	2	3.17	52	18	28.57
APA	DNB, KLP, Storebrand	212	63,022	13	0	0.00	0	0	0.00	13	0	0.00	13	0	0.00	0	0	0.00
BP	DNB, KLP, NBIM, Storebrand	511	266,849	43	6	1.17	5	5	0.98	53	11	2.15	46	10	1.96	11	8	1.57
Chevron	DNB, KLP, NBIM	826	245,512	270	0	0.00	6	6	0.73	190	1	0.12	273	0	0.00	15	3	0.36
CNOOC	Storebrand	343	643,351	67	6	1.75	3	3	0.87	78	5	1.46	68	5	1.46	21	7	2.04
ConocoPhillips	DNB, KLP	784	112,963	596	0	0.00	2	2	0.26	445	2	0.26	593	2	0.26	5	1	0.13
Ecopetrol	NBIM, Storebrand	217	87,743	149	24	11.06	3	3	1.38	149	38	17.51	149	36	16.59	149	46	21.20
Eni	DNB, KLP, NBIM, Storebrand	518	403,935	83	16	3.09	18	18	3.47	92	5	0.97	92	3	0.58	30	24	4.63
Equinor	DNB, KLP, Storebrand	875	243,147	0	0	0.00	0	0	0.00	6	0	0.00	4	0	0.00	0	0	0.00
Exxon	DNB, KLP, NBIM	809	374,597	405	27	3.34	1	1	0.12	296	24	2.97	410	24	2.97	24	20	2.47
Frontera Energy	KLP	69	17,199	69	10	14.49	0	0	0.00	69	9	13.04	69	9	13.04	69	13	18.84
Gazprom	DNB, KLP	72	105,347	19	0	0.00	0	0	0.00	20	0	0.00	20	0	0.00	5	0	0.00
Lukoil	KLP	37	66,958	10	0	0.00	1	1	2.70	14	0	0.00	11	0	0.00	2	0	0.00
MOL	DNB, KLP, NBIM, Storebrand	273	19,707	263	23	8.42	0	0	0.00	267	28	10.26	265	23	8.42	0	0	0.00
OMV	DNB, KLP, NBIM, Storebrand	286	60,286	143	11	3.85	1	1	0.35	155	16	5.59	149	14	4.90	1	0	0.00
Orlen	DNB, KLP, NBIM, Storebrand	346	48,664	209	43	12.43	0	0	0.00	211	37	10.69	209	30	8.67	0	0	0.00
Petrobras	DNB, KLP, NBIM, Storebrand	184	75,028	54	12	6.52	0	0	0.00	54	22	11.96	54	21	11.41	47	28	15.22
Petronas	DNB, KLP, Storebrand	194	266,934	53	3	1.55	4	4	2.06	56	1	0.52	53	1	0.52	17	1	0.52
Repsol	DNB, KLP, NBIM, Storebrand	548	84,818	330	25	4.56	1	1	0.18	241	43	7.85	332	40	7.30	50	25	4.56
Rosneft	KLP	23	36,154	18	3	13.04	0	0	0.00	18	3	13.04	18	3	13.04	10	5	21.74
Royal Dutch Shell	DNB, KLP, NBIM, Storebrand	965	640,070	132	23	2.38	12	12	1.24	142	9	0.93	136	8	0.83	22	18	1.87
Santos	DNB, KLP, Storebrand	348	137,319	108	4	1.15	0	0	0.00	154	3	0.86	110	3	0.86	8	3	0.86
Sinopec	KLP, NBIM, Storebrand	400	255,121	150	15	3.75	2	2	0.50	157	15	3.75	149	15	3.75	29	15	3.75
TotalEnergies	DNB, KLP, NBIM, Storebrand	431	493,788	75	13	3.02	14	14	3.25	77	4	0.93	76	2	0.46	38	19	4.41
Tullow	KLP	29	35,842	14	11	37.93	0	0	0.00	14	10	34.48	14	10	34.48	11	10	34.48
Vår Energi	DNB, KLP, Storebrand	302	30,902	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Vermilion	KLP	99	17,352	83	11	11.11	0	0	0.00	83	8	8.08	83	5	5.05	0	0	0.00
YPF	Storebrand	116	148,340	68	6	5.17	0	0	0.00	76	8	6.90	66	8	6.90	12	11	9.48

APPENDIX B.4 – INDEX

While each asset can be considered against each specific comparison layer (e.g., extent of overlap with mangroves, planted forests, etc), results can be combined to create index scorings. An equal weighted relative index was generated as a rapid means to highlight those assets with potentially higher interaction with forests relative to other assets. For all four extractive classes, this index considered each assets relative percentage of the total overlap of a given comparison layer. The specific comparison layers and weighting applied are as follows.

