NATURE ACTION 100+:
CHANGING AND GREENING INVESTOR AND CORPORATE BEHAVIOR TO PROTECT ECOSYSTEMS AND BIODIVERSITY

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Your willingness to participate in our research has furthered our understanding of how financial markets can influence corporate behavior to protect ecosystems and biodiversity. We are hopeful this report will advance future nature finance solutions.

AUTHORS

Nature Action 100+: Changing and Greening Investor and Corporate Behavior to Protect Ecosystems and Biodiversity is the result of a collaborative effort of the following SIPA graduate students: Angela Attrey, Alexandra Carruthers, Aldo Defilippi, Ananya Misra, Anna Rautenberg, Brian Kennedy, Elizabeth Reichart, Emily Udal, Gabriela Eslava Bejarano, Hyunah Shim and Tianhao Niu.

ABSTRACT

Nature and biodiversity are relatively new considerations for financial markets. With few existing conventions for risk evaluation and metrics, and limited regulatory and policy consensus on this topic, adoption of biodiversity considerations as part of investing has been slow. This work aims to reflect on the role of the financial sector in managing biodiversity risks and engaging with the companies in which they invest to do the same. Additionally, this report aims to design a framework for establishing a Nature Action 100+ effort and focuses on sectors with significant financial assets and countries where nature is being compromised in unsustainable ways. This report consists of three parts.

Part I: Presents a case study on the Climate Action 100+ Initiative, including its inception, strengths, and weaknesses, to inform the development of a future Nature Action 100+.
Part II: Outlines a framework for a potential Nature Action 100+, including goals for the initiative, an analysis of how Nature Action 100+ should differ from or connect to Climate Action 100+, and suggestions for practical implementation of the initiative.
Part III: Proposes Nature Action 100+ member companies using a top-down, sectoral based approach to identify the largest sectors and sub-industries associated with natural capital dependency and impacts. This list of sub-industries and the list of respective companies can be used to identify high priority sectors for biodiversity and natural capital risks and biodiversity target setting.

NATURE ACTION 100+

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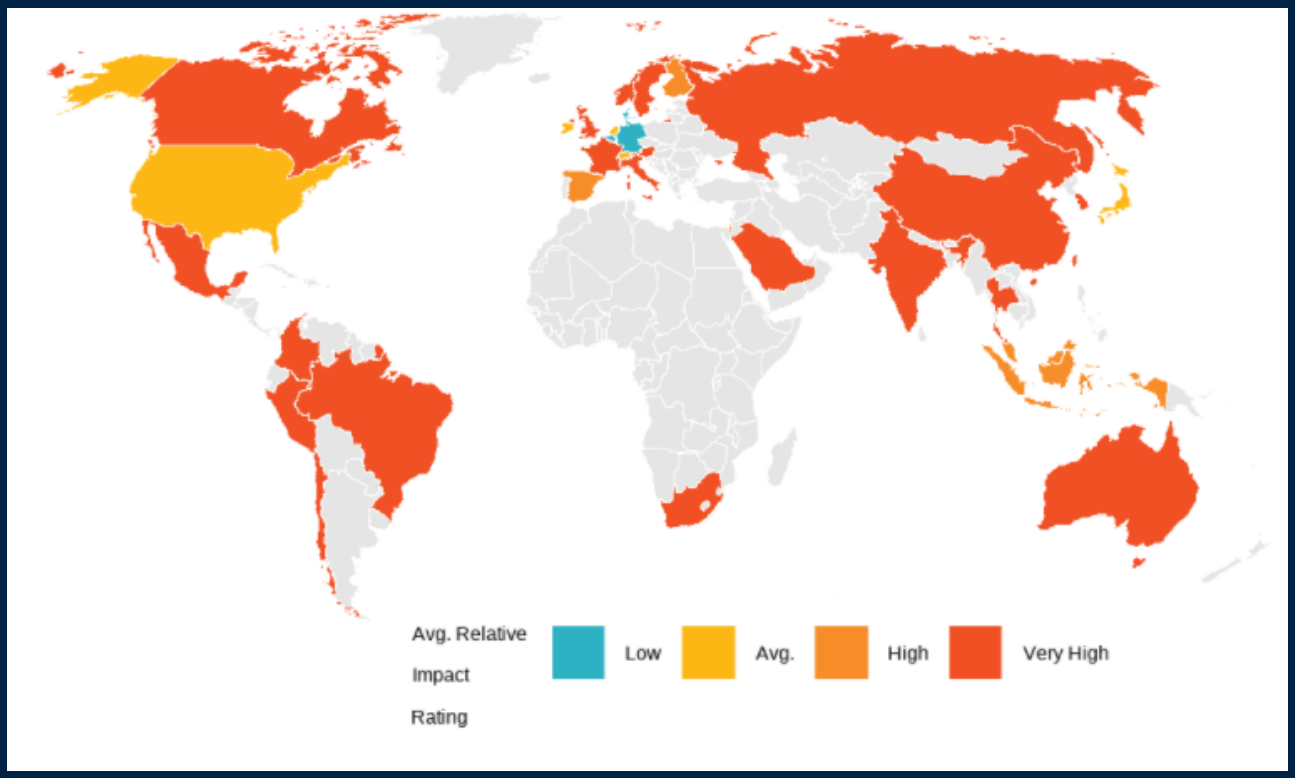
EXECUTIVE SUMMARY

All economic and social activities are underpinned by natural capital and biodiversity, but their crucial importance is undervalued by companies. Biodiversity is deteriorating at an alarming rate, with potentially far-reaching and irreversible impacts on the Earth - indeed, the World Economic Forum has identified biodiversity loss and ecosystem collapse as a global risk every year for the last five years.[1] Responding to this urgency, investors have increasingly called on companies to transform their activities to consider the impact on nature and the environment.

This report has three main objectives. First, it examines the current state of play with reference to the Climate Action 100+, the largest existing investor-led coalition targeting selected greenhouse gas emitting companies. It identifies a gap in existing investor engagement mechanisms that specifically target companies whose activities threaten natural capital and biodiversity. As previously noted by the World Bank,[2] this gap highlights the need for a Nature Action 100+ initiative. Second, it references lessons learned from Climate Action 100+ and target sectors and industries with the largest impact and dependence on nature to propose a model governance framework for the potential Nature Action 100+ initiative. Lastly, it develops a robust methodology to identify the companies that should be targeted in a future Nature Action 100+ initiative.

This report represents a call to action for investors, companies and policymakers alike, at a crucial moment in natural history. The rapid degradation of biodiversity across the world highlights the urgent need to transform operating activities to avoid cascading crises associated with passing planetary tipping points. Investors have an important role to play in directly liaising with Focus Companies to reduce company impact and dependence on natural capital. A Nature Action 100+ initiative could spur transformative change and help address both the climate and ecological emergencies.

Figure 1 - Sample Nature Action 100+ companies and their average relative impact on nature, by domiciliation



1. World Economic Forum Global Risks Perception Survey 2019–2020
2. World Bank (2020), "Mobilizing Private Finance for Nature", World Bank Group, https://pubdocs.worldbank.org/en/916781601304630850/Finance-for-Nature-28-Sep-web-version.pdf

WHY DO WE NEED TO TARGET NATURE?

A deep dive into the literature on biodiversity and finance indicates a growing awareness of the importance of biodiversity; indeed, the Dasgupta Review[3](2021) emphasized nature as an asset upon which our economies, livelihoods, and well-being depend. But our review indicates an alarming lack of concrete corporate action on existing biodiversity commitments and efforts to factor biodiversity loss into risk and valuation. The absence of a single, definable metric of biodiversity degradation (akin to greenhouse gas emissions targets) has also stymied such efforts. This report points to the need for investor-led initiatives to directly engage with businesses that impact and are highly dependent on natural capital and biodiversity.

WHAT LESSONS CAN WE LEARN FROM OTHER INVESTOR-LED INITIATIVES?

The Climate Action 100+ initiative is the largest single investor engagement initiative on climate change, bringing together 545 investor signatories and 167 global companies who are critical to the net-zero emissions transition, and provides a model for a future Nature Action 100+. The initiative was successful in generating momentum, creating a vision for mission-led investing, and increased advocacy and awareness. However, just 43% of companies from the initiative's focus list have set a net zero by 2050 target of some form, and only 51% have set a short-term (by 2025) emission reduction target. Therefore, there is a need for action with increased urgency and engaging with companies on the demand side of carbon emissions. A case study on the strengths and weaknesses of the Climate Action 100+ also reveals important lessons for a future biodiversity related initiative. Key findings identify an opportunity for establishing clear sectoral transition pathways and more ambitious targets to align the stated objectives of Climate Action 100+ with its operational activities, including measures to ensure accountability among investors and companies alike. The study also finds that a too complex governance mechanism, with an unclear division of responsibilities between partnering organizations, can hamper achieving the goals. Having a more centralized governance structure with one organization in charge for the coordination would increase the efficiency of Climate Action 100+ in the future.

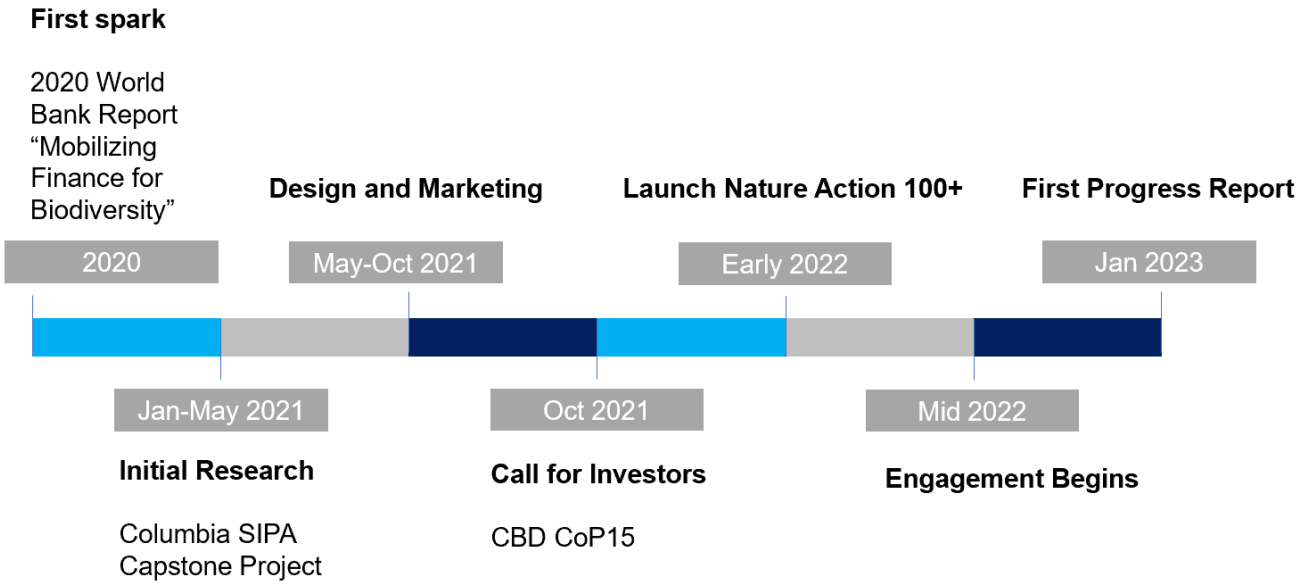
WHAT LESSONS CAN WE LEARN FROM OTHER INVESTOR-LED INITIATIVES?

A successful Nature Action 100+ should target the companies whose operating activities have the most influence on biodiversity. The report proposes a novel methodology for identifying such companies. Using data from the UNEP-WCMC ENCORE tool, we identify the top 20 sub-industries that have the greatest impact and dependence on natural capital, and then identify the largest 100+ companies in these sub-industries by market capitalization. The identified companies have a wide geographical footprint, highlighting the scope of the threat to biodiversity and underscoring the need for a holistic and global investor-led mechanism (see Figure 1). The report offers guidance on how financial institutions can use this methodology to identify companies based on their impact or dependence on a particular natural capital asset (for example, water or habitats) or location of interest.

3. https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review

WHAT DOES A SUCCESSFUL NATURE ACTION 100+ LOOK LIKE?

The report outlines a potential framework for a future Nature Action 100+ investor engagement initiative to target biodiversity and natural capital. It outlines the main asks for target companies, including the existence of a strategy for net biodiversity loss, the inclusion of natural capital loss in risk assessments and the establishment of biodiversity targets. The report explores the relative merits and demerits of four governance mechanisms of the initiative, as well as practical first steps and a timeline to implementing it. It determines that the goal of Nature Action 100+ initiative is to get companies to net zero biodiversity loss and proposes an actionable timeline for short-term implementation, including using the upcoming Convention on Biological Diversity CoP as an opportunity to launch the initiative. This near-term implementation underscores the urgency of action on biodiversity.



WHICH COMPANIES SHOULD WE TARGET FOR THE NATURE ACTION 100+?

A successful Nature Action 100+ should target the companies whose operating activities have the most influence on biodiversity. The report proposes a novel methodology for identifying such companies. Using data from the UNEP-WCMC ENCORE tool, we identify the top 20 sub-industries that have the greatest impact and dependence on natural capital, and then identify the largest 100+ companies in these sub-industries by market capitalization. The identified companies have a wide geographical footprint, highlighting the scope of the threat to biodiversity and underscoring the need for a holistic and global investor-led mechanism (see Figure 1). The report offers guidance on how financial institutions can use this methodology to identify companies based on their impact or dependence on a particular natural capital asset (for example, water or habitats) or location of interest

CONCLUSION

This report finds that the existing biodiversity and nature-focused efforts are not sufficient to address the widespread destruction and degradation of the natural environment resulting from corporate activity. Therefore, it identifies the need for a concrete mechanism to fill this gap, which is Nature Action 100+. Learning from Climate Action 100+, we provide a fully actionable outline of a potential Nature Action 100+ initiative, including its structure, goals, list of targeted companies and implementation timeline. Such an initiative can help to spur change and avoid ecosystem collapse.

1. **Learn from other investor-led initiatives.**

Climate Action 100+ created momentum and generated awareness of the need to reduce greenhouse gas emissions, but has not yet achieved the catalytic transformation needed to avert climate emergency. Based on our analysis of strengths and weaknesses of Climate Action 100+, we propose a way to catalyze the system through an increased advocacy, expanding the benchmarking exercise to build a strong data-backed business case for companies in key sectors, simplifying and centralizing the governance mechanism of Climate Action 100+, introducing region-specific targets, building internal rankings and raising the threshold for approving new members.

2. Target companies using a robust and transparent methodology.

Companies targeted through Nature Action 100+ must be those with the greatest potential to change the trajectory of biodiversity degradation. With this in mind, we developed a robust and transparent methodology for identifying sub-industries with the greatest impact and dependence on natural capital, and then identifying the largest players in these sectors. Our methodology is also modular and easily adapted to suit the needs of investors.

3. Create accountability and transparency.

We propose four alternatives for the governance mechanism of the Nature Action 100+ initiative, highlighting their pros and cons in accelerating its efficiency and impact. Nature Action 100+ investors will engage with companies on biodiversity issues to spur change in operating activities. Companies in Nature Action 100+ will be required to monitor and evaluate their performance against biodiversity targets to make sure that progress is being made. Similarly, companies must disclose their biodiversity impacts to enable investors to make informed mission-led investment decisions.

4. Have a set of clear objectives for targeted companies.

Our proposed Nature Action 100+ governance framework is concrete and outlines a core vision: net-zero biodiversity loss from operating activities. To achieve this, companies will be required to assess their dependency and impact on biodiversity and incorporate biodiversity into their decision-making. Nature Action 100+ will regularly monitor the achievement of these objectives.

5. Time is of the essence.

Biodiversity loss is accelerating and the planet is fast approaching tipping points that could lead to irreversible and cascading damages to all life on Earth. Investors should move fast to put in place a Nature Action 100+ and demand change from targeted companies. We propose a near-term actionable implementation plan that takes advantage of the upcoming Convention on Biological Diversity to build momentum for the Nature Action 100+.

GLOSSARY

TERM/ACRONYM/ABREVIATION	MEANING
BIODIVERSITY[4]	The Convention on Biological Diversity defines biological diversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems."
CLIMATE ACTION 100+ (CA 100+)[5]	An investor-led initiative to ensure the world's largest greenhouse gas emitters take necessary action on climate change.
ENCORE	Exploring Natural Capital Opportunities, Risks, and Exposure tool, developed by the Natural Capital Finance Alliance UNEP-WCMC.
FOCUS COMPANIES	List of publicly-traded companies in this report which fall under the relevant sub-industries for the creation of an initial Nature Action 100+ list.
GICS	Global Industry Classification Standard (GICS)
NATURE[6]	"The global natural ecosystem in its entirety. This encompasses both the stock of natural capital assets as well as the way in which they interact with each other. In this sense, biodiversity is a characteristic of nature, insofar as it refers to the presence of diversity across the natural ecosystem."
NATURAL CAPITAL ASSETS[7]	"The stock of renewable and non-renewable natural resources – such as plants, animals, water, soils and minerals – that combine to yield a flow of benefits to people."

4. Convention on Biodiversity. Available at: https://www.cbd.int/convention/articles/?a=cbd-02.
5. Climate Action 100+. Available at: https://www.climateaction100.org/.
6. Global Canopy. The Case for a Task Force on Nature-related Financial Disclosures. 2020. Available at: https://globalcanopy.org/wp-content/uploads/2020/11/Task-Force-on-Nature-related-Financial-Disclosures-Full-Report.pdf.
7. Global Canopy. The Case for a Task Force on Nature-related Financial Disclosures. 2020. Available at: https://globalcanopy.org/wp-content/uploads/2020/11/Task-Force-on-Nature-related-Financial-Disclosures-Full-Report.pdf.

GLOSSARY

TERM/ACRONYM/ABREVIATION	MEANING
NATURE ACTION 100+ (NA 100+)	An investor engagement initiative to ensure that select corporates take necessary action on biodiversity and natural capital conservation, including a strategy for net biodiversity loss, the inclusion of natural capital loss in risk assessments and the establishment of biodiversity targets.
TCFD	Task Force on Climate-Related Financial Disclosure
TNFD	Task Force on Nature-related Financial Disclosures

PART I

CLIMATE ACTION 100+: LEVERAGING INVESTORS TO MAKE A POSITIVE IMPACT

BACKGROUND

Investors are showing keen interest in assessing which companies will end up on the wrong side of climate history. Many investors have started focusing on how companies are positioned with regards to climate action and net-zero transition. Climate Action 100+ came into existence as an investor initiative that aims to ensure that the world's largest corporate greenhouse gas emitters are taking necessary steps to address the critical issue of climate change. Has the initiative been successful in achieving its goals? How can Climate Action 100+ further drive the change it has been advocating for? More importantly, how should its role evolve going forward?

FOUNDING OF CLIMATE ACTION 100+

Launched in 2017, Climate Action 100+ is now the largest-ever investor engagement initiative on climate change. Its Secretariat is run by five partner organizations - the Asia Investor Group on Climate Change (AIGCC), Ceres, the Investor Group on Climate Change (IGCC), the Institutional Investor Group on Climate Change (IIGCC) and the Principles for Responsible Investment (PRI). Climate Action 100+ brings together 167 global companies in 32 markets that have significant greenhouse gas (GHG) emissions and/or are deemed critical to the net-zero emissions transition and to meeting the objectives of the Paris Agreement. The hope is that by engaging these target companies, investors can leverage their position into helping their portfolios meet the challenge of net-zero and resilience-proofing their way of business.

"Investors concerned about climate change have never been better organized, thanks to Climate Action 100+...nor have they ever had more success"

The Economist
May 30,2018

The initiative began with the California Public Employees' Retirement System (CalPERS) wondering if there was a more sustainable way to decarbonize its portfolio while still delivering on its mission on behalf of 1.6 million public employees. By identifying the worst emitters in its portfolio and actively engaging them, CalPERS laid the foundation for what investors would do as partners of Climate Action 100+. The five partner organizations mentioned above, together with five investor representatives

from CalPERS, AustralianSuper, HSBC Global Asset Management, Ircantec, and Manulife Investment Management, form a Global Steering Committee for the initiative. The Steering Committee is further supported by smaller working groups, including Strategic Projects Working Group, Engagement Coordination Working Group, Communications Working Group, Governance Working Group, and the Fundraising Working Group.

From its inception, the literature and interviews indicate that Climate Action 100+ has been shaped and led by its participating investors who determine the engagement strategy pursued with each focus company and update the initiative on progress.[8] The joint organizers, with their expertise in managing investor networks, in turn support participating investors, providing numerous forms of guidance and leading regionally-focused working groups. An important distinction is that between investors, who are involved as members of Climate Action 100+, and corporations (or investees), which are focus companies selected for engagement in the initiative.

Climate Action 100+ members join the initiative through a sign-on commitment, and though no standard fee is paid by each participant, members make ad-hoc donations to each of the four philanthropic partner organizations: Climateworks Foundation, Children's Investment Fund Foundation, KR Foundation, and Sea Change Foundation. Climate Action 100+ is entirely financed through these voluntary contributions, donations from a variety of philanthropies both publicly and anonymously, and the five partner organizations which contribute staff resources. The budget of the initiative is currently kept confidential

Summary Box 1. What does Climate Action 100+ asks of its members?

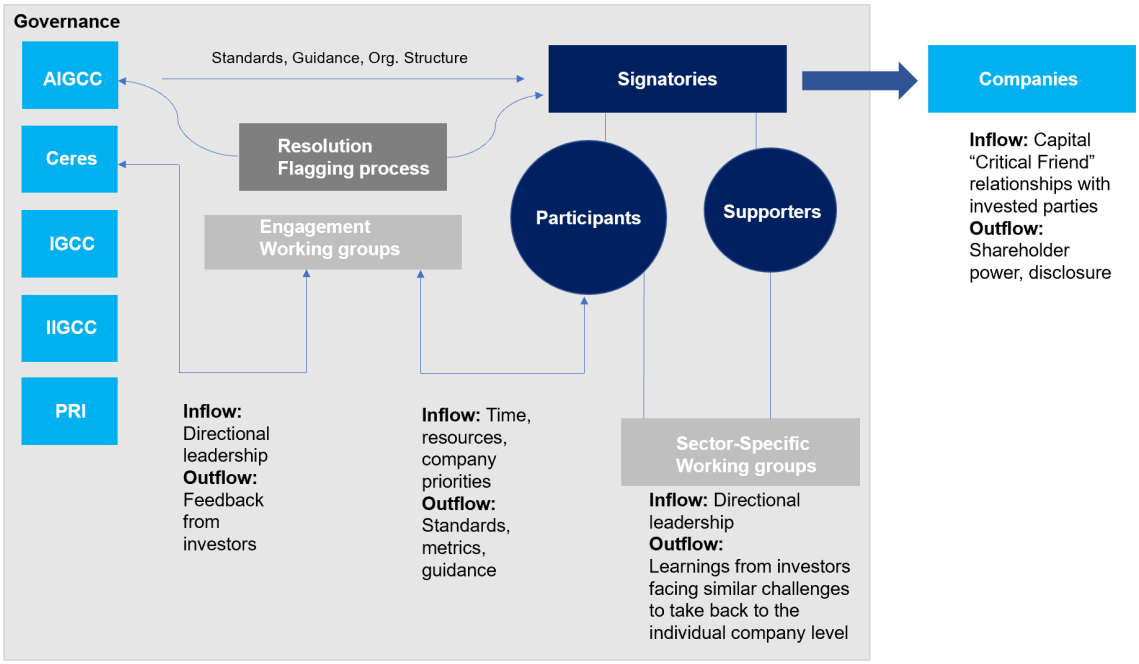
Three pillars have served as the group's "asks" of companies since its inception:

1. Governance -- strong governance frameworks that provide clarity, accountability, and oversight as to how climate change will impact corporations;
2. Action -- take the needed actions to reduce GHG emissions across the supply chain in line with Paris Agreement targets; and
3. Disclosure -- enhance corporate disclosure in line with Task force on Climate-Related Financial Disclosure (TCFD) guidelines

How an investor engages with a company is determined by a number of company characteristics, including its profile and industry sector, the firm's approach to climate change to present, the regional context, and how responsive it is to investor engagement.

8. Climate Action 100+. *Progress Report.* 2020. Available at: https://www.climateaction100.org/wp-content/uploads/2020/12/CA100-Progress-Report.pdf

3. CLIMATE ACTION 100+: A SYSTEM OF ACTORS



4. THEORY OF CHANGE: ACTIONING CLIMATE ACTION 100+ ASKS

How Climate Action 100+ investors are interacting with the companies in their portfolios includes, but is not limited to:

- Holding one-on-one or group meetings with companies;
- Making joint statements with the company;
- Making statements at a company annual general meeting (AGM);
- Supporting shareholder resolutions on climate change risk;
- Voting actions for climate accountability and against resolutions/actions that would backtrack on organizational progress on climate change (for example, voting in favor of enhanced climate risk disclosure, and voting against the re-election of directors who have failed in their accountability of climate change risk).

PLACES TO INTERVENE IN A SYSTEM by Donella Meadows (in increasing order of effectiveness)

12. Constants, parameters, numbers (such as subsidies, taxes, standards).

11. The sizes of buffers and other stabilizing stocks and flows.

10. The structure of material stocks and flows (such as transport networks, population age structures).

9. The lengths of delays, relative to the rate of system change.

8. The strength of negative feedback loops, relative to the impacts they are trying to correct against.

7. The gain around driving positive feedback loops.

6. The structure of information flows (who does and does not have access to information).

5. The rules of the system (such as incentives, punishments, constraints).

4. The power to add, change, evolve, or self-organize system structure.

3. The goals of the system.

2. The mindset of paradigm out of which the system - its goals, structure, rules, delays, parameters - arises.

1 . The power to transcend paradigms.

