

Borealis Blueprint:

A Proposal for Unlocking Natural Capital

Verdant Strategies

MIPC

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Current Challenges Facing Finland



Finland's forestry sector accounts for **18% of exports** and over **3% of GDP** but became a net carbon emitter by 2021, releasing **2 $MtCO_2e$** more than it absorbed



Intensified logging and biodiversity loss jeopardize long-term economic and environmental sustainability



EU Nature Restoration Law and **Biodiversity Strategy 2030** impose strict restoration mandates that increase compliance costs



Non-compliance risks **capital exclusion**, threatening assets especially given BWF's **60% domestic asset concentration**



Combined environmental and regulatory pressures endanger Finland's 2035 net-zero target

Tradeoffs

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Rapid Carbon Sequestration vs Biodiversity

Logging Yields vs Future Forest Resilience

Domestic Concentration vs Global Diversification

Traditional Assets vs Market-Based Restoration

Borealis Blueprint

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Objectives

Address Finland's Forestry & Biodiversity Risk

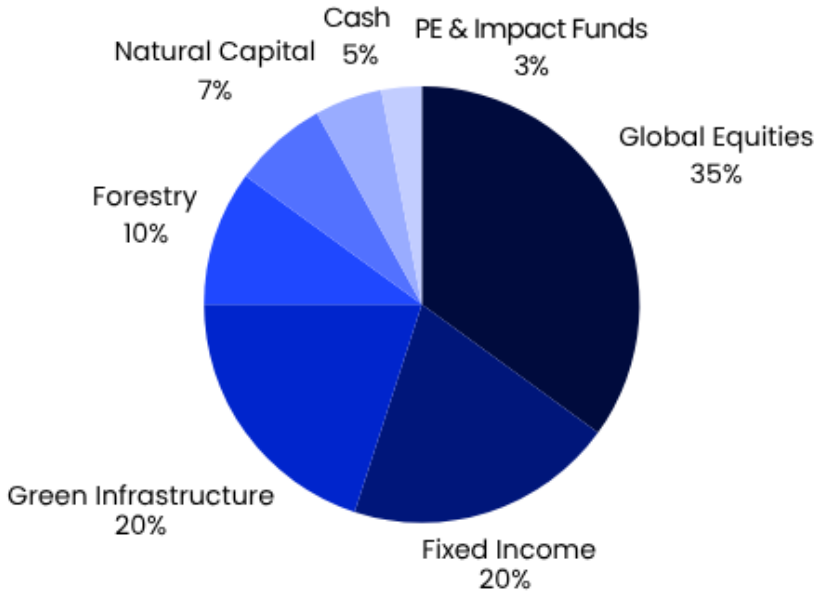
Position BWF as a Global Biodiversity and Innovation Leader

Our Method

Embed Nature as Productive Capital

Adopt 3D Lens: Risk, Return & Ecological Impact

Portfolio distribution



Geographic Mix: 27% Finland, 34% NA, 21% EU, 10% EM, 8% APAC

Target Return: 8.1% **Sharpe Ratio:** 0.86

Expected Volatility: 7.1 %

Addressing Finland's Domestic Natural Capital Challenges

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Forestry Sector Challenge

Finland faces biodiversity loss and forest ecosystem degradation risks.

↓

Economic risks arise from **stranded forestry assets**.

Our Resolutions

16% yield cut needed in order to achieve:

- Native restoration > monocultures
- Longer growth cycles
- Restoring the carbon sink

Mechanism:

Invest in Green Infrastructure

Green infrastructure investments in projects that help us meet the net-zero targets

Screen Forestry Assets

Remove legacy forestry assets that do not have sustainable timber value & biodiversity gains at the forefront

Establish Natural Asset Company

Turn long-term domestic ecological risks into investable, productive assets by shifting from extractive to regenerative forestry through a new high impact investable asset class: establishment of the world's first sovereign-backed **Natural Asset Company (NAC)** platform

What is a NAC?

A **Natural Asset Company (NAC)** is a corporate entity that manages and restores ecosystems, forests and wetlands, while generating revenue from carbon and biodiversity credits and sustainable timber, without changing land ownership.

Finland Forestry: Borealis NAC Spotlight

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THE CONCEPT | OWNERSHIP | INVESTMENT | REVENUES

Built on Finland's existing METSO and Helmi programs.