Variable	Weighting
Key Biodiversity Areas Area Overlap (%)	0.2
Intact Forest Landscapes 2020 Area Overlap (%)	0.2
Tree Cover Loss Total Summed Area (2001 to 2022) %	0.2
Above Ground Biomass (Mg C ha−1) (Normalised Mean) (0 - 100)	0.2
Tropical Tree Cover (Mean) (0 -100)	0.2

Table AB

A table showing the data layers and weighting used to generate a simple index to highlight extractive assets with a potential higher interaction with forests.

It is important to note, that this index is a simple 'flagging' tool, it's not benchmarked, nor meant as a robust means for detailed peer-to-peer comparison. It is designed as a quick means to show out of the millions of assets assessed which thousands may be of higher interest than others.

			No. of Mining Projects				% of Mining Projects			
Index Score - Equal Intervals	No. of All Mining Projects	% No. of All Mining Projects	DNB	KLP	NBIM	Storebrand	DNB %	KLP %	NBIM %	Storebrand %
0	22,227	59.8031	678	1,423	1,223	585	66.2757	65.8491	65.1572	61.7740
1	4,829	12.9927	96	229	213	123	9.3842	10.5969	11.3479	12.9884
2	2,567	6.9067	50	125	106	56	4.8876	5.7844	5.6473	5.9134
3	1,543	4.1515	42	81	67	37	4.1056	3.7483	3.5695	3.9071
4	1,023	2.7524	31	66	54	19	3.0303	3.0541	2.8769	2.0063
5	816	2.1955	24	40	39	25	2.3460	1.8510	2.0778	2.6399
6	1,291	3.4735	40	75	73	35	3.9101	3.4706	3.8892	3.6959
7	1,653	4.4475	36	66	56	45	3.5191	3.0541	2.9835	4.7518
8	416	1.1193	10	22	21	10	0.9775	1.0180	1.1188	1.0560
9	190	0.5112	2	4	4	2	0.1955	0.1851	0.2131	0.2112
10	142	0.3821	3	2	1	1	0.2933	0.0925	0.0533	0.1056
11	177	0.4762	4	10	6	2	0.3910	0.4627	0.3197	0.2112
12	162	0.4359	5	11	8	5	0.4888	0.5090	0.4262	0.5280
13	64	0.1722	1	3	2	0	0.0978	0.1388	0.1066	0.0000
14	10	0.0269	1	2	2	2	0.0978	0.0925	0.1066	0.2112
15	9	0.0242	0	0	0	0	0.0000	0.0000	0.0000	0.0000
16	6	0.0161	0	0	0	0	0.0000	0.0000	0.0000	0.0000
17	3	0.0081	0	0	0	0	0.0000	0.0000	0.0000	0.0000
18	7	0.0188	0	1	1	0	0.0000	0.0463	0.0533	0.0000
19	32	0.0861	0	1	1	0	0.0000	0.0463	0.0533	0.0000

Table AC – Index – Mining Projects

Here for illustrative purpose only, we report the mining project index results. The table summarizes index scores, grouped by equal interval, for active mining projects across the four portfolios assessed.

Mining projects, compared to other asset classes, are fairly widely distributed across the index. Relative to mining concessions a larger percentage (13%) 4,978 mines face higher or significant exposure to Key Biodiversity Areas, Intact Forest Landscapes, Forest Loss, Above Ground Carbon and Tropical Tree cover (Table AC). Index results are shown, as a simplistic example, results need to be considered in detail by each individual variable, results shown require further due diligence (See Discussion).