3 Opportunities for Climate Action 100+ Actors to Leverage the System for Greater Effectiveness[9]

12. Constants, parameters, numbers: Throughout our interviews, investors reiterated the need for clear frameworks and metrics by which they can hold their companies, and themselves, accountable for climate target-setting. The Climate Action 100+ governance team has already supplied much of what investors needed, and will continue to produce new tools and materials to help achieve Climate Action 100+ goals, such as the recently released net-zero company benchmark.
Is target-setting a sufficient governance tool in order to achieve the Climate Action 100+'s intended outcomes? Target-setting can only be effective in conjunction with other corporate sustainability best practices: greater transparency, disclosure, and corporate strategies that actually change how business is done by reducing emissions across operations, or changing those operations entirely.

5. The rules of the system: Steeper entry hurdles could be one way to ensure Climate Action 100+ members are not just using coalition affiliation for their own public gain, but rather are setting measurable goals that they are accountable for.

2. The mindset or paradigm out of which the system arises: The most difficult, but systematically effective, place to intervene in this system is what drives investing and asset management in and of itself: returns. How does Climate Action 100+ link real returns to tangible change in practices? The paradigm shift would require a reconceptualization of the primacy of shareholder value as articulated by Milton Friedman.[10]

9. Based on Donella Meadows' Places to Intervene in a System.
10. New York Times. A Friedman doctrine-- The Social Responsibility Of Business Is to Increase Its Profits. 1970. Available at: https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html

5. SWOT ANALYSIS OF CLIMATE ACTION 100+

Our review of the literature on Climate Action 100+ progress as well interviews of investors and climate experts resulted in several key findings.

The Climate Action 100+ platform has played a significant role in generating momentum. The initiative strives to provide stewardship and engagement support to some of the highest-emitting companies in the world. Our various interviews highlighted how Climate Action 100+ caught the attention of many high-profile investors. It served as a platform to articulate a clear vision for what investors expect out of the companies with regards to climate action. It received an overwhelming support from the investor community as it built on a lot of previous work in the field of climate investing and further crystallized the main goals.

Climate Action 100+ was fueled by a large body of investor engagement work that preceded the initiative. Climate Action 100+ proved to be a much-needed aggregator of initiatives as it was able to communicate a set of baseline requests. These requests included targets to be adopted to achieve net zero emissions as well as parameters to improve governance as well as disclosures. The timing was important as the Paris Agreement came into force in November 2016 and the TCFD working group put together a clear reporting philosophical standard. As a large community of investors were becoming well versed with the topic of climate change, Climate Action 100+ served as a platform that brought all important stakeholders together to build a huge infrastructure that involves 500+ institutions. Investees are

a large group of influential market actors with a large combined market capitalization ($ 10.3 trillion)[11] that can bring about potential change. With $52 trillion in assets under management, and invested in 32 different markets, Climate Action 100+ brings powerful actors around the globe together under one umbrella.

Some of our interviews also noted that the initiative was successful in holding the largest companies accountable. Despite the regulatory environment and lack of strong market signal, some of the largest utilities and mining companies in North America adopted net zero emissions and attributed their adoption of targets to Climate Action 100+. However, it is unclear if some of these claims of corporate action were spurred or supported by Climate Action 100+ efforts, or occurred apart from the coalition's efforts entirely.

From an advocacy perspective, the initiative helped in gaining traction as investor/company focus and interests were clear, and not too complex. Given that the COVID-19 pandemic has further put a spotlight on climate change, this momentum will grow even further in the future.

Despite the success, there are various aspects in which Climate Action 100+ can be improved to meet its objectives. Some of our interviews hinted that planning for scale from the very beginning would have been better. From the very beginning, Climate Action 100+ defined clear goals in terms of TCFD disclosures, emissions reduction and governance.

However, in the initial few years, there was a lack of well-defined metrics/benchmark that measures the performance of companies. The Climate Action 100+ Net-Zero Company Benchmark, which[12] assesses the performance of Focus Companies against the three goals, was released three years later, in March 2021. Climate Action 100+ collaborated with Ernst & Young in 2020 to design the Net-Zero Company Benchmark. This benchmark supports investors in understanding and evaluating the targets and linked actions of companies involved. The Climate Action 100+ Technical Advisory Group, including Carbon Tracker Initiative (CTI), InfluenceMap (IM), Transition Pathway Initiative (TPI) and 2° Investing Initiative (2DII) supported the development of the benchmark. Some 159 companies were assessed in the first round and many companies are yet to be monitored using the benchmark.

Target setting has not been ambitious enough. Only 43% of Climate Action 100+ companies have set a net zero by 2050 target or ambition in some form, and only 51% have set a short-term (by 2025) emission reduction target. That indicates that there is still a significant proportion of Climate Action 100+ companies that have not set any climate targets at all. Furthermore, these targets do not often cover both the companies' operational scope 1 and 2 emissions, as well as the most material upstream and downstream scope 3 emissions.

There is also misalignment between stated Climate Action 100+ objectives and operational activities. At a sector-

11. Bloomberg as of 15 December 2020.
12. Climate Action 100+. Net-Zero Company Benchmark. 2021. Available at:. https://www.climateaction100.org/progress/net-zero-company-benchmark/

level, Climate Action 100+ analysis assessing companies in the oil and gas, utilities, and transportation sectors show gaps in companies' planned capital allocation and technology mix. For example, despite 54% of Climate Action 100+ oil and gas Focus Companies having a net-zero by 2050 target in some form, analysis from Carbon Tracker shows 194 of the new oil and gas projects sanctioned in 2020 are misaligned with the <1.75°C climate scenario.

Further, we also observed that clear disclosure blind spots remain. CDP analysis of Climate Action 100+ companies' reported data found that while Climate Action 100+ respondents acknowledge exposure to a variety of environmental risks, there exist blind spots in corporate disclosure. These include physical risks along value chains for climate and forests and transition risks for water. Further, through our research we also found that there were certain issues around target setting for various regions as different regions have their own climate priorities and interests.

Our interviews also highlighted some inefficiencies around decision-making and governance. As 5 equal partner organizations managed the project, responsibilities were initially not well established. This sometimes resulted in lack of onus and linked governance problems. Some questions have been raised around the mechanism used to form the steering committee and whether it resulted in effective decision making around strategic priorities, governance and infrastructure. Given the nature of the global initiative, coordination between different working groups can also prove to be an issue at times.

6. CLIMATE ACTION 100+: A WAY FORWARD

Summary Box 2.

Recommendations. To address the existing gaps, Climate Action 100+ should:

- Highlight publicly high-performing companies and investors
- Investors should carefully look into advocacy strategies of companies they invest in
- Expand the benchmark to include all companies of Climate Action 100+
- Simplify and centralize the governance mechanism, and clarify responsibilities
- Develop different targets for different regions
- More efforts towards engaging with companies in Asia and North America
- Prepare sectoral and regional strategies
- Create internal company rankings
- Raise threshold for approving new members to ensure there are no free-riders
- Engage with more companies on the demand side for fossil fuels

With these successes and gaps, the main challenge for Climate Action 100+ is the improvement of the existing framework in order to make it more efficient and impactful. For example, how to identify best practices and ways to achieve the targets within the existing timeline; what tools to use to meet these goals; how to address the gaps effectively; and which of the Climate Action 100+ elements could serve to build a similar effort that focuses on nature and biodiversity? The literature

and insights from interviews point towards a number of issues that Climate Action 100+ should reflect upon.

Catalyzing the System

There are several ways to accelerate the process to achieve Climate Action 100+ targets. Interviewees emphasized the need to press with increased urgency. For instance, a good example has already been set by BlackRock, which holds the boards accountable[13] or New York State, which sells the stock or does not buy the stock of companies that are performing poorly on ESG factors. Highlighting publicly high-performing companies and investors that are sustainability leaders could likely incentivize others, thus, moving the market to be more responsive to climate change.

Another aspect is for investors to look into the advocacy strategy of companies they invest in. It seems essential to analyze companies' lobbying efforts to determine whether and how they align with the climate strategy. Investment decisions should, thus, to some extent, account for advocacy policy.

Meeting Climate Objectives

Overall, the achievement of climate neutrality goals in the framework of Climate Action 100+ is a dynamic, constantly evolving process. With time, new tools appear, which can be used to address the existing gaps. One such tool is the Net-Zero Asset Owner Alliance with its ambition to drive sustainable economies, which was announced at the UN Secretary-General's Climate Summit in New York in September 2019.

More recently, the Net Zero Company Benchmark aims to assess the performance of a set of focus companies against three high-level goals: emissions reduction, governance and disclosure. There are currently 159 focus list companies included in the assessment, and more companies will be added in the following assessment cycles. The Benchmark has a potential to expand its sectoral focus, for instance, to include cement and energy companies, and should aim to include all partnering companies in the following assessment cycle[15]

Tools such as these should be utilized to advance clear sectoral transition pathways and targets. For instance, many of the interviewed investors see them useful for building a strong, data-backed business case for companies in key sectors to meet net-zero commitments. One of the interviewed investors suggested "exploring the sector of electric power companies based in Europe and North America, whose timeframe for net-zero goals by 2050 could be curtailed to 2030".

Governance around Climate Action 100+ leaves some space for improvement. An interviewed member of Climate Action 100+ admitted that "investors won't say it, but there is some politics throughout that organization on how to run a partnership. The more organizations the more complicated it gets, and the more territorial it gets". Many agreed that the governance mechanism is complex and causes confusion due to multiple coordinators and different approaches to how the initiative should operate. It is not

13. Bloomberg. BlackRock's Latest Climate Instructions Come With a New Threat. 2021. Available at : https://www.bloomberg.com/news/articles/2021-02-17/blackrock-s-latest-climate-instructions-come-with-a-new-threat

14. UN Environment Programme Finance Initiative. Global asset owners setting and reporting on ambitious interim targets for net-zero emissions by 2050. 2021. Available at : https://www.unepfi.org/net-zero-alliance/

15. Climate Action 100+. Climate Action 100+ adds to focus list of companies. 2021. Available at: https://www.climateaction100.org/news/climate-action-100-adds-to-focus-list-of-companies/

possible to access information that would disclose internal status, roles, and responsibilities of each partner organization running the initiative. It can be assumed, however, that a more efficient coordination and a clear division of responsibilities among the five partner organizations would be a way to address that challenge. For instance, assigning only one coordinator, and filling this position on a rotating basis such that a representative from each partner organization would have a chance to take office, could improve governance effectiveness.

At the same time, an important aspect to recognize for Climate Action 100+ is the fact that companies in different countries and regions of the world have their own priorities and interests that heavily depend on local circumstances. Therefore, the initiative's targets and assessment should take this into consideration. On the one hand, there should be different targets set for developing and developed countries, with more ambitious targets for the latter. On the other hand, however, Climate Action 100+ engages with only 34 Focus Companies based in Asia (USD 3.2 trillion market capitalization), whereas there are 57 companies based in Europe and 54 in North America (USD 2.9 and USD 3.9 trillion market capitalization, respectively). Given that two out of ten largest global GHG emitters are China (over 26% of global emissions) and the United States (over 12% of global emissions), more efforts should be directed towards engaging with companies in Asia and North America.

Climate Action 100+ could potentially account for some aspects of nature, such as land-use change. There is an important overlap between nature and climate. According to some investors "if net-zero commitments are tailored only towards climate change, and do not understand the role of land-use change in GHG emissions and target setting, they will not accomplish their goals". In a broader perspective, the covid-19 pandemic has shed light on the importance of nature-related risks. Research shows that the transmission of zoonotic diseases can be linked to deforestation and land degradation by exposing people to a closer contact with wild animals, which increases the risk of disease transmission to humans[17] Further to that, nature-based solutions are a smart investment strategy more than ever before, as they mitigate the negative impacts of economic crises, contribute to creating jobs in new sectors and attract investors to create more business opportunities.[18] It is important to acknowledge that reducing global warming to 1.5°C cannot be accomplished without nature-based solutions.

One of the main factors that weakens the credibility of Climate Action 100+ is related to engagement targets and commitment. Many of its members do not have credible target strategies. For instance, only 10% of focus companies under Climate Action 100+ have clear strategies to meet the scope 3 emissions targets.[19] In this context, taking action to address the "greenwashing" problem is

16. World Resources Institutes. This Interactive Chart Shows Changes in the World's Top 10 Emitters. 2020. Available at: https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters

17. Global Canopy. The Case for a Task Force on Nature-related Financial Disclosures. 2020. Available at: https://globalcanopy.org/wp-content/uploads/2020/11/Task-Force-on-Nature-related-Financial-Disclosures-Full-Report.pdf.

18. Institute for European Environmental Policy. Nature-based solutions and their socio-economic benefits for Europe's recovery. 2021. Available at: https://ieep.eu/publications/nature-based-solutions-and-their-socio-economic-benefits-for-europe-s-recovery#:~:text=Nature%2Dbased%20solutions%20can%20help,investors%20creating%20new%20business%20opportunities.

19. Climate Action 100+. Progress Report. 2020. Available at: https://www.climateaction100.org/wp-content/uploads/2020/12/CA100-Progress-Report.pdf

necessary. Investors should reflect on an approach that would ensure that companies they invest in have a clear, tangible, and measurable roadmap to meet these targets. To push this idea forward, Climate Action 100+ could prepare sectoral strategies for key sectors of engaged companies that would ensure the alignment with the goals of the initiative (currently, only a strategy for the aviation sector has been published). This could be further expanded to include regional strategies, given the need for a stronger focus on top largest global GHG emitters. The Net-Zero Company Benchmark would serve as a tool to measure the sectoral and regional progress against the designated strategic goals. Further to that, members of Climate Action 100+ should establish their own internal company rankings to ensure accountability of those companies.

Better accountability would not only benefit meeting climate-neutrality goals through companies, but also through investors themselves. Increasing the threshold for investors who wish to join any of the five investor networks would help to ensure that there are no free-riders off the work done by hard-working, committed investors. This is worth considering particularly because the issue was raised by interviewees, who noted that joining the existing alliances under the Climate Action 100+ umbrella is currently relatively easy. One of them argued that "investors who invest in coal plants should not be allowed to enter existing coalitions".

Lastly, the spectrum of global carbon emissions consists of emissions coming from the supply and the demand side for fossil fuels.

While the supply side focuses on production, it represents roughly 15% of global carbon emissions, as opposed to the demand side that focuses on the use and combustion of fossil fuels (see Appendix G).[20] Climate Action 100+ is currently skewed towards the supply side on the spectrum of global carbon emissions, mostly focusing on production, and fails to effectively address the demand side, i.e., consumers and manufacturers of products that consume fossil fuels. Engaging with a larger number of companies that are on the demand side could significantly improve the overall performance of the initiative[21] These could include engaging with more companies in the shipping sector (currently only one company included), as well as airlines and automobiles sectors (manufacturers of products that use fossil fuels).

Lessons for Nature

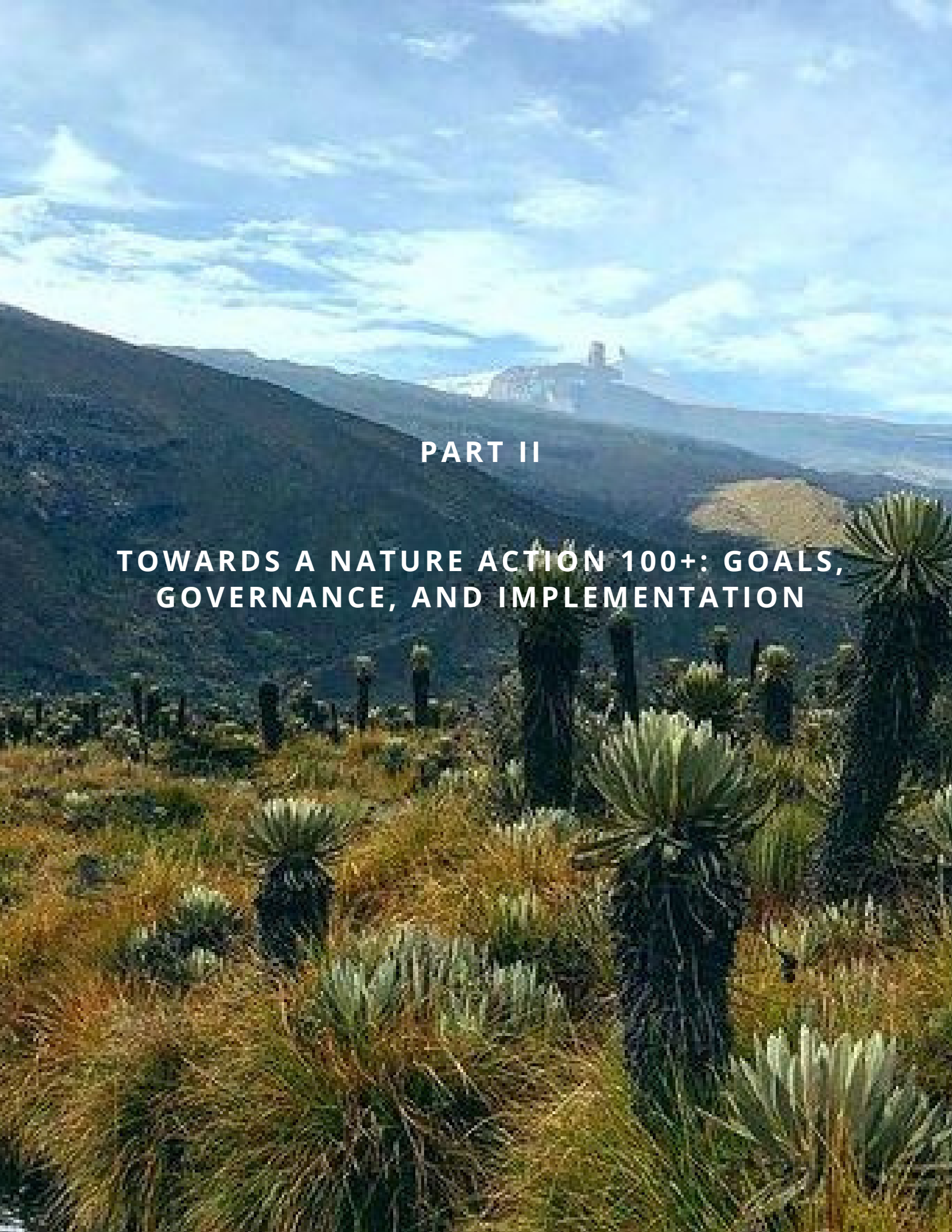
Nature Action 100+ has to ensure that there is a way to measure progress. It is important to clearly describe the areas, where the focus needs to be, set progress goals on the year-to-year basis in order to show outcomes. A replication of the climate-focused benchmark, overviewed by Transition Pathway Initiative,[22] could potentially create a similar tool for nature and biodiversity.[23] Additionally, it should be determined where Nature Action 100 would be placed relative to Climate Action 100+: whether it would be a joint effort (and if so, then how), a separate one, or whether both could have a common umbrella and a narrative.

20. Our World in Data. Sector by sector: where do global greenhouse gas emissions come from?. 2020. Available at: https://ourworldindata.org/ghg-emissions-by-sector

21. Global Canopy. The Case for a Task Force on Nature-related Financial Disclosures. 2020. Available at: https://globalcanopy.org/wp-content/uploads/2020/11/Task-Force-on-Nature-related-Financial-Disclosures-Full-Report.pdf.

22. Climate Action 100+. Net-Zero Company Benchmark. 2021. Available at:. https://www.climateaction100.org/progress/net-zero-company-benchmark/

23. Transition Pathway Initiative. The TPI tool. 2021. Available at : https://www.transitionpathwayinitiative.org/#:~:text=The%20Transition%20Pathway%20Initiative%20(TPI,TPI%20tool%20is%20available%20here.



PART II

TOWARDS A NATURE ACTION 100+: GOALS, GOVERNANCE, AND IMPLEMENTATION

BACKGROUND

This section defines goals for the Nature Action 100+ initiative, and explores governance options, implementation strategies, limitations, and best practices identified during the course of research.

Nature Action 100+ is a proposed investor engagement mechanism to protect natural capital and biodiversity. The initiative will position investors to engage with Focus Companies (see Part III of this report for details on the specific companies and the methodology used to select them) in high impact and dependency sectors to influence their action on specific biodiversity issues. By directly entering into discussions with companies on biodiversity issues, investors can establish productive relationships that can help push companies to more actively protect biodiversity. This influence increases as multiple investors with like goals speak with a unified voice. The key difference between Nature Action 100+ and other existing initiatives on biodiversity for investors (see Appendices E and F) is its explicit focus on and identification of companies that have the potential to do the most damage to biodiversity.

Nature Action 100+ will involve various actors; the four below groups will be the most critical.

Actor	Description	Responsibility
Steering Committee	Comprised of investors and representatives from investor networks	Set goals and targets for Nature Action 100+
Investor Networks	Comprised of investors that are already taking action on biodiversity issues	Organize investor engagement groups and coordinate with Focus Companies
Investors	Comprised of investors that want to engage on biodiversity issues	Engage directly with Focus Companies to influence action on specific biodiversity issues
Focus companies	Comprised of the biggest public companies in sectors with high impact and dependency on biodiversity	Align with goals of Nature Action 100+ and work towards improving impact on biodiversity

2. NATURE ACTION 100+ GOALS AND GOVERNANCE

2.1. GOALS

Summary Box 1.

Goals

Biodiversity is a critical risk factor for the planet, but also for investors. As a result, it is increasingly becoming a factor considered by investors when allocating capital. Nature Action 100+ is intended to give investors a platform to push companies that are most impactful to biodiversity ("Focus Companies", as detailed in Part III) towards a clear, easily understandable set of targets over the medium- and long-term:

- Medium-term: Net zero loss of biodiversity; and
- Longer-term: New positive impact on biodiversity.

Along with a deliberate selection of Focus Companies (see Part III), four primary pillars will enable Climate Action 100+ to achieve its ambitious goal:

- Targeted engagement and accountability from investors;
- Awareness and education;
- Reporting and measurement; and
- Advocacy for stronger regulation.

Required steps to establish these pillars are detailed in this section; recommendations on an associated governance framework to support the pillars are detailed in Section 2.2.

PiInvestors are increasingly considering biodiversity as a risk factor that can impact the financial performance of companies. Nature Action 100+ is intended to be a platform through which investors can articulate a clear vision for what they expect of Focus Companies with regard to biodiversity in order to decrease the risk of financial impacts.

The overarching objective of Nature Action 100+ is to position investors to push Focus Companies to work towards straightforward, easily understood goals that can be expanded and locally tailored in the future, as needed:

·Net zero loss of biodiversity in the medium-term; and

·Net positive impact on biodiversity in the long-term.

Nature Action 100+ will also allow investors to engage Focus Companies on specific biodiversity impacts – e.g., habitats, species, water – based on the sector and the investor's interests.

Nature Action 100+ will work through four main pillars of action to achieve these goals.

Pillar 1 - Engagement on Accountability and action

Investors will use Nature Action 100+ as a collective action tool to engage with Focus companies on biodiversity issues and hold them accountable for meeting specified nature related goals. Nature Action 100+ member corporations will be held accountable for action to meet specified nature related goals within an appropriate time frame.

Pillar 2 - Awareness and Education

Nature Action 100+ will gather like-minded investors, which highlights biodiversity as a topic which the investment community needs to consider as both a risk and an opportunity.

Pillar 3 - Reporting and Measurement

Nature Action 100+ will play a role in advocating for development and adoption of biodiversity-specific reporting and measurement frameworks used to disclose biodiversity data.

Pillar 4 - Regulation

Nature Action 100+ will play a role in advocating for stronger regulation of biodiversity practices at companies in sectors with high biodiversity impacts and dependencies.

Engagement is the pillar through which investors directly interface with Focus Companies. Among other things, engagement between investors and Focus Companies will promote the need to include biodiversity in company strategic plans and decision-making and help to encourage regular dialogue on biodiversity. Engagement can also encourage adoption of specific sector policies to reduce biodiversity impact such as deforestation, marine habitat loss, etc.

The other pillars provide Nature Action 100+ with a framework to support better engagement between investors and Focus Companies.

- Awareness: If more investors have awareness of the risks and opportunities around biodiversity loss, Nature Action 100+ may be able to attract more members and have a stronger united front for engaging with Focus Companies.

- Reporting and measurement: Nature Action 100+ can encourage Focus Companies to adopt better reporting and measurement tools, leading to better and more transparent measurement and disclosure of biodiversity information. For example, in collaboration with initiatives like the Task Force on Nature-related Financial Disclosures (TNFD), Nature Action 100+ can enable companies to assess their financial and strategic plans against a range of biodiversity loss scenarios and improve decision-making.

- Regulation: Stronger regulation of biodiversity practices will amplify the results that Nature Action 100+ is driving towards and help drive improvement in Focus Companies' (along with companies outside of the focus list) biodiversity practices.

Why would Nature Action 100+ be important for Focus Companies?

Economic activities are causing unprecedented declines in biodiversity. As a result, biodiversity risk – and nature loss risk more broadly – is steadily becoming a higher impact and probability risk for companies that cannot be ignored.

The initial Focus Companies identified for Nature Action 100+ are those that are most dependent on and impactful to biodiversity. This high dependency puts their economic activity, and resulting financial performance, at risk as a result of biodiversity loss. In this sense, Nature Action 100+ is risk management for Focus Companies, who are positioned to recognize the benefits of actions to protect biodiversity and of more sustainable practices.

Nature Action 100+ could also fulfil the fiduciary duty of companies to their stakeholders. The landscape of the fiduciary duty is in transition as the role of business as agents of social responsibility expands from solely making financial benefits to their shareholders. This expanded view of fiduciary duty is adding importance on how companies interpret their relationship with the environments that operate with and within.

What are the actions that are required of Nature Action 100+ Focus Companies?

Understanding the dependency and exposure to biodiversity risk is the first step towards identifying opportunities to mitigate the harm or transition to more sustainable activities. By incorporating biodiversity into business model risk assessment, decision-making, and disclosure practices, Focus Companies can become leaders as they drive towards net-zero biodiversity loss.

Along with overarching activities to achieve net zero loss of biodiversity in the medium-term and net positive impact on biodiversity in the long-term, Focus Companies will also be encouraged to:

- Identify sector-specific goals, such as zero deforestation; and
- Align with the proposed Corporate Biodiversity Goals developed by the Joint Nature Conservation Committee which include:
  - Embedding biodiversity into decision making;
  - Reducing impacts and promoting sustainable use in operations and supply chains;
  - Improving the status of biodiversity;
  - Enhancing the benefits society draws from biodiversity; and
  - Increasing stakeholder engagement support and knowledge sharing.