NAC creates market-based value from ecosystem health, rewarding landowners and investors.

Aligned with EU biodiversity and Net-Zero goals.

Structured as a corporation that:

1. Holds the rights (not ownership) to the value of natural assets
2. Managing it for restoration, conservation, and sustainable use

BWF's initial **€500 million** investment would fund:

1. Restoration and biodiversity enhancement
2. Sustainable timber production
3. Monetization of ecosystem services: carbon and biodiversity credits

The NAC earns income from:

1. Carbon credits
2. Biodiversity credits
3. Sustainable timber

Reinvests profits into further restoration and dividends back to the sovereign fund.

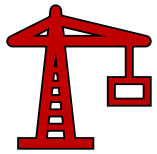
Rapid Carbon Sequestration vs Biodiversity

Logging Yields vs Future Forest Resilience

Traditional Assets vs Market-Based Restoration

Positioning BWF as a Global Biodiversity and Innovation Leader

BWF's Success Depends on Addressing Market Frictions Limiting Nature-Finance Maturity:



Biodiversity market fragmentation and immaturity

→ need for standardized metrics, scalable structures and market liquidity



Measurement uncertainty and inconsistency

→ require credible frameworks to quantify and verify biodiversity performance across assets and portfolios

By translating the WEF's *Finance Solutions for Nature* framework into an actionable investment architecture, BWF lays the foundation for early sovereign leadership in global biodiversity finance



Develop Market Prototypes (WEF-Aligned Instruments)

Benefit: Positions Finland as testbed for scalable biodiversity finance & BWF for a first-mover premium as markets mature



Mainstream Biodiversity Across the Portfolio

Benefit: Credible reporting builds reputational resilience & biodiversity screening frameworks keep BWF ahead of emerging global regulations



Extend Finnish Leadership & Shape Standards

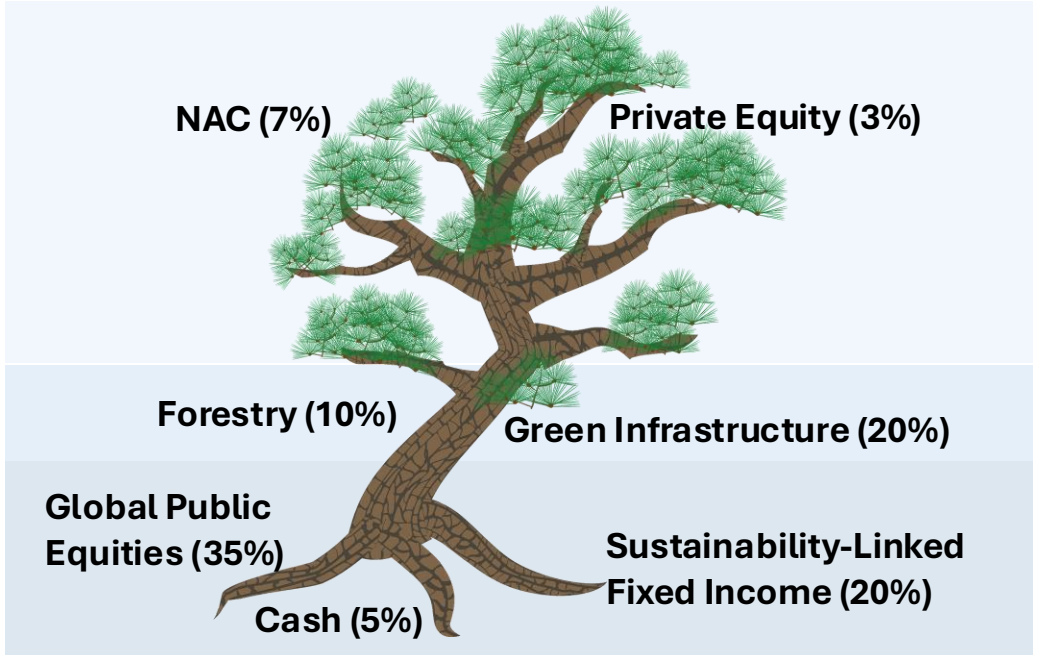
Benefit: Co-investment and open-data partnerships builds global credibility and early influence in global nature markets

Portfolio Construction for Resilient Prosperity & Capital Protection

The Borealis Blueprint achieves lasting, nature-based prosperity through the maturity and strength of its dual objectives:



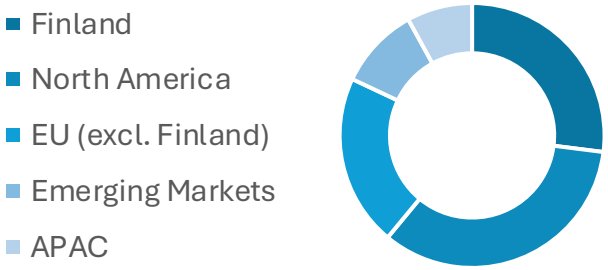
Balanced and rooted portfolio architecture:



Balanced Geographic Footprint:

Objective 1: Deliver targeted domestic biodiversity, forestry and Net-Zero outcomes without overconcentrating portfolio risk in local assets or regulation

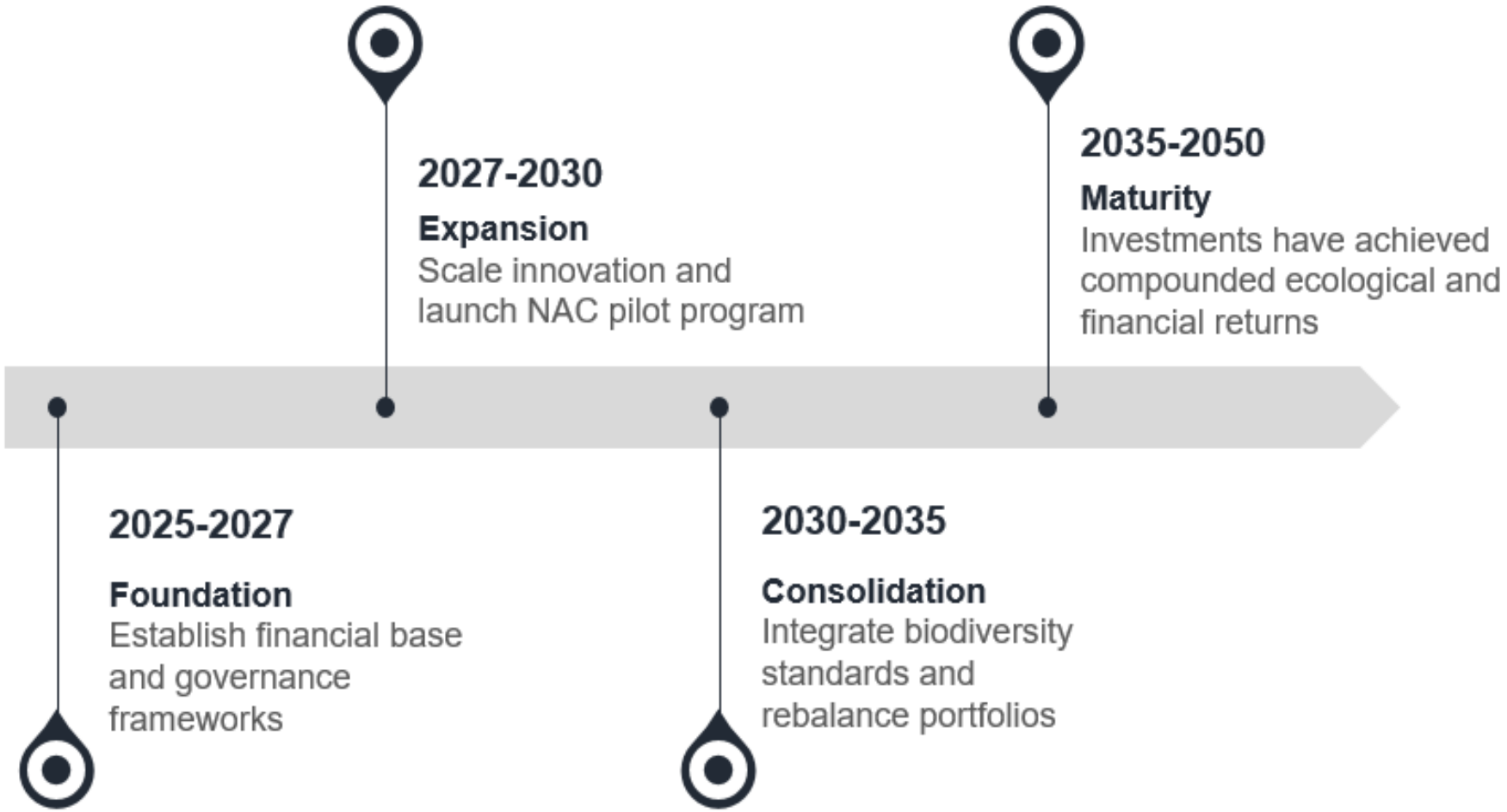
Objective 2: Achieve global diversification that enables active learning, ecosystem and market insight and engagement with emerging biodiversity finance practices



