

BIODIVERSITY AND INFRASTRUCTURE INVESTING

How infrastructure investors are factoring biodiversity impacts into decision-making

August 2024



Dear Reader,

We are pleased to present *“Biodiversity and Infrastructure Investing: How infrastructure investors are factoring biodiversity impacts into decision-making.”* This timely report, developed in partnership between WWF and Oliver Wyman, builds on our commitment to sustainable infrastructure investment.



Biodiversity loss is a global crisis that demands immediate attention. Its consequences threaten ecosystems, economies, and the well-being of all life. Infrastructure investors must urgently address the impact of their investments on biodiversity, and this report provides the essential insights to do so.

The report examines why biodiversity loss merits the same focus as climate change, highlighting the increasing awareness and evolving regulations in this area. It explores how investors can use existing tools to address biodiversity risks while uncovering new opportunities. Best practice case studies demonstrate how leading investors are integrating biodiversity considerations throughout the investment process, setting a continuously improving bar and proving that positive change is achievable.

This report is a critical resource for infrastructure investors and advisors. By making biodiversity central to investment decisions, we can protect our planet’s life support systems, ensure the resilience of essential infrastructure, and drive sustainable development.

We thank the authors and contributors for their invaluable work and hope this report catalyzes collaboration and decisive action towards a future in which nature and infrastructure investments work in harmony.

Sincerely,

A stylized, handwritten signature in black ink, consisting of a large, sweeping initial 'V' followed by a few more strokes.

Vivek Kumar
Chief Executive Officer
World Wide Fund for Nature (Singapore)



ABOUT THIS REPORT

Objective

This white paper, developed by Oliver Wyman and WWF, the global conservation organization, reviews how infrastructure investors and their advisors incorporate biodiversity into investing. It explores approaches used to assess biodiversity impacts and risks, and investor rationale for considering these impacts and risks in decision-making. It presents perspectives on the outlook for further progress and where improvement is of most value.

This work builds on Oliver Wyman and WWF's 2020 white paper "Incorporating Sustainability into Infrastructure: How climate and nature-related factors are applied in the investment process", which looked at a range of ESG considerations, including biodiversity. This new paper aims to increase awareness of biodiversity loss specifically, as a crisis comparable to climate change which threatens the global economy and the well-being of all life. This work was also supported in part by the United States Agency for International Development (USAID)-funded Asia's Linear Infrastructure safeGuarding Nature (ALIGN) Project, which aims to enhance the development and implementation of effective, high-quality linear infrastructure safeguards that protect people and nature from harm.

Research

This paper relied on the following research:

- **A global infrastructure investor survey** with 51 responses, including 20 investors with >US\$5 billion in assets under management, forming the primary basis of this report.
- **Direct interviews** with selected survey respondents to supplement survey findings.
- **In-depth literature review** to contextualize survey findings and provide examples of initiatives, regulatory changes, and investor actions on biodiversity loss.

Citation

Oliver Wyman and WWF (2024) *Biodiversity and Infrastructure Investing*.

Structure

Findings are presented in five main sections:

- **Biodiversity loss:** Infrastructure's impacts on biodiversity, and risks for investors.
- **Growing awareness and action:** Evidence of growing awareness, and policy developments.
- **Investor current practice:** Approaches, frameworks, and metrics used by investors.
- **Outlook for further progress:** Factors driving change, role of barriers, and key actions.
- **Best practice case studies:** Examples of best practice throughout the investment lifecycle.

EXECUTIVE SUMMARY

Infrastructure investors have made progress integrating environmental, social and governance (ESG) considerations into investment decisions. But, there is room to better measure and mitigate investments' impacts on biodiversity.

The loss of biodiversity is a critical global issue that threatens the well-being and livelihoods of all people. Infrastructure — essential, built assets that underpin the global economy — contributes to this crisis through five nature impacts: climate change, habitat change, pollution, resource use, and invasive species spread.

In turn, biodiversity loss creates physical and transition risks for infrastructure. Mitigating these risks and investing in nature is critical to ensure economic resilience, drive sustainable development, and conserve our natural world.

Most investors surveyed for this white paper assess the climate change impacts of their portfolios (82%, N=51). However, investors less commonly assess other nature impacts that contribute to biodiversity loss: 59% of respondents assess habitat change, 45% resource use, 39% pollution, and 12% invasive species spread. These results reflect advanced awareness and action on climate change, while familiarity with other nature impacts is still developing.

Investors often rely on qualitative methods to assess nature impacts. Some incorporate quantitative metrics (for example, area of land cleared). Quantitative measures are more commonly used in screening or managing assets, and less commonly in valuation or risk assessment, potentially leaving gaps in understanding and quantification of risks. Investors have made greater progress for infrastructure perceived as higher impact (for example, utilities, energy, and transport sectors). However, there is room for improvement across the board.

An increase in regulatory action and mounting institutional investor pressure on biodiversity loss are expected to prompt infrastructure funds and advisors to adopt broader, more sophisticated assessments of biodiversity impact and risks. Progress on defining common standards and developing new models of nature-positive and resilient investment will enable change with extensive work to date already establishing many of the elements investors require to act. Meanwhile, infrastructure investors have started to play roles in accelerating this change.

There are clear reasons to act urgently on this issue:

- **Biodiversity loss is a crisis comparable to climate change.** Investors and advisors must address both crises as a matter of diligent risk management and as global citizens. Policy attention is expected to increase as governments translate the 2022 Kunming-Montreal Global Biodiversity Framework into national policies and regulations. This will make addressing biodiversity an unavoidable part of infrastructure investing in the future.
- **Progress is achievable now.** Barriers revealed by our survey reflect the fact that most regulators and governments have not yet mandated common standards. Nonetheless, investors have sufficient clarity around the shape of future mandates to start to assess biodiversity impacts and risk exposures and develop mitigation strategies. Investors who act early will be better placed to manage transition risks later.
- **A nature-positive transition will create new opportunities.** Nature repair will be required to reverse or at least slow biodiversity loss. Infrastructure investors may be able to enhance returns by incorporating positive nature impacts into developments and may need to do so to comply with new regulations. Additionally, investors will need to consider how they should participate in new markets for natural capital (for example, biodiversity credit markets).

BIODIVERSITY LOSS






Biodiversity is the combination of living organisms and habitats that maintains balanced ecosystems. Biodiversity is critical for the health of land, freshwater, ocean, and atmosphere biomes which, in turn, support clean air, food and water, and underpin large parts of the global economy. According to WEF’s The New Nature Economy Report, over half of global gross domestic product (GDP) is estimated to be moderately or highly dependent on nature and ecosystem services. However, biodiversity is in rapid decline. Globally, wildlife populations declined by a staggering 69% on average between 1970 and 2022 ([WWF’s Living Planet Index](#)). Ongoing biodiversity loss threatens the well-being and livelihood of all people.

Infrastructure’s impacts on biodiversity

Infrastructure — essential, built assets across utilities, transportation, energy, digital, energy services, agricultural, and social sectors — contributes to biodiversity loss through five critical Nature Impacts (see Exhibit 1). Infrastructure projects can result in ecosystem destruction or fragmentation, and pollution, and contribute to climate change through GHG emissions. They can

alter the mechanics of ecosystems, impacting water flow, soil composition, and microclimates. The five Nature Impacts are key global drivers of biodiversity loss. Half of the threats to wildlife populations globally relate to habitat change or resource use, 13% to invasive species and disease, 7% to pollution, and 6% to climate change.¹

Exhibit 1: The five critical Nature Impacts

Nature Impact	Definition	Illustrative metrics
 Climate change	Long-term shifts in temperatures and weather patterns due to greenhouse gas (GHG) emissions (CO ₂ , CH ₄ , ...).	Metric tons of CO ₂ -equivalent gas emitted.
 Habitat change	Modification of the environment where a species lives, by removal, fragmentation, or reduction in quality.	Forest removed (hectares); ocean area impacted (square miles).
 Pollution	Presence of substances/heat/noise with undesirable environmental effects due to nature, location, or quantity.	Plastic introduced (tons); NO ₂ in air (parts per million).
 Resource use	Exploitation of natural resources (for example, water, oil, gas, minerals, and timber) with direct or indirect effect on species.	Freshwater used (megaliters); mineral ore removed (tons).
 Invasive species spread	Spread of species outside their natural distribution threatening the natural ecosystem.	Invasive species population.

Source: Oliver Wyman

¹ Species exploitation is excluded due to the focus of this paper on infrastructure’s impact on biodiversity.

The relationship between Nature Impacts and biodiversity loss is not one-to-one. Their severity varies across biomes (see Exhibit 2) and they have cumulative effects when combined.

Exhibit 2: Nature Impacts severity by biome

NATURE IMPACT	BIOMES				
	Land	Freshwater	Ocean	Atmosphere	
Climate change	Medium	Medium	Medium	Medium	<p>Land: Increases surface temperature, animal migration, failed migration.</p> <p>Freshwater/ocean: Impairs water quality (nutrient runoff/salinity/acidification).</p> <p>Atmosphere: Animal nesting disruption and nutrient loss, forced migration.</p>
Habitat change	High	High	High	Medium	<p>Land: Deforestation, clearing, dredging, ...</p> <p>Freshwater/ocean: Marine heat, turbidity, current alterations, nutrient shifts.</p> <p>Atmosphere: Clearing/disturbing natural ecosystems.</p>
Pollution	Medium	Medium	High	High	<p>Ocean: Increased toxicity and waste, as well as noise and light pollution.</p> <p>Atmosphere: Non-GHG pollutants impacting birds and insects.</p>
Resource use	High	High	Low	Low	<p>Land: Commodity extraction and deforestation leading to habitat change.</p> <p>Freshwater: Water intake/ discharge causing warming and contamination.</p>
Invasive species	Medium	Medium	Medium	Low	<p>Land: Non-native species (for example, rats, insects and plants) introduced via freight.</p> <p>Freshwater/ocean: Bacteria/barnacles introduction via shipping.</p>

Degree of impact: ■ Low ■ Medium ■ High

Source: EPA — Impacts by Sector; Science Direct — Invasive Species in Freshwater Ecosystems; MIT — Freshwater and Climate Change; Agriculture Australia — Invasive Species; BBC — How undersea cables may affect marine life; Earth Journalism Network — How submarine cables are threatening the fragile ecosystem of the mediterranean seabed; EOS Data Analytics — Deforestation & Greenhouse Gas; Texas Disposal Systems — Ocean Pollution: Causes, effects, prevention; ICUN — Marine plastic pollution; UNEP — Freshwater pollution; UCAR — Air quality and climate change; National Geographic — Freshwater resources; Environment Co — Threats to the ocean from poor water management; Reef Resilience Network — Impacts on Marine Life.

Infrastructure can create Nature Impacts across the value chain and across different stages of the asset lifecycle (see Exhibit 3).