Call out box 1.

Steps to incorporate biodiversity protection in ongoing activities

Based on the lessons learned from Climate Action 100+ and other existing frameworks such as UNEP and the Joint Nature Conservation Committee, we propose the following 5 steps that companies could take to incorporate biodiversity protection in their activities:

1. Assessment of exposure of the companies' activities to biodiversity dependency and their impacts on biodiversity and biodiversity-related risks.
2. Setting biodiversity-related targets. These targets would be related to reducing or avoiding negative impacts from their activities and shifting and promoting biodiversity-positive actions to restore and regenerate biodiversity.
3. Incorporate biodiversity into decision-making in their business model.
4. Monitoring and evaluating performance against biodiversity targets.
5. Disclosure and transparency of biodiversity-related impacts.

Why would Nature Action 100+ be important for investors?

For investors, a range of changes in nature – such as droughts, erosion, invasive species, air pollution, and contamination of water bodies and soil – have had identifiable adverse financial effects, for example through declines in real estate or stock prices, or bank defaults. The COVID-19 pandemic, which has its roots in disrupted ecosystems, has also had global macroeconomic and financial implications. Biodiversity loss endangers ecosystemic services, which threatens both society and businesses that depend on them, and in turn investors and insurers that rely on a well-functioning economy. By considering their nature risk, investors will be better equipped to devise solutions that will protect their portfolios in an era of accelerating environmental change, as well as to identify potential opportunities around solutions provision and new products.

Nevertheless, few investors know how to incorporate these considerations and implement measurable biodiversity-linked targets to assess the impact of their investments on biodiversity loss. The interest on biodiversity is accompanied by some challenges, including lack of knowledge and awareness around the importance of incorporating biodiversity risks into investment decisions; lack of clear regulation frameworks at the intersection of finance and biodiversity; lack of expertise at the investor level to promote data availability; and measurement frameworks to value natural capital adequately. By incorporating biodiversity loss and opportunities into investment decisions and financial models, investors will encounter structural advantages, such as more sustainable financing with enhanced risk assessment, stronger company brand, more satisfied customers and staff, and a culture of innovation.[24]

24. Ecogain. *Ecogain Biodiversity Index: The state of biodiversity and business in the Nordic countries*. 2020. Available at: https://www.ecogain.se/s/Ecogain_Biodiversity_Index_2020.pdf

Call out box 2.
Key questions investors should be asking Focus Companies

Investors need to be asking tactical questions through the engagement process to understand Focus Company progress towards the goal of net zero biodiversity loss. For example:

1. Does the organization have a strategy to get to net zero biodiversity loss, and ultimately net positive impact on biodiversity?
2. Does the organization have biodiversity policies in place?
3. Does the organization currently track, measure, and report on their biodiversity footprint or impact?
4. Does the organization include biodiversity loss in their risk assessments?
5. Is there a specific team devoted to biodiversity?
6. Is there a member on the board of directors that has adequate experience and knowledge regarding biodiversity?
7. Is there a board committee that considers biodiversity as part of their responsibility?

In addition to the fiduciary duty of companies, investors also need to interpret their relationship with the environments that operate with and within. The unique position of the investor as an interested and invested party in the performance of companies makes it so that engagement is a critical tool for change. Via Nature action 100+, investors could be more active in their engagement strategies, and be wielded to influence biodiversity friendly behaviors across a portfolio.

What are the actions that are required of Nature Action 100+ investors?

One key question that must be answered in the construction of Nature Action 100+ is how to determine types of investors that will be allowed or asked to participate in the initiative. In particular, whether to limit inclusion to investors that meet or exceed specific requirements or behaviors tied to biodiversity. Our recommendation is that Nature Action 100+ initially allow any interested investor to join in order to build momentum, and later implement a tiered system where investors are recognized to different degrees based on biodiversity actions they have taken.

The "open tent" approach to investor inclusion – which is similar to that adopted by Climate Action 100+ – has the substantial benefit of materially reducing the burden on investors that may be interested in joining. This is particularly important for Nature Action 100+ given the criticality of developing enough scale to influence Focus Companies. However, there are downsides to this approach. Most notably, enabling all investors to join – regardless of any evidence of a demonstrated commitment to decreasing biodiversity loss – may position bad actors to join exclusively for the purpose of greenwashing (i.e., to create an appearance that they are taking action on environmental issues without driving any material progress).

On the opposite side of the inclusion spectrum, Nature Action 100+ could create a set of specific requirements to

dictate whether to allow a new investor to join. For example, if the investor:

- Is part of an existing investor network on biodiversity
- Assesses biodiversity risk as part of their portfolio analysis
- Calculates their biodiversity footprint, including the footprint of the investee companies where available
- Reports publicly on biodiversity considerations in its portfolio
- Has made a public commitment to protect biodiversity

The material disadvantage of this latter approach is the requirements may turn investors away from the initiative by creating barriers to enter. Turning away interested investors could result in difficulties getting the initiative off the ground and could impact the time to reach scale.

Given these conflicting impacts, we recommend that Nature Action 100+ adopt a staggered approach. Initially, any interested investor should be allowed to join, as the downsides of potential greenwashing are outweighed by the scale and momentum benefits of the “open tent” policy. Later, the initiative should employ a tiered model where investors self-select into different groups depending on what action they are willing to take on biodiversity (based on the requirements noted above). This will allow the initiative to both gain rapid traction while also positioning it to explicitly emphasize the most involved, dedicated, and impactful investors once it has become better established.

2.2. GOVERNANCE

Summary box 2.
Governance

Establishing an effective governance structure will be a critical component that will impact the success – or failure – of Nature Action 100+. One of the first steps in developing this structure is to determine how Nature Action 100+ should be aligned with Climate Action 100+, and how (and whether) the two initiatives should coordinate actions and governance.

Four standalone governance structures are considered in this paper:

1. Nature Action 100+ is absorbed into Climate Action 100+
2. Nature Action 100+ is a separate initiative under the umbrella of Climate Action 100+
3. Nature Action 100+ is a separate initiative independent of Climate Action 100+
4. Climate Action 100+ is a separate initiative under the umbrella of Nature Action 100+

Weighing the potential benefits and costs of the options – the descriptions, pros, cons of which are detailed in the following sections – we recommend that option 3 (Nature Action 100+ is a separate initiative independent of Climate Action 100+) be adopted. This recommendation will allow Nature Action 100+ to:

- Address strategic weaknesses in Climate Action 100+ (e.g., unclear governance structure that drives confusion among participants);
- Better position itself to partner with existing biodiversity-focused initiatives (e.g., Finance for Biodiversity);
- Attract biodiversity-focused investors specifically; and
- Position itself as a key steppingstone to enable the five major anthropogenic drivers of biodiversity (changes in land and sea use; species overexploitation; climate change; pollution; and, invasive species and diseases) to be addressed over time by targeted initiatives.

Additional steps detailed later in this report include formalizing the initiative's decision-making process, accountability mechanisms, membership rules, funding mechanisms, and others. There is also a need for further exploration of potential conflicts of interest – these should be carefully considered in future reports and analysis.

Biodiversity loss and climate change have been described as twin crises that are distinct from each other yet closely interrelated.[25] As such, initiatives that aim to address one of these issues can learn much from those that have tried to address the other, which is why a potential Nature Action 100+ should pay close attention to the Climate Action 100+ endeavor. Through the course of our research, we heard from many investors that getting governance right is key to a successful investor initiative. Investment professionals have many competing priorities in their day-to-day work, so an initiative such as Nature Action 100+ needs to be effectively administered to ensure maximum participation and impact.

This section will explore the advantages and disadvantages of the different options for governance and leadership of Nature Action 100+. The interviews conducted with investors uncovered diverse viewpoints on the issue of Nature Action 100+ governance. We have examined four options for program administration in detail:

1. Nature Action 100+ is absorbed into Climate Action 100+
2. Nature Action 100+ is a separate initiative under the umbrella of Climate Action 100+

25. Tobin-de la Puente & Mitchell, 2021, p.207; Farber, 2015, p.841.

3. Nature Action 100+ is a separate initiative independent of Climate Action 100+
4. Climate Action 100+ is a separate initiative under the umbrella of Nature Action 100+

detailed below, the first two options represent the most straightforward and rapid deployment paths, given the high reliance on existing Climate Action 100+ infrastructure. Option 3 is more complex but will robustly position Nature Action 100+ for future growth and success. Option 4, while novel, is likely more challenging given expected concerns and pushback from existing participants in Climate Action 100+. We recommend utilizing option 3 (Nature Action 100+ is a separate initiative independent of Climate Action 100+).

Call Out Box 3
Advantages and Disadvantages of Governance Options

Option	**Option 1:** NA100+ absorbed into CA100+	**Option 2:** NA100+ is separate under umbrella of CA100+	**Option 3:** NA100+ is a separate initiative & independent of CA100+	**Option 4:** CA100+ is separate under umbrella of NA100+
Description	CA100+ incorporates some aspects of nature into existing structure	NA100+ uses CA100+ infrastructure to create a separate initiative dedicated to nature	NA100+ operates indecently from CA100+, potentially with another partner	NA100+ absorbs CA100+ reflecting that climate change is a driver of biodiversity loss
Pros	• **Efficiency:** uses CA100+ existing infrastructure, framework and signatories	• **Efficiency:** utilizes CA100+ branding and marketing to increase speed and efficiency of NA100+ rollout	• **Nature Specific:** opportunity to design a program specific to biodiversity and distinct from climate	• **Nature Specific:** unified initiative with an overarching goal to preserve nature in its totality
Cons	• **Complexity:** further increases complexity of CA100+ goals and governance • **Limited Overlap:** Focus Companies differ between NA100+ and CA100+	• **Capacity:** limited resources available from CA100+ to implement NA100+ • **Governance:** does not enable NA100+ to address strategic weaknesses with CA100+ governance	• **Limited Resources:** new initiative will take time and resources to develop • **Competition:** risk of competing attention between the two initiatives	• Additional complexity, organizational infrastructure, and resourcing needs To be explored further.

Option 1: Nature Action 100+ is absorbed into Climate Action 100+

Climate Action 100+ could incorporate some aspects of nature into the existing structure. Though all interviewees recognized nature action as important, some expressed concerns about building a separate initiative to address them. Among the reasons given against a separate Nature Action 100+ was a predicted difficulty in attracting sufficient new members that have a strong interest in nature action to offset the costs. Nature remains a relatively new topic outside of the conservation realm and therefore currently lacks the traction of climate.

This perceived lag in awareness and knowledge led multiple interviewees to suggest temporarily incorporating it into Climate Action 100+ while the gap closes and commitments are made towards preserving biodiversity at the investor level. They proposed incorporating some aspects of nature that fit into the climate agenda, and could be calibrated to be part of Climate Action 100+. To that end, there could be a secondary nature-oriented target list of Focus Companies that are wrapped around the existing one, or a single platform with different target lists.

The main advantage of doing this is that the climate initiative has already developed an infrastructure, framework, and signatories, all of which could potentially accelerate the nature-focused efforts. Some of the participants and supporters of Climate Action 100+ would likely be interested in incorporating nature-related aspects into their agenda, and having nearly full participation from the existing Climate Action 100+ investors would give significant momentum to a new nature initiative.

However, there are also considerable disadvantages. Many interviewed investors perceive Climate Action 100+ as an already complex mechanism, where adding biodiversity metrics and targets could make it less efficient and effective. The risk observed in this scenario is that the nature aspects of the program will not get enough attention as investors already concentrate their effort on climate; or, conversely, nature initiatives will take the attention away from climate. A final and significant disadvantage is that the methodology from Part III shows that the companies that need to be targeted through a biodiversity loss initiative differ from those in Climate Action 100+, resulting in a missed opportunity to engage the most critical companies for biodiversity conservation if the initiatives are combined. Using the methodology from Part III, there are 49 Focus Companies that overlap between the two initiatives when considering the companies that have the highest impact on nature, and only 12 Focus Companies that overlap when considering the companies with the highest dependencies on nature, giving evidence to why it may not be the strongest option to combine the two initiatives in the long run.

Climate Action 100+ Steering Committee				
PRI Climate Action 100+ Global Working Group	Ceres North America Engagement Working Group	IIGCC European Engagement Working Group	AIGCC-PRI Asian Engagement Working Group	IGCC Australian & New Zealand Engagement Working Group
Focus Companies	Focus Companies	Focus Companies	Focus Companies	Focus Companies

Option 2: Nature Action 100+ is a separate initiative under the umbrella of Climate Action 100+

Nature Action 100+ could be structured as a separate initiative which sits under the umbrella of Climate Action 100+. Nature Action 100+ would bring in new partnership organizations that have a focus on biodiversity and a variety of geographic representation. A new Global Steering Committee for Nature Action 100+ would be established with the biodiversity partner organizations and representation from Climate Action 100+ for consistency.

The main advantage of this option is that the framework used for Climate Action 100+ has been proven successful at scale. Adopting the same framework and operating under the umbrella of Climate Action 100+ would allow Nature Action 100+ to benefit from the processes already in place for running engagement strategies and administrative aspects such as branding and marketing. The Climate Action 100+ brand could bring validity to this new initiative from the start and help it successfully launch. All of these things are likely to increase the speed and efficiency with which Nature Action 100+ could get off the ground, which is in itself an advantage.

A concern with this option is that the organizations involved with Climate Action 100+ may have inadequate human and financial resources to designate a sufficiently-robust second team to deal with the nature issue exclusively. This dilution of resources could lead to the new initiative being overshadowed by the existing Climate Action 100+, or indeed the opposite; distract attention away from Climate Action 100+. Many investors noted that governance needs to be well organized for the initiative to be effective, and one concern is that having the same organizations spearheading both programs may lead to a decline in the quality or efficiency of administration. A second disadvantage is that it commits Nature Action 100+ to closely aligning with how Climate Action 100+ runs its program, which does not allow Nature Action 100+ to be strategic in addressing weaknesses identified with Climate Action 100+. Overall, there are significant advantages and disadvantages to this option and there is not a clear side that dominates.

Climate Action 100+ Steering Committee				
Nature Action 100+ Steering Committee				
Nature Action 100+ Investor Group 1	Nature Action 100+ Investor Group 2	Nature Action 100+ Investor Group 3	Nature Action 100+ Investor Group 4	Nature Action 100+ Investor Group 5
Nature Action 100 + Focus Companies	Nature Action 100+ Focus Companies	Nature Action 100+ Focus Companies	Nature Action 100+ Focus Companies	Nature Action 100+ Focus Companies

Option 3: Nature Action 100+ is a separate initiative independent of Climate Action 100+

Nature Action 100+ could be a separate initiative from Climate Action 100+. Given how complex the existing climate initiative is, and the issues associated with that, it might be more straightforward to build a new platform. From a practical point of view, having a separate initiative, which would be comprehensive, might make sense in order to bring together all biodiversity and nature-related targets and metrics into one place.

Breaking off from Climate Action 100+opens the door for Nature Action 100+ to establish a joint partnership with existing biodiversity initiatives. For example, Finance for Biodiversity Pledge is an initiative launched in 2020 that has engagement with companies as a key pillar of its work. Nature Action 100+ could serve as the mechanism for Finance for Biodiversity Pledge investors to engage with Focus Companies. Other organizations with existing investor networks, such as Principles for Responsible Investment, may have a subset of investors that are expressing interest in biodiversity and may be interested in teaming up with Nature Action 100+ to deploy engagement strategies.

Many environmental experts underscored the necessity to present nature as a distinct area from climate. Further to that, they point out that nature has, in fact, a broader umbrella than climate. The five major anthropogenic drivers of biodiversity loss are identified by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and ranked in terms of largest relative impact on ecosystems, as follows:[26] changes in land and sea use; species overexploitation; climate change; pollution; and, invasive species and diseases.[27]

Focus Companies enlisted in Climate Action 100+ primarily address climate change. Though the close interrelations between these five drivers are recognized, each warrant independent consideration, for each driver hosts individual causes and solutions. Examining the Focus Companies identified in Part III of this report, the overlap between Climate Action 100+ and Nature Action 100+ is sufficiently low to infer that the scope of biodiversity loss is broader and to focus on only one or some of the many drivers would ultimately dilute the objective. An initiative that acknowledges all five drivers is therefore justified.

Another argument in favor of a standalone Nature Action 100+ is that climate and nature actions can be conflicting and thus, if merged, they may offset each other. For instance, the push for renewable energy sources as substitutes to carbon-intensive energy sources has, to some extent, contributed to biodiversity loss. Cases of this include hydropower projects that have caused severe river habitat fragmentation and even destruction of entire ecosystems via upstream flooding. Similarly, the threats posed by wind turbines on migratory bird and bat populations, many of which are considered keystone species in their ecosystems, have been widely documented. Though urgent

26. IPBES, 2019, p.17
27. WWF Living Planet Report, 2020, p.20

decarbonization of economies is encouraged, these concerns further evidence the potential discord in interests between the two initiatives.

A final argument in favor of a standalone initiative is that it allows Nature Action 100+ to chart its own course, separately from Climate Action 100+. Separating the two initiatives would give Nature Action 100+ the opportunity to evolve into a program that is best fit for taking action on biodiversity loss. Being separate from Climate Action 100+ would allow biodiversity experts to craft a program that will best be able to meet the initial goal of net zero biodiversity loss and future goal of net positive impact on biodiversity.

An argument against this option is that starting a brand-new initiative would take significant time and resources to set up and develop a reputation, and even longer until there are demonstrable results. Defining which organizations should be leaders is challenging and finalizing governance and operational processes without the groundwork of Climate Action 100+ would take time and resources, which may not be readily available in the timeframe needed. Additionally, there is a risk that if the two initiatives are separate, they may be actioning contradictory solutions to the detriment of both goals - for example, wind turbines can have negative impacts on biodiversity, so Nature Action 100+ might be trying to encourage other options, but turbines provide clean energy so Climate Action 100+ would likely be promoting this technology.

Nature Action 100+ Steering Committee				
Nature Action 100+ Investor Group 1	Nature Action 100+ Investor Group 2	Nature Action 100+ Investor Group 3	Nature Action 100+ Investor Group 4	Nature Action 100+ Investor Group 5
Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies

Option 4: Climate Action 100+ is a separate initiative under the umbrella of Nature Action 100

Climate Action 100+ could eventually be incorporated into Nature Action 100+. This option considers Climate Action 100+ as a separate initiative under the umbrella of Nature Action 100+. It recognizes the enormous complexity of the environmental crisis and the systemic insufficiencies of focusing primarily on GHG emissions (the driver of Climate Action 100+) to solve it. Instead, this option proposes an alternative approach where the overarching goal is to preserve nature in its totality. This stems from the five anthropogenic drivers that contribute to biodiversity loss, only one of which is the changing climate caused by GHG emissions. As such, a Nature Action 100+ blanket initiative that advocates for net zero biodiversity loss must, by default, address corporate emissions that contribute to climate change. In addition to a climate subgroup, there could be others targeting companies whose damaging activities relate to the remaining four drivers and escape the reach of Climate Action 100+. For example, those that contribute to species overexploitation or that cause pollution.

Under this structure, a Nature Action 100+ Steering Committee would be responsible for coordinating the different subgroups to ensure there are no competing forces. The viability of this option, including its governance, advantages, and disadvantages, warrants further analysis in future studies.

Nature Action 100+ Steering Committee				
Climate Action 100+ Steering Committee				
Nature Action 100+ Investor Group 1	Nature Action 100+ Investor Group 2	Nature Action 100+ Investor Group 3	Nature Action 100+ Investor Group 4	Nature Action 100+ Investor Group 5
Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies	Nature Action 100 + Focus Companies

2.3. LEARNINGS FROM CLIMATE ACTION 100+

Summary box 3.

Climate Action 100+ learnings

Climate Action 100+ presents several key learnings for Nature Action 100+ both in areas where it succeeded, and in shortfalls that create potential opportunities for refinement.
Key strengths that Nature Action 100+ should strive to emulate include:

- Precisely identifying appropriate Focus Companies using simple criteria;
- Identifying clear, common goals;
- The ability to increase the level of ambition over time; and,
- Clearly demonstrating the impact to investors of the targeted risk factors.

Interviewees also identified several shortfalls and concerns with Climate Action 100+ that represent opportunities for Nature Action 100+:

- Ensuring centralized management with a clear line of accountability;
- Building a process that better positions latecomers to integrate into the initiative;
- Acknowledging and adapting to geographical distinctions;
- Recognizing the impact of "leakage", and pushing regulators and investors to adopt policies that punish firms guilty of adopting policies that drive it; and,
- Structuring the initiative so that investors can not only set increasingly ambitious goals, but also continuously incentivize Focus Companies to meat or exceed those goals.

Many of the strengths of Climate Action 100+ stem from its precision in identifying initial participants. These were selected by employing two relatively simple criterion:

1. 100 Focus Companies with the largest volume of direct and indirect scope 1, 2, and 3 emissions;[28] and
2. 67 '+' list companies nominated by investors given their specific ability to drive the clean energy transition; their exposure to climate-related financial risk; or because they are crucial at a regional or national level.[29]

The combined 167 companies account for over 80% of global corporate GHG emissions.[30]

This selection process allowed the platform to bring together the most relevant stakeholders, which in turn helped identify common clear goals. Participating interviewees generally praised this clarity in goal-setting as another of the initiative's strong suits, and it allows investors to continue pushing the Steering Committee to make goals even more ambitious. Ultimately, this led to tangible results, as Focus Companies adopted concrete climate actions, including building resilient infrastructure, even at a time when there were no clear regulatory and market signals.

A Nature Action 100+ must be equally accurate in its selection criteria of Focus Companies as well as in its goal-setting and measurement of progress. This requires clearly delineated focus areas and setting annual milestones in order to show outcomes. To that end, the Net-Zero Company Benchmark could inspire a similar standard for nature and biodiversity.[31] Admittedly, the identification process for Climate Action 100+, as well as the critical actions that corporate actors must take to align with the Paris Agreement emission goals to mitigate climate change, are both relatively straightforward.[32] However, when it comes to protecting nature, the links between corporate actions and biodiversity loss are considerably more intractable, in part because of the latter's multifactorial essence.[33] This makes it difficult what percentage of biodiversity loss the 100+ Focus Companies are responsible for with the current data available.

The Nature Action 100+ initiative must therefore ensure that investors similarly perceive deteriorated nature – including biodiversity loss – as detrimental to their best interests and share the motivation to engage Focus Companies on their harmful practices. Numerous studies have estimated that over half of global GDP depends on high-functioning ecosystems (i.e: microorganisms essential for soil fertility), implying this connection should not be difficult to make once awareness efforts are underway.

In regards to governance, Nature Action 100+ stands to benefit from having centralized management with a clear-line of accountability. This recommendation stems from interviewees' concerns relating to the inefficiencies around the decision-making process of Climate Action 100+, which were mainly brought about by having five equal partner organizations managing the project. Similarly, latecomers to the initiative found it difficult to integrate into engagement groups that were already set up, spawning the need for a more inclusive approach.

28. Identified using CDP modelled and reported data.
29. Climate Action 100+. Progress Report. 2019. Available at: https://climateaction100.files.wordpress.com/2019/10/progressreport2019.pdf
30. Climate Action 100+. Progress Report. 2019. Available at: https://climateaction100.files.wordpress.com/2019/10/progressreport2019.pdf
31. Climate Action 100+. Net-Zero Company Benchmark. 2021. Available at:. https://www.climateaction100.org/progress/net-zero-company-benchmark/
32. Tobin-de la Puente & Mitchell, 2021, p.207
33. Tobin-de la Puente & Mitchell, 2021, p.207

For biodiversity even more so than climate, different companies in different regions will have unique priorities and interests. Climate Action 100+ could have benefited from a more efficient allocation of resources and time instead of trying to establish common and standardized grounds, a concern that is likely to be aggravated when dealing with the more complex and localized problems of biodiversity loss and ecosystem collapse. Acknowledging geographical distinctions and adapting to these is therefore encouraged.

Relatedly, in Climate Action 100+ the fear of free-riders remains latent, as does the broader issue of carbon leakage to companies outside the initiative. Though carbon leakage is an issue associated with carbon policies, lessons can nonetheless be learned from the risks of acting unilaterally and with different stringency between jurisdictions. If Focus Companies adhere to strict nature regulations that competitors outside the list must not, then this can lead to a similar type of 'leakage'. These matters should be recognized when envisioning Nature Action 100+.

A final important challenge of Climate Action 100+ pertains to the difficulties investors have had incentivizing Focus Companies to continuously improve and keep delivering as goals become more ambitious. As biodiversity loss inevitably accentuates in the years to come, driven by centuries of systemic inertia, the challenges of preventing spillover effects from nature degradation will also increase. As a result, Nature Action 100+ Focus Companies will probably be faced with similar demands to rapidly expand on their deliverables. Interviewees supported the idea of clear and immediate escalation tactics to address this issue.

2.4. LEARNINGS FROM EXISTING BIODIVERSITY EFFORTS

Summary box 4
Learnings from existing biodiversity efforts

Existing efforts targeting biodiversity risk typically focus on specific risks (e.g., deforestation) rather than Nature Action 100+'s more ambitious goal of addressing global biodiversity risk more broadly. However, they still present ample learnings for Nature Action 100+, such as:

- Including forward-looking estimates (vs. backwards looking assessments) of physical, transitional, and systemic biodiversity loss in risk and valuation methodologies is key;
- Investors are better able to identify where changes are most needed when their attention is focused on the impacts of their activities on nature;
- Footprinting methods can be highly effective; and
- Location-specific analysis is critical for natural capital assessment; however, there are substantial challenges in collecting and distributing this data.

Nature Action 100+ will be most effective if it can take these and other learnings into account when developing governance and enforcement mechanisms. It should also opportunistically develop mutually beneficial partnerships with existing initiatives, such as with the TNFD framework (whose quantitative metrics will be crucial building blocks for Nature Action 100+) and the Finance for Biodiversity Pledge (which could collaborate with Nature Action 100+ when developing their 2024 commitment plans).