Domestic Concentration vs Global Diversification

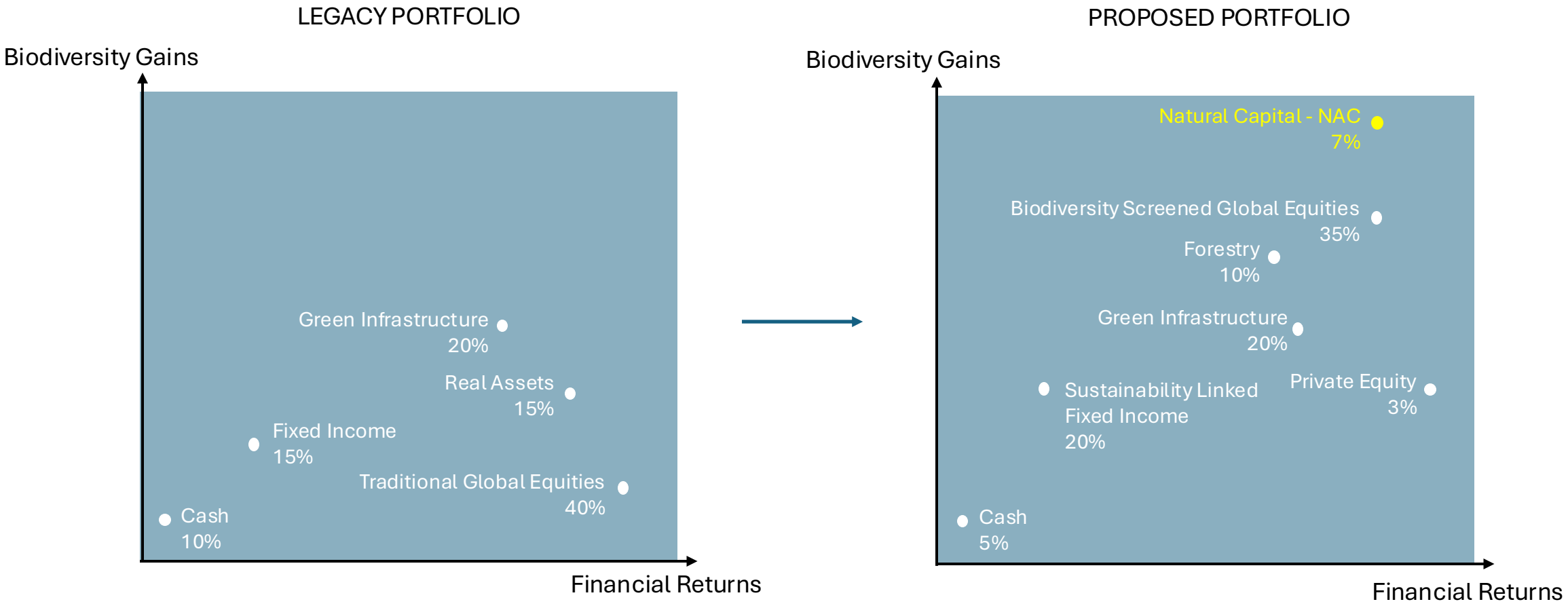
Finland (27%)	EU (21%)	NA (34%)	APAC (8%)	EM (10%)
Domestic impact anchor	Regulatory alignment	Developed market exposure	Innovation & biome diversification	High biodiversity ROI