Measuring the direct impact of an infrastructure asset on biodiversity can be challenging. Nature Impacts can often more readily be used to quantify an asset's biodiversity footprint.

Exhibit 3: Illustrative Nature Impacts for a highway development

Stage	Direct	Indirect (up/downstream)
Development	Construction causes habitat change through on-site land clearing.	Production of construction materials (for example, subgrade, asphalt) may result in habitat change, resource depletion, or pollution upstream.
Operations	Ongoing use of highway may fragment habitats by reducing animal crossings and create noise and air pollution.	Development in surrounding areas may result in further habitat change and/or pollution.
End of life	Demolition may further disturb local habitat and create soil or air pollution.	Disposal of demolition waste may require further land use (that is, landfill) and create pollution off-site.

Source: Oliver Wyman

Risks for investors

Infrastructure investors face both physical and transition risks relating to biodiversity loss:

- **Physical risks:** Risks that result from the degradation of nature and consequential loss of ecosystem services (for example, flooding, oil spills, forest fires, degradation of farming land, etc.).
- **Transition risks:** Risks due to actions aimed at reducing or reversing negative impacts on nature (for example, regulatory changes, investor sentiment or consumer preferences, etc.).

Risks can manifest in a variety of forms, including credit, market, liquidity, operational, and liability risks (see Exhibit 4). Physical risks may have a direct impact on financial returns (for example, via increased insurance premiums or investments to build resilience). Transition risks may lead to stranded assets as governments and investors seek to reduce Nature Impacts.

Exhibit 4: Physical and transition risks for infrastructure investors

Risk	Risk cause	Company impacts	Financial risks	Examples
Physical risks	The decline of: <ul style="list-style-type: none"> • Air quality and local climate • Food and other goods provision • Habitat intactness • Hazard regulation • Water security 	<ul style="list-style-type: none"> • Disruption of value chain and activities • Raw material price volatility • Adjustment or relocation of activities • Pricing externalities • Stranded assets • Capital destruction • Reputational damage 	<ul style="list-style-type: none"> • Credit • Market • Liquidity • Operational • Liability 	Surface transport project: <ul style="list-style-type: none"> • Deforestation decreasing carbon sequestration, having negative impact on local species • Developer faces reputational damages • Increased credit risk, as financing banks move away from high-biodiversity loss industries/assets
Transition risks	Changes in: <ul style="list-style-type: none"> • Policy and regulation • Technology • Business model innovation • Consumer and investor sentiment 			Electricity transmission regulation: <ul style="list-style-type: none"> • Changing regulation adding environmental costs to T&D operators, increasing cost base • Increased liquidity risk due to uncertain cost base

Source: Cambridge Institute for Sustainability Leadership 2021, Taskforce on Nature-related Financial Disclosures (TNFD) Recommendations 2023

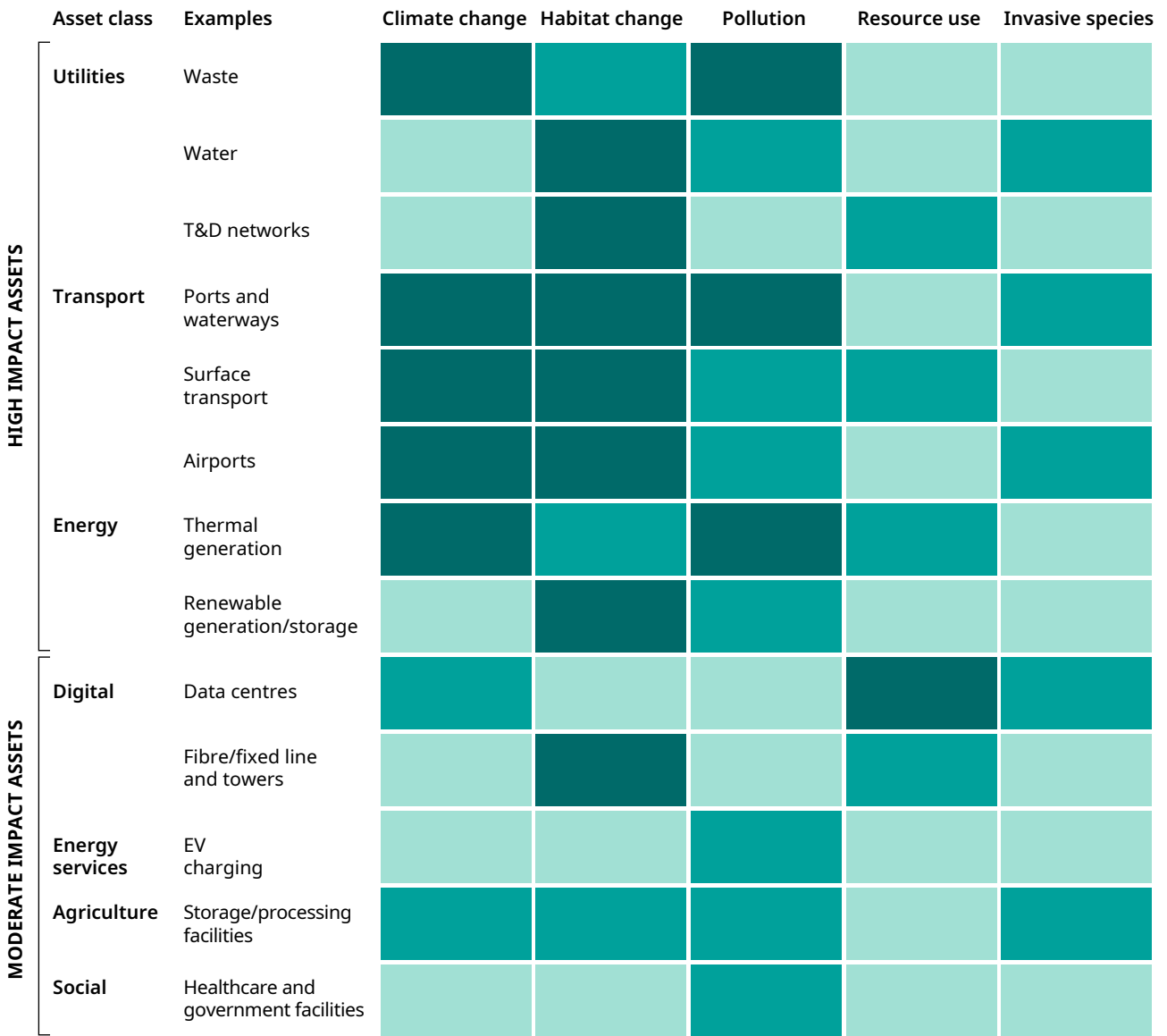
Nature Impacts by type of infrastructure

Infrastructure assets differ in their footprints across the five Nature Impacts (see Exhibit 5). Certain infrastructure asset classes, such as those in the energy, utilities, and transport sectors, tend to have a greater overall impact on biodiversity. Other asset classes, such as those in energy services, agriculture (excluding animal husbandry and monocropping), digital, social sectors, may still have substantial impact. Accounting for an asset’s specific interfaces with nature, including location and sensitivity of

local ecosystems, is critical in gauging degree of impact.² According to David Mytton’s Data centre water consumption research, data centers generally require significant quantities of fresh water for cooling (~25 million liters per MW, using traditional methods). A data center operating in a water-scarce region would face greater physical and transition risks compared to a data center operating in a region with relatively abundant water (or with cooler temperatures, reducing the need for cooling).

² Impact relates to the infrastructure assets that support a sector, rather than the sector’s overall impact. For example, agricultural infrastructure includes processing and sorting facilities which are not high-impact relative to animal husbandry and cropping, which are not included in this definition of infrastructure.

Exhibit 5: Nature Impacts by asset class



Degree of impact: ■ Low ■ Medium ■ High

Source: Oliver Wyman analysis; NIH — Biodiversity loss from freshwater use for China's Electricity Generation; The Guardian — Australia's renewable energy goals can't come at the cost of biodiversity; IUCN — Biodiversity impacts. Biofriendly planet — Electric vehicles and their impact on the environment; Research Gate — Power lines and impacts on biodiversity; Public Service Commission of Wisconsin — Environmental impacts of transmission lines; Science direct — Biodiversity accountability in water utilities; SPREP — Halting our loss of biodiversity, in a world of manufacturing processes; Aviation Environment Federation — Biodiversity; Climate Champions — Shipping can tackle climate change; Our Shared Seas — Habitat and biodiversity loss; Ardian — Biodiversity: the next big challenge for transport companies; Utilities One — The impact of telecommunication towers on wildlife and the environment; Ramboll — Biodiversity and data centers; Data Center Dynamics: What has biodiversity got to do with data centers?; Kager Publishers — Health and environmental impact of hospital wastes; Chatham house — food systems impacts on biodiversity loss.

Trends in global infrastructure investment

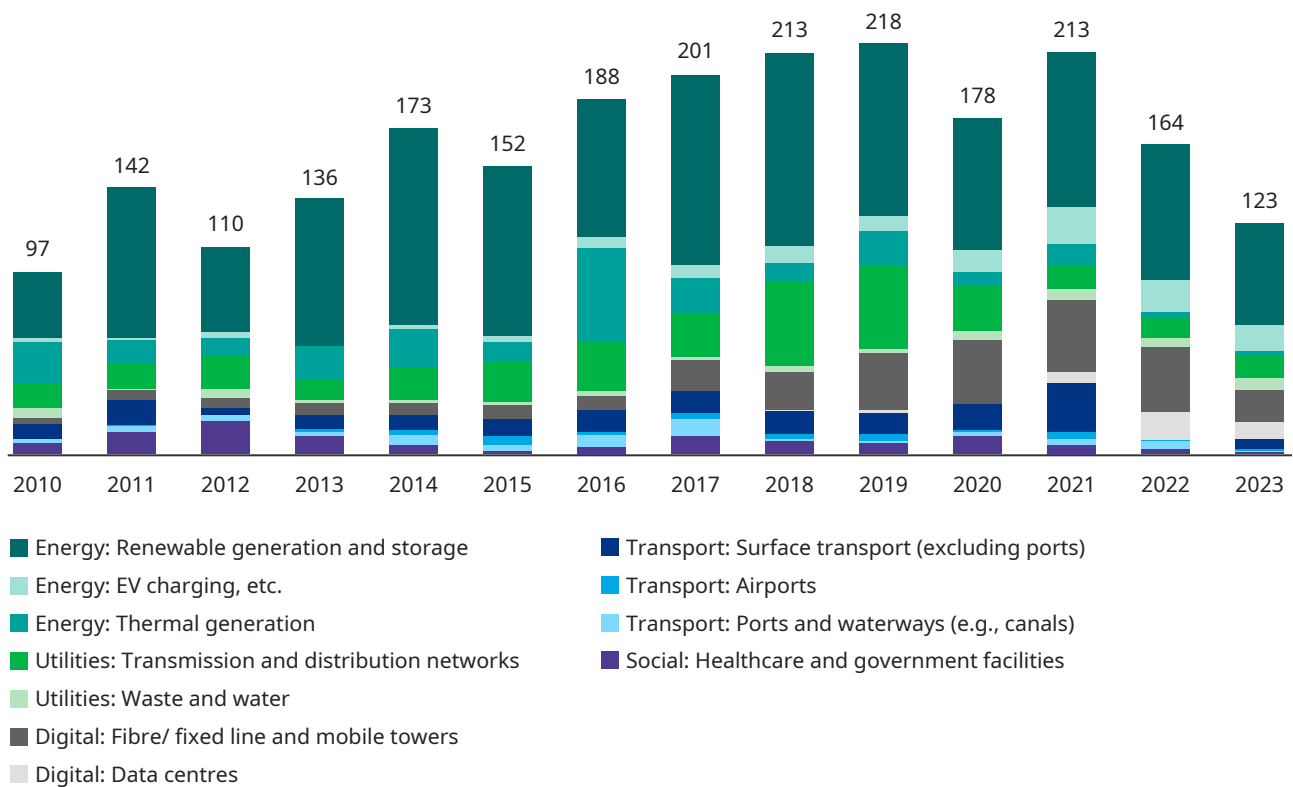
The past decade saw significant growth in infrastructure transactions globally. The number of transactions grew globally at a rate of 6% per year between 2010 and 2020 (see Exhibit 6). This growth was fueled by low interest rates and ongoing economic development globally, and privatization and regulatory reform in high-income countries.