The existing biodiversity efforts have provided an enabling environment for biodiversity finance. There are both public and private data providers which provide biodiversity related data. Under regional and global initiatives, there are biodiversity alliances that gather private entities to commit to biodiversity-related initiatives. Appendices E and F contains a series of available biodiversity data providers and biodiversity finance working groups, which Nature Action 100+ investors might be interested in examining further to understand best practices.

What can Nature Action 100+ learn from existing biodiversity efforts?

Through existing biodiversity efforts, groups of investors that are collaborating to tackle biodiversity loss and others are indirectly addressing biodiversity risk through adoption of specific sector policies (e.g., palm oil and deforestation). However, the review uncovered that there is still limited awareness of and few commitments to biodiversity at the investor level.

Factoring biodiversity loss into risk and valuation: Investors have primarily focused on biodiversity loss due to acute events, but less attention has been paid to how business activities are fundamentally reliant on biodiversity to produce goods and services.[34] Analysis from the Natural Capital Coalition finds that investors are not identifying which assets, governments, or companies are most exposed to natural capital risk. Investors are increasingly seeking the[35] tools and strategies needed for actively managing biodiversity portfolios in ways that address performance risk.[36]

These nature-related financial risks include, but are not limited to:

- Physical risk, which arises from chronic depletion of natural resources and acute natural events, arising from weakened ecosystems, and leading to disruptions to businesses' production processes or to demand.[37]
- Transition risk, which is the risk that businesses suffer financially due to stronger policies or social norms that penalize the direct or indirect harm that their production processes or products have on nature.[38]
- Systemic risk, which is the risk undertaken by humanity at-large as destruction of natural habitats brings people in closer contact with wild animals and thereby increases the likelihood of pathogen transmission to humans (zoonosis).[39] The COVID-19 pandemic is a clear example of systemic risk. Additionally, system risk encompasses the risk inherent in the role nature plays in the vital links that support human life. For example, a widespread loss of pollinators has drastic implications for global food security.[40]

Factoring forward-looking in risk assessment: The current risk assessment practices by the investors that consider current dependencies or historical trends (or a combination of both) can lead to mispricing of nature-related financial risks, as these risks have only relatively recently started to materialize.[41] Other methods, which involve forward-looking, are needed for sustainable risk management practice.[42]

34. PRI. Investor action on biodiversity: discussion paper. 2020. Available at: https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity.
35. Trucost. Natural Capital at Risk: The Top 100 Externalities of Business. 2013. Available at: https://www.trucost.com/publication/natural-capital-risk-top-100-externalities-business/.
36. Koellner, T., & Schmitz, O. Biodiversity, Ecosystem Function, and Investment Risk. BioScience. 2016. 56(12), 977-985. doi:10.1641/0006-3568(2006)56[977:befair]2.0.co;2
37. Global Canopy. The Case for a Task Force on Nature-related Financial Disclosures. 2020. Available at: https://globalcanopy.org/wp-content/uploads/2020/11/Task-Force-on-Nature-related-Financial-Disclosures-Full-Report.pdf.
38. Ibid.
39. Ibid.
40. European Commission: Science for Environment Policy. What do pollinator declines mean for human health?. 2016. Available at: https://ec.europa.eu/environment/integration/research/newsalert/pdf/what_do_pollinator_declines_mean_for_human_health_446na1_en.pdf
41. The Economics of Biodiversity: The Dasgupta Review. Available at: https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review
42. Ibid.

Impact assessment integration: An assessment of an investor's impacts, in addition to its dependencies, on natural capital is important in understanding exposures to nature-related financial risks. Through identifying both the positive and negative impacts their activities have on elements of natural capital, investors can identify where they need to change the type and provision of their financial services and channel financial flows in a way that support natural assets and their sustainable use. Some investors have already started to increase their awareness of their impacts on biodiversity specifically. However, such efforts are more focused on marketing purposes rather than fully integrated as part of their impact assessment yet.

Footprinting methods can play a central role in impact assessments[43] Investors can use footprinting methods to screen their activities directly, by assessing the impacts generated by their activity. It can be used to monitor the footprint of goods and services produced by businesses within its portfolio, assess sustainable investment decisions and policies, and for external reporting, for example to inform stakeholders about the overall footprint of the portfolio. Footprinting methods can also help investors produce and set quantitative targets for biodiversity, to assess whether they are contributing to 'No Net Loss' or 'Net Gain'. Management and mitigation of nature-related financial risks can lead to increased resilience of balance sheets for investors.

Lack of comprehensive data: Location-specific analysis is also critical for natural capital assessments as natural capital assets in one location can have very different characteristics to those in a neighboring location.[44] Investors wishing to understand, assess and integrate natural capital risks in their activities have faced a lack of comprehensive and systematic information on how businesses depend on the environment and the consequences when that relationship is disrupted by environmental change.[45] Due to lack of private sector progress on existing biodiversity commitments, biodiversity that have not translated into action, nor biodiversity risk disclosure. As a result, many banks do not collect data relative to natural capital risk from borrowers, or do not collect them in a way that is easily accessible or usable by banks' central risk teams. There can be considerable challenges in sourcing key information from borrowers. Where this proves to be unfeasible, banks may consider using relevant regulatory and market databases as proxies for borrower data. As the dependency and impacts of biodiversity are broad, the existing tracking efforts are based on various data sources which could lead to spatial and inconsistent results as well. Comprehensive biodiversity-related data are essential in tackling nature conservation.

What does Nature Action 100+ need to do differently? The same?

Unlike climate change, for which there are such cross-sectoral metrics as "CO2 equivalent," the challenge for existing efforts of biodiversity is that there is no agreed quantifiable goal for biodiversity globally.[46]

43. Ibid.

44. UNEPFI. Integrating Natural Capital Risk Assessments: A step-by-step guide for banks. 2019. Available at: https://www.unepfi.org/wordpress/wp-content/uploads/2019/01/Integrating-Natural-Capital-Risk-Assessments.pdf

45. UNEPFI. Exploring Natural Capital Opportunities, Risks and Exposure: A practical guide for financial institutions. 2018. Available at: https://www.unepfi.org/wordpress/wp-content/uploads/2018/11/NCFA_Exploring-Natural-Capital-Opportunities-Risks-and-Exposure_Nov-2018.pdf

46. GreenBiz. Why Investors Are Betting On Biodiversity. 2020. Available at: https://www.greenbiz.com/article/why-investors-are-betting-biodiversity.

Several have been proposed, such as species abundance per square kilometer, but none has yet reached to serve as a measurement to compare impacts across sectors and borders.[47] Reflecting those constraints of existing efforts, Nature Action 100+ aims to provide a platform with a common definition and goals. Moreover, with development of the initiative, monitoring mechanisms will be also stipulated in addition to the impact measurement which could be done at the investment making stage.

Additionally, voluntary commitment from the private sectors remains vastly insufficient.[48] The New York Declaration on Forests (NYDF) of 2015 is an agreement endorsed by 180 governments, companies, indigenous community networks, and civil society organizations with the aim of halving and ultimately ending natural forest loss by 2020 and 2030, respectively.[49] Only half of NYDF member companies have disclosed their progress towards these goals in the six years since the agreement was signed.[50] Thus, similar to the Convention on Biological Diversity (CBD)'s post 2020 global biodiversity framework, a follow-up response to the failure of stakeholders to meet biodiversity goals could be incorporated in the Nature Action 100+, through the progress reports.

What role could these existing efforts play in Nature Action 100+?

The current ongoing development of the TNFD framework plays an important role in Nature Action 100+, as it can provide quantitative metrics that are globally acceptable for biodiversity assessment.

Such disclosure pressures are also shown by rating agencies, which have started to include nature-related disclosures in their assessments. Institutional investors are demanding more accountability from the invested companies in terms of the environmental risks of business operations, which means investors can put increased pressure on companies with higher costs of capital when engaging in nature-degrading practices. But such efforts are still in early stages.

Nature Action 100+ can also leverage the existing alliances and pledges as continuing efforts for biodiversity conservation. For example, one of the latest alliances, Finance for Biodiversity Pledge, could collaborate with Nature Action 100+ for taking their 2024 commitment plans, which includes collaboration, knowledge sharing, and engaging with companies.[51]

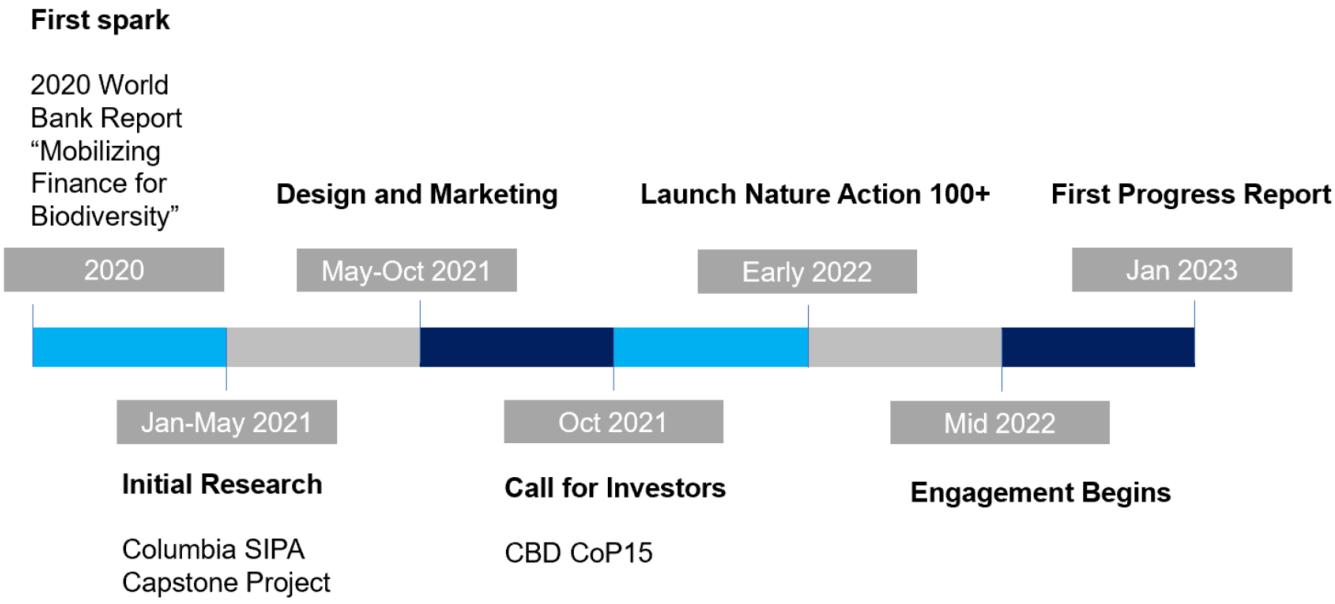
Lastly, there also exists a need for nuanced cooperation between financing mechanisms for biodiversity protection and financial tools to combat climate change.[52] Current efforts at securing finance, implementing initiatives, and building the knowledge base around climate and biodiversity financing remain fragmented and often sectorial in their nature.[53] Additionally, reports found that action taken to combat biodiversity loss can conflict with climate mitigation, and vice versa.[54] More work must be done at a sector level to identify trade-offs; for example, if an activity supports climate action but causes harm to life on land.

47. Ibid.
48. Land Use Policy. Bridging funding gaps for climate and sustainable development: Pitfalls, Progress, and Potential of Private Finance. Vol. 71, 2018. Available at: https://www.sciencedirect.com/science/article/pii/S0264837717310049?via%3Dihub
49. New York Declaration on Forests Progress Assessment. Available at: https://forestdeclaration.org/
50. Land Use Policy. Bridging funding gaps for climate and sustainable development: Pitfalls, Progress, and Potential of Private Finance. Vol. 71, 2018. Available at: https://www.sciencedirect.com/science/article/pii/S0264837717310049?via%3Dihub
51. Finance For Biodiversity Pledge. Available at: https://www.financeforbiodiversity.org/about-the-pledge/
52. Global Canopy. The Little Biodiversity Finance Book. 2020. Available at: https://globalcanopy.org/wp-content/uploads/2020/12/LittleBiodiversityFinanceBook_3rd-edition.pdf
53. Land Use Policy. Bridging funding gaps for climate and sustainable development: Pitfalls, Progress, and Potential of Private Finance. Vol. 71, 2018. Available at: https://www.sciencedirect.com/science/article/pii/S0264837717310049?via%3Dihub
54. Schelske, O (et al.). Habitat, water security and air quality: New index reveals which sectors and countries are at risk from biodiversity loss. Available at : https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-biodiversity-and-ecosystems-services.html

3. IMPLEMENTATION

To implement an initiative such as Nature Action 100+, there are several practical considerations which need to be addressed. We suggest these considerations as a starting point, but this will need to be expanded on as the initiative approaches its launch date, and beyond as international biodiversity practices continue to evolve.

Timeline: The upcoming meeting of the Conference of the Parties to the Convention on Biological Diversity in October 2021 presents an exciting opportunity to announce Nature Action 100+. Doing so would help the initiative to reach a wide and global audience and put the spotlight on the investment community's role in protecting nature. This report provides the initial groundwork for Nature Action 100+, with additional design work and marketing required before the launch.

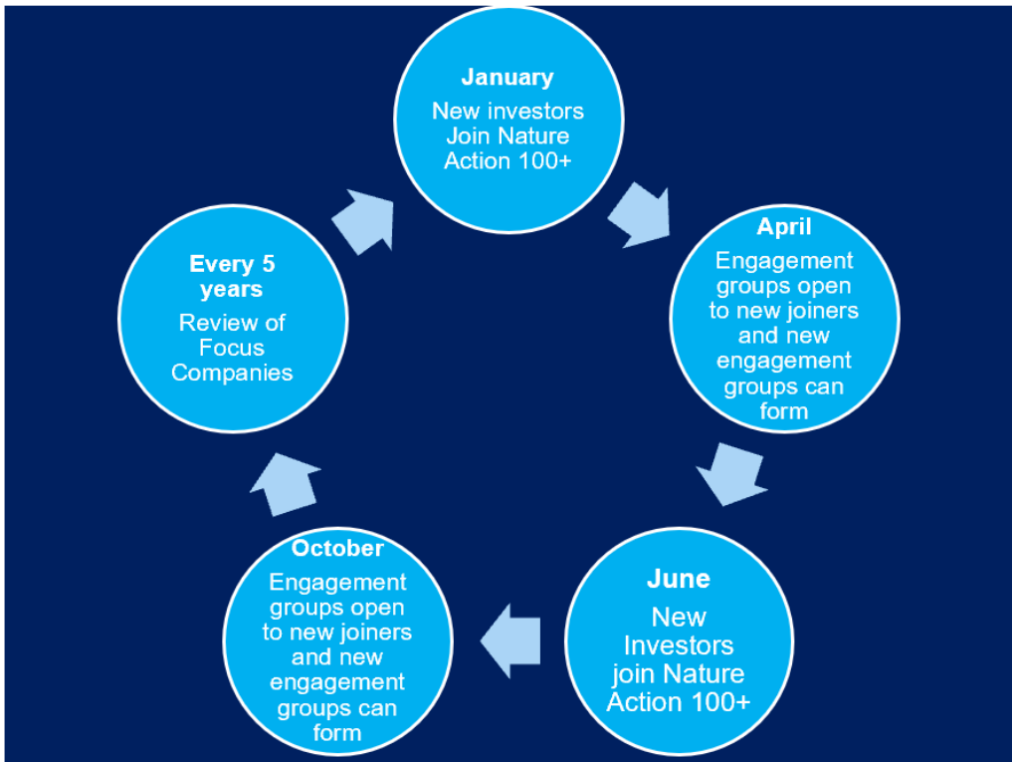


Financing: Nature Action 100+ will have several up front and ongoing operating costs, such as legal, human capital, branding, and marketing. To cover operating costs, Climate Action 100+ partners with nonprofits and relies on in-kind donations from participating investors. Nature Action 100+ could follow a similar model, or adopt a modest membership fee for investors which is tiered based on assets under management. Many investor initiatives use a membership fee model with success.

Marketing: The marketing of Nature Action 100+ will look very different depending on whether it is established as an initiative under Climate Action 100+ or a separate initiative. Under Climate

Action 100+, Nature Action 100+ could use their existing marketing channels to reach new audiences and promote the initiative. If Nature Action 100+ is established separately, it will also need to establish new marketing channels. A potential avenue for this would be through establishing relationships with existing initiatives for biodiversity to reach their audiences. If Nature Action 100+ is able to get a few high-profile investors to sign up for the initiative, this will help it gain momentum.

On-Boarding of Investors: There should be regular junctions at which new investors are able to join the initiative. One challenge identified with Climate Action 100+ is that it was hard for new investors to join in on engagement with Focus Companies because the engagement groups have already been established. To combat this, engagement groups could be opened to new investors off cycle from when new investors join the initiative, such as in the below graphic.



On-Boarding of Focus Companies: There should be a regular review of the Focus Companies and the target sectors that are part of Nature Action 100+, with investor feedback taken into account. This review can be completed internally if resources are available, or outsourced to a third-party firm with expertise in biodiversity. This review should happen at least every five years to determine if there need to be new companies or sectors added. The composition of Focus Companies may also change as methods for measuring biodiversity impacts and dependencies improve.

Reporting: Once established, Nature Action 100+ should publicly publish an annual report on the initiative's progress. This should include information on which investors have joined the initiative and the progress Focus Companies have made towards the goal of net zero biodiversity loss.

4. LIMITATIONS

In terms of limitations, biodiversity loss is more intractable than climate change. Whereas in Climate Action 100+ a direct correlation can be identified between the 100+ largest corporate emitters of GHG and the 100+ Focus Companies selected using the first criterion, a comparable,universal metric to 'tons of CO2 equivalent' does not currently exist for biodiversity loss. This project has proposed one such metric, and others like abundance of species per square kilometer have been promoted elsewhere, yet a mainstream solution in the short term is improbable.

While this continues to be the case, commitment to the initiative will remain compromised. The adoption of a universal metric will, in turn, allow investors to better assess and report on the risk of biodiversity loss from Focus Companies' activities. By doing so, they may take action to mitigate that risk and impact.

Furthermore, corporate activities have a direct effect on biodiversity loss but represent only a fraction of its global threats. Acknowledging this as a limitation can help manage expectations regarding the impact of a Nature Action 100+. For instance, harmful corporate activities – at least those that stem from publicly-listed companies that can be influenced by financial investors – only marginally contribute to wildlife trafficking (a main cause of species overexploitation, one of the five drivers of biodiversity loss).[55] Similarly, the spread of invasive species (another of the five drivers) is only partially brought about by corporate action.[56]

In fact, many variables within each of the five drivers of biodiversity loss can be attributed to factors underpinned by more systemic problems, which relate to ingrained societal values and general human behavior. Therefore, the ability of investors to engage in these instances, even when applicable, is restricted. These include, but are not limited to: human population growth rates and its consequences (i.e., urban sprawl or coastal development that cause land-use change), production and consumption patterns (i.e., dietary changes, such as a global increase in demand for animal-based protein, including beef), as well as the proliferation of small and/or informal actors (i.e., smallholder agriculture or artisanal and illegal practices in mining, fisheries, and logging) that operate outside the realm of formal financial markets. The combined impact of these 'other' factors must be recognized as a major contributor to biodiversity loss that rivals that of Focus Companies.

In addition, the investor engagement strategy is not strong enough with a standalone basis without regulation support. One interviewee shared his question over the effectiveness of

55. Morton et al., 2021
56. Doherty et al., 2016

shareholder engagement strategy without regulation in place, based on Climate Action 100+ experience. Based on the monitoring by Ceres, a sustainability nonprofit organization, among 140 climate-related shareholder proposals as they were considered at annual general meetings of shareholders, only six proposals won majority votes.[57] This outcome is improved from 2019 when only one that garnered a majority of shareholder approval.[58] However, the effectiveness is expected to be in place slowly by itself. The regulation support is needed for biodiversity finance.

5. BEST PRACTICES FOR FOCUS COMPANIES

As the United Nations Decade on Biodiversity (2011-2020) wraps up, it is worth highlighting investors' actions to support protection of biodiversity, strategies to reduce biodiversity loss and implementation of risk assessments to include biodiversity in business and financial decisions. The following is a hypothetical case study of the curated list of best practices from Focus Companies on biodiversity that can set the path towards Nature Action 100+:

User profile: Focus company highly dependent on biodiversity

Sustainability priorities

- Take action to restore, maintain and enhance biodiversity
- Halt or reduce negative biodiversity impacts associated, directly or indirectly with the company's activities.

How to engage in biodiversity best practices?
Step 1: Map biodiversity dependency, exposure and risks
Step 2: Review global biodiversity goals as well as national and regional biodiversity goals of their operation sites
Step 3: Set specific biodiversity-related targets
Step 4: Implement changes
Step 5: Include a Monitoring and Evaluation tool to track progress against biodiversity targets

Commitments

- Not to operate activities within the boundaries of official inscribed UNESCO World Heritage sites and avoid any activities that might have a direct or indirect impact on the integrity of a World Heritage site.
- Not to operate any activities within the boundaries of Strict Nature Reserves (IUCN) or protected areas according to the national law ruling.
- Enhance biodiversity around operating sites and throughout the supply chain.
- Support and further biodiversity conservation and restoration where the company's activities take place.
- Engage in partnerships with leading biodiversity conservation organizations.
- Transparency and reporting. For this commitment it is important to set a clear baseline on biodiversity data and disclose progress towards no net biodiversity loss and net positive impact.
- Integrate biodiversity into the company's decision-making processes.

57. GreenBiz. How Climate Proposal Fared During The 2020 Proxy Season. 2020. Available at: https://www.greenbiz.com/article/how-climate-proposals-fared-during-2020-proxy-season
58. Ibid.

6. CONCLUSION

The goal of Nature Action 100+ is for Focus Companies to reach net zero biodiversity loss in the medium term, and net positive impact on biodiversity in the longer term. We have made suggestions of questions and actions investors may want to ask of Focus Companies, but establishing a full framework will be necessary to reach this goal. This represents a piece of further work to be done.

Nature Action 100+ is different from existing biodiversity initiatives and fills a gap because it directly targets the Focus Companies and tries to influence change at that level and it uses the power of investors and their capital to accomplish this.

There are four possible governance options for Nature Action 100+:

1. Nature Action 100+ is absorbed into Climate Action 100+
2. Nature Action 100+ is a separate initiative under the umbrella of Climate Action 100+
3. Nature Action 100+ is a separate initiative independent of Climate Action 100+
4. Climate Action 100+ is a separate initiative under the umbrella of Nature Action+

There are advantages and disadvantages to each option and this needs to be explored further with interested parties to come to a final conclusion for implementation. This also represents a piece of further work to be done.

Nature Action 100+ has a great opportunity to launch with the upcoming Convention on Biological Diversity Conference of the Parties in Kunming later this year. We have suggested some marketing, financing, and onboarding considerations, in addition to a proposed timeline for program implementation, which sees the program launch in 2022.

There are limitations to Nature Action 100+ as it is proposed in this paper. The initiative will only cover public companies. Nature Action 100+ also doesn't consider drivers of biodiversity loss such as urban sprawl, land use change, and illegal logging or mining, which can't specifically be attributed to companies. It can expand to more sectors and companies in the future, which is something to work towards as the program evolves.

PART III

NATURE ACTION 100+: METHODOLOGY TO IDENTIFY HIGH PRIORITY SECTORS

ABSTRACT

The Nature Action 100+ initiative is an investor engagement mechanism to protect natural capital ecosystems and biodiversity using a top-down, sectoral based approach to identify the largest sectors and sub-industries associated with natural capital dependency and impacts. Data used for this analysis was conducted with the ENCORE tool, developed by the Natural Capital Finance Alliance UNEP-WCMC. The ENCORE data was used to identify the top 20 sub-industries by impact and dependency, which were then applied to create a sample list of the top 100+ companies using the GICS industry classification. The top 100+ companies were limited to publicly traded companies from Bloomberg and selected based on a global sequential ranking of their market capitalization in USD. The top 100+ ranked companies have been identified as part of the proposed investor engagement initiative, The Nature Action 100+. This list of sub-industries and the list of respective companies can be used to identify high priority sectors for biodiversity and natural capital risks and biodiversity target setting. The Nature Action 100+ is an important first step to encourage the private sector as well as investors to think about biodiversity and natural capital impacts and dependencies.

BACKGROUND

Nature Action 100+ is an investor engagement initiative focused on reducing key corporate actors' impact on global biodiversity loss. We use a top-down, sectoral approach driven by the ENCORE natural capital framework to identify candidate Focus Companies with the greatest impact and dependence on biodiversity. While our methodology does not measure direct biodiversity impact and dependence on the firm level, a sectoral natural capital framework can approximate corporate interactions with biodiversity and generate meaningful results for investors seeking to engage on biodiversity and nature issues. Our methodology enables investors to prioritize sectors for potential interventions and assists in the initial identification of Focus Companies to be included in Nature Action 100+.

Sectoral based approaches can be useful considering the limited availability of firm-level biodiversity and natural capital data and associated metrics. Examples of sectoral approaches include The Economics of Ecosystems and Biodiversity (TEEB), a global initiative which seeks to bring the values of biodiversity and ecosystem services into decision-making at all levels.[59] Truecost, in partnership with TEEB, published a report, *Natural Capital at Risk: the Top 100 Externalities of Business (2013)*, to determine the largest natural capital risks for business, investors and governments. This research identified the top sectors associated with high impact Environmental Key Performance indicators (such as land use, water consumption, greenhouse gases, air pollution, land and water pollution and waste).[60] Sectoral frameworks such as these can be useful to identify the highest impact externalities and regions in which these impacts occur. We note that while other top-down, sectoral-based approaches can be used by investors, for purposes of our research, we have opted to use the ENCORE data tool, given the transparency of the data and ease of use, courtesy of Natural Capital Finance Alliance UNEP-WCMC. This data tool and framework is explained in more detail in the following sections.