Implementation



SUMMARY

Visual Concept of Portfolio Impact



Definitions

NAC

Forest Research Summaries & Quantitative Methods

Key Assumptions

Legacy Portfolio

Portfolio Architecture

Risk Framework

Implementation

WEF 2025 Financial Solutions for Nature

Metrics & KPIs

Bibliography

Term	Definition
Natural Asset Company (NAC)	Corporate structure that manages and monetizes natural ecosystems through ecosystem services revenues.
Biodiversity Credits	Tradable units representing verified improvements in ecosystem health or biodiversity outcomes.
Biodiversity Footprint for Financial Institutions (BFFI)	Framework for investors to assess and report biodiversity impact across portfolios.
Green Bonds	Debt instruments financing projects with environmental benefits such as renewable energy or conservation.
Sustainability-Linked Bonds (SLBs)	Bonds whose interest rates depend on the issuer achieving sustainability goals.
Sharpe Ratio	Risk-adjusted return measure: excess return per unit of volatility.
Expected Volatility	Projected fluctuation in investment returns over time.
Target Return	The desired annual rate of return for a portfolio or investment.
Carbon Sink / Source	A sink absorbs CO_2; a source emits it. Finland's forests shifted from sink to source in 2021.
Stranded Asset Risk	Risk of asset devaluation due to environmental regulation or ecological decline.

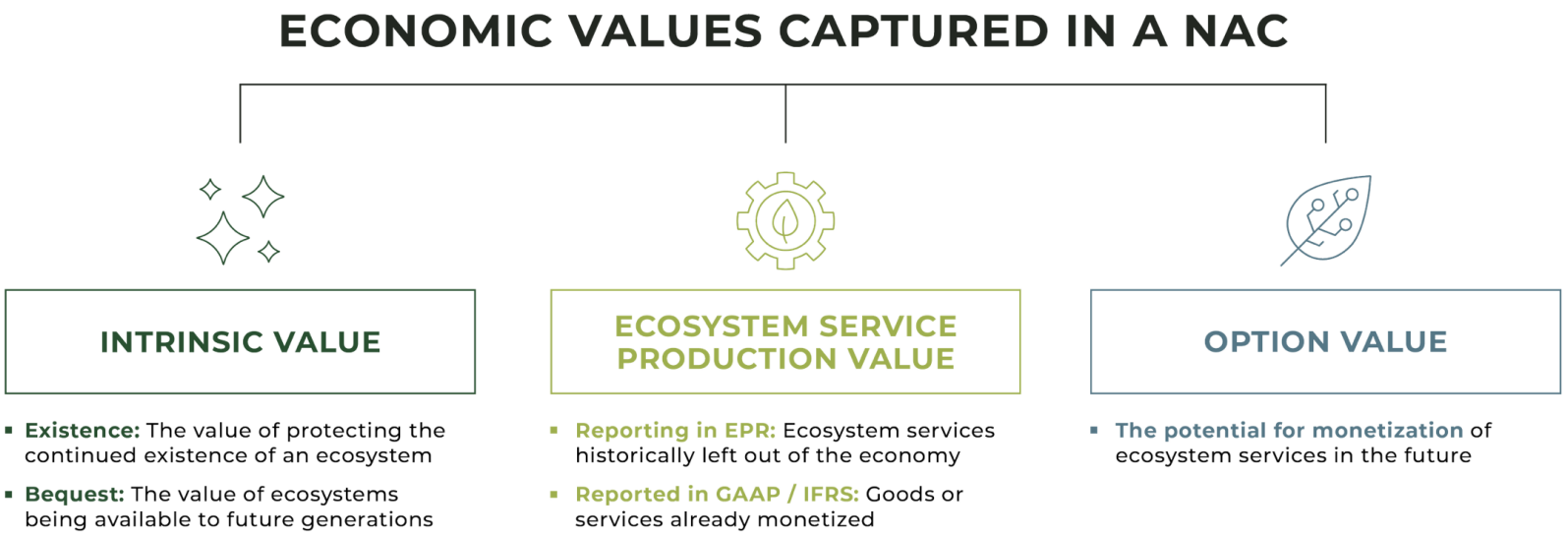
Term	Definition
Biodiversity Intactness Index (BII)	Percentage of original species diversity remaining after human impacts.
Kunming-Montreal Global Biodiversity Framework (GBF)	UN global agreement adopted at COP15 to halt and reverse biodiversity loss by 2030, anchored by goals like protecting 30% of land and oceans (“30x30”) and aligning finance with nature-positive outcomes
Shannon Index (H’)	Measure combining species richness and evenness to assess biodiversity.
Internal Carbon Price	Assigned value per tonne of CO_2 used for investment risk analysis.
Taskforce on Nature-related Financial Disclosures (TNFD)	Framework guiding nature-related financial risk reporting.
Dual Mandate Matrix	Framework balancing financial returns and ecological integrity in decisions.
Borealis Blueprint	Guiding strategy for biodiversity-integrated investing and NAC creation.
Green Infrastructure	Assets like renewables and low-carbon transport that deliver environmental benefits.
Natural Capital	The stock of natural assets providing ecosystem goods and services with economic value.
Biodiversity-Linked Financing	Loans or bonds tied to measurable biodiversity outcomes.
EU Nature Restoration Law	EU policy requiring measurable ecosystem restoration across member states.