The number of infrastructure projects declined by 58% from 2021–2023, due to pandemic-related

project delays and cancellations, and post-pandemic economic volatility.³ Investment is expected to rebound over the next few decades, driven by an accelerated net zero transition. Achieving Paris Agreement goals is estimated to require annual global investment in energy transition infrastructure (for example, renewable generation) to quadruple as stated in the Energy Transition Investment article by the World Economic Forum.

Exhibit 6: Global infrastructure transactions

Number of transactions per year, 2010–2023



Source: Preqin, Q3 2023, Infrastructure Dataset 2010–2023 Note: Factoring contestable infrastructure transactions; exclusions applied based on deal size, stake, pieced transactions, countries (filtering for OECD + HK, SG, UAE), non-DFI debt funding, and industry (including bridges, railroads, roads, tunnels, cable television networks, and majority of social excl. housing, hospitals, accommodation)

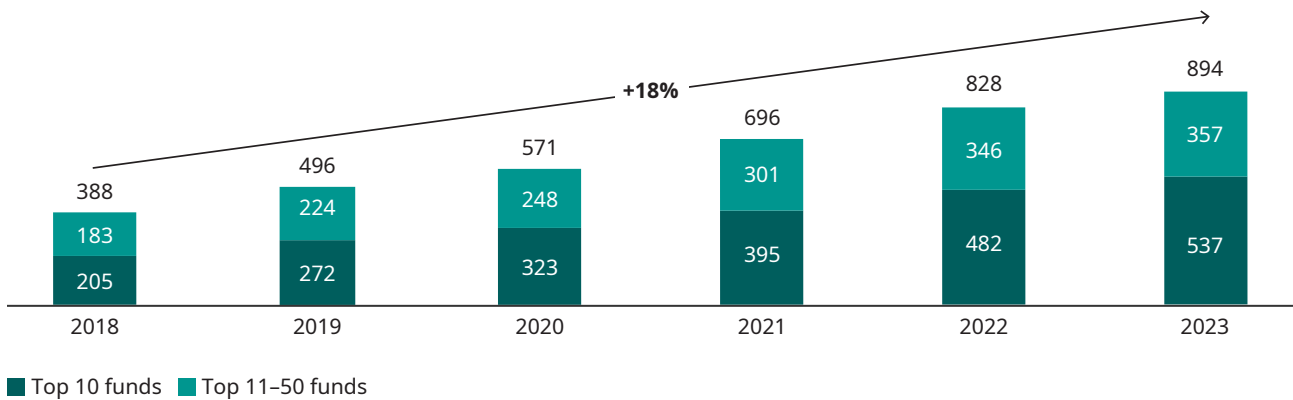
³ Construction Dive, “\$9.6B worth of infrastructure projects delayed or cancelled during COVID-19”, accessed March 2024; The Guardian, “Federal government to slash 50 infrastructure projects due to blowouts”, accessed March 2024.

Overall capital funding for infrastructure grew rapidly, at 18% per year 2018–23 (see Exhibit 7).

Europe has historically had the highest number of transactions per year, followed by the Americas (see Exhibit 8). In Europe, renewable energy projects accounted for 75% of all energy infrastructure transactions. The ambitious transition targets and investment agenda of major economies and the European Union are expected to underpin further investment growth.

Exhibit 7: Capital raised by global top 50 infrastructure

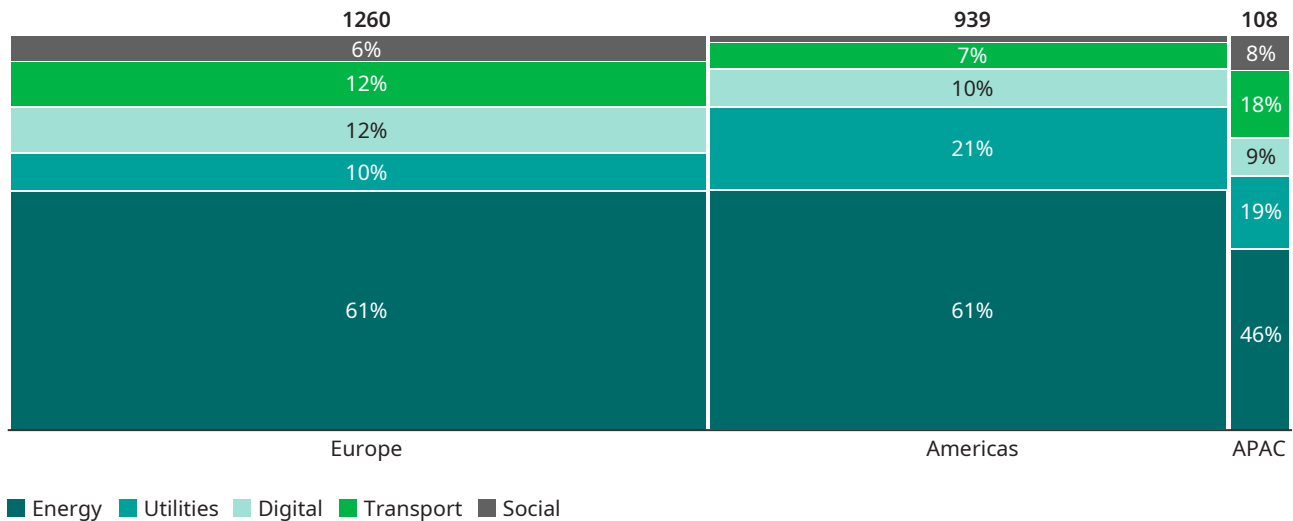
\$ billion



Note: Infrastructure investing involves committing equity capital towards tangible, physical assets, that are expected to produce stable cashflows over a long horizon. Capital raised is capital definitively committed to an infrastructure investment program (final or interim close trailing 5-years)
 Source: Infrastructure Investor — Top 50 List

Exhibit 8: Infrastructure transactions by region

Number of transactions, 2010–2023



Note: Contestable infrastructure transactions. Exclusions applied based on deal size, stake, pieced transactions, countries (OECD + HK, SG, UAE), non-DFI debt funding, and industry (incl. bridges, railroads, roads, tunnels, cable TV networks, social infrastructure excl. housing, hospitals, accommodation.)

Source: Preqin, Q3 2023, Infrastructure Dataset 2010–2023

Biodiversity considerations by company type

Infrastructure investors and their advisors play critical roles in managing biodiversity-related risks and investing in nature repair. Professionals surveyed for this white paper come from various types of organizations involved in infrastructure investing, including infrastructure funds, development finance institutions (DFIs), transaction advisors, and financing banks. The levers an organization can apply to incorporate biodiversity considerations in the investment process differ somewhat depending on its role in this process (see Exhibit 9).

Exhibit 9: Illustrative levers used by organizations to integrate biodiversity considerations

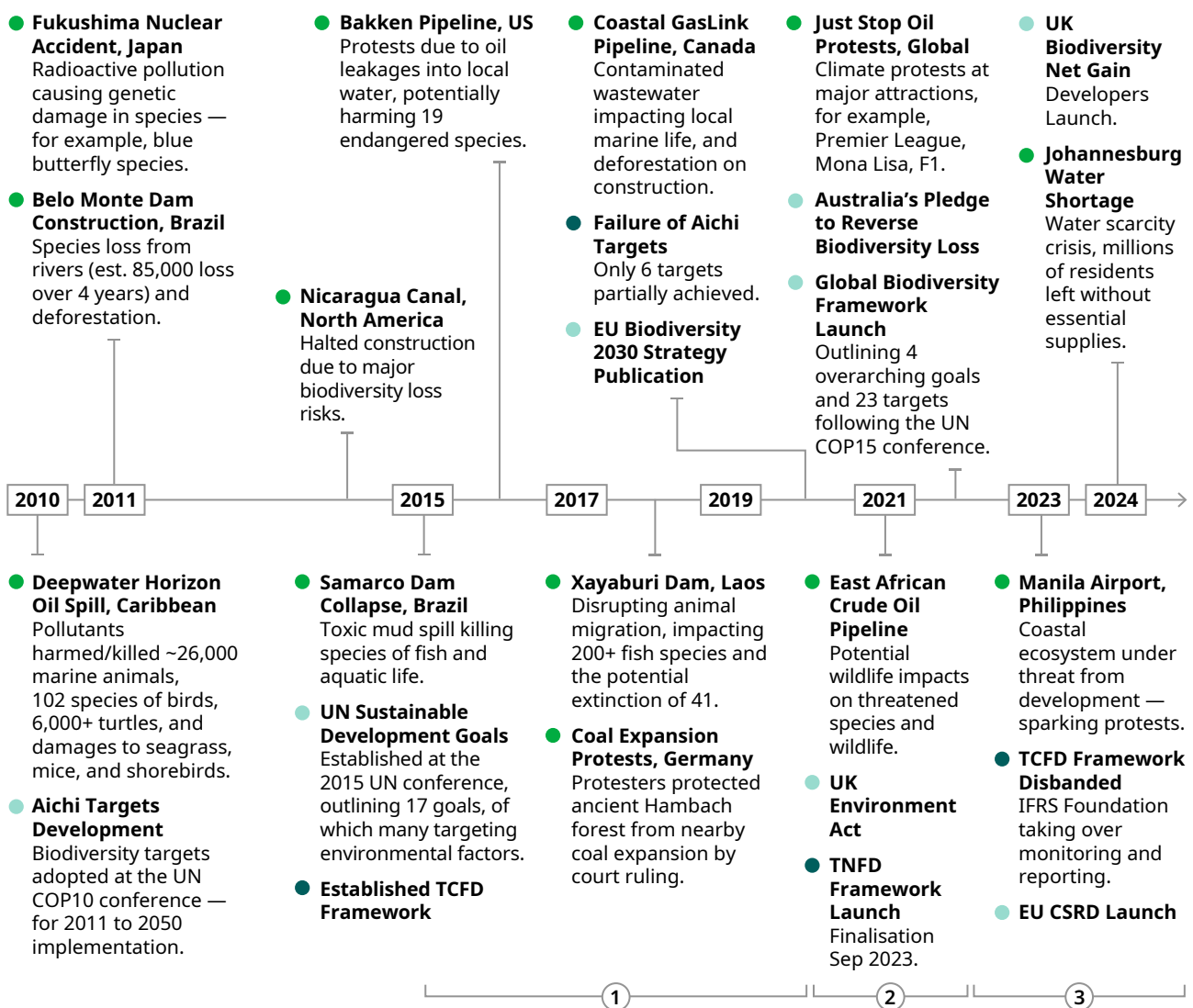
Company type	Key levers
Infrastructure funds	<ul style="list-style-type: none"> • Using public and proprietary environmental data and tools to measure Nature Impacts. • Implementing nature-positive strategies to mitigate biodiversity risks. • Investing directly in sustainable and environmental uplift projects.
Transaction advisors	<ul style="list-style-type: none"> • Assessing investors’ stewardship strategy using questionnaires, benchmarks or scorecards. • Supporting investors with quantitative modelling or risk assessments relating to biodiversity.
Development finance institutions (DFI)	<ul style="list-style-type: none"> • Integrating policies, instruments, projects to safeguard investments for positive biodiversity outcomes. • Providing technical and knowledge support to investors. • Developing environmental frameworks, databases, and tools for the market.
Financing banks	<ul style="list-style-type: none"> • Assessing nature risks and impacts of portfolios using risk scorecards, policies, and benchmarks. • Integrating sustainability-linked performance incentives into financing instruments.