			No. of Mining Concessions				% of Mining Concessions			
Index Score - Equal Intervals	No. of All Mining Concessions	% No. of All Mining Concessions	DNB	KLP	NBIM	Storebrand	DNB %	KLP %	NBIM %	Storebrand %
0	1,054,367	59.9449	18,900	40,842	38,875	22,725	72.0549	58.6212	61.9917	70.1259
1	430,970	24.5023	4,602	21,270	17,026	6,067	17.5448	30.5292	27.1504	18.7218
2	107,697	6.1230	1,358	4,495	3,938	2,237	5.1773	6.4518	6.2797	6.9030
3	51,282	2.9156	549	1,557	1,458	634	2.0930	2.2348	2.3250	1.9564
4	25,290	1.4378	125	503	490	102	0.4766	0.7220	0.7814	0.3148
5	19,275	1.0959	65	144	152	61	0.2478	0.2067	0.2424	0.1882
6	12,280	0.6982	93	102	99	81	0.3546	0.1464	0.1579	0.2500
7	8,994	0.5113	144	165	160	145	0.5490	0.2368	0.2551	0.4474
8	22,576	1.2835	226	312	273	196	0.8616	0.4478	0.4353	0.6048
9	12,978	0.7379	57	140	101	48	0.2173	0.2009	0.1611	0.1481
10	4,384	0.2492	5	37	34	4	0.0191	0.0531	0.0542	0.0123
11	1,681	0.0956	5	3	3	5	0.0191	0.0043	0.0048	0.0154
12	986	0.0561	2	2	2	2	0.0076	0.0029	0.0032	0.0062
13	829	0.0471	3	3	3	3	0.0114	0.0043	0.0048	0.0093
14	1,009	0.0574	2	2	2	2	0.0076	0.0029	0.0032	0.0062
15	1,279	0.0727	14	14	14	14	0.0534	0.0201	0.0223	0.0432
16	2,650	0.1507	79	79	79	79	0.3012	0.1134	0.1260	0.2438
17	338	0.0192	1	1	1	1	0.0038	0.0014	0.0016	0.0031
18	18	0.0010	0	0	0	0	0.0000	0.0000	0.0000	0.0000
19	10	0.0006	0	0	0	0	0.0000	0.0000	0.0000	0.0000

Table AD – Index - Mining Concessions

Here for illustrative purpose only, we report the mining concession index results. The table summarizes index scores, grouped by equal interval, for active mining concessions across the four portfolios assessed.

Most mining concessions score low within the index, with 5% (89,287 concessions) found to have higher or 'significant' exposure to Key Biodiversity Areas, Intact Forest Landscapes, Forest Loss, Above Ground Carbon and Tropical Tree cover. The vast majority over one million claims were found to have limited or zero exposure. High scores were rare, with the portfolio results highlighting the same specific assets across the four investors. Index results are shown, as a simplistic example, results need to be considered in detail often by individual variable, results shown require further due diligence (See Discussion).

			No. of Oil and Gas Wells				% of Oil and Gas Wells			
Index Score - Equal Intervals	No. of all Oil and Gas Wells	% No. of All Oil and Gas Wells	DNB	KLP	NBIM	Storebrand	DNB %	KLP %	NBIM %	Storebrand %
0	582,371	99.1155	68,974	73,449	63,149	81,801	97.1013	97.2615	96.8365	97.5436
1	3,530	0.6008	1,766	1,767	1,765	1,764	2.4862	2.3399	2.7066	2.1035
2	930	0.1583	258	266	265	264	0.3632	0.3522	0.4064	0.3148
3	46	0.0078	3	3	3	3	0.0042	0.0040	0.0046	0.0036
4	25	0.0043	0	0	0	0	0.0000	0.0000	0.0000	0.0000
5	15	0.0026	2	2	2	3	0.0028	0.0026	0.0031	0.0036
6	13	0.0022	0	0	0	0	0.0000	0.0000	0.0000	0.0000
7	30	0.0051	1	1	1	1	0.0014	0.0013	0.0015	0.0012
8	28	0.0048	3	3	3	2	0.0042	0.0040	0.0046	0.0024
9	24	0.0041	0	0	0	0	0.0000	0.0000	0.0000	0.0000
10	22	0.0037	0	0	0	0	0.0000	0.0000	0.0000	0.0000
11	11	0.0019	1	1	1	1	0.0014	0.0013	0.0015	0.0012
12	19	0.0032	3	3	3	3	0.0042	0.0040	0.0046	0.0036
13	19	0.0032	4	4	3	1	0.0056	0.0053	0.0046	0.0012
14	29	0.0049	1	1	2	2	0.0014	0.0013	0.0031	0.0024
15	50	0.0085	4	4	4	4	0.0056	0.0053	0.0061	0.0048
16	77	0.0131	5	5	5	6	0.0070	0.0066	0.0077	0.0072
17	318	0.0541	8	8	6	6	0.0113	0.0106	0.0092	0.0072
18	3	0.0005	0	0	0	0	0.0000	0.0000	0.0000	0.0000
19	8	0.0014	0	0	0	0	0.0000	0.0000	0.0000	0.0000