METSO, Helmi & *Prioritised Action Framework for Biodiversity LIFE*

What is an NAC?
Recognized in the World Economic Forum's (WEF) 2025 Finance Solutions for Nature report as one of the most scalable mechanisms for nature investment, NACs convert ecosystem restoration and biodiversity recovery into a structured, reportable asset base (World Economic Forum, 2025). Precisely, they are a new type of corporate structure designed to hold the rights to manage, maintain and restore natural assets (like forests, wetlands, coral reefs, etc.) and to generate revenues from the ecosystem services those assets provide (such as carbon sequestration, clean water, biodiversity, etc.) (DePillis, 2024).

Mandate Definition:
- NAC is explicitly tasked to "quantify, preserve, and enhance ecosystem productivity as a form of national wealth."
- Its charter includes biodiversity recovery, carbon sequestration, and nature-linked economic innovation.

How does it work?



Legal Safeguards:
- Explicitly clarifies that NAC activities cannot privatize or trade land — only the ecosystem services derived from them.
- Land contracts must include reversibility clauses and state ownership protections.

METSO, Helmi & *Prioritised Action Framework for Biodiversity LIFE*

The NAC would complement the following existing national biodiversity programs which have demonstrated effective conservation outcomes but face financial constraints and scale.

METSO Programme (2008-2025)

Goal: Halt the ongoing decline in the biodiversity of Finnish forest habitats and species

Mechanism: Forest owners can voluntarily offer their forests either for temporary conservation or for permanent protection

NAC Fit: Provides proof of concept for a rights-transfer framework and pipleline of eligible forest sites

Helmi Habitats Programme (2021-2030)

Goal: Safeguard and restore threatened habitats (wetlands,woodlands, peatlands, grasslands)

Mechanism: State-led restoration through municipal and community partnerships

NAC Fit: Demonstrates institutional coordination and provides a baseline asset pipeline, governance and communication structure for NAC to scale

Priodiversity LIFE (2024-2031)

Goal: Coordinate research and action plans to create large areas of high biodiversity value

Mechanism: 60+ measures to restore and link fragmented habitats, engage communities, develop shared data infrastructure and pilot monitoring frameworks

NAC Fit: Builds the data, monitoring and stakeholder systems needed for natural capital valuation

Together, these programs form the operational backbone of Borealis NAC

NAC: Operations and Partners

Why a Separate NAC (vs. Within the Sovereign Wealth Fund):

- The **Borealis Wealth Fund (BWF)** is a financial investor, it manages macro-level capital allocation, not on-the-ground ecosystem restoration.
- The **Borealis NAC** acts as the **operational arm:** a purpose-built vehicle with legal authority to hold and monetize *ecosystem management rights*, something the BWF legally cannot do under its current financial charter.

Separating the NAC provides:

- **Operational flexibility** (can sign land-use and restoration contracts, hire ecologists, and issue credits).
- **Transparency and accountability** — ecological performance and financial returns are reported separately.
- **Scalability** — it can attract private co-investment and register independently on global credit registries (Verra, Plan Vivo, EU Nature Restoration)

Who We Are Targeting:

Primary partners: small and family forest owners who manage over 60% of Finland's forests but lack capital or access to restoration credit markets.
NAC provides them with:

- **Voluntary restoration contracts** and **performance-based payments** (Helmi-style).
- **Technical and financial support** for sustainable forest management.

Secondary partnerships: large industrial forestry companies: to scale data, verification, and restoration methods.