Source: Various market leading companies sustainability reports across infrastructure funds, transaction advisors, development finance institutions, and financing banks

GROWING AWARENESS AND ACTION

Major biodiversity events, including relating to infrastructure development, have raised the profile of biodiversity considerations in recent decades. These events have included crises (for example, the Deepwater Horizon oil spill) and political movements (for example, the Just Stop Oil movement) that have drawn attention to the impacts and dependencies of infrastructure on biodiversity. Growing awareness is driving domestic and international changes in policy, corporate practices, and capital markets (see Exhibit 10).

Exhibit 10: Timeline of biodiversity events and regulation



● Major Biodiversity Events ● Legislation ● Frameworks

1. Acceleration of climate change initiatives to achieve Paris 1.5C agreement, increased focus on decarbonisation objectives
2. Increasing importance behind biodiversity considerations
3. Acceleration of biodiversity initiatives, in line with the Convention on Biological Diversity 15th Conference of the Parties (COP 15) Kunming-Montreal Global Biodiversity Framework (GBF)

Source: Various online biodiversity publications (events, protests, regulations, frameworks)

Changing public, corporate and investor perceptions

Recent studies demonstrate that public awareness of the importance of biodiversity is high and has increased in recent years.

- **A 2022 WWF study** across nine low and middle-income countries found that 81% of respondents were familiar with “biodiversity” as a term, up from 73% in a 2018 study, and that 79% associated biodiversity with “balance in the natural order” or “climate control” as stated in the Societal Biodiversity Awareness study.
- **A 2022 UEBT survey** of six thousand consumers across six medium and high-income countries found that 82% of respondents could correctly define biodiversity, and that 63% put biodiversity loss in their top three most pressing environmental concerns as stated in the Biodiversity Barometer article.
- **A 2020 Economist Intelligence Unit study** found that mentions of nature loss on the social media platform X (formerly Twitter) increased by 65% 2016–2020, and that media coverage of nature-based protests increased by 103% 2018–2019 as stated in the An Eco-wakening article.

Corporate and investor behaviours are shifting alongside public awareness. According to S&P’s ESG Reporting Assurance Analysis, over one-third of S&P 500 companies disclosed a biodiversity policy in 2023 and 99% issued a sustainability report. Over 150 financial institutions, including asset managers with over US\$20 trillion in combined assets under management, have signed the Kunming-Montreal Global Biodiversity Framework (GBF). Over 320 companies, including over 60 financial institutions, are TNFD Framework “early adopters”. Over 200 institutional investors have signed up to the Nature Action 100 initiative, representing over US\$28 trillion in combined assets under management.

Impact of growing biodiversity awareness on infrastructure

Policymakers are increasingly aware of the physical risks posed by biodiversity loss. Recent examples of projects cancelled or altered due in part to biodiversity considerations include:

1. Roissy-Charles de Gaulle Airport Expansion (France, 2021): The French Government made the airport operator cancel plans for a fourth terminal, based on inconsistency with GHG emissions targets and environmental goals, and requested that the airport develop a new project to adapt for a future with less air travel and new forms of low-emissions flight.

2. Thabametsi Power Station (South Africa, 2020): The private consortium developing the 630MW power station cancelled the project in 2020, before construction began, due to concerns over increased GHG emissions and impacts on regional water supply.

Investors face transition risks from increasing policy focus. Projects that do not sufficiently mitigate Nature Impacts may face regulatory or policy barriers. It is becoming more common for developments to incorporate mitigation strategies.

Examples include:

- **Viva Restinga reforestation project (Brazil, 2016):** Arteris, a Brazilian toll road operator, began Viva Restinga (“living coastal forests”) to restore 166 hectares of native habitat.
- **ReCoral coral restoration project (Taiwan, 2022):** Orsted, a Danish energy company, is running proof-of-concept projects to restore coral reefs near offshore wind turbines.
- **Champlain Hudson Power Express (United States, 2022):** The ~550-km transmission line from Québec to New York City will convert a former petrol storage site into an electricity converter station, removing six oil tanks and significantly remediating the site.

Changing regulatory approaches to biodiversity

Governments and industry bodies have undertaken significant work in recent decades to develop guidance and frameworks to measure and mitigate biodiversity impacts. Key examples are the Global Biodiversity Framework (2022) and the Taskforce on Nature-related Financial Disclosures (TNFD).

Several countries are developing legislation in line with GBF commitments, with conservation and disclosure requirements, and incentives to invest in natural capital. Examples include:

- **United Kingdom, Biodiversity Net Gain, 2023:** Nationally Significant Infrastructure Projects (NSIP) must result in a 10% net gain in natural ecosystem coverage from late 2025.

- **Canada, National Biodiversity Strategy, 2024:** The 2030 plan aims to preserve nature through provincial and territorial targets and strategies.
- **Australia, Nature Positive Plan, 2023:** A plan to establish a national environmental protection agency, a target to protect 30% of land and water by 2030, and a biodiversity credits market.

Further nature and biodiversity preservation legislation is in discussion in several other countries (for example, Italy, France, Germany, and the USA).

INVESTOR CURRENT PRACTICE

Infrastructure investors have made progress incorporating biodiversity considerations into investment decision-making. This has primarily been driven by awareness of opportunities for enhanced, or more resilient, returns, and by investor preferences. Investors surveyed were aware of the importance of all five Nature Impacts but less likely to measure non-climate change Nature Impacts. Assessments generally rely on qualitative analysis, rather than quantitative metrics. There is a low degree of standardization among approaches, with limited consolidation around key frameworks. Investors prioritise assessments for asset classes seen as higher impact (such as energy assets), with understandably greater gaps for asset classes seen as lower impact (such as social infrastructure). Significant opportunity exists to better integrate biodiversity considerations.

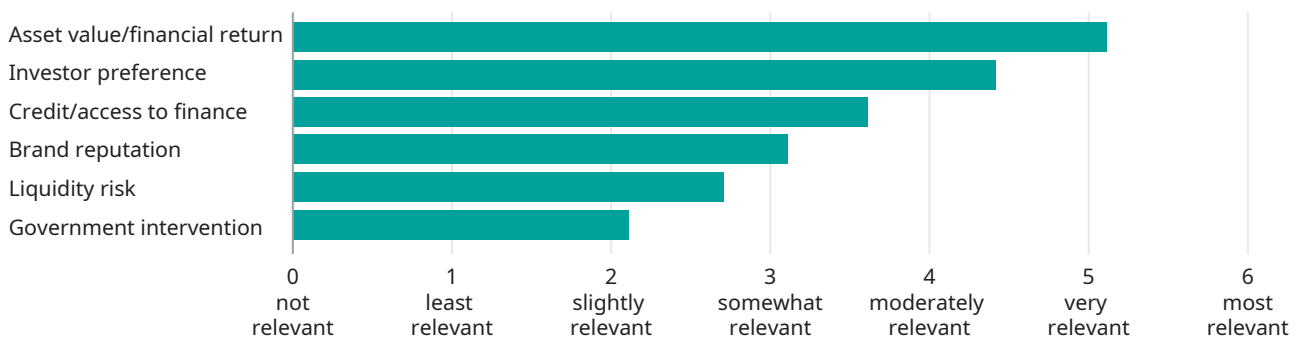
Investor reasons to incorporate biodiversity considerations

The most prevalent reasons for considering Nature Impacts in investment decisions are financial returns and investor preferences (see Exhibit 11), in line with results from our 2020 Incorporating Sustainability into Infrastructure Report on broader ESG considerations. Financial returns considerations reflect biodiversity-

related financial risks, and opportunities for enhanced returns by mitigating or reducing Nature Impacts (for example, by securing lower cost of capital through “green” financing) or by participating in emerging financial incentives for nature remediation (for example, biodiversity credit markets).