59. Trucost. Natural Capital at Risk: The Top 100 Externalities of Business. 2013. Available at: https://www.trucost.com/publication/natural-capital-risk-top-100-externalities-business/.
60. Ibid.

There have been recent developments among financial institutions to play a greater role in protecting biodiversity, however there are many practical challenges. For instance, as outlined in our literature review, it may be challenging for financial institutions to aggregate biodiversity data as it is location specific and varies according to the type of asset at that location.[61] Investors may need to engage with companies and data service providers to encourage the use of meaningful and consistent biodiversity data.[62]

Despite these challenges, there has been some progress with respect to establishing frameworks to incorporate biodiversity and natural capital assets into broader investment decisions and operational decisions. For example, we have identified three primary categories of data mapping and frameworks to assess biodiversity and natural capital; these can be categorized as i) Reporting and Disclosure Protocols, ii) Biodiversity Footprint Tools, and iii) Mapping Tools. Reporting and Disclosure Protocols, such as the Taskforce on Nature-related Financial Disclosures (TNFD) aim to facilitate the assessment, management and reporting to address the impacts on nature to assess nature-related risk.[63] Biodiversity Footprint Tools such as EXIOBASE and The Global Biodiversity Score, are tools that allow financial institutions to consider their environmental footprint and establish and measure corporate and financial commitments for biodiversity.[64] Finally, mapping tools range from exploratory to highly technical and require company spatial data and GIS expertise to obtain results.[65] Among these mapping tools, investors can evaluate how biodiversity and ecosystem services are linked to sectors of the economy. For purposes of this analysis however, our team utilized the data from ENCORE (Exploring Natural Capital Opportunities, Risks, and Exposure) tool, developed by the Natural Capital Finance Alliance UNEP-WCMC, to utilize a sectoral based approach to identity the top industry sub-industries to facilitate a Nature Action 100+ list.

Through understanding and quantifying biodiversity risk through high priority sectors, investors will be better able to incorporate this into their investment decisions. The following sections describe our methodology using the ENCORE dataset to identify high priority sectors by dependency and by impact and the practical implications of these results in choosing companies to target through investor engagement schemes.

2. METHODS

This section outlines the data sources and methodology used to identify companies for inclusion in the Nature Action 100+.

2.1 ENCORE TOOL AND SUB-INDUSTRY RANKING

Initially, we undertook a rigorous analysis of existing analyses of nature capital risk assessment, and identified promising existing methodologies.[66,67] For analyses targeted at financial institutions, most sources used categorical data from the Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) tool developed by the Natural Capital Finance Alliance and the UNEP-WCMC.

61. PRI. *Investor action on biodiversity: discussion paper*. PRI. 2020. Available at: https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity.
62. Ibid.
63. TNFD. Bringing together a Taskforce on Nature-related Financial Disclosures. Available at: https://tnfd.info/why-a-task-force-is-needed/.
64. Capitals Coalition. *Global Biodiversity Score: A Tool to Establish & Measure Corporate & Financial Commitments for Biodiversity*. 2019. Available at: https://capitalscoalition.org/global-biodiversity-score-a-tool-to-establish-measure-corporate-financial-commitments-for-biodiversity/.
65. WWF. Natural capital and organizations strategies: an overview of available tools. 2019. Available at: https://wwfint.awsassets.panda.org/downloads/191220__wwf_fr___natural_capital_tools_overview__english_.pdf
66. World Economic Forum. Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy. 2020. Available at: https://www.weforum.org/reports/nature-risk-rising-why-the-crisis-engulfing-nature-matters-for-business-and-the-economy
67. De Nederlansche Bank. Values at risk? Sustainability risks and goals in the Dutch financial sector. 2019. Available at: https://www.dnb.nl/media/hm1msmzo/values-at-risk-sustainability-risks-and-goals-in-the-dutch.pdf

The ENCORE tool provides a categorical mapping of 167 GICS sub-industries by 86 production processes to 21 ecosystem services and the 8 natural capital assets that underpin them.

For sake of clarity, the ENCORE tool employs two pathways for assessing sub-industries' interactions with natural capital: i) Impact and ii) Dependency. Impact refers to the economic activities which impact ecosystem services and natural capital. Effectively this aims to address the human-induced impacts on biodiversity. While dependency refers to the ways in which economic activities rely on ecosystem services and natural capital. The high dependence on the production processes which rely on biodiversity (through the ecosystem services reliant on biodiversity) exposes some economic sectors to a greater degree of risk arising from its potential biodiversity or natural capital loss. The below table summarizes the Impacts and Dependencies and their respective use cases.

Figure 1. Summary of Impact and Dependency

	Impact	**Dependency**
Overview	Refers to the human-induced impacts on biodiversity. In other words, higher impact sub-industries have production processes that have a higher impact on biodiversity (i.e., land, freshwater, etc.).	Dependency refers to the importance of ecosystem services provided by biodiversity for a production process. In other words, higher dependency sub-industries, rely more heavily on multiple-ecosystem services.
ENCORE Definition & Methodology Summary	Impacts were assessed based on seven criteria derived from literature on the major human-induced impacts on biodiversity, these criteria are included below: 1. Use of land and freshwater area 2. Use of marine area 3. Use of natural resources and/or organisms 4. Pollution (e.g., solid waste, water, soil and air pollutants, excluding atmospheric pollutants) 5. Climate change (i.e., emission of atmospheric pollution) 6. Invasive species (i.e., sector is typical involved in their spreading) 7. Disturbances (e.g., noise and light pollution) • To identify the priority sectors based on their impact on natural capital, our scores were derived for each production process using the materiality of each production process' impact on ecosystem services. • Materiality of impact on ecosystem services was determined based on the extent of changes in the quantity or quality of natural capital that stem from each production process.	Dependencies were assessed based on 21 ecosystem services (see Figure 7 for list of ecosystem services) included in ENCORE and are grouped into four main categories according to the function they provide for production processes, which are listed below: 1. Direct physical input 2. Enabling production 3. Mitigating direct impacts 4. Protecting from disruption To identify the priority sectors based on their dependency for biodiversity - scores were derived using ratings of the materiality of each production process' dependence on ecosystem services (detailed in ENCORE). Materiality Of each production process's dependence on ecosystem services was determined based on two criteria: i) the significance of the loss in production process if ecosystem service was disrupted and ii) the significance of the financial loss due to the loss in functionality in the production process.
Potential Use Cases	The identification of sub-industries that have the highest impact on biodiversity can help investors identify priority biodiversity target setting initiatives.	The identification of high dependency sub-industries which are the most reliant on ecosystem services which can help identify potential corporate level risks as a result of exposure to industries with high biodiversity dependency.
Source: UN Environment Programme, UNEP Finance Initiative and Global Canopy 2020. Beyond 'Business as Usual': Biodiversity targets and finance. Managing biodiversity risks across business sectors. UNEP-WCMC, Cambridge, UK, 42 pp.		

ENCORE includes a categorical ranking (Very High, High, Medium, Low, Very Low) of the materiality of each production process' dependence on these ecosystem services. Based on expert analysis and research, these materiality rankings indicate the importance of the contribution of an ecosystem service to a production process, and the materiality of the impact if the ecosystem service were to be disrupted.[68] Each ecosystem service is provided by one or a combination of eight natural capital assets, and drivers of environmental change that could impact the relevant asset.[69] The ENCORE data also includes a simple categorical rating (Red, Amber, Green) indicating the influence of drivers of environmental change on ecosystem services by natural capital assets.

Figure 2. ENCORE Natural Capital Assets

Natural Capital Assets		Description
	Atmosphere	The atmosphere is the mass of air surrounding the earth. Its components (such as oxygen) and its processes (such as temperature regulation) support a number of essential ecosystem services.
	Habitats	Habitats refer to the conditions of the environment necessary for life to prosper. These conditions vary widely between species but can include such elements as water and food availability, temperature range, or absence of predators. Habitats can be defined very narrowly for one population of a particular species or more widely by type such as forests or coastal habitats that host many different species.
	Land geomorphology	Land geomorphology describes the structure of the land, such as mountains and valleys. Land geomorphology supports the provision of ecological regulatory services, like erosion control.
	Minerals	Minerals are naturally occurring compounds not produced by living beings. They can be metallic or non-metallic and play an important supporting role in the provision of services like soil quality.
	Ocean geomorphology	Ocean geomorphology describes the structure of the marine environment such as shelfs and slopes. Ocean geomorphology supports the provision of regulatory services, like dilution by ecosystems.
	Soils and sediments	Soils and sediments are the layers of the earth's surface that support life. They comprise top-soil, sub-soil and ocean sediments and support a number of regulatory services.
	Species	Species includes plants, animals, fungi, algae and genetic resources, which can be wild or domestic/commercial, for example livestock.
	Water	Water includes surface water, ground water, ocean water, fossil water and soil water.

Source: ENCORE
Note: These natural capital assets underpin a list of 27 ecosystem services (see Figure 7)

68. Natural Capital Finance Alliance. Exploring Natural Capital Opportunities, Risks and Exposure: A practical guide for financial institutions. Available at: https://naturalcapital.finance/wp-content/uploads/2018/11/Exploring-Natural-Capital-Opportunities-Risks-and-Exposure.pdf
69. Ibid.

The scores for dependencies were calculated by converting the relevant materiality scores Very High, High, Medium, Low and Very Low to 5, 4, 3, 2 and 1, respectively. We calculated a mean influence score of the drivers of environmental change on natural capital assets by converting Red, Amber and Green to 3,2 and 1 respectively and then taking a mean influence score by asset and ecosystem service. We then multiply the quantitative dependency score by the mean influence score for an indication of the dependence of the sub-industry by ecosystem service weighted by influence on natural capital assets. To rank sub-industries, we take a simple mean of these weighted materiality rankings by sub-industry to determine those sectors with the greatest dependence on natural capital assets. To generate a similar list of sub-industries by dependency on natural capital assets, we simply calculate a simple mean of weighted materiality rankings by sub-industry for those production processes that depend on the relevant natural capital asset.

Figure 3. Dependency Method

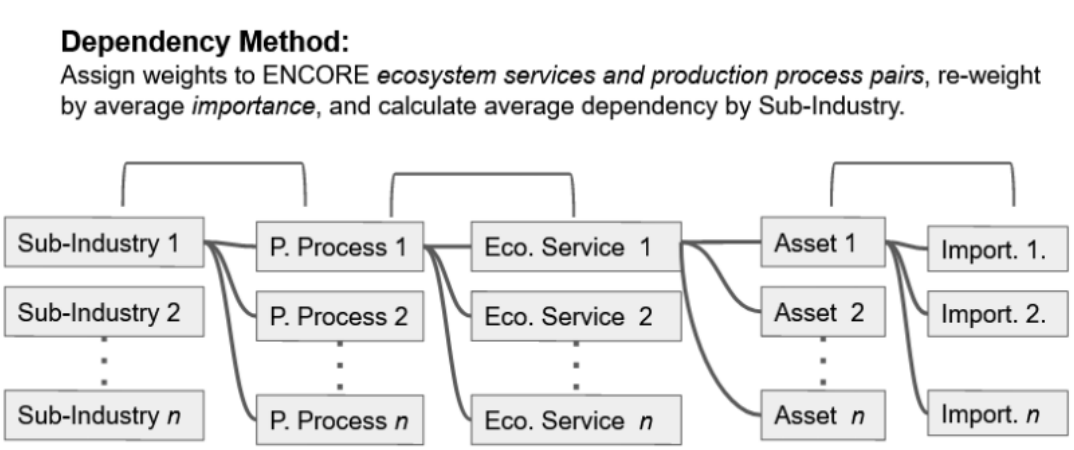
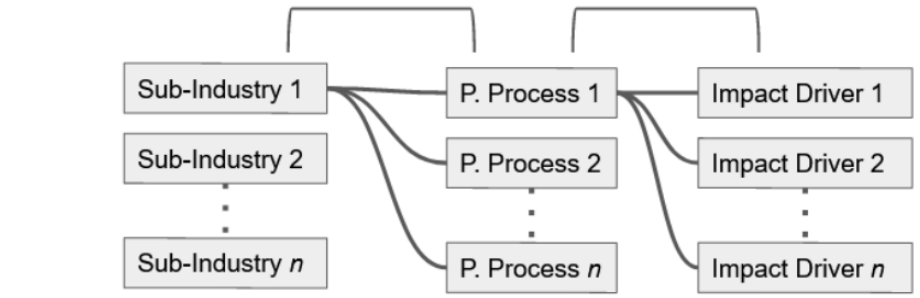


Figure 4. Impact Method



The ENCORE tool also includes a categorical ranking (Very High, High, Medium, Low) to assess the materiality of each production process' impact on ecosystem services. Impacts are "changes in the quantity or quality of natural capital that occurs as a consequence of an impact driver" (Natural Capital Protocol, 2016). Like dependencies, the impact materiality rankings were developed and validated using sector experts. To rank sub-industries by their impact on natural capital, we converted the Very High, High, Medium and Low assessments with 4, 3, 2 and 1, respectively. We take a simple mean of these impact materiality rankings by sub-industry to determine an overall ranking. To develop asset-specific rankings, we filter by the ecosystem services that impact the relevant asset and then take a simple mean of the impact materiality by sub-industry.

Our analysis presents the ranking of sub-industries based on the descending order of their calculated dependence and impact materiality score (Figures 5 and 6). We also present the rankings of sub-industries by the descending order of their dependence and impact score as calculated for specific natural capital assets. Notably, we do not present the scores themselves, which were calculated for ranking purposes. The materiality and dependency scores are not cardinal and cannot be interpreted directly, and we choose not to present them for clarity.

2.2 BLOOMBERG DATA FOR TOP 100+ COMPANIES

Using our sub-industry rankings, we generated two sample lists of the top 100+ companies by impact and dependency on natural capital, respectively. These companies were selected based on a sequential ranking of their market capitalization in USD. For purposes of this analysis, we selected the top 200 companies by both dependency and impact. The results for the top companies can be found in the Appendix.

3. RESULTS

3.1. DESCRIPTIVE FINDINGS

Using our weighting schema we were able to identify the top industry sub-industries by impacts and dependencies. The top twenty sub-industries by impacts and dependencies are outlined in Figures 5 and 6 below.

Figure 5. Sub-industry by Impact

Rank	Sub-industry classification	Sector Classification
1	Coal & Consumable Fuels	Energy
2	Integrated Oil & Gas	Energy
3	Oil & Gas Drilling	Energy
4	Metals & Mining	Materials
5	Marine Ports & Services	Industrials
6	Forest Products	Materials
7	Airlines	Industrials
8	Airport Services	Industrials
9	Marine	Industrials
10	Oil & Gas Exploration & Production	Energy
11	Commodity Chemicals	Materials
12	Semiconductor Equipment	Information Technology
13	Paper Packaging	Materials
14	Paper Products	Materials
15	Agricultural Products	Consumer Staples
16	Homebuilding	Consumer Discretionary
17	Highways & Rail tracks	Industrials
18	Construction Materials	Materials
19	Specialty Chemicals	Materials
20	Renewable Electricity	Utilities

Figure 6. Sub-industry by Dependency

Rank	Sub-industry classification	Sector Classification
1	Forest Products	Materials
2	Marine	Industrials
3	Coal & Consumable Fuels	Energy
4	Tobacco	Consumer Staples
5	Agricultural Products	Consumer Staples
6	Food Distributors	Consumer Staples
7	Technology Distributors	Information Technology
8	Trading Companies & Distributors	Industrials
9	Air Freight & Logistics	Industrials
10	Distributors	Consumer Discretionary
11	Health Care Distributors	Health Care
12	Building Products	Industrials
13	Metals & Mining	Materials
14	Wireless Telecommunication Services	Communication Services
15	Integrated Telecommunication Services	Communication Services
16	Integrated Oil & Gas	Energy
17	Airport Services	Industrials
18	Airlines	Industrials
19	Marine Ports & Services	Industrials
20	Water Utilities	Utilities

We use this list of sub-industries to subset Bloomberg's global equity database by GICS sub-industry and then identify the top 100+ companies by using market capitalization as a proxy for impact and size. These companies are shown in the Appendix according to their sub-industry classification.

3.2. DISCUSSION

The objective of a Nature Action 100+ is to utilize investor engagement to push Focus Companies towards a goal of achieving net zero biodiversity loss in the medium-term and net positive impact on biodiversity in the long-term. To achieve this goal, Focus Companies must improve internal governance and their external disclosure of biodiversity related risks. To do this, existing initiatives such as the Task Force on Nature-related Financial Disclosures (TNFD), can be a helpful tool for companies within these high priority sectors to assess their financial and business plans against a range of biodiversity loss scenarios and help improve decision-making.

Our sub-industry classification by dependency and impact has several practical implications. First, through this top-down approach, investors are able to identify natural capital risks for companies whose activities are driving biodiversity loss. This represents a meaningful improvement over extant tools available to the investment industry may be useful for investors who wish to encourage companies within these sub-industries to disclose and manage biodiversity risks and impacts. This information may also be useful for identifying priority sectors and in the establishment of sector or sub-industry level biodiversity and natural capital specific goals such as no net biodiversity loss or zero deforestation targets.[70]

Given ENCOREs linking of natural capital assets and sub-industries, investors are also able to identify natural asset specific risk. For instance, using this methodology, investors can consider their investment decisions for industries that may have high dependencies or impacts on habitat, water, species, among other natural capital assets (see Figure 7). Given that efforts to mitigate biodiversity impacts lack a universal target, such as a 1.5℃ in the Climate Action 100+ initiative, identifying specific natural capital assets may allow "nature-aware" investors to conduct asset and sub-industry level screens and further refine engagement or initiative building.

Notably, our approach of identifying priority sub-industries allows investors to choose their appropriate weighting mechanism for the identification of companies within those sub-industries. While we present a sample list of 100+ companies from the 20 sub-industries with the greatest impact and dependency on natural capital based on their market capitalization (Appendix A and Appendix B), investors may wish to choose other financial metrics, or (weighted) combinations thereof, to select companies active within these priority sub-industries. Notably, investors may also wish to target companies in sub-industries based on their impact or dependence on particular natural capital assets (see Figure 2), or based on the location of their operating activities.

70. UN Environment Programme. *Beyond 'Business as Usual: Biodiversity targets and finance. Managing biodiversity risks across business sectors.* 2020. Available at: https://www.unepfi.org/publications/banking-publications/beyond-business-as-usual-biodiversity-targets-and-finance/

When considering a more active ownership approach and drawing from the Climate Action 100+ initiative, investors can engage with companies in those high priority sub-industries to determine specific biodiversity and natural capital objectives. Our interviews revealed that the Climate Action 100+ initiative, given its scale and scope of investor involvement, helped ensure accountability for companies to keep their climate objectives. For instance, some of the largest utilities and mining companies in North America adopted net zero emissions and attribute these actions to the Climate Action 100+. Therefore, we believe a similar engagement such as the Nature Action 100+, could be effective to motivate corporates to achieve natural capital specific goals and manage potential biodiversity risks.

Additionally, research interviews with various asset managers uncovered that the numerous frameworks and initiatives on climate and environment represent an impediment to active investor participation given the limited bandwidth among asset managers. In response, we would encourage investors to incorporate natural capital and biodiversity targets into their investment decisions using existing frameworks. When evaluating a potential company for investment, we would encourage investors to consider setting biodiversity specific targets in combination with similar ESG reporting standards or frameworks. Other metrics that may be suitable for capturing biodiversity and natural capital risk assessments include industry accepted reporting frameworks such as the Natural Capital Protocol and most recently, the Taskforce on Nature-related Financial Disclosures (TNFD).

3.3 LIMITATIONS OF THE METHODOLOGY

This section provides a (non-exhaustive) list of the limitations of this process of choosing the top 100+ companies to target for the Nature Action 100+. Our analysis identifies companies with natural capital exposure (as measured by the ENCORE tool), based on market capitalization and their sectoral classification in the industry taxonomy outlined by Global Industry Classification Standard (GICS). Our selection of companies is therefore sensitive to each of these components.

Given the nascency of comprehensive firm-level biodiversity and natural capital risk information, our top-down approach represents a more feasible approach to implementing a nature risk framework compared to a bottom-up approach, which attempts to address biodiversity impacts at the firm level. Future approaches to populating a list suitable for investor engagement on the subjects of biodiversity and natural capital could develop or utilize firm-level metrics and/or employ methods that directly quantify the impact associated with firm activities. Such bottom-up approaches may better capture geographic and firm level heterogeneity in production behavior and associated biodiversity risk.

3.3.1. TOP-DOWN ANALYSIS

This analysis provides a 'top-down' view of the largest companies active in sectors considered to have the greatest impact on biodiversity. We use an existing industry-level assessment of biodiversity impact and dependency to identify a subset of individual companies that can be targeted in a potential Nature Action 100+ investor engagement initiative. This analysis does not seek to directly quantify firm-level nature dependency and impact and instead relies on the existing, sub-industry level, assessment of the dependence and impact of production processes on ecosystem services from the ENCORE project.

3.3.2 ENCORE TOOL

We use Natural Capital Finance's ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)[71] tool as the basis for our sub-industry ranking. ENCORE categorically assesses production processes for their impact and dependence on natural capital assets and then links natural capital assets to GICS sub-industry classifications. Based on our literature review and interviews with experts in the field, ENCORE is the most up-to-date and appropriate tool for assessing natural capital risk. Nevertheless, the use of ENCORE results in some limitations for interpretation.

Use of the ENCORE tool has several key limitations. The research for the categorial assessment for ENCORE was undertaken in 2016, and has not been regularly updated. Our sub-industry ranking is therefore static and will not change unless the ENCORE tool is also updated. Further, the ENCORE framework for assessing the importance of natural capital assets and influence of drivers of environmental change are guidelines, not hard rules.[72] Importantly, the analysis is not location-specific and the true dependence and impact of production processes on natural capital may vary across countries.

Notably, ENCORE utilizes the concept of ecosystem service to link sub-industries with natural capital assets. Ecosystem services are defined as: "a benefit that nature provides to enable or facilitate business production processes" per Common International Classification of Ecosystem Services (European Environment Agency, 2021). Cultural ecosystem services, such as the use of nature for religious purposes, were not incorporated into the ENCORE framework. While critiques of ecosystem services exist,[73] our literature review indicated that they are a widely understood and accepted mechanism of understanding economic and social dependence on nature and natural capital. Further, they can serve as an adequate proxy for biodiversity risk.

71. ENCORE. *Exploring Natural Capital Opportunities, Risks and Exposure.* Available at: https://encore.naturalcapital.finance/en/.
72. ENCORE. Limitations. Available at: https://encore.naturalcapital.finance/en/data-and-methodology/limitations.
73. Ibid.

Figure 7. ENCORE Ecosystem Services

Animal-based energy	Ground water
Bio-remediation	Maintain nursery habitats
Buffering and attenuation of mass flows	Mass stabilisation and erosion control
Climate regulation	Mediation of sensory impacts
Dilution by atmosphere and ecosystems	Pest control
Disease control	Pollination
Fibres and other materials	Soil quality
Filtration	Surface water
Flood and storm protection	Ventilation
Genetic materials	Water flow maintenance
	Water quality

Source: ENCORE
Note: Adapted from the Common International Classification of Ecosystem Services (European Environment Agency, 2021)

3.3.3 INDUSTRY CLASSIFICATION

ENCORE uses GICS codes to identify sub-industries. GICS is an industrial taxonomy which classifies all major public companies into 11 sectors and 158 sub-industries according to their main business activity. This classification standard is regularly updated by S&P Dow Jones Indices and MSCI Inc. Our analysis is sensitive to changes in this classification system, and our rankings of sub-industries with the greatest impact and dependence of natural capital could change after future revisions of the GICS classification framework. Further, the results from our analysis are unlikely to be directly applicable to other industrial taxonomies, such as the Industry Classification Benchmark maintained by FTSE.

3.3.4 SAMPLE FIRMS

Companies in Appendix A and B were selected based on their ranked market capitalization, which necessarily biases the analysis towards large listed public companies. Privately held companies were considered to be out of the scope for this analysis as there is limited scope for engagement from portfolio investors or financial institutions to change operating decisions. Therefore, considering these limitations, investors should consider other characteristics which may be more effective measures for a company's size and impacts, such as a firm's revenue, as this may include a more comprehensive universe, to the extent private company revenue estimates may be sufficient to include.

Given that our analysis is sectoral and identifies companies based on their associated sub-industry. the identification of companies to be included in the Nature Action 100+ is therefore not sensitive to firm-level characteristics. This may impact the accuracy or specificity of the analysis at the firm-level. In addition, our selection of companies does not attempt to assess the degree to which these companies may already be attempting to reduce their biodiversity impact or internalize the natural capital risks associated with their operating activities. Future work should seek to improve the proposed selection process and incorporate additional criteria, to the extent more company information is available.