NAC: Governance & Oversight

Board Composition:

- Representatives from **BWF**, **Ministry of Finance**, and **Ministry of Environment**
- Independent scientific and financial experts (LUKE, SYKE, forestry economists)

Golden Share:

- Retained by the Finnish state, providing veto rights over actions inconsistent with national biodiversity or carbon objectives

Accountability Mechanisms:

- Annual **independent audit** of financial and ecological results
- Reporting aligned with **EU Taxonomy**, **TNFD**, and **ISSB standards**

Performance-linked management incentives based on:

- Hectares restored
- tCO_2e sequestered
- Verified biodiversity uplift

NAC: Stakeholder Integration

Communication & Stakeholder Cooperation (Helmi Programme Model)

- Guided by Finland's Helmi Habitats Programme emphasizing voluntary collaboration and local engagement.

  Stakeholder Integration:
  - Landowners, forestry associations, NGOs
  - Public–private co-financing of restoration projects.
  - Incentives for private forest owners through biodiversity-linked payments.
  - Transparent communication of success metrics and financial reinvestment.

- Mirrors Helmi's approach: **participatory governance**, **voluntary enrollment**, **co-benefits** for both economy and ecosystems.

NAC: Value Creation & Financial Outlook

Revenue Streams:

- **Carbon and biodiversity credits** verified under EU and global frameworks (Verra).
- **Sustainable timber** certified under FSC/PEFC with biodiversity-linked premiums.

Financial Model:

Initial BWF equity injection of **€500M** funding three activity streams:

- Restoration of biodiversity
- Sustainable timber production
- Ecosystem service monetization

Expected nominal return: 7–9% annually, consistent with sustainable forestry benchmarks.

- Early years show reduced logging yield; long-term appreciation from ecosystem service markets offsets this.

Reinvestment Policy:

- Revenue shared with landowners, reinvested in conservation, or distributed as dividends to the BWF — ensuring a **closed-loop of restoration and return**

NAC: Sector and Market Access

Legal or Financial Solution?

It's **both**:

- **Legally**, the NAC creates a compliant framework under Finnish and EU law to manage and monetize natural capital without transferring land ownership.
- **Financially**, it converts ecological recovery into **new revenue streams,** carbon, biodiversity, and sustainable timber credits, supporting the sovereign fund's long-term returns.

Market Access & Capital Deployment

The NAC provides **direct market access** — it can register and trade verified credits internationally under **Verra**, **Gold Standard**, or **EU Nature Restoration markets**.

This enables Finland to participate in the fast-growing **nature markets** without intermediaries, increasing transparency and national benefit capture.

NAC: Implementation

Phase 1 (Years 1–3):
- Legal structuring, ecosystem mapping (LUKE), and pilot restoration projects.
- Establish baseline biodiversity and carbon inventories.

Phase 2 (Years 3–5):
- Monetize first carbon and biodiversity credits.
- Launch biodiversity-linked loans and partnerships with private landowners.
- Publish first full **Ecological Performance Report**.

Phase 3 (Years 5–10):
- Scale portfolio to 500,000 ha under management.
- Integrate with **EU Nature Restoration Law** compliance frameworks.

- **A1. Supporting Literature**

Forest certification and economic insights: a European perspective

(Frontiers in Forests and Global Change, 2024; DOI: 10.3389/ffgc.2024.1464837)

This meta-study reviews how third-party forest-certification systems (FSC, PEFC) influence economic outcomes across Europe. It finds that certified forest owners typically capture price premiums of 2–5 % and benefit from more stable export demand, though certification costs can offset gains for smallholders. These findings support the Borealis Wealth Fund's assumption that Finland's certified timber could command a 25–30 % premium by 2030 as EU procurement increasingly requires certified material.

Secondary wood manufacturers' willingness-to-pay for certified wood products in Italy

(Forest Policy and Economics 86, 2017, p. 45-52; ScienceDirect)

Using a discrete-choice model of 224 Italian manufacturers, this study estimates an average willingness-to-pay of 4.6 % for certified wood inputs and up to 9 % for firms exporting to northern Europe. It confirms that certification adds measurable market value and justifies incorporating certification-driven premiums in the Fund's revenue assumptions.