Exhibit 11: Investor motivations to integrate biodiversity into investment decisions

Average, on a scale of 6 = most relevant to 0 = not relevant



Note: Survey respondents were asked which factors are most relevant when considering biodiversity in infrastructure investment decision-making
 Source: Oliver Wyman and WWF biodiversity survey (N=51)

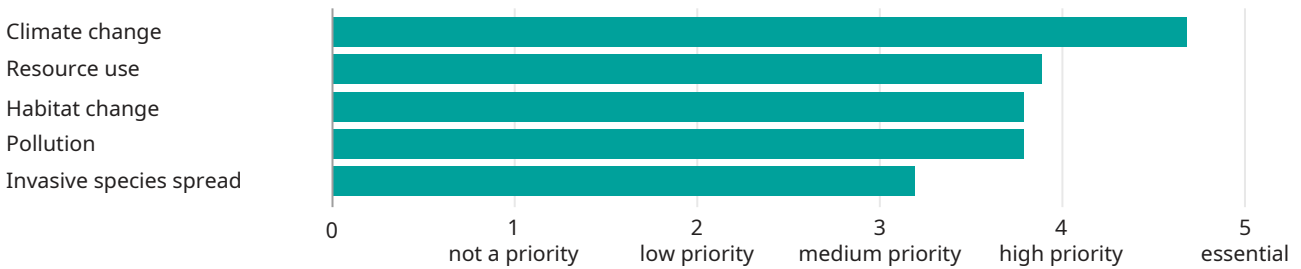
Institutional investor preferences are increasingly shifting in favor of assets with neutral or positive Nature Impacts. Some financing banks have introduced new forms of credit that offer superior terms for these assets. For example, one major bank (and TNFD signatory) has developed sustainability-linked loans that provide lower interest rates for investments with better nature outcomes (for example, carbon sequestration, reforestation) and

lower risk exposures (for example, greater drought resilience). Liquidity risks may increase over time for assets with high negative Nature Impacts or without transition plans.

Survey respondents see all Nature Impacts as important (see Exhibit 12). However, investors rate climate change alone as “essential” in decision-making.

Exhibit 12: Importance of Nature Impact in infrastructure investment decision-making

Average, on a scale of 5 = essential to 1 = not a priority

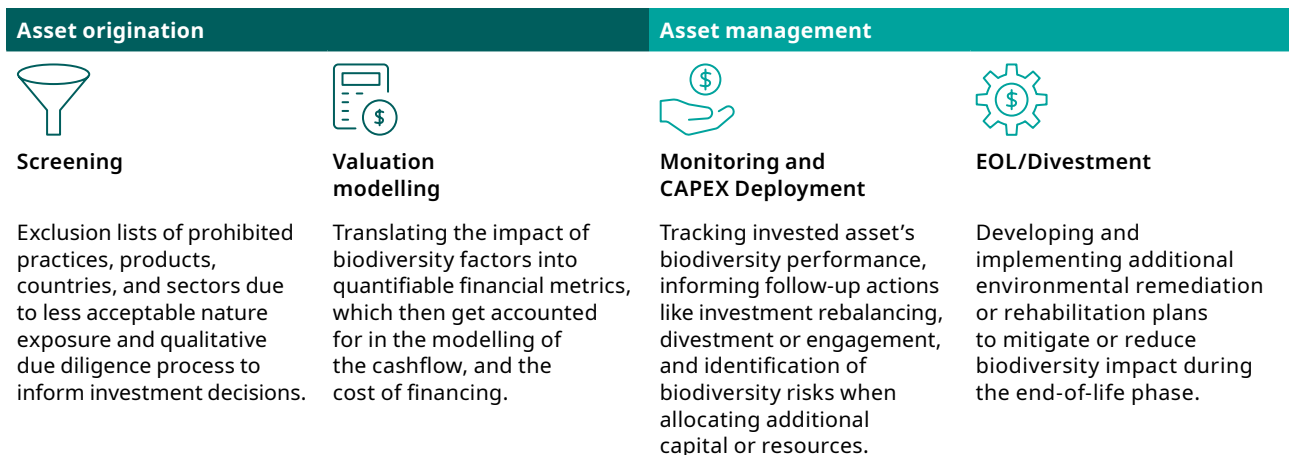


Note: Survey respondents were asked which factors are most relevant when considering biodiversity in infrastructure investment decision-making
Source: Oliver Wyman and WWF biodiversity survey (N=51)

Biodiversity considerations across the investment lifecycle

Managing exposure to Nature Impacts concerns the full investment lifecycle. Stages captured in the survey were screening, valuation modelling, monitoring and ongoing CAPEX, and end-of-life and divestment (see Exhibit 13).

Exhibit 13: Illustrative integration of Nature Impacts across the investment lifecycle



Survey respondents indicate that Nature Impacts are similarly integrated across origination and management stages (see Exhibit 14). Most investors (82%) surveyed consider climate change impacts, while a smaller share consider other Nature Impacts (59% habitat change, 45% resource use, 39% pollution, and 12% invasive species spread). This reflects greater awareness and action on climate change relative to the full range of factors that also affect biodiversity. However, these non-climate change Nature Impacts are especially important to understand given their effects are concentrated on nearby ecosystems (whereas climate change is global).

Investors surveyed are more likely to use qualitative assessments of Nature Impact than quantitative measures. Where metrics are used, common

examples include CO2-equivalent emissions (climate change), total area in hectares for remediation (habitat change), tons of plastic diverted (pollution), and water use (resource use). Few respondents have quantitatively modelled the impact of invasive species, citing a lack of frameworks and data challenges.

Respondents indicate that they consider both physical (96%) and transition risks (94%) in the origination stage. However, in the management stage they primarily consider physical risks (90%), with less consideration of transition risks (71%). Respondents are more likely to use quantitative measures for physical risks (61%) relative to transition risk (27%), due to greater difficulty defining and measuring the latter.

Exhibit 14: Incorporation of biodiversity considerations by investment stage and approach



Percent of respondents: 0-20% 20-40% 40-60% 60-80% 80-100%

Note: Survey respondents were asked how they currently integrate each Nature Impact
 Source: Oliver Wyman and WWF biodiversity survey (N=51)

Biodiversity frameworks and metrics

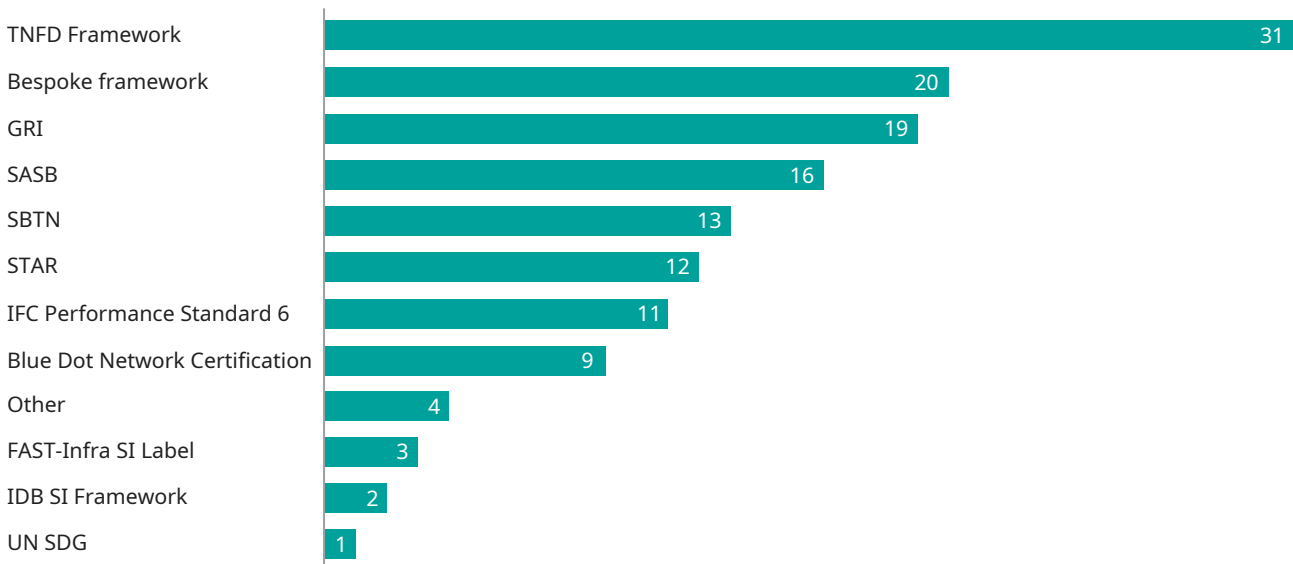
All respondents indicate the use of nature-related frameworks in investment decisions. However, there is limited consolidation around individual frameworks. The most used is the TNFD Framework, which only 31% of respondent have adopted (see Exhibit 15). One-fifth of respondents indicate they use bespoke frameworks, primarily larger infrastructure funds, often in conjunction with external frameworks.

The TNFD Framework recommends that companies assess nature-related impacts and dependencies across the value chain. Over 90% of respondents consider at least one Nature Impact within their direct operations, followed by 63% considering upstream impacts, and 18% considering downstream impacts. Climate change is the most measured Nature Impact across upstream and downstream value chain segments.

Survey respondents who use quantitative metrics generally measure similar types of metrics for a given Nature Impact. Metrics included:

- **Climate change:** CO2-equivalent emissions (scopes 1, 2, and 3); emissions avoided; weighted average carbon intensity (WACI).
- **Habitat change:** Land and water area impacted; remediation requirements/costs; species movement monitoring.
- **Pollution:** Decibels above baseline; volume, diversion, and recovery of non-GHG pollutants (for example, chemical: NOx, SO2, VOC; waste: plastics, cardboard, hazardous...).
- **Resource use:** Water withdrawn, consumed, discharged, replaced; energy consumed; timber used; construction materials used (for example, concrete); total inputs consumed/outputs produced ratio.
- **Invasive species spread:** No metrics observed.