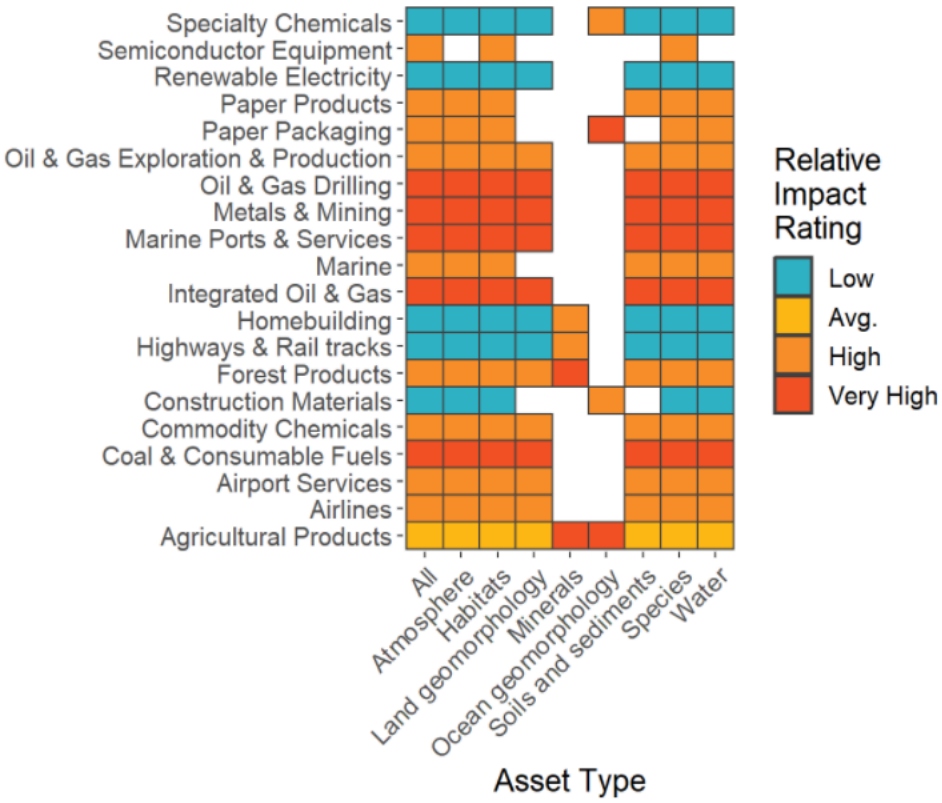
4. CASE STUDIES

To help clarify the various ways in which investors can utilize our sub-sector rankings to identify potential companies that may be relevant to them based on a set of criteria, we have developed a brief case study below to illustrate this process for two different use-cases.

Case Study 1: Evaluate Companies within Sub-industries with Greatest Impacts on Natural Capital (Water)

- Objective: A large asset manager wants to perform an initial screen of the global equity market to identify companies with a high-degree of impact on natural capital, specifically addressing sub-industries that also have the greatest impacts on water for US domiciled companies.
- Screening Criteria: Identify the top 10 largest companies by market capitalization (in USD), domiciled in the United States, sub-industry GICS code with highest impacts (classified as "Very High") for water as the natural capital asset.

Figure 8. Asset-Level Impact Rankings by Sub-Industry



Note: Sections that do not have a color in the above heatmap are because ecosystem services associated with those sub-industries do not impact these natural capital assets

The above Asset-Level Impact Rankings by Sub-Industry heat map shows the top 20 sub-industries with the greatest overall impact on natural capital, and also indicates their relative impact on eight natural capital assets. Investors can use this categorical ranking to determine the sub-industries that most degrade biodiversity and also have the most impact on water (or other natural capital assets of their choosing). Based on the heatmap using "Very High" as the selection criteria for Water, these sub-industries include: *Oil & Gas Drilling, Metals & Mining, Marine Ports & Services, Integrated Oil & Gas, and Coal & Consumable Fuels*. From this, an investor may use Bloomberg or another data provider of their choice to select companies, using any criteria they wish, filtering by sub-industries using their respective GICS codes.

Using the above screening criteria, below is a sample output. Also note that the below companies may not take into account all sub-industries used in the selection process given the top companies are determined by their market capitalization, therefore a potential limitation. Hence, we encourage investors to utilize their own screening criteria most relevant to them and consider other factors such as geographic locations, revenue composition, external ESG ratings, among other factors.

Figure 9. Top 10 U.S.-Domiciled Companies by Sub-industry with Highest Water Impacts

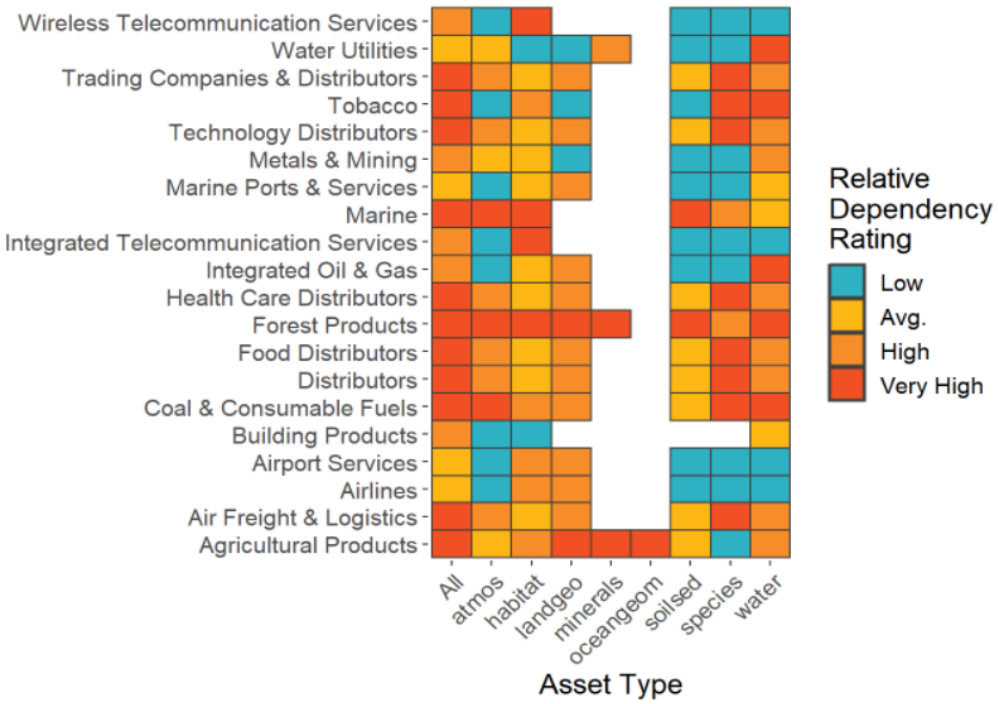
Rank	Long Company Name
1	Exxon Mobil Corp
2	Chevron Corp
3	Freeport-McMoRan Inc
4	Newmont Corp
5	Nucor Corp
6	Occidental Petroleum Corp
7	Steel Dynamics Inc
8	Reliance Steel & Aluminum Co
9	Cleveland-Cliffs Inc
10	Royal Gold Inc

Source: Bloomberg data.
Note: Market Capitalization as of April 2021, this list is subject to change. Filters applied using Bloomberg data.

Case Study 2: Evaluate Companies within Sub-industries with Greatest Dependencies on Natural Capital (Habitats)

- **Objective:** A large asset manager is concerned about biodiversity degradation in South America, with an interest in companies domiciled in Brazil. In particular, she wants to see how exposed her portfolio is to the risk of natural habitat degradation over time.
- **Screening criteria:** Identify the top 10 companies by market capitalization (in USD), domiciled in Brazil, select sub-industries by GICS code with highest dependencies (classified as "Very High), for habitats as the natural capital asset.

Figure 10. Asset-Level Dependency Rankings by Sub-Industry



Note: Sections that do not have a color in the above heatmap are because ecosystem services associated with those sub-industries do not depend on these natural capital assets

Similarly, using the heatmap above for dependencies, the sub-industries which have a "Very High" dependency on habitat include: *Wireless Telecommunications Services, Marine, Integrated Telecommunication Services,* and *Forest Products.* From these sub-sectors, we can identify priority companies based on a given screening criteria. The illustrative output is a list of companies domiciled in Brazil, sorted by their market capitalization, which were evaluated based on the "Very High" dependency on natural habitats.

Figure 11. Top 10 Brazil-Domiciled Companies by Sub-industry with Highest Dependency on Habitats

Rank	Long Company Name
1	Telefonica Brasil SA
2	TIM SA/Brazil
3	Duratex SA
4	Oi SA
5	Hidrovias do Brasil SA
6	Telecomunicacoes Brasileiras SA
7	Log-in Logistica Intermodal SA
8	Eucatex SA Industria e Comercio
9	Trevisa Investimentos SA
10	Atom Participacoes SA

Source: Bloomberg data.
Note: Market Capitalization as of April 2021, this list is subject to change. Filters applied using Bloomberg data.

5. CONCLUSION

Identifying the top sub-industry groups facilitates targeted investor engagement initiatives by natural-capital dependency and impact. Using a top-down sectoral based approach may be useful for many investors given the lack of company-level biodiversity and natural capital metrics. Investors can and should utilize this methodology to consider their exposure to these sub-industries and assess whether specific biodiversity targets for companies that operate within these sub-industries can be achieved.

While there are limitations to our approach, we believe that this sectoral methodology can be a helpful tool to guide investor outreach to facilitate transparent reporting and data collection for biodiversity and natural capital risk assessment. Considering that the identified subset of companies is determined by a relatively static metric (market capitalization at a point in time), we would encourage investors to also consider additional quantitative and qualitative factors to pull companies that may be most relevant to them such as a company's geographic presence, financial performance, governance, operational risks, and external industry metrics such as credit or ESG assessments, to further refine the list of companies to be included in a Nature Action 100+. Given the above inherent limitations with this approach, we further encourage investors to also consider the two-fold approach with the framework which is to not only provide guidance for an investor engagement agenda with companies identified in the Nature Action 100+, but also provide investors and corporates with an operational focus to identify biodiversity impacts and dependencies. This categorization aligns with TNFD's conceptualization of both physical and transition nature-risk.

Ultimately, it will be up to investors and companies alike to address the inherent risks of a potential collapse of biodiversity. While our sectoral framework is a useful starting point for investors to engage with corporates to manage and prevent the collapse of biodiversity and natural capital, urgent action is required before nature is pushed past a tipping point beyond which investor action may no longer be an effective mechanism to prevent the inevitable consequence and irreversible damage due to collapse in finite natural capital and ecosystems.

APPENDIX A: LITERATURE REVIEW

I. Introduction to the problem - Biodiversity and Financial Services

Never before has there been a more critical moment for global biodiversity. More than 55% of global GDP is dependent on biodiversity and ecosystem services.[74] The World Economic Forum's 2020 Global Risks Report ranks biodiversity loss and ecosystem collapse as one of the top five threats humanity will face in the next ten years.[75] SwissRE's Biodiversity and Ecosystem Services Index finds that in 20% of all countries, ecosystems are in a fragile state across more than 30% of the entire country area.[76] In A Safe Operating Space for Humanity, Johan Rockström and co-authors identify biodiversity as the planetary system which has been degraded at a magnitude beyond any other.[77]

A. Definitions

Biodiversity in its broadest sense is the richness of life on earth,[78] and while biodiversity conservation, protection, and restoration is the stated objective of a wide variety of societal actors, the term biodiversity remains poorly defined and widely applied to a number of often conflicting ideas.[79] The Convention on Biological Diversity defines biological diversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems."[80] Ecosystem services are a related idea, defined by The Economics of Ecosystems and Biodiversity (TEEB) as the direct and indirect contributions of ecosystems to human well-being.[81]

Closely connected to these ideas is the concept of natural capital, commonly defined as a stock of resources, both in the living and non-living environment, some of which are renewable and others which are not.[82] Famously studied by the Club of Rome in 1972, continued population and industrial growth at their current pace will degrade natural capital further.[83] Natural capital is a concept foundational to human well-being, consumption of goods and services, and value creation in our economies.

The Earth's biodiversity may be considered as a global public good, implying that the enjoyment or value derived from an area being "biodiverse" is not diminished because others have the same enjoyment. However,[84] a public good point of view on biodiversity oversimplifies the many forces which degrade its richness, such as the privatization of public land by corporations, private activities that threaten biodiversity, and the social contexts within which public goods from ecosystems are provided and utilized.[85]

74. Swiss Re. Habitat, water security and air quality: New index reveals which sectors and countries are at risk from biodiversity loss. 2020. Available at: https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-biodiversity-and-ecosystems-services.html

75. World Economic Forum. The Global Risks Report. 2020. Available at: https://www.weforum.org/reports/the-global-risks-report-2020

76. Swiss Re. Habitat, water security and air quality: New index reveals which sectors and countries are at risk from biodiversity loss. 2020. Available at: https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-biodiversity-and-ecosystems-services.html

77.Nature. A safe operating space for humanity. 2009. Available at: https://www.nature.com/articles/461472a

78. Global Canopy. The Little Biodiversity Finance Book. 2012. Available at: https://globalcanopy.org/insights/publication/the-little-biodiversity-finance-book-3rd-edition-2012/

79.Society for Conservation Biology. Conservation of Biodiversity in a World of Use. 2001. Available at: https://conbio.onlinelibrary.wiley.com/doi/abs/10.1046/j.1523-1739.1999.97463.x?casa_token=K5PnB8r7qkAAAAA%3A8p0dDUf9xeFXb_5EmPkIMH1nP-6f_zKrxW1DF865A8TEiP4XmKL27U7qCiI-6a-U94jZBgU_BEvZbJla

80. Convention on Biological Diversity. *Article 2 – Use of Terms.* Available at: https://www.cbd.int/convention/articles/?a=cbd-02

81.The Economics of Ecosystems and Biodiversity (TEEB). Available at: http://teebweb.org/

82. WWF. *Natural Capital and Organizations Strategies: An Overview of Available Tools.* 2019. Available at: https://wwfint.awsassets.panda.org/downloads/191220__wwf_fr___natural_capital_tools_overview__english_.pdf

83. Meadows, D. et al, The Limits to Growth. 1972. Available at: https://www.clubofrome.org/publication/the-limits-to-growth/

84. Kretsch, C., van Dijk, J. and C. Schleyer (2016): Public Goods and Ecosystem Services. In: Potschin, M. and K. Jax (eds): OpenNESS Ecosystem Services Reference Book. EC FP7 Grant Agreement no. 308428. Available via: www.openness-project.eu/library/reference-book

85. Ibid.

What is increasingly evident is that financial institutions and private finance are already involved in biodiversity loss, and therefore have a critical role to play in not only *halting what degradation they enable through their activities*, but additionally, in the *protection and management of biodiversity*. But as outlined by the *Financing Nature: Closing the Global Biodiversity Gap,* there exists more than USD $700 billion gap between the rate at which natural systems are being degraded and the financing needed to support natural systems.[86] Annually, the world sees at least USD $740 billion in lost ecosystem services.[87] The billions in funding needed to bolster these ecosystem services has fallen short by every measure over the past decade. In both 2010 and 2020, the world missed the Convention on Biological Diversity target to "achieve a significant reduction of the current rate of biodiversity loss." [88]

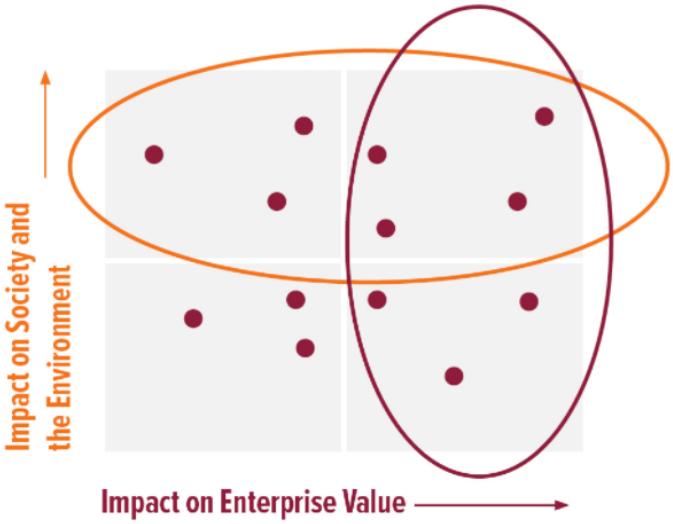
Action and Engagement: What are financial institutions doing?

A. Why should financial institutions care about biodiversity?

Nature-related risks [89] are material to financial transactions. Biodiversity loss creates increased transition, physical, litigation, regulatory, and systemic risk to their operations, in addition to potential effects on their investments' [90] value in the short, medium, and long term.

At the forefront of this review are the tenets of stakeholder primacy and fiduciary duty, or a responsibility to generate maximum financial return for stakeholders. Some investors are adopting a more stakeholder-focused approach with a view towards the longer term, but the experience of the authors and the literature agree that fiduciary duty guides the majority of investor action, but this is changing as the role of business as agents of social responsibility expands. This narrow view of fiduciary duty is a decreasing minority of how both investors and companies interpret their relationship with the environments that operate with and within.

Investors and company reports reflect this changing view, with 2020 bringing about increasing business community consensus that materiality is double. [91]



- Considers the company's impacts outwards;
- Uses the GRI definition: "topics that reflect its most significant impacts on the economy, environment and people, including impacts on human rights." (draft)
- Presented in the sustainability report
- For multiple stakeholders

- Considers the company's impacts inwards;
- Uses the SASB definition: "expected to influence investment or lending decisions that users make on the basis of their assessments of short-medium-,and long-term financial performance and enterprise value." (draft)
- Presented in the annual report
- For investors, lenders and other creditors

Figure 1. Illustrating double materiality [Adopted from BSR: *Why companies should address double materiality*

86. Paulson Institute & The Nature Conservancy & Cornell Atkinson Center for Sustainability. *Financing Nature: Closing the Global Biodiversity Financing Gap*. 2020. Available at: https://www.paulsoninstitute.org/wp-content/uploads/2020/10/Updated-10.23.20-FINANCING-NATURE_Exec.-Summary_Final-with-endorsements_101420.pdf
87. Global Canopy. The Little Biodiversity Finance Book. 2012. Available at: https://globalcanopy.org/insights/publication/the-little-biodiversity-finance-book-3rd-edition-2012/
88. Convention on Biological Diversity. *Aichi Biodiversity Targets*. Available at: https://www.cbd.int/sp/targets/
89. Global Canopy. *The Case for a Task Force on Nature-related Financial Disclosures.* 2020. Available at: https://globalcanopy.org/insights/publication/the-case-for-a-task-force-on-nature-related-financial-disclosures/
90. PRI. *Investor Action on Biodiversity: Discussion Paper*. 2020. Available at: https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity
91. BSR. Why Companies Should Assess Double Materiality. 2021. Available at: https://www.bsr.org/en/our-insights/blog-view/why-companies-should-assess-double-materiality

Businesses are increasingly compelled to report on financially material topics that influence enterprise value as well as topics material to the economy, environment, and people (see Figure 1).

The unique position of the investor as an interested *and* invested party in the performance of companies makes it so that engagement is a critical tool for change. Investors are increasingly becoming active in their engagement strategies, and can be wielded to influence behavior across a portfolio. This is already being borne out by agenda-driven investors, such as those part of Climate Action 100+, who engage in a number of strategies to increase transparency, disclosure, and ambitious target-setting (See Climate Action 100+ Case Study below).

B. Relevant Coalitions for Biodiversity and Ecosystems

The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative with the principal objective of mainstreaming the values of biodiversity and ecosystem services into decision-making at all levels.[92] The initiative, which emerged from the 2007 G8 meeting, aims to shed light on the role of natural capital in human well-being, which is largely hidden, and emphasize ecosystem service perspectives as the informers of economic valuation, including through incentives, price signals, as well as market-based solutions.[93] Additional coalitions organizing action around the issue of biodiversity include Act4Nature,[94] Business for Nature,[95] De Nederlandse Bank Sustainable Finance Platform,[96] European Business @ Biodiversity Platform, Finans Norge, Natural Capital Finance Alliance, and Finance for Biodiversity. There are also focused investor initiatives that examine the individual components of biodiversity, such as the Deforestation Investors Alliance or As You Sow's Deforestation Fund program, where investors can determine if their funds are invested in corporations engaging in deforestation.[97]

C. Disclosure

Important biodiversity and nature risk disclosure initiatives are asking financial institutions to assess, manage, and report on their dependencies and impacts on nature as never before. The Taskforce on Nature-related Financial Disclosures (TNFD) is developing a framework for regulating and supporting biodiversity reporting and risk assessment for the corporate and financial sector (see Tools for Measuring Impact below).[98] Generally, a review of the literature finds that reporting and disclosure standards for companies wanting a view of their activities which affect biodiversity are lacking. Specific initiatives, such as CDP's Forests Questionnaire and the Roundtable on Sustainable Palm Oil (RSPO) are important but piecemeal measures.[99]

D. Policy Structures that Support Investor Realignment on Biodiversity

The EU Biodiversity Strategy for 2030,[100] the EU Taxonomy for Sustainable Activities,[101] and France's Article 173 of the law on Energy Transition for Green Growth are each examples of governments' attempts to regulate activity on biodiversity and protect ecosystem services. Regulation EU 2019/2088 of the European Parliament and Council on sustainability-related disclosures in financial services requires

92. Trucost. *Natural Capital at Risk: The top 100 externalities of business.* 2013. Available at: https://www.naturalcapitalcoalition.org/wp-content/uploads/2016/07/Trucost-Nat-Cap-at-Risk-Final-Report-web.pdf
93. The Economics of Ecosystems and Biodiversity (TEEB). Available at: http://teebweb.org/
94. Act4Nature. Available at: http://www.act4nature.com/en/
95. Business for Nature. Available at: https://www.businessfornature.org/
96. De Nederlandsche Bank. Sustainable Finance Platform. Available at: https://www.dnb.nl/en/green-economy/sustainable-finance-platform/
97. As You Sow. Available at: https://www.asyousow.org/invest-your-values
98. Taskforce on Nature-related Financial Disclosures. Available at: https://tnfd.info/
99. Disclosure Insight Action. Available at: https://www.cdp.net/en/forests
Roundtable on Sustainable Palm Oil. Available at: https://rspo.org/
100. European Commission. Biodiversity Strategy for 2030. Available at: https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en
101. European Commission. EU Taxonomy for Sustainable Activities. Available at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en#:~:text=%E2%80%9CEU%20taxonomy%E2%80%9D-,What%20is%20the%20EU%20taxonomy,implement%20the%20European%20Green%20Deal.

market participants to report on several sustainability related topics, and biodiversity disclosures are included in these requirements that came into effect in March 2021. [102] Intergovernmental agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora are implemented via EU Wildlife Trade Regulations.[103] Despite these examples, our review found that regulations on biodiversity are less frequent compared to climate, but the topic is beginning to be regularly included in sustainable finance policy.[104]

II. Gaps in the Literature

Our review of the literature found that groups of investors that are collaborating to tackle biodiversity loss and others are indirectly addressing biodiversity risk through adoption of specific sector policies (e.g., palm oil and deforestation). However, the review uncovered that there is still limited awareness of and few commitments to biodiversity at the investor level. Investors play a role in supporting the five key drivers of biodiversity: diminution and degradation of habitats, overexploitation of soils, introduction of non-native species, general environmental pollution, and climate change. [105]

A. Lack of private sector progress on existing biodiversity commitments

This literature review uncovered numerous collective agreements on biodiversity that have not translated into action, nor biodiversity risk disclosure. This conclusion is echoed in a recent review of agreements with the aim of commitment remains vastly insufficient. [106] driving financing for sustainable development that found that voluntary commitment remains vastly insufficient. The New York Declaration on Forests (NYDF) of 2015 is an agreement endorsed by 180 governments, companies, indigenous community networks, and civil society organizations with the aim of halving and ultimately ending natural forest loss by 2020 and 2030, respectively.[107] Only half of NYDF member companies have disclosed their progress towards these goals in the six years since the agreement was signed. [108]

The Convention on Biological Diversity's post 2020 global biodiversity framework is a response to the failure of stakeholders to meet any one of the 20 Aichi Biodiversity goals, established in 2011. These included addressing the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society, reducing the direct pressures on biodiversity and promoting sustainable use, improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity, and more.[109] Involvement of investors in meeting CBD targets has been limited to consulting with the Global Partnership for Business and Biodiversity. [110]

B. Factoring biodiversity loss into risk and valuation

A 2020 PRI analysis finds that to date, investors have primarily focused on biodiversity loss due to acute events, but less attention has been paid to how business activities are fundamentally reliant on biodiversity to produce goods and services. [111]

101. European Commission. *EU Taxonomy for Sustainable Activities*. Available at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en#:~:text=%E2%80%9CEU%20taxonomy%E2%80%9D:-,What%20is%20the%20EU%20taxonomy,implement%20the%20European%20Green%20Deal.
102. European Parliament. *Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector (Text with EEA relevance)*. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019R2088
103. European Commission. *The European Union and Trade in Wild Fauna and Flora*. Available at: https://ec.europa.eu/environment/cites/legislation_en.htm
104. PRI. *Investor Action on Biodiversity: Discussion Paper*. 2020. Available at: https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity
105. Millennium Assessment. *Ecosystems And Human Well-Being*. 2005. Available at: http://www.millenniumassessment.org/documents/document.356.aspx.pdf
106. Land Use Policy. Bridging funding gaps for climate and sustainable development: Pitfalls, Progress, and Potential of Private Finance. Vol. 71, 2018. Available at: https://www.sciencedirect.com/science/article/pii/S0264837717310049?via%3Dihub
107. New York Declaration on Forests – Progress Assessment. Available at: https://forestdeclaration.org/
108. Land Use Policy. Bridging funding gaps for climate and sustainable development: Pitfalls, Progress, and Potential of Private Finance. Vol. 71, 2018. Available at: https://www.sciencedirect.com/science/article/pii/S0264837717310049?via%3Dihub
109. Convention on Biological Diversity. Aichi Biodiversity Targets. Available at: https://www.cbd.int/sp/targets/
110. Convention on Biological Diversity. The Global Partnership for Business and Biodiversity. Available at: https://www.cbd.int/business/gp.shtml
111. PRI. Investor Action on Biodiversity: Discussion Paper. 2020. Available at: https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity

Analysis from the Natural Capital Coalition finds that investors are not identifying which assets, governments, or companies are most exposed to natural capital risk.[112] Investors are increasingly seeking the tools and strategies needed for actively managing biodiversity portfolios in ways that address performance risk.[113] These nature-related financial risks include, but are not limited to:

- Physical risk, which arises from chronic depletion of natural resources and acute natural events, arising from weakened ecosystems, and leading to disruptions to businesses' production processes or to demand.[114]
- Transition risk, which is the risk that businesses suffer financially due to stronger policies or social norms that penalize the direct or indirect harm that their production processes or products have on nature.[115]
- Systemic risk, which is the risk undertaken by humanity at-large as destruction of natural habitats brings people in closer contact with wild animals and thereby increases the likelihood of pathogen transmission to humans (zoonosis).[116] The COVID-19 pandemic is a clear example of systemic risk. Additionally, system risk encompasses the risk inherent in the role nature plays in the vital links that support human life. For example, a widespread loss of pollinators has drastic implications for global food security.[117]

Sectoral Analysis

A joint report between UNEP and the Swiss government, Beyond "Business as Usual": Biodiversity Targets and Finance, found that among critical actions for setting evidence-based biodiversity goals was the need for financial institutions to assess their exposure to priority sectors, where dependencies and impacts on biodiversity are high.[118] The report suggested that financial institutions should focus on the following sectors:

1. Agricultural Products
2. Apparel, Accessories & Luxury Goods
3. Brewers
4. Distribution
5. Electric Utilities
6. Independent Power Producers & Energy Traders
7. Mining
8. Oil & Gas Exploration & Production
9. Oil & Gas Storage & Transportation

C. Biodiversity's synergies with Climate Change

There also exists a need for nuanced cooperation between financing mechanisms for biodiversity protection and financial tools to combat climate change.[119] Current efforts at securing finance, implementing initiatives, and building the knowledge base around climate and biodiversity financing remain fragmented and often sectorial in their nature.[120] Additionally, reports found that action taken to combat biodiversity loss can conflict with climate mitigation, and vice versa.[121] More work must be done at a sector level to identify trade-offs; for example, if an activity supports climate action but causes harm to life on land. More broadly, there are also trade-offs in terms of which nature-related topics receive attention and funding. Climate change is urgent and mitigating emissions[122]

112. Trucost. *Natural Capital at Risk: The top 100 externalities of business.* 2013. Available at: https://www.naturalcapitalcoalition.org/wp-content/uploads/2016/07/Trucost-Nat-Cap-at-Risk-Final-Report-web.pdf
113. Koellner, T & Schmitz, O. (2006). Biodiversity, Ecosystem Function, and Investment Risk. In: BioScience. Available at: https://www.jstor.org/stable/10.1641/0006-3568(2006)56%5B977:befair%5D2.0.co;2?Search=yes&resultItemClick=true&searchText=investment%20biodiversity&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dinvestment%2Bbiodiversity&ab_segments=0%2Fbasic_SYC-5187_SYC-5188%2Ftest&refreqid=fastly-default%3Afc203f7b17715474e41bb703ce9b7d0c&seq=1
114. Global Canopy. The Case for a Task Force on Nature-related Financial Disclosures. 2020. Available at: https://globalcanopy.org/insights/publication/the-case-for-a-task-force-on-nature-related-financial-disclosures/
115. Ibid.
116. Ibid.
117. European Commission: Science for Environment Policy. What do pollinator declines mean for human health?. 2016. Available at: https://ec.europa.eu/environment/integration/research/newsalert/pdf/what_do_pollinator_declines_mean_for_human_health_446na1_en.pdf
118. Natural Capital Finance Alliance & UNEP & Global Canopy. Beyond 'Business as Usual': Biodiversity Targets and Finance. 2020. Available at: https://naturalcapital.finance/wp-content/uploads/2020/06/Beyond-Business-As-Usual-Full-Report.pdf
119. Global Canopy. The Little Biodiversity Finance Book. 2012. Available at: https://globalcanopy.org/insights/publication/the-little-biodiversity-finance-book-3rd-edition-2012/
120. Land Use Policy. Bridging funding gaps for climate and sustainable development: Pitfalls, Progress, and Potential of Private Finance. Vol. 71, 2018. Available at: https://www.sciencedirect.com/science/article/pii/S0264837717310049?via%3Dihub
121. Swiss Re. Habitat, water security and air quality: New index reveals which sectors and countries are at risk from biodiversity loss. 2020
122. WWF. The 'triple challenge' and tackling trade-offs between climate, food and biodiversity goals. 2020. Available at: https://wwfint.awsassets.panda.org/downloads/white_paper___the_triple_challenge_and_tackling_trade_offs_between_climate_food_and_biod.pdf

remains unfinished, prompting practitioners to worry that if broader nature and biodiversity concerns are brought into the conversation, the global community might fail to address either crisis.