Table AE – Index - Oil and Gas Wells

Here for illustrative purpose only, we report the oil and gas wells index results. The table summarizes index scores, grouped by equal interval, for active oil and gas wells across the four portfolios assessed.

Almost all oil and gas wells score low within the index, with 99.1% found to have low or zero direct spatial exposure to Key Biodiversity Areas, Intact Forest Landscapes, Forest Loss, Above Ground Carbon and Tropical Tree cover (Table AE). However, against single variables, many wells still have significant interaction (See Results). In total, 0.11% of oil and gas wells (666) were found to have higher or significant exposure to Key Biodiversity Areas, Intact Forest Landscapes, Forest Loss, Above Ground Carbon and Tropical Tree cover. Index results are shown, as a simplistic example, results need to be considered in detail often by individual variable, results shown require further due diligence (See Discussion).

			No. of Oil and Gas Concessions				% of Oil and Gas Concessions			
Index Score - Equal Intervals	No. of All Oil and Gas Concessions	% No. of All Oil and Gas Concessions	DNB	KLP	NBIM	Storebrand	DNB %	KLP %	NBIM %	Storebrand %
0	26,276	83.6123	6,229	6,705	4,815	5,546	91.4282	90.3274	88.5436	91.0972
1	3,062	9.7435	422	510	438	356	6.1940	6.8705	8.0544	5.8476
2	887	2.8225	80	105	91	96	1.1742	1.4145	1.6734	1.5769
3	519	1.6515	35	45	37	39	0.5137	0.6062	0.6804	0.6406
4	236	0.7510	12	15	15	14	0.1761	0.2021	0.2758	0.2300
5	91	0.2896	8	8	8	7	0.1174	0.1078	0.1471	0.1150
6	40	0.1273	1	1	1	2	0.0147	0.0135	0.0184	0.0329
7	35	0.1114	4	4	4	2	0.0587	0.0539	0.0736	0.0329
8	25	0.0796	3	3	3	1	0.0440	0.0404	0.0552	0.0164
9	34	0.1082	1	1	3	3	0.0147	0.0135	0.0552	0.0493
10	29	0.0923	8	8	7	8	0.1174	0.1078	0.1287	0.1314
11	17	0.0541	0	0	0	0	0.0000	0.0000	0.0000	0.0000
12	23	0.0732	1	2	2	2	0.0147	0.0269	0.0368	0.0329
13	21	0.0668	2	3	3	3	0.0294	0.0404	0.0552	0.0493
14	22	0.0700	0	0	0	0	0.0000	0.0000	0.0000	0.0000
15	31	0.0986	4	4	4	4	0.0587	0.0539	0.0736	0.0657
16	21	0.0668	0	0	0	0	0.0000	0.0000	0.0000	0.0000
17	17	0.0541	2	3	3	2	0.0294	0.0404	0.0552	0.0329
18	22	0.0700	1	6	4	3	0.0147	0.0808	0.0736	0.0493
19	18	0.0573	0	0	0	0	0.0000	0.0000	0.0000	0.0000

Table AF – Index - Oil and Gas Concessions

Here for illustrative purpose only, we report the oil and gas concession index results. The table summarizes index scores, grouped by equal interval, for active oil and gas concessions across the four portfolios assessed.

Almost all oil and gas concessions score low within the index, with 1.4% (446 concessions) found to have higher or ‘significant’ exposure to Key Biodiversity Areas, Intact Forest Landscapes, Forest Loss, Above Ground Carbon and Tropical Tree cover. Oil and gas concession are often large areas (on average significantly larger than mining concessions). The larger the area the lower the likelihood of consistently high averaged values from key comparison layers such as Forest Loss, or Key Biodiversity Areas. With extremely large oil and gas concessions this creates a bias towards smaller concessions gaining higher index scores. Highlighting the importance of considering the data in detail (See Discussion).

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