Exhibit 15: Most used biodiversity frameworks
% of respondents



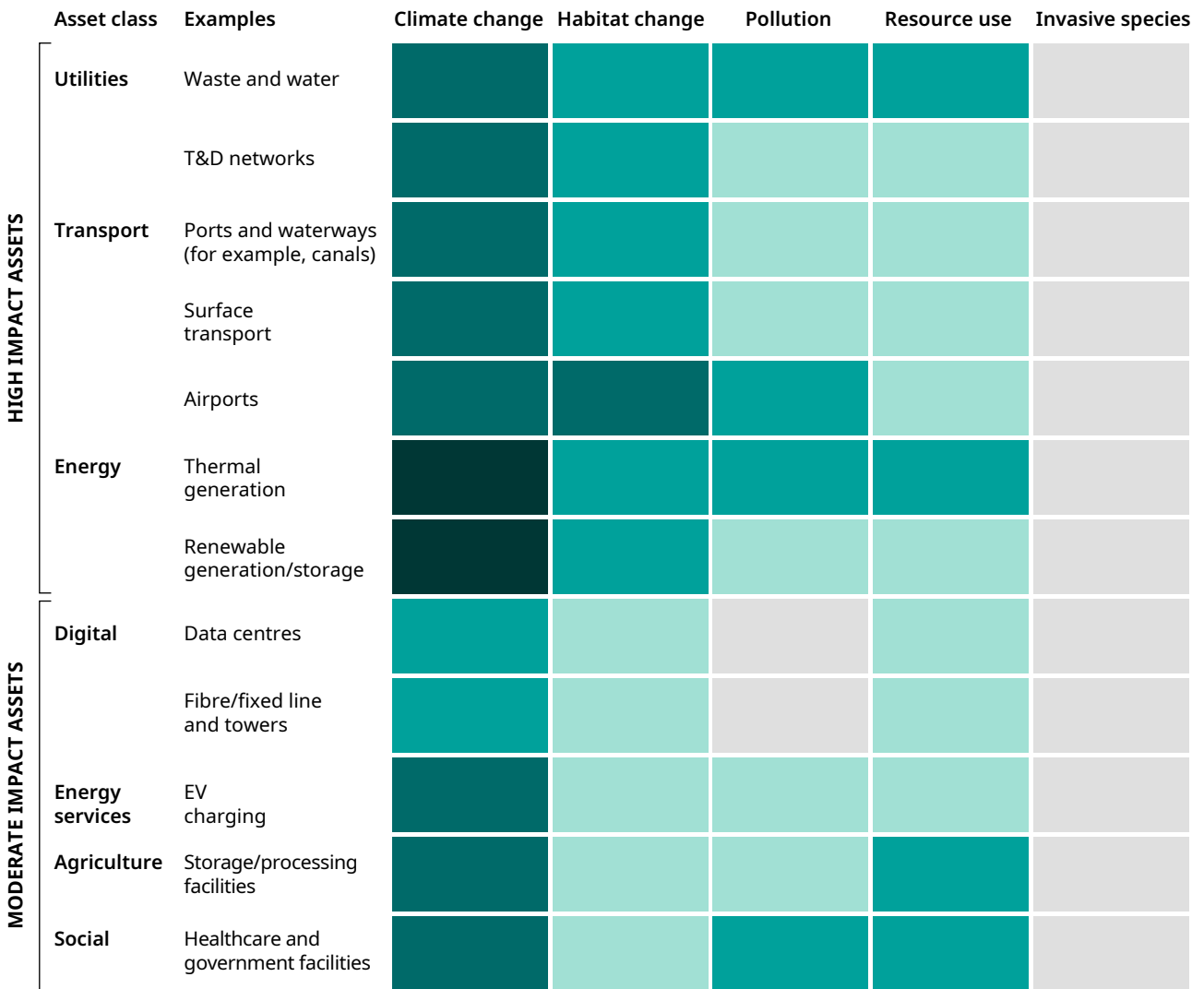
Notes: Survey respondents were asked what frameworks and / or metrics they currently use, intend to use, or are considering using. TNFD = Taskforce on Nature-related Financial Disclosures. GRI = Global Reporting Initiatives. SASB = Sustainability Accounting Standards Board. SBTN = Science-based Targets Network. STAR = Species Threat Abatement and Restoration. IDB = Inter-American Development Bank.
Source: Oliver Wyman and WWF biodiversity survey (N=51)

Nuances across asset classes and industry participants

Investors in higher-impact infrastructure asset classes (utilities, transport, and energy) have integrated Nature Impacts into investment decisions to a greater extent than for moderate-impact assets (digital, energy services, agriculture,

social), especially for non-climate change Nature Impacts (see Exhibit 16). More than half of survey respondents (64%) measure habitat change for high-impact asset classes, whereas only 43% do so for moderate-impact asset classes.

Exhibit 16: Nature Impacts considered by infrastructure asset class



Share of responses: 0-20% 20-40% 40-60% 60-80% 80-100%

Note: Survey respondents were asked which of the following asset classes they are currently measuring
 Source: Oliver Wyman and WWF biodiversity survey (N=51)

OUTLOOK FOR FURTHER PROGRESS

Half of survey respondents believe there has been at least adequate progress in metrics (55%) and tools (53%) to incorporate Nature Impacts in investment decision-making. Investors now have many of the elements required to disclose and mitigate Nature Impacts, and leading investors have started to act. Ongoing work to reduce or remove remaining barriers is progressing at a rapid pace. Critical further actions for investors will include:

Increasing breadth and sophistication of Nature Impact assessments: Investors are expected to adopt more sophisticated biodiversity assessments, including greater use of quantitative metrics, and incorporate assessments more broadly in the investment process, including in financial modelling and quantitative risk assessments.

Mitigating and remediating Nature Impacts: Investors are expected to develop strategies to mitigate Nature Impacts and related risks for infrastructure developments and portfolio companies and to participate in nature-positive investment opportunities.

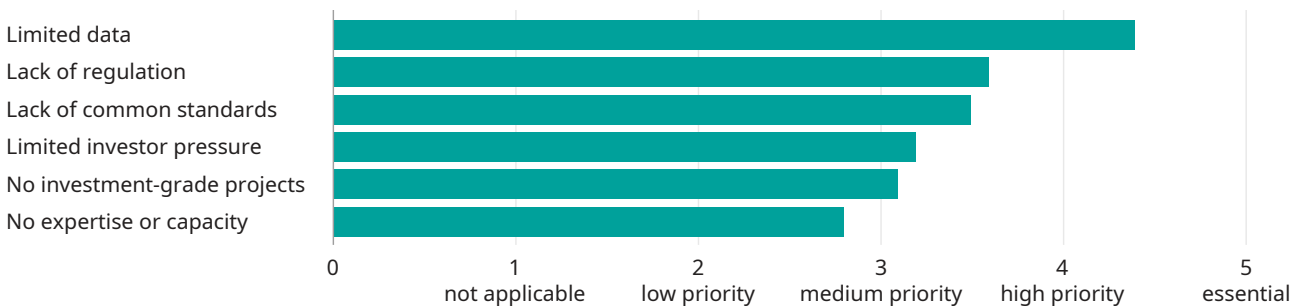
Progress on remaining barriers to action

Respondents raised various challenges to further incorporating biodiversity considerations. The highest priority of these was a perceived lack of usable data. Other key challenges raised included a lack of impetus for change from regulation and a perceived lack of common standards. Substantial effort has been made to address these challenges. These challenges are interlinked. For example,

regulatory change has an important role in setting common standards, and investor pressure will increase with improved disclosures of financial risks. Further change is expected to take place rapidly, driven especially by progress in data availability, regulatory change, consolidation around common standards, and development of nature-positive investment opportunities

Exhibit 17: Barriers impacting Nature Impacts incorporation in investment decisions

Average, on a scale of 5 = Essential to 1 = Not applicable



Note: Survey respondents were asked what barriers are most important to including Nature Impacts within investment decision-making
 Source: Oliver Wyman and WWF biodiversity survey (N=51)

Data availability

Many metrics and data sources exist to measure Nature Impacts and biodiversity, including granular sector- and region-specific data and assessment tools, and standards to identify appropriate data and assessments for their activities (see the appendix for a list of data sources, tools, and frameworks). Key examples include the WWF Biodiversity Risk Filter, Freshwater Ecosystems Explorer, IBAT, ENCORE, and Global Forest Watch. These data sources and tools enable investors to identify biodiversity impacts and risk exposures (for example, assessing the proximity of their assets to key ecosystems and developing heatmaps of potential Nature Impact and dependencies as identified within the TNFD's Guidance on the identification and assessment of nature-related issues: The LEAP approach report).

Investors face ongoing challenges to identify and use available data, although these are manageable or subject to collective improvement efforts. Key challenges are:

- **Dataset interoperability:** Work is continuing to improve the interoperability of available datasets on Nature Impacts. TNFD's Nature-related Data Catalyst Initiative workshop stated that, not all datasets are set up in a way where they can be integrated easily, and it can be difficult to aggregate some data sources.
- **Coverage:** Investor portfolios may span value chain segments, geographies, and ecosystems, and there may be coverage gaps for certain habitats or species.
- **Bespoke data:** Measuring Nature Impacts that may require granular location-specific data (for example, soil tests, invasive species counts). Collecting this data may require bespoke solutions, which required additional investment and effort.

Major ongoing initiatives will accelerate the uptake of existing data sources and development of additional data sources. A key initiative is the Nature-related Data Catalyst, a TNFD initiative working to identify and respond to shortcomings in existing nature-related data and analytics. The TNFD is also exploring the concept of a "Global Public Nature-related Facility" to connect and expand existing data platforms into a shared and open platform. Advances in technology used to collect data (for example, satellites, IOT devices, and sensors) and analytics (for example, AI/ML) will improve investors' abilities to gather and use Nature Impacts data.

Regulatory change

The regulatory landscape relating to biodiversity and Nature Impacts assessment is evolving rapidly. Recent examples of domestic or regional actions include:

- **France, Article 29 of the Law on Energy and Climate (2021)**, requiring French companies to publish biodiversity vigilance plans, and introducing liability for biodiversity damage.
- **EU, Corporate Sustainability Reporting Directive (2023)**, requiring companies to disclose business and risk strategy, metrics, and targets related to biodiversity and ecosystems.⁴
- **Germany, Supply Chain Due Diligence Act (2023)**, requiring companies to disclose supply chain-related biodiversity risks.
- **Australia, Nature Repair Market Bill** (expected 2024), will establish a register of nature conservation and restoration projects to incentivise private investment.
- **EU, Nature Restoration Law (2024)**, requiring member states to restore at least 30% of habitats in poor condition by 2030, 60% by 2040, and 90% by 2050.

⁴ GRESB. Note: The vigilance plans must identify biodiversity risks from company activities, assess impacts on ecosystems, describe any mitigation actions taken, outline monitoring procedures, and specify goals to improve or regenerate biodiversity.

Consolidation around common standards

- Governments, business, and capital markets are increasingly consolidating around a set of core biodiversity frameworks. Two key examples are:
- The Global Biodiversity Framework (2022) sets out targets and implementation mechanisms to reverse biodiversity loss and build resilience.
- The TNFD Framework (2023) sets out common standards to report biodiversity impacts and risks in financial disclosures.

These frameworks will increasingly translate to domestic and regional legislation and regulatory requirements and reflected in established global standards. For example, the IFRS International Sustainability Standards Board (ISSB) has identified biodiversity as a priority research area and is engaging with the TNFD. Biodiversity impact and risk disclosures may eventually be incorporated into international financial accounting standards.