Furthermore, while both represent related features of the Earth's environment, climate in many ways is more straightforward to address. Whereas greenhouse gas emissions from human activity are the direct cause of a changing climate, biodiversity loss is a multifactor issue that cannot be encompassed by a set of activities. Because measuring biodiversity impact is so challenging, tools for financing climate change are, in some respects, easier to implement with their narrower focus on GHGs.

III. How is the private sector measuring impact on Biodiversity today?

A. The Difficulty in Determining Biodiversity Thresholds

A key challenge for governments and the private sector has been to empirically quantify the threshold beyond which there is no return. Whereas climate change has established a 1.5 degree C threshold through the work of the IPCC and the subsequent Paris Agreement, humanity still struggles to identify the link between levels of biodiversity characteristics required to produce a desired ecosystem service.[123] Johan Rockström et. al described the transgression of the planetary biodiversity boundary that has already taken place in their work A Safe Operating Space for Humanity. Their report finds that species are becoming extinct at a rate that we have not witnessed since the global-mass event, and is 100 to 1000 times greater than what can be defined as natural.[124] The authors admit that planetary boundaries always contain subjective insights - how many species are we willing to let go extinct before a threshold is determined to be, indeed, crossed?

B. Tools for measuring Impacts

Closing the Global Biodiversity Gap finds that screening tools and standards that enable investors to review risks and make informed decisions to avoid investments that may have negative impacts on biodiversity (or to invest in areas with positive biodiversity impacts) are critical to closing the mismatch of funds leveraged for biodiversity efforts.[125] Our literature review found that it can be challenging for financial institutions to aggregate biodiversity data as it is location specific and varies according to the type of asset at that location.[126] Any fruitful effort by institutions will require investors to engage with companies and data service providers in order to encourage the provision of more meaningful and consistent biodiversity data.[127]

Reporting and Disclosure Protocols

- Modeled after the Task Force on Climate-related Financial Disclosures (TCFD), the Taskforce on Nature-related Financial Disclosure (TNFD) is a disclosure framework for corporates and financial institutions to assess, manage and report on their dependencies and impacts on nature, aiding in the appraisal of nature-related risk and the redirection of

123. Koellner, T & Schmitz, O. (2006). *Biodiversity, Ecosystem Function, and Investment Risk*. In: BioScience. Available at: https://www.jstor.org/stable/10.1641/0006-3568(2006)56%5B977:befair%5D2.0.co;2?Search=yes&resultItemClick=true&searchText=investment%20biodiversity&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dinvestment%2Bbiodiversity&ab_segments=0%2Fbasic_SYC-5187_SYC-5188%2Ftest&refreqid=fastly-default%3Afc203f7b17715474e41bb703ce9b7d0c&seq=1

124. Nature. A safe operating space for humanity. 2009. Available at: https://www.nature.com/articles/461472a

125. Paulson Institute & The Nature Conservancy & Cornell Atkinson Center for Sustainability. Financing Nature: Closing the Global Biodiversity Financing Gap. 2020. Available at: https://www.paulsoninstitute.org/wp-content/uploads/2020/10/Updated-10.23.20-FINANCING-NATURE_Exec.-Summary_Final-with-endorsements_101420.pdf

126. PRI. Investor Action on Biodiversity: Discussion Paper. 2020. Available at: https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity

127. Ibid.

global financial flows away from nature-negative outcomes and towards nature-positive outcomes.[128]

Biodiversity Footprint Tools

- EXIOBASE is an environmental footprinting resource that provides insight into the final consumption in 43 countries,[129] including the carbon, water, land, and material footprint of each. This tool was developed with the aim of accurately reflecting the resource use and the emissions related to final consumption.
- The Global Biodiversity Score is a Capital Coalition-developed footprint assessment tool that helps institutions establish and measure corporate and financial commitments for biodiversity.[130] The tool focuses on the biodiversity impacts of economic activities across firms' value chains in a robust and synthetic way.
- The Corporate Biodiversity Footprint, in development by AXA Investment Managers, BNP Paribas Asset Management, Sycomore Asset Management, and Mirova, will allow investors to measure how their investments impact biodiversity.[131] The tool will help investors to integrate impacts to nature and biodiversity into their risk assessments and research, with a focus on transparency and working towards more standard, comparable metrics.

Mapping Tools

The tools in this section range from exploratory to highly technical and often require company spatial data and GIS expertise to obtain results. Spatial finance is an increasingly important[132] tool for mapping and measuring impacts and dependencies of supply chains on biodiversity and natural capital.[133]

- The Swiss RE-developed index, BES, can be used to locate known single biodiversity risks.[134] It gives first hand insights into where an institution operates, whether it be in degraded or pristine ecosystems, or if an industrial activity is dependent on BES in a given location.[135] A location-specific view can also reveal where future operations would become more vulnerable to business interruption, in addition to pointing out where property values could be protected by BES against natural hazards.
- PRI Association Mitigation Hierarchy is a mapping tool that investors can use to drive positive and reduce negative biodiversity outcomes.[136]
- InVEST is a family of modeling tools that map, measure and value the goods and services we obtain from nature.[137] This WWF-developed tool enables decision-makers to assess the trade-offs associated with alternative policy options, and to identify areas where investment in ecosystem services can enhance human development and conservation of terrestrial, freshwater, and marine ecosystems.[138]
- ENCORE (Exploring Natural Capital Opportunities, Risks, and Exposure) is a spatial tool developed by the Natural Capital Finance Alliance UNEP-WCMC to help users better visualize how businesses across all sectors of the economy depend on nature, and how these dependencies might represent a business risk if environmental degradation disrupts them. The tool focuses on goods and services that nature supports.[139]

128. Taskforce on Nature-related Financial Disclosures. Available at: https://tnfd.info/
129. Tukker, A. & Bulavskaya, T., & Giljum, S., et al (2014), The Global Resource Footprint of Nations. Available at: https://www.truthstudio.com/content/CREEA_Global_Resource_Footprint_of_Nations.pdf
130. Capitals Coalition. Global Biodiversity Score: A Took to Establish & Measure Corporate & Financial Commitments for Biodiversity. 2019. Available at: https://capitalscoalition.org/global-biodiversity-score-a-tool-to-establish-measure-corporate-financial-commitments-for-biodiversity/
131. Mirova. Available at: https://www.mirova.com/en
132. WWF. Natural Capital and Organizations Strategies: An Overview of Available Tools. 2019. Available at: https://wwfint.awsassets.panda.org/downloads/191220__wwf_fr___natural_capital_tools_overview__english_.pdf
133. World Bank Group. Spatial Finance: Challenges and Opportunities in a Changing World. 2020. Available at: https://openknowledge.worldbank.org/handle/10986/34894
134.Swiss Re. Habitat, water security and air quality: New index reveals which sectors and countries are at risk from biodiversity loss. 2020. Available at: https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-biodiversity-and-ecosystems-services.html
135. Ibid.
136.PRI. Investor Action on Biodiversity: Discussion Paper. 2020. Available at: https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity
137. WWF. InVEST. Available at: https://www.worldwildlife.org/pages/invest
138.Ibid.
139. ENCORE. Available at: https://encore.naturalcapital.finance/en/about

APPENDIX B: TOP 100+ COMPANIES BY IMPACT

Figure 12. Top 100+ Companies by Impact Sub-Industries.

Coal & Consumable Fuels	
China Shenhua Energy Co Ltd	CHINA
Shaanxi Coal Industry Co Ltd	CHINA
Integrated Oil & Gas	
Ecopetrol SA	COLOMBIA
Saudi Arabian Oil Co	SAUDI ARABIA
Rosneft Oil Co PJSC	RUSSIA
Gazprom PJSC	RUSSIA
LUKOIL PJSC	RUSSIA
Gazprom Neft PJSC	RUSSIA
Surgutneftegas PJSC	RUSSIA
Oil & Natural Gas Corp Ltd	INDIA
PTT PCL	THAILAND
PetroChina Co Ltd	CHINA
China Petroleum & Chemical Corp	CHINA
Equinor ASA	NORWAY
Petroleo Brasileiro SA	BRAZIL
Exxon Mobil Corp	UNITED STATES
Chevron Corp	UNITED STATES
Royal Dutch Shell PLC	NETHERLANDS
TOTAL SE	FRANCE
BP PLC	BRITAIN
Suncor Energy Inc	CANADA
Eni SpA	ITALY
Occidental Petroleum Corp	UNITED STATES
Imperial Oil Ltd	CANADA
Cenovus Energy Inc	CANADA
Repsol SA	SPAIN
OMV AG	AUSTRIA
Metals & Mining	
POSCO	SOUTH KOREA
MMC Norilsk Nickel PJSC	RUSSIA
Polyus PJSC	RUSSIA
Nippon Steel Corp	JAPAN
Novolipetsk Steel PJSC	RUSSIA
Sumitomo Metal Mining Co Ltd	JAPAN
Severstal PAO	RUSSIA
JSW Steel Ltd	INDIA
Hindustan Zinc Ltd	INDIA
Tata Steel Ltd	INDIA
Grupo Mexico SAB de CV	MEXICO
Anglo American Platinum Ltd	SOUTH AFRICA
Vale SA	BRAZIL
China Steel Corp	TAIWAN

Zijin Mining Group Co Ltd	CHINA
Impala Platinum Holdings Ltd	SOUTH AFRICA
BHP Group Ltd	AUSTRALIA
Kumba Iron Ore Ltd	SOUTH AFRICA
Sibanye Stillwater Ltd	SOUTH AFRICA
Baoshan Iron & Steel Co Ltd	CHINA
Rio Tinto Ltd	AUSTRALIA
China Molybdenum Co Ltd	CHINA
Citic Pacific Special Steel Group Co Ltd	CHINA
Ganfeng Lithium Co Ltd	CHINA
BHP Group PLC	AUSTRALIA
Norsk Hydro ASA	NORWAY
China Hongqiao Group Ltd	CHINA
Rio Tinto PLC	BRITAIN
Zhejiang Huayou Cobalt Co Ltd	CHINA
Shandong Gold Mining Co Ltd	CHINA
Saudi Arabian Mining Co	SAUDI ARABIA
Fortescue Metals Group Ltd	AUSTRALIA
Southern Copper Corp	PERU
Newmont Corp	UNITED STATES
Freeport-McMoRan Inc	UNITED STATES
Barrick Gold Corp	CANADA
Anglo American PLC	BRITAIN
Glencore PLC	SWITZERLAND
Franco-Nevada Corp	CANADA
ArcelorMittal SA	LUXEMBOURG
Nucor Corp	UNITED STATES
Wheaton Precious Metals Corp	CANADA
Newcrest Mining Ltd	AUSTRALIA
Agnico Eagle Mines Ltd	CANADA
First Quantum Minerals Ltd	CANADA
Antofagasta PLC	CHILE
Marine Ports & Services	
Adani Ports & Special Economic Zone Ltd	INDIA
Shanghai International Port Group Co Ltd	CHINA
Forest Products	
Svenska Cellulosa AB SCA	SWEDEN
Airlines	
Air China Ltd	CHINA
China Southern Airlines Co Ltd	CHINA
Southwest Airlines Co	UNITED STATES
Delta Air Lines Inc	UNITED STATES
Ryanair Holdings PLC	IRELAND
United Airlines Holdings Inc	UNITED STATES
Singapore Airlines Ltd	SINGAPORE
American Airlines Group Inc	UNITED STATES
International Consolidated Airlines Group SA	BRITAIN

Airport Services	
Airports of Thailand PCL	THAILAND
Shanghai International Airport Co Ltd	CHINA
Aena SME SA	SPAIN
Sydney Airport	AUSTRALIA
Aeroports de Paris	FRANCE
Commodity Chemicals	
Chandra Asri Petrochemical Tbk PT	INDONESIA
LG Chem Ltd	SOUTH KOREA
Asahi Kasei Corp	JAPAN
Formosa Plastics Corp	TAIWAN
Nan Ya Plastics Corp	TAIWAN
Formosa Chemicals & Fibre Corp	TAIWAN
Saudi Basic Industries Corp	SAUDI ARABIA
Hengli Petrochemical Co Ltd	CHINA
Rongsheng Petrochemical Co Ltd	CHINA
Petronas Chemicals Group Bhd	MALAYSIA
Dow Inc	UNITED STATES
LyondellBasell Industries NV	UNITED STATES
Marine	
AP Moller - Maersk A/S	DENMARK
COSCO SHIPPING Holdings Co Ltd	CHINA
Kuehne + Nagel International AG	SWITZERLAND
Hapag-Lloyd AG	GERMANY
Oil & Gas Exploration & Production	
Novatek PJSC	RUSSIA
Tatneft PJSC	RUSSIA
PTT Exploration & Production PCL	THAILAND
CNOOC Ltd	CHINA
ConocoPhillips	UNITED STATES
Canadian Natural Resources Ltd	CANADA
EOG Resources Inc	UNITED STATES
Pioneer Natural Resources Co	UNITED STATES
Woodside Petroleum Ltd	AUSTRALIA
Hess Corp	UNITED STATES
Devon Energy Corp	UNITED STATES
Diamondback Energy Inc	UNITED STATES
Texas Pacific Land Corp	UNITED STATES
Paper Packaging	
Yunnan Energy New Material Co Ltd	CHINA
International Paper Co	UNITED STATES
Amcor PLC	BRITAIN
Avery Dennison Corp	UNITED STATES
Westrock Co	UNITED STATES
Packaging Corp of America	UNITED STATES
Smurfit Kappa Group PLC	IRELAND

Paper Products	
Suzano SA	BRAZIL
UPM-Kymmene Oyj	FINLAND
Stora Enso Oyj	FINLAND
Mondi PLC	BRITAIN
Semiconductor Equipment	
Tokyo Electron Ltd	JAPAN
Advantest Corp	JAPAN
Lasertec Corp	JAPAN
Disco Corp	JAPAN
ASML Holding NV	NETHERLANDS
Applied Materials Inc	UNITED STATES
Xinyi Solar Holdings Ltd	CHINA
Lam Research Corp	UNITED STATES
KLA Corp	UNITED STATES
Enphase Energy Inc	UNITED STATES
Teradyne Inc	UNITED STATES
Entegris Inc	UNITED STATES
SolarEdge Technologies Inc	ISRAEL
ASM International NV	NETHERLANDS
Agricultural Products	
Tongwei Co Ltd	CHINA
New Hope Liuhe Co Ltd	CHINA
Wilmar International Ltd	SINGAPORE
Archer-Daniels-Midland Co	UNITED STATES
Darling Ingredients Inc	UNITED STATES
Construction Materials	
UltraTech Cement Ltd	INDIA
Shree Cement Ltd	INDIA
Grasim Industries Ltd	INDIA
Siam Cement PCL/The	THAILAND
Anhui Conch Cement Co Ltd	CHINA
Beijing Oriental Yuhong Waterproof Technology Co Ltd	CHINA
China National Building Material Co Ltd	CHINA
LafargeHolcim Ltd	SWITZERLAND
CRH PLC	IRELAND
Vulcan Materials Co	UNITED STATES
Martin Marietta Materials Inc	UNITED STATES
James Hardie Industries PLC	IRELAND
HeidelbergCement AG	GERMANY
Highways & Rail tracks	
Transurban Group	AUSTRALIA
Atlantia SpA	ITALY
Homebuilding	
Sekisui House Ltd	JAPAN
DR Horton Inc	UNITED STATES
Lennar Corp	UNITED STATES
NVR Inc	UNITED STATES
PulteGroup Inc	UNITED STATES
Persimmon PLC	BRITAIN

Specialty Chemicals	
Shin-Etsu Chemical Co Ltd	JAPAN
Nippon Paint Holdings Co Ltd	JAPAN
Asian Paints Ltd	INDIA
Nitto Denko Corp	JAPAN
Wanhua Chemical Group Co Ltd	CHINA
Novozymes A/S	DENMARK
Chr Hansen Holding A/S	DENMARK
Sherwin-Williams Co/The	UNITED STATES
Ecolab Inc	UNITED STATES
DuPont de Nemours Inc	UNITED STATES
Sika AG	SWITZERLAND
PPG Industries Inc	UNITED STATES
International Flavors & Fragrances Inc	UNITED STATES
Givaudan SA	SWITZERLAND
Koninklijke DSM NV	NETHERLANDS
EMS-Chemie Holding AG	SWITZERLAND
Akzo Nobel NV	NETHERLANDS
Albemarle Corp	UNITED STATES
Celanese Corp	UNITED STATES
Evonik Industries AG	GERMANY
Symrise AG	GERMANY
RPM International Inc	UNITED STATES
Umicore SA	BELGIUM
Covestro AG	GERMANY
Croda International PLC	BRITAIN
Renewable Electricity	
Adani Green Energy Ltd	INDIA
China Yangtze Power Co Ltd	CHINA
Huaneng Lancang River Hydropower Inc	CHINA
Brookfield Renewable Partners LP	CANADA
EDP Renovaveis SA	SPAIN

APPENDIX C: TOP 100+ COMPANIES BY DEPENDENCY

Figure 13. Top 100+ Companies by Dependency Sectors

Forest Products	
Svenska Cellulosa AB SCA	SWEDEN
Marine	
AP Moller - Maersk A/S	DENMARK
COSCO SHIPPING Holdings Co Ltd	CHINA
Kuehne + Nagel International AG	SWITZERLAND
Hapag-Lloyd AG	GERMANY
Coal & Consumable Fuels	
China Shenhua Energy Co Ltd	CHINA
Shaanxi Coal Industry Co Ltd	CHINA
Tobacco	
Japan Tobacco Inc	JAPAN
ITC Ltd	INDIA
Smoore International Holdings Ltd	CHINA
Philip Morris International Inc	UNITED STATES
Swedish Match AB	SWEDEN
Altria Group Inc	UNITED STATES
British American Tobacco PLC	BRITAIN
RLX Technology Inc	CHINA
Imperial Brands PLC	BRITAIN
Agricultural Products	
Tongwei Co Ltd	CHINA
New Hope Liuhe Co Ltd	CHINA
Wilmar International Ltd	SINGAPORE
Archer-Daniels-Midland Co	UNITED STATES
Darling Ingredients Inc	UNITED STATES
Air Freight & Logistics	
SG Holdings Co Ltd	JAPAN
SF Holding Co Ltd	CHINA
DSV PANALPINA A/S	DENMARK
United Parcel Service Inc	UNITED STATES
FedEx Corp	UNITED STATES
Deutsche Post AG	GERMANY
ZTO Express Cayman Inc	CHINA
Expeditors International of Washington Inc	UNITED STATES
XPO Logistics Inc	UNITED STATES
CH Robinson Worldwide Inc	UNITED STATES
Distributors	
Genuine Parts Co	UNITED STATES
Pool Corp	UNITED STATES
LKQ Corp	UNITED STATES
Food Distributors	
Sysco Corp	UNITED STATES
Health Care Distributors	
Celltrion Healthcare Co Ltd	SOUTH KOREA
McKesson Corp	UNITED STATES
AmerisourceBergen Corp	UNITED STATES

Cardinal Health Inc	UNITED STATES
Technology Distributors	
CDW Corp/DE	UNITED STATES
Trading Companies & Distributors	
ITOCHU Corp	JAPAN
Mitsubishi Corp	JAPAN
Mitsui & Co Ltd	JAPAN
Sumitomo Corp	JAPAN
Toyota Tsusho Corp	JAPAN
Marubeni Corp	JAPAN
MonotaRO Co Ltd	JAPAN
Adani Enterprises Ltd	INDIA
Fastenal Co	UNITED STATES
United Rentals Inc	UNITED STATES
WW Grainger Inc	UNITED STATES
Ashtead Group PLC	BRITAIN
Ferguson PLC	BRITAIN
Brenntag SE	GERMANY
Building Products	
Daikin Industries Ltd	JAPAN
Assa Abloy AB	SWEDEN
Nibe Industrier AB	SWEDEN
Xinyi Glass Holdings Ltd	HONG KONG
Johnson Controls International plc	UNITED STATES
Trane Technologies PLC	IRELAND
Carrier Global Corp	UNITED STATES
Cie de Saint-Gobain	FRANCE
Geberit AG	SWITZERLAND
Masco Corp	UNITED STATES
Fortune Brands Home & Security Inc	UNITED STATES
Kingspan Group PLC	IRELAND
Lennox International Inc	UNITED STATES
Allegion plc	IRELAND
Metals & Mining	
POSCO	SOUTH KOREA
MMC Norilsk Nickel PJSC	RUSSIA
Polyus PJSC	RUSSIA
Nippon Steel Corp	JAPAN
Novolipetsk Steel PJSC	RUSSIA
Sumitomo Metal Mining Co Ltd	JAPAN
Severstal PAO	RUSSIA
JSW Steel Ltd	INDIA
Hindustan Zinc Ltd	INDIA
Tata Steel Ltd	INDIA
Vedanta Ltd	INDIA
Grupo Mexico SAB de CV	MEXICO
Anglo American Platinum Ltd	SOUTH AFRICA
Vale SA	BRAZIL
China Steel Corp	TAIWAN
Zijin Mining Group Co Ltd	CHINA
Impala Platinum Holdings Ltd	SOUTH AFRICA
BHP Group Ltd	AUSTRALIA
Kumba Iron Ore Ltd	SOUTH AFRICA

Sibanye Stillwater Ltd	SOUTH AFRICA
Baoshan Iron & Steel Co Ltd	CHINA
Rio Tinto Ltd	AUSTRALIA
China Molybdenum Co Ltd	CHINA
Citic Pacific Special Steel Group Co Ltd	CHINA
Ganfeng Lithium Co Ltd	CHINA
BHP Group PLC	AUSTRALIA
Norsk Hydro ASA	NORWAY
China Hongqiao Group Ltd	CHINA
Rio Tinto PLC	BRITAIN
Shandong Gold Mining Co Ltd	CHINA
Zhejiang Huayou Cobalt Co Ltd	CHINA
Saudi Arabian Mining Co	SAUDI ARABIA
Fortescue Metals Group Ltd	AUSTRALIA
Southern Copper Corp	PERU
Newmont Corp	UNITED STATES
Freeport-McMoRan Inc	UNITED STATES
Barrick Gold Corp	CANADA
Anglo American PLC	BRITAIN
Glencore PLC	SWITZERLAND
Franco-Nevada Corp	CANADA
ArcelorMittal SA	LUXEMBOURG
Nucor Corp	UNITED STATES
Wheaton Precious Metals Corp	CANADA
Newcrest Mining Ltd	AUSTRALIA
Agnico Eagle Mines Ltd	CANADA
First Quantum Minerals Ltd	CANADA
Antofagasta PLC	CHILE
Integrated Telecommunication Services	
Telkom Indonesia Persero Tbk PT	INDONESIA
Nippon Telegraph & Telephone Corp	JAPAN
Chunghwa Telecom Co Ltd	TAIWAN
Saudi Telecom Co	SAUDI ARABIA
Verizon Communications Inc	UNITED STATES
China Telecom Corp Ltd	CHINA
AT&T Inc	UNITED STATES
Telenor ASA	NORWAY
China Tower Corp Ltd	CHINA
Emirates Telecommunications Group Co PJSC	UAE
Telia Co AB	SWEDEN
China Unicom Hong Kong Ltd	HONG KONG
Maroc Telecom	MOROCCO
Deutsche Telekom AG	GERMANY
Telefonica Brasil SA	BRAZIL
BCE Inc	CANADA
Telstra Corp Ltd	AUSTRALIA
Singapore Telecommunications Ltd	SINGAPORE
TELUS Corp	CANADA
Orange SA	FRANCE
Swisscom AG	SWITZERLAND
Cellnex Telecom SA	SPAIN
Telefonica SA	SPAIN
BT Group PLC	BRITAIN

Koninklijke KPN NV	NETHERLANDS
Vantage Towers AG	GERMANY
Telecom Italia SpA/Milano	ITALY
Wireless Telecommunication Services	
SK Telecom Co Ltd	SOUTH KOREA
SoftBank Group Corp	JAPAN
KDDI Corp	JAPAN
SoftBank Corp	JAPAN
Bharti Airtel Ltd	INDIA
Safaricom PLC	KENYA
China Mobile Ltd	HONG KONG
America Movil SAB de CV	MEXICO
Advanced Info Service PCL	THAILAND
Taiwan Mobile Co Ltd	TAIWAN
Vodacom Group Ltd	SOUTH AFRICA
T-Mobile US Inc	UNITED STATES
China United Network Communications Ltd	CHINA
Vodafone Group PLC	BRITAIN
Rogers Communications Inc	CANADA
Integrated Oil & Gas	
Ecopetrol SA	COLOMBIA
Saudi Arabian Oil Co	SAUDI ARABIA
Rosneft Oil Co PJSC	RUSSIA
Gazprom PJSC	RUSSIA
LUKOIL PJSC	RUSSIA
Gazprom Neft PJSC	RUSSIA
Oil & Natural Gas Corp Ltd	INDIA
Surgutneftegas PJSC	RUSSIA
PTT PCL	THAILAND
PetroChina Co Ltd	CHINA
China Petroleum & Chemical Corp	CHINA
Equinor ASA	NORWAY
Petroleo Brasileiro SA	BRAZIL
Exxon Mobil Corp	UNITED STATES
Chevron Corp	UNITED STATES
Royal Dutch Shell PLC	NETHERLANDS
TOTAL SE	FRANCE
BP PLC	BRITAIN
Suncor Energy Inc	CANADA
Eni SpA	ITALY
Occidental Petroleum Corp	UNITED STATES
Imperial Oil Ltd	CANADA
Cenovus Energy Inc	CANADA
Repsol SA	SPAIN
OMV AG	AUSTRIA
Airlines	
Air China Ltd	CHINA
China Southern Airlines Co Ltd	CHINA
China Eastern Airlines Corp Ltd	CHINA
Southwest Airlines Co	UNITED STATES
Delta Air Lines Inc	UNITED STATES
Ryanair Holdings PLC	IRELAND
United Airlines Holdings Inc	UNITED STATES

Singapore Airlines Ltd	SINGAPORE
American Airlines Group Inc	UNITED STATES
International Consolidated Airlines Group SA	BRITAIN
Airport Services	
Airports of Thailand PCL	THAILAND
Shanghai International Airport Co Ltd	CHINA
Aena SME SA	SPAIN
Sydney Airport	AUSTRALIA
Aeroports de Paris	FRANCE
Marine Ports & Services	
Adani Ports & Special Economic Zone Ltd	INDIA
Shanghai International Port Group Co Ltd	CHINA
Water Utilities	
American Water Works Co Inc	UNITED STATES

Source: Bloomberg Data as of March 2021

APPENDIX D: RANKINGS BY SUB-INDUSTRY & COUNTRY

Figure 14. Asset-Level Dependency Rankings by Sub-Industry

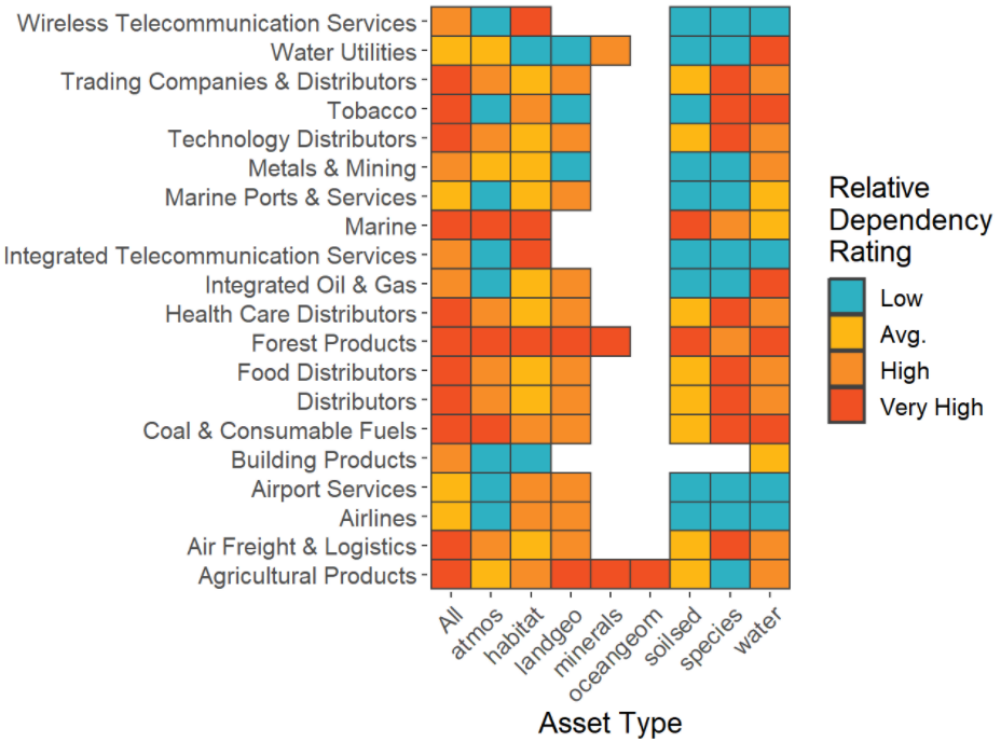


Figure 15. Asset-Level Impact Rankings by Sub-Industry

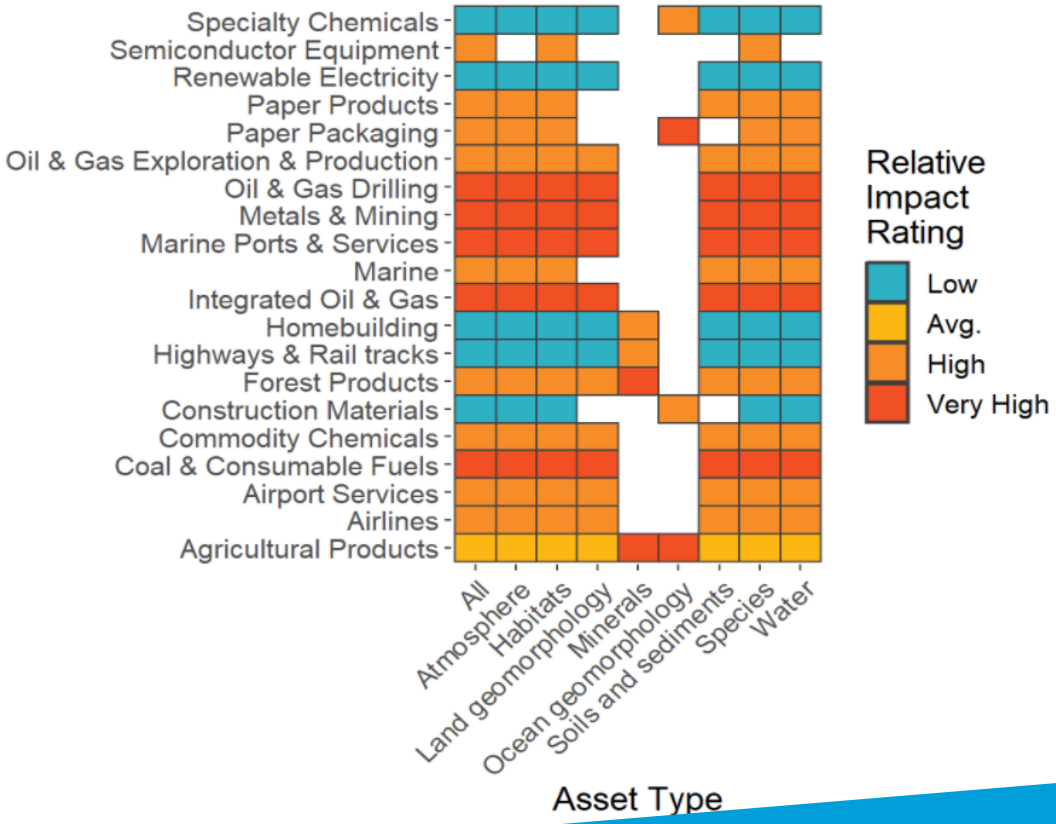
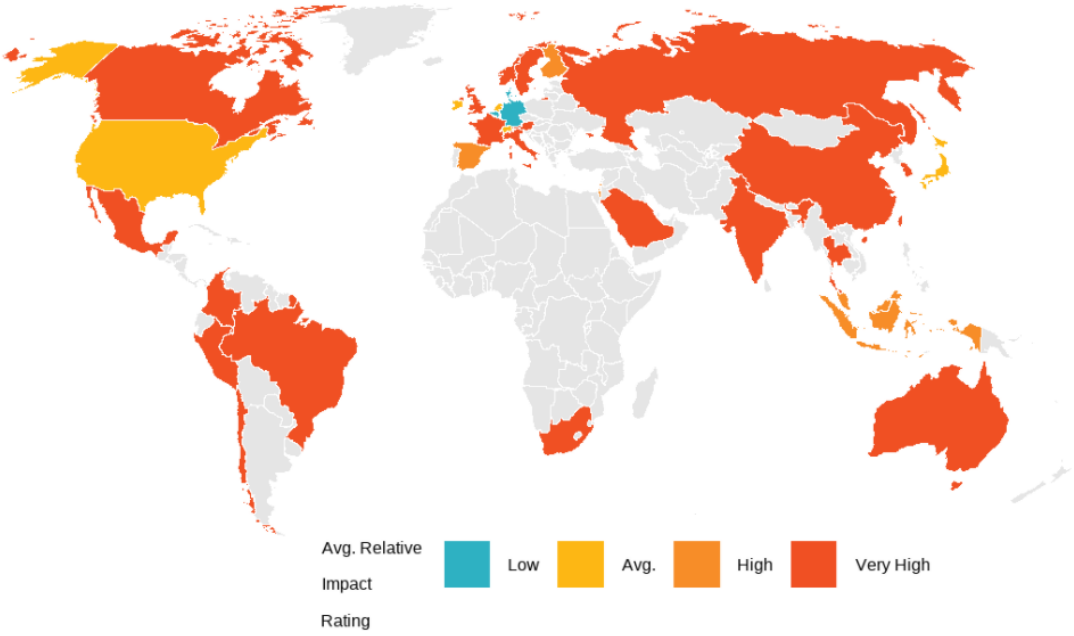
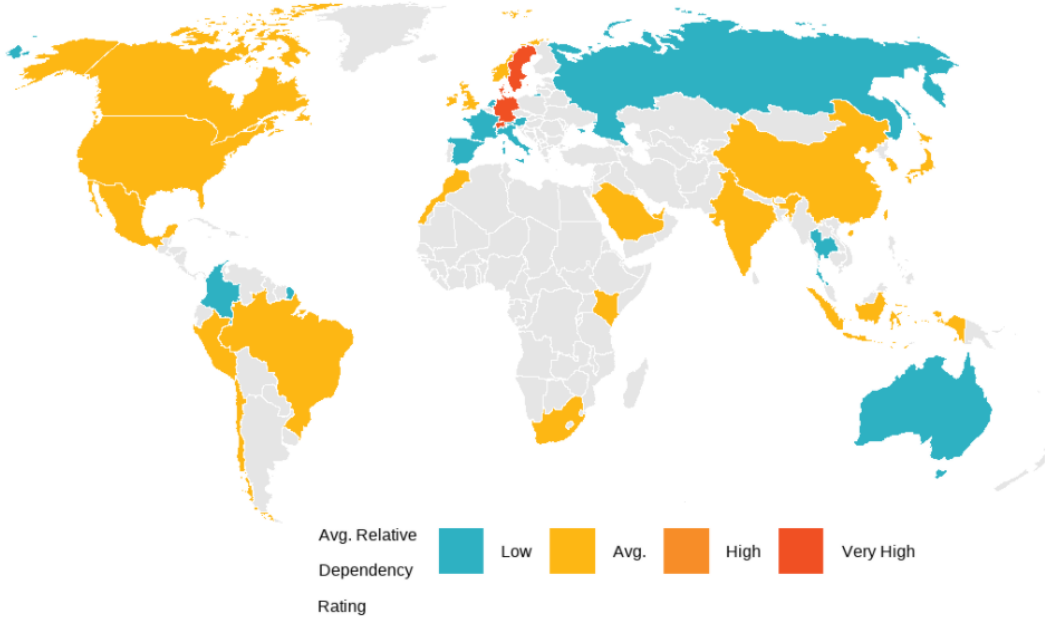


Figure 16. Avg. Relative Impact Rating by Country



Note: Global Heatmap is based on the average score of firms domiciled in countries by their respective sub-industry impacts

Figure 17. Avg. Relative Dependency Rating by Country



Note: Global Heatmap is based on the average score of firms domiciled in countries by their respective sub-industry dependencies

APPENDIX E: EXISTING BIODIVERSITY DATA PROVIDERS

Data Provider: Both public and private entities provide a comprehensive resource for the archival of biodiversity related data

DATA PROVIDER	DESCRIPTION
EXPLORING NATURAL CAPITAL OPPORTUNITIES, RISKS AND EXPOSURE (ENCORE)[140]	ENCORE provides financial institutions with systematic information for assessing their exposure to Nature-related risks, exploring businesses' dependencies on natural capital, and the effects of changes in the condition of natural assets businesses rely on. It covers 167 economic sectors and 21 ecosystem services.
THE INTEGRATED BIODIVERSITY ASSESSMENT TOOL (IBAT)[141]	IBAT provides an integrated biodiversity assessment tool. The web-based map and reporting tool that provides rapid access to three of the world's biggest biodiversity-related datasets (IUCN Red List of Threatened Species, World Database on Protected Areas, and Key Biodiversity Areas)
SOFT COMMODITY RISK PLATFORM (SCRIPT)[142]	SCRIPT benchmarks companies on the strength of their soft commodity production, and assesses portfolio exposure to deforestation, biodiversity loss and other soft commodity sector risks. It aims to help financial institutions understand and mitigate the risks associated with financing companies in soft commodity supply chains.
SPECIES THREAT ABATEMENT AND RECOVERY (STAR) METRIC	STAR provides investors with a tool to assess the biodiversity return on investment. Use of the presence of threatened species as an indicator for ecosystem quality. Positive impact is based on the reduced extinction risk by addressing key drivers of species loss.
TRASE FOR FINANCE[143]	Trase Finance is an open-access information system and decision-support platform that will enable financial institutions to understand and mitigate their exposure to deforestation in their portfolios and allow civil society and governments to better hold to account those failing to act. It draws on more than 30 disparate data sources that combine Trase's unique deforestation-risk data with data on company ownership and legal structures, tax registrations, and a wide range of capital raising mechanisms.

140. ENCORE. Available at: https://encore.naturalcapital.finance/en
141. Integrated Biodiversity Assessment Tool. Available at: https://www.ibat-alliance.org/
142. Global Canopy. SCRIPT. Available at: https://www.script.finance/en/update/
143. Transparency for Sustainable Economics. Available at: https://trase.earth/

APPENDIX F: EXISTING BIODIVERSITY ALLIANCES

Biodiversity Alliances: under regional and global initiatives, the alliances gather private entities to commit to biodiversity-related initiatives.

BIODIVERSITY ALLIANCE	DESCRIPTION
TASKFORCE ON NATURE-RELATED FINANCIAL DISCLOSURES (TNFD) [144]	A Taskforce on Nature-related Financial Disclosures has 73 Informal Working Group Members which work towards a framework for corporates and financial institutions to assess, manage and report on their dependencies and impacts on nature, aiding in the appraisal of nature-related risk and the redirection of global financial flows away from nature-negative outcomes and towards nature-positive outcomes.
FINANCE FOR BIODIVERSITY PLEDGE	The Pledge has a total of 37 signatories, with EUR 4.9 trillion assets under management. The Pledge signatory companies commit to making a positive contribution to biodiversity through their activities and investments and encourage other financial institutions to join.
BUSINESS AND BIODIVERSITY OFFSETS PROGRAM [145]	Business and Biodiversity Offsets Program has 72 partnerships and develops an international standard on biodiversity offsets agreed by an international multi stakeholder group.
COALITION FOR PRIVATE INVESTMENT IN CONSERVATION (CPIC)	CPIC creates the enabling conditions that support a material increase in private, return seeking investment in conservation.
COMMUNITY OF PRACTICE FINANCE AND BIODIVERSITY (EU COP F@B)	CoP F@B explores opportunities and challenges on scaling projects and innovations for biodiversity by the financial sector. Underlines the need for standardisation of measuring biodiversity (gain) or at least the development of a common ground around methods of measuring positive impacts on biodiversity.

144. Task Force on Nature-related Financial Disclosures. Available at: https://tnfd.info/
145. Forest Trends. Business and Biodiversity Offsets Program. Available at: https://www.forest-trends.org/bbop/

APPENDIX F: EXISTING BIODIVERSITY ALLIANCES

Biodiversity Alliances: under regional and global initiatives, the alliances gather private entities to commit to biodiversity-related initiatives.

BIODIVERSITY ALLIANCE	DESCRIPTION
EU BUSINESS@BIODIVERSITY PLATFORM (EU B@B PLATFORM)	EU Business@Biodiversity platform is a forum for dialogue and policy interface to discuss the links between business and biodiversity at EU level. The Platform pursues 1)supporting the development of methods, criteria and standards 2) fostering the integration of biodiversity and natural capital into the decision-making process of a critical mass of businesses and financial institutions, and ultimately helps to deliver on the objectives of the EU Biodiversity Strategy to 2030.
BUSINESS FOR NATURE[146]	Business for Nature is a global coalition -more than 50 organizations- that brings together business and conservation organizations and forward thinking companies to call on governments to work together to create a positive policy feedback loop to adopt policies to reverse nature loss in the next decade. Business for Nature current priorities include: 1. Amplify the business's voice to encourage the adoption of a transformative Post-2020 Biodiversity Framework at the UN Convention on Biological Diversity (CBD COP15); 2. Strengthen evidence of business leadership and momentum on nature through our growing network of companies committing and acting for nature and advocating for ambitious policies; 3. Contribute to simplifying and converging high-level nature and climate policy messaging from business.
INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES)[147]	An independent intergovernmental body established by States to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. IPBES currently has 137 member States. The work of IPBES can be broadly grouped into four complementary areas (Assessments, Policy Support, Building Capacity & Knowledge, Communications & Outreach)

146. Business For Nature. Available at: https://www.businessfornature.org/
147. IPBES. Available at: https://ipbes.net/about

APPENDIX F: EXISTING BIODIVERSITY ALLIANCES

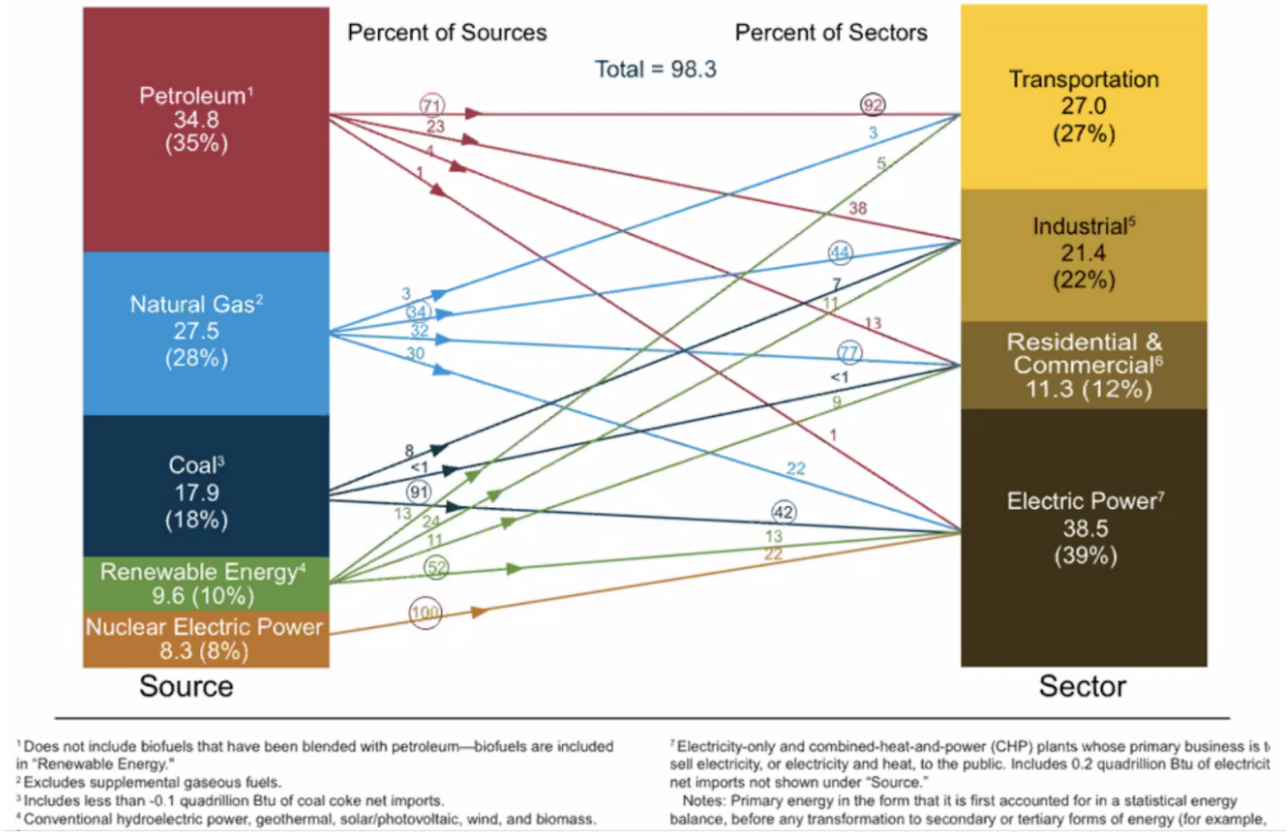
Biodiversity Alliances: under regional and global initiatives, the alliances gather private entities to commit to biodiversity-related initiatives.

BIODIVERSITY ALLIANCE	DESCRIPTION
THE SCIENCE BASED TARGETS NETWORK[148]	A network that is part of the Global Commons Alliance that "aims to provide business with consensus guidance on how to restore balance to the global commons by operating within Earth's limits while meeting society's needs". The SBTN is comprised of 45+ organizations working together to provide science-based targets for companies and cities. This project builds on the Science Based Targets Initiative on climate change.
ACT4NATURE INTERNATIONAL[149]	Act4nature international is an alliance initiated to accelerate concrete business action for nature. Dedicated to French businesses with international activities, its aim is to mobilise them on their direct and indirect impacts, their dependencies and their possibilities to act in favour of biodiversity. 65 businesses committed to the initiative in 2018 and more than 40 new commitments are expected in 2021.
THE NATURAL CAPITAL FINANCE ALLIANCE (NCFA)	NCFA is a finance sector-led initiative, providing expertise, information and tools on material aspects of natural capital for financial institutions. It works to support these institutions in integrating natural capital considerations into their risk management processes and products as well as helping them to discover new opportunities. The NCFA secretariat is run jointly by UNEP FI and Global Canopy.

148. Science Based Targets Network. Science-Based Targets for Nature: Initial Guidance for Business. 2020. Available at: https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/Science-Based-Targets-for-Nature-Initial-Guidance-for-Business.pdf

149. Act4Nature. Available at: http://www.act4nature.com/en/

APPENDIX G: GLOBAL CARBON EMISSIONS



Source: Source: The slide was prepared by prof. Cary S. Krosinsky

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Frick, W.F., E.F. Baerwald, J.F. Pollock, R.M.R. Barclay, J.A. Szymanski, T.J. Weller, A.L. Russell, S.C. Loeb, R.A. Medellin, L.P. McGuire. (2017). Fatalities at wind turbines may threaten population viability of a migratory bat. Biological Conservation. 209: 172-177. Retrieved from: https://doi.org/10.1016/j.biocon.2017.02.023

Global Biodiversity Score: A Tool to Establish & Measure Corporate & Financial Commitments for Biodiversity. Capitals Coalition. (2019, June 5). https://capitalscoalition.org/global-biodiversity-score-a-tool-to-establish-measure-corporate-financial-commitments-for-biodiversity/.

Global Canopy. (n.d.). The Case for a Task Force on Nature-related Financial Disclosures. https://globalcanopy.org/wp-content/uploads/2020/11/Task-Force-on-Nature-related-Financial-Disclosures-Full-Report.pdf.

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IPBES. (2019). Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES secretariat, Bonn, Germany. Retrieved from: https://www.ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf

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