Development of nature-positive investment opportunities

Emerging options for nature positive investments will enable investors to adjust investment strategies

Expected future progress

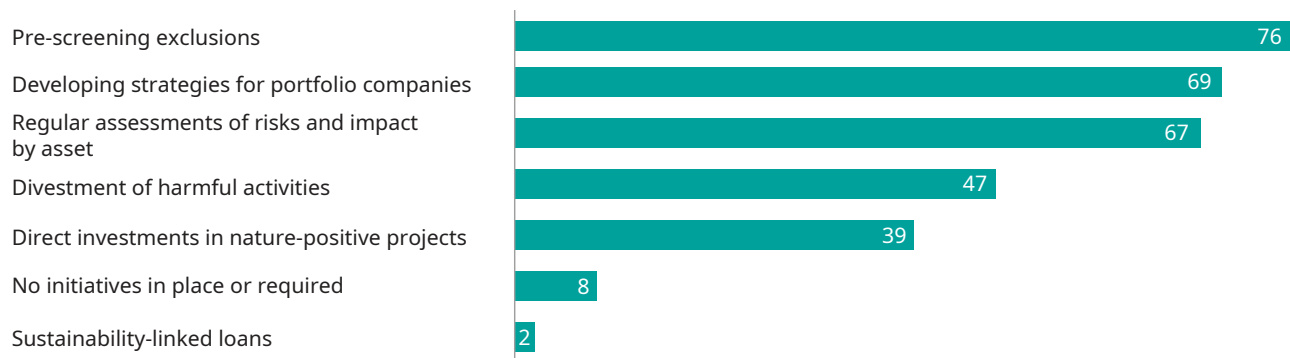
Most survey respondents have initiatives to reduce and mitigate biodiversity impact (92%). Common approaches include pre-screening (76% of respondents), engagement with portfolio companies on mitigation (69%), and regular assessments of asset biodiversity impacts (67%). Approaches differ on asset divestment (47%),

to account for Nature Impacts. These options include innovation in mitigating the Nature Impacts of infrastructure projects (for example, on- or off-site habitat restoration and conservation) and new forms of 'nature positive' investments such as biodiversity credits. A nature positive transition will be essential to tackling biodiversity loss, beyond managing exposures to biodiversity risks through infrastructure assets. UNEP estimates that investment in nature-based solutions (for example, habitat restoration) must quadruple by 2050 if the world is to tackle the crises of climate change and biodiversity loss. Noting that, the European Commission defines nature-based solutions as solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social, and economic benefits, and help build resilience. Examples of these include urban heat mitigation, flood mitigation and forestry improvements. However, according to the European Investment Bank and European Commission's Investing in nature-based solutions report, private investor participation in nature-based solutions is limited, with only 3% of these projects sourcing 50% or more of funding from private investors.

and investments in nature-based solutions (39%). Investors will likely broaden the types of initiatives they use and are likely to adopt increasingly sophisticated approaches (for example, more advanced methods of monitoring Nature Impacts and innovative mitigations strategies).

Exhibit 18: Initiatives used to mitigate impacts on biodiversity

% of respondents



Note: Survey respondents were asked to select initiatives they use to reduce negative outcomes or seek positive outcomes on biodiversity
 Source: Oliver Wyman and WWF biodiversity survey (N=51)

Pre-screening

Most investors (76%) currently use pre-screening exclusions. Examples include:

- **A leading Nordic asset manager** excludes and divests from companies with substantial and sustained exposure to coalmining, oil sand, arctic drilling, deforestation in the Amazon.
- **A Dutch asset manager** excludes companies active in palm oil production or distribution and forestry that do not meet at least 75% FSC certification.

Investors often rely on limited or qualitative pre-screening assessments. We expect that investors will adopt more advanced pre-screening over time. This may include screening based on more criteria (including a broader range of Nature Impacts) and more quantitative metrics.

Mitigation via portfolio companies

A high proportion (69%) of investors surveyed indicate that they engage with portfolio companies directly to manage biodiversity-related risks. Examples include:

1. **A global asset manager** held talks with over 30 portfolio companies with activities known to impact biodiversity or vulnerabilities to biodiversity-related risks.

2. **A European asset manager** launched a dedicated engagement program focusing on biodiversity from deforestation and habitat change linked to five high-impact commodities (cocoa, natural rubber, tropical timber, soy, and beef).

We expect that investors will continue to increase their engagement with portfolio companies to manage and mitigate biodiversity risks and reduce Nature Impacts, including adopting more sophisticated mitigation strategies and technologies.

Regular impact assessments

Many infrastructure investors have made progress introducing regular Nature Impacts assessments and disclosures. Examples include:

- **A Canadian fund** monitors a range of Nature Impact metrics from portfolio companies, including emissions, water, waster, energy consumption, and biodiversity.
- **An American fund** monitors a range of Nature Impact metrics from portfolio companies, such as land restoration (acres), and seeds sold to farmers (kilograms).

Some investors are using aggregate metrics to measure biodiversity impacts directly, such as:⁵

- Mean Species Abundance (MSA)
- Potentially Disappeared Fraction (PDF)
- Risk of Extinction Unit
- Biodiversity Impact Index
- Natural Capital Value

Investors indicate that biodiversity assessment metrics cannot easily be translated into a financial impact (unlike GHG emissions in many jurisdictions, where one ton of CO₂-equivalent emissions can be translated into a financial impact via a carbon emissions cost). Most investors (51%) indicate that there has only been basic progress on this topic from 2020.

Assessments of biodiversity risks and impacts will likely become more sophisticated over time, including translation to financial impacts or risks. Introduction of regulatory incentives, which is occurring or likely to occur in some jurisdictions, will make it simpler for investors to translate Nature Impacts or direct biodiversity measures into a financial impact (for example, similar to a regulatory or market-based carbon emissions cost).

Direct investments in nature positive projects

Private capital currently represents a small part of overall investment in nature-positive assets and projects, providing majority funding in only 3% of nature-based projects globally.⁶ Two-fifths of survey respondents (39%) directly invest in 'nature-positive' projects. Private financing for nature-positive investments is likely to increase significantly, with two key drivers:

- **Greater awareness of physical risks** associated with biodiversity, in part related to increasing disclosure requirements. Mitigating these risks will require investment in nature-based solutions to ensure ecosystem services are maintained.
- **Development of new markets** in several jurisdictions to incentivize nature-positive investment, such as biodiversity credit markets. These markets will enable investors to capture the value of positive externalities from investment in nature conservation.

5 World Economic Forum (2022), "Investing in a Biodiversity-Integrated Manner"

6 The European Investment Bank and European Commission, "Investing in nature-based solutions", accessed March 2024.

CASE STUDIES

This section highlights examples of leading practice in incorporating biodiversity impacts and risks in infrastructure investment decision-making, and areas where investors are exploring new ways of mitigating risks or reducing Nature Impacts. It provides references for investors and advisors looking to make progress.

CASE STUDY 1

Leading alternative asset manager

A leading global alternative asset manager has incorporated biodiversity considerations and metrics in decision-making across its infrastructure portfolio. Additionally, this asset manager has recently developed a platform to invest in nature-positive projects.

Incorporation of biodiversity considerations

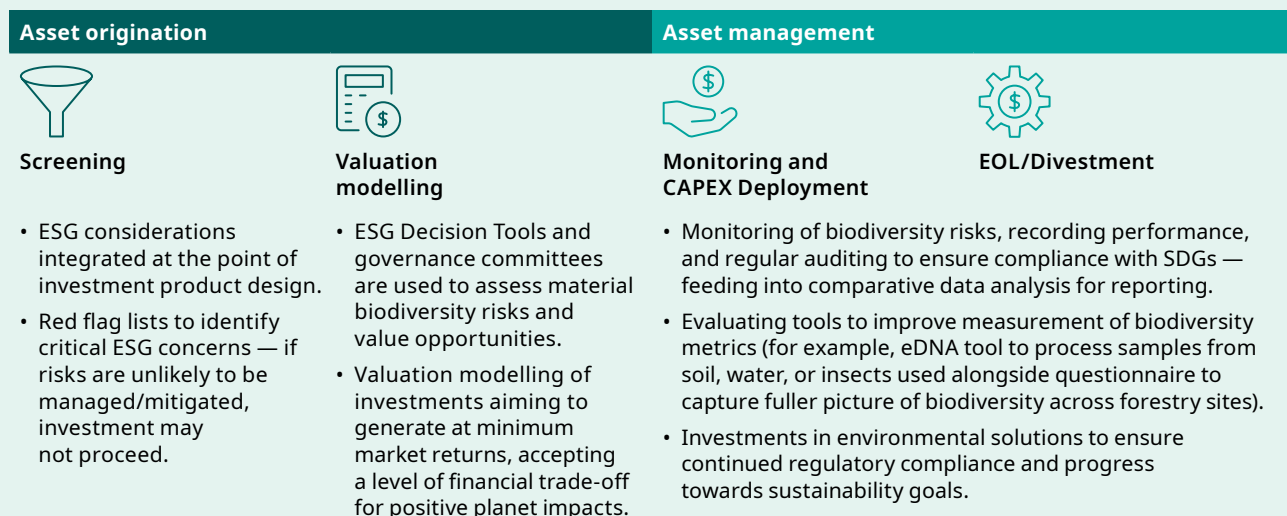
The asset manager includes a range of biodiversity considerations across the investment lifecycle (see Exhibit 19).

Examples of this firm’s approach to measuring and mitigating Nature Impacts in action include:

1. New measures to quantify biodiversity in forestry assets: The asset manager is expanding a DNA-based soil testing approach to detect species at commercial forestry sites. This method complements regular species surveys from forest managers.

2. Work to develop mitigation strategies with portfolio companies: The asset manager worked with a portfolio company to improve hazardous and clinical waste management, reduce emissions from transportation, and recycle energy through industrial heating networks (for example, improving on-site incineration techniques, resulting in area-wide transportation emission reduction). The asset manager tracks various KPIs, including tons of waste processed, emissions from the waste incineration plant, heat recovered from primary operations, transportation miles saved, and tons of waste by-product.

Exhibit 19: Specialist Infrastructure Investor — Investment lifecycle



Natural capital investment platform

In addition to integrating biodiversity factors across the investment lifecycle, this asset manager has established a platform to invest in natural capital assets. This platform will invest in rebuilding native forests and wetlands on long-term leases from landholders (for example, 30 years) and will capture value through emerging biodiversity markets.

These markets work by enabling infrastructure developers to offset habitat change by restoring habitat off-site. Examples of such markets include the United Kingdom's "Biodiversity Net Gain" credits system and a proposed market in the Australian Government's "Nature Positive Plan".

The United Kingdom's Biodiversity Net Gain law is one of the furthest progressed schemes involving a form of biodiversity credit market. It requires developers to deliver a 10% "net gain" in habitat over a pre-development baseline, mandatory for small sites from February 2024, and designated

Nationally Significant Infrastructure Projects from November 2025. This net gain is quantified using "habitat units" in the development area, based on a standard formula accounting for native habitat area. The 10% gain can be achieved through on and off-site enhancement, or by purchasing defined biodiversity credits from the Government.

Forms of investor participation in natural capital are emerging alongside biodiversity credit markets. Examples include "habitat banks," which are private or public bodies that manage land for its natural resource value, captured through selling biodiversity credits. Habitat banks in the United Kingdom, set up to participate in the Net-Gain market, generally operate by leasing plots of land (with 10–20 hectares usually the minimum per transaction). Lease terms are often in the order of 30 years. Landowner payments are in the range of £20–60 thousand.





CASE STUDY 2

Top 10 global investor

A leading fund focused on critical infrastructure engages portfolio companies to mitigate biodiversity-related physical and transition risks, tracks quantitative metrics on sustainability, and invests in sustainable opportunities.

An example of the fund applying this approach is its work with a data centre portfolio company to set targets for water usage and habitat change. Data centres typically require large volumes of water for cooling. The fund has set a net-neutral water impact target for all new assets and a target to improve surrounding habitat (see Exhibit 20).

Exhibit 20: Top 10 Global Investor biodiversity considerations through investment lifecycle





Asset origination		Asset management	
 <p>Screening</p> <ul style="list-style-type: none"> • Red flag lists to identify critical ESG concerns. For example, Environmental impact assessments to identify sensitive habitats during selection. • Red flag lists periodically updated to align with new policies, regulations, investor concerns, and ongoing consumer preferences. 	 <p>Valuation modelling</p> <ul style="list-style-type: none"> • Climate risk assessments to identify physical (water stress and future flood assessments) and transitional (carbon pricing assessments) exposure, develop mitigation, and potential remediation plans. • For example, geospatial analysis of high-water stress regions near potential data centres, understanding emissions profile and waste disposal practices. 	 <p>Monitoring and CAPEX Deployment</p> <ul style="list-style-type: none"> • Annual protected area assessments to monitor ongoing habitat risks — verifying proximity to protected areas. • Tracking spatial footprint and operational impacts of datacentres via various metrics for example, water conservation — absolute water withdrawal, consumption, and discharge in high-stress regions, geothermal cooling throughput; biodiversity metric — facilities with improved habitat (% of improved habitat/landscaping facilities). • Landscaping on- and off-site to improve habitats near facilities for example, plants/practices to attract local pollinators and migratory birds. • Enhancing biodiversity throughout operations for example, on-site customer E-waste recycling service at all US facilities, eliminating reliance on water cooling for data centres. 	 <p>EOL/Divestment</p>

CASE STUDY 3

Top 10 global investor

A global top ten infrastructure fund aims to align sustainability outcomes to the relevant UN Sustainable Development Goals and incorporates biodiversity considerations through the investment lifecycle (see Exhibit 21). An example includes its development of proprietary tools to track Nature Impacts across their portfolio companies, and work with its portfolio to develop strategies to reduce Nature Impacts.

Exhibit 21: Top 10 Global Investor investment lifecycle

Asset origination		Asset management	
			
Screening	Valuation modelling	Monitoring and CAPEX Deployment	EOL/Divestment
<ul style="list-style-type: none"> • Red flag lists screening critical ESG concerns (for example, restricting investments in businesses with exposure to coal). • Risks and opportunities are evaluated in the context of policy, capabilities, and financial returns for example, compliance assessment to EU Taxonomy’s technical screening criteria (for example, impacts on water and marine resources). 	<p>Analytical tools used to identify and track material biodiversity factors, for example:</p> <ul style="list-style-type: none"> • Proprietary ESG tracker and data portal. • ESG proxy alert systems. • 3rd party tools (for example, SDG Database, Blackrock’s Aladdin, Bloomberg, etc.) and expert advisor supplementation. 	<ul style="list-style-type: none"> • Transition plan with biodiversity conservation actions and responsibilities, including implementation timetable, and tracked by asset management team. • Monitoring asset-specific metrics to track transition progress towards proposed goals (for example, number of trees planted, tonnes of waste treated, tonnes of wood waste treated). • Additional investments supporting biodiversity conservation (for example, installing wastewater recovery systems at renewable energy plants to adapt to increasing water scarcity). 	<ul style="list-style-type: none"> • Biodiversity advantages and opportunities are integrated into the realisation process. • Investment teams may divest from holdings in companies/ issuers with severe sustainability risks.

Portfolio company strategies to reduce Nature Impacts

The fund worked with an airport portfolio company to launch a new sustainability strategy in line with its sustainability goals, including biodiversity transition plans for each airport. These transition plans included baseline analysis on a range of Nature Impact metrics, conducting risk assessments, and developing interventions.

Examples of strategies include:

- **Banning single-use products** in terminals, with biodegradable security bags introduced as an alternative, and scheme effectiveness tracked through plastic waste monitoring.
- **Strategies to reduce pollution** from plane landing and take-off, with scheme effectiveness tracked by monitoring surface water run-off into water courses and groundwater.
- **Strategies to achieve zero net biodiversity loss**, tracked through ongoing species surveys.

The fund also worked with a shipping portfolio company to develop strategies to reduce impact on and improve marine life, including:

- **Creating artificial reefs** using end-of-life concrete platforms.
- **Reducing waste** by recycling end-of-life crane cables for use in pedestrian bridges.

The fund invests in various waste-to-resource businesses, including waste management companies which divert organic waste from landfill to be recycled or used as biofuel. The fund tracks various quantitative metrics for these portfolio companies, including:

- **Climate change:** Scope 1 and 2 GHG emissions.
- **Resource use:** Tons of waste diverted by material type (glass, carpet, and mattress), 12-month recycling and recovery rates, and kWh of energy produced from biogas.

CASE STUDY 4

Tier 1 global bank

A global bank has started integrating sustainability KPIs into loan terms for some financing instruments, including financing rates that vary based on whether the borrower meets pre-defined sustainability performance targets.

The bank assesses borrowers' biodiversity risks and impacts through pre-screening, including:

- **Nature Impact assessment** to ensure the borrower's activities are in line with environmental policies and global regulations. Certain projects with direct impacts on high-value ecosystems (for example, UNESCO heritage sites, Ramsar wetland sites or IUCN critical natural habitats) or certain economic activities are excluded from financing, (for example, controversial arms industries, deforestation of rain forests, ...).
- **Risk assessment** to determine the materiality of biodiversity risk exposures. The bank scores risks using an environmental framework and sector-specific policies. Assessments include qualitative (H/M/L over a 3–5-year horizon) and quantitative measures (financing exposure). Engagements are rejected if a maximum threshold is exceeded.

The bank links financing rates to sustainability performance targets based on the borrower's sector and investment purpose. For example, rates might be linked to water use for borrowers operating in areas of water stress or in high-water-use sectors. Borrowers are required to monitor water use, and outline actions to address water challenges.

Example: Sustainability-linked loan to a dairy operator

The bank provided a large sustainability-linked loan to a dairy farming company to fund new processing, storage, and logistics infrastructure assets. The loan had variable interest rate based on a benchmark (LIBOR) plus a spread varying based on whether certain sustainable performance targets are met (with independent auditor validation), including:

- **Reduction of GHG emissions** from production and transport.
- **Decrease in GHG emissions** from farming.
- **Maintaining supply chain traceability** for high-impact raw materials (for example, soy).

CONCLUSION

This white paper reviews how infrastructure investors incorporate biodiversity considerations into investment decision-making and the outlook for further progress. It finds that increasing awareness and action on biodiversity has yet to translate to widespread assessment of biodiversity risk exposures and impacts in infrastructure. Growing regulatory and investor pressure will drive faster change, while converging standards and data sources, and new markets will be key enablers. Investors have a role to play in accelerating progress, and many started to act in advance of regulatory change. Acting early is critical for three key reasons:

Biodiversity loss is a crisis on the scale of climate change. Biodiversity loss poses a threat to humanity similar in magnitude to that of climate change and will attract increasing policy focus. Addressing the causes of biodiversity loss is critical for infrastructure investors and their advisors to appropriately manage risks and reduce societal impacts. Action will be unavoidable as part of future infrastructure investing.

Investors have the tools they need to act now.

Significant work has been undertaken to define mitigation and disclosure standards and develop data sources to track Nature Impacts (see appendix for a detailed list). Investors have sufficient clarity around the shape of future mandates to start to work on changes with confidence. Investors who act early will be better placed to manage transition risks later.

A nature-positive transition will create new opportunities.

Nature repair will be required to reverse biodiversity loss. New “nature-positive” opportunities will emerge for investors to enhance returns through cheaper green financing, improving resilience against biodiversity-related risks, and new incentives to invest in nature capital.

APPENDIX: FRAMEWORKS, TOOLS, DATA SOURCES

The following is a list of major biodiversity frameworks, assessment tools, and databases.

Biodiversity frameworks and conventions

1. Global Biodiversity Framework (GBF)
2. Sustainable Development Goals (SDG)
3. Convention on Biological Diversity (CBD)
4. Convention on Wetlands (Ramsar Convention)
5. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
6. Convention on the Conservation of Migratory Species of Wild Animals
7. International Treaty on Plant Genetic Resources for Food and Agriculture
8. World Heritage Convention (WHC)
9. International Plant Protection Convention (IPPC)
10. International Whaling Commission (IWC)
11. Taskforce on Nature-related Financial Disclosures (TNFD)
12. Sustainability Accounting Standards Board (SASB)
13. Global Reporting Initiative (GRI)
14. CDP Worldwide
15. IFC Performance Standard
16. FAST-Infra Sustainable infrastructure Label Network
17. Inter-American Development Bank SI Framework

Biodiversity assessment tools and calculation methods

1. Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE)
2. Integrated Biodiversity Assessment Tool (IBAT)
3. STAR (Risk of Extinction)
4. Potentially Disappeared Fraction (PDF)
5. Integrated Valuation of Ecosystem Services and Trade-offs (InVEST)

6. Global Methodology of Mapping Human Impacts on the Biosphere (GLOBIO)
7. MaxEnt (Biodiversity Informatics)
8. Biodiversity Net Gain Tool (UK Gov — BNG Tool)
9. Geospatial Analysis Tools (for example, QGIS, ArcGIS, UKHab)
10. Species Diversity (Richness, Evenness, Shannon Index, Simpson Index)
11. Species Abundance (Mean Species, Total Species, Relative Species)
12. Species Distribution (Range, Endemism, Rarity)
13. World Wide Fund for Nature (WWF) Biodiversity Risk Filter

Biodiversity databases

1. Catalogue of Life (integrates many biodiversity sub-databases together)
2. Global Biodiversity Information Facility (GBIF)
3. Global Species Database (GSD)
4. Biodiversity Heritage Library (BHL)
5. Threatened Species Link
6. The Plant List
7. World Biodiversity Database
8. Biodiversity Information Sharing Service (BISS)
9. Integrated Botanical Information System (IBIS)
10. World Register of Marine Species
11. Integrated Taxonomic Information System
12. Ocean Biodiversity Information System (OBIS)
13. S&P Global Sustainable1 Database
14. Many individual species-specific databases (for example, BacDive, FishBase)

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The ALIGN Project aims to expand the development and implementation of effective, high-quality infrastructure safeguards in Asia that protect people and nature from harm and ensure ecosystems continue to thrive. The project is made possible by the generous support of the American people through USAID. The ALIGN Project is implemented by WWF in partnership with the Center for Large Landscape Conservation. The contents of this report are the responsibility of Oliver Wyman and WWF and do not necessarily reflect the views of USAID or the United States Government. For more information on the ALIGN Project visit www.alignproject.org.

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