- **A2. Quantitative Method for Carbon-Sink Restoration**

Objective: Restore Finland's net LULUCF (Land Use, Land-Use Change and Forestry) sequestration to the 2015 level, closing an estimated 17.82 Mt CO2 per year gap between current and target performance. The model uses an established rule-of-thumb from Suomen luonnonsuojeluliitto (SLL) and the Finnish Environment Institute (SYKE): each 1 million m^3 (Mm^3) change in annual harvest volume corresponds to a 1.5 Mt CO2 per year change in the net sink.

Key Calculation:

Required harvest reduction = 17.82 ÷ 1.5 = 11.88 Mm^3 per year. This reduction is phased in linearly from 2026 to 2030, increasing by 2.376 Mm^3 each year. By 2030, harvest volumes are 16.3% below 2023 levels, equivalent to 11.88 Mm^3 or about 3.7 million hectares of stands withheld from harvest

Dataset/Publication	Main Variable Used	Institution/year
SYKE / SLL Policy Brief	1 Mm^3 ↔ 1.5 Mt CO2 yr^{-1}	SLL / SYKE (2025)
LUKE (2024)	Roundwood removals 72.7 Mm^3 (2023 provisional)	Natural Resources Institute Finland
LUKE / ICOS (2024)	Forest emissions +1.12 Mt CO2; LULUCF +11.8 Mt CO	ICOS Carbon Portal
UNFCCC CRTs (2024)	2015 vs 2023 LULUCF sink values	Government of Finland
Lehtonen et al. (2023)	CCF on peatlands adds ≈ 1 Mt CO_2 yr^{-1} sink	Natural Resources Institute Finland
FAO Open Knowledge (2023)	Forest area 22.8 Mha	FAO / NFI Finland

A4. Methodological Caveats

The 1.5 Mt CO2 per Mm^3 factor is an average derived from national-level analyses. The true sequestration effect depends on which stands are spared from harvest. Peatland forests store a disproportionately large share of Finland's carbon; over 70% of total forest soil carbon. Thus, reductions in harvest volume alone cannot realistically restore the 2015 sink level unless combined with large-scale peatland rewetting and shifts to continuous-cover forestry. In practice, a mixed strategy, moderate harvest reductions coupled with targeted peatland restoration, achieves greater carbon and biodiversity gains with smaller economic costs.

Appendix A5. Policy Interpretation

A linear reduction of approximately 16% in fellings by 2030 could restore the 2015 carbon sink level if achieved solely through reduced harvests. However, this model assumes uniform forest response across all ecosystems, which is not accurate at scale. In reality, restored forests will differ structurally and ecologically from 2015 forests due to soil degradation, drainage history, and climatic changes. Therefore, full sink recovery requires simultaneous peatland rewetting (responsible for roughly 70% of Finland's forest carbon sequestration) alongside harvest moderation. This combined pathway ensures both ecological integrity and economic feasibility.

A1. Market & Valuation

There will be active markets for carbon and biodiversity credits, enabling the monetization of ecosystem outcomes.
Carbon prices remain stable or rise above the internal benchmark (≈ US$65/$tCO_2$).
Investors continue to seek nature-positive assets and accept natural-capital valuation methods.
Green bonds and blended-finance instruments remain available to fund restoration projects.

A2. Policy & Regulation

EU and national biodiversity laws (Nature Restoration Law, 30×30 targets) remain consistent and enforceable.
NACs are legally recognized and supported as investable conservation structures.
Taskforce on Nature-related Financial Disclosures (TNFD) and International Financial Reporting Standards (IFRS) converge, allowing uniform environmental reporting.
Governments maintain incentives for private conservation investment.

A3. Ecological & Operational

Targeted forest and land areas can achieve measurable restoration within 10–20 years.
Baseline data and remote sensing are reliable enough for credible measurement, reporting and verification.
Climate or pest shocks remain within manageable risk limits.
The NAC has sufficient governance rights over land management to enforce restoration protocols, harvest limits, and conservation zoning.

A4. Financial & Portfolio Integration

Diversification across assets and regions mitigates local ecological and policy risks.
Improvements in carbon and biodiversity metrics correlate with higher asset value and lower financing costs.
The internal carbon price and biodiversity risk scores accurately reflect long-term balance-sheet risks, allowing proactive allocation and de-risking.
Comparable benchmarks (Temasek, AXA) guide performance evaluation

A5. Governance & Stakeholders

Local alignment exist. Landowners, communities, and indigenous groups support conservation and restoration activities, minimizing social risk.
Stakeholders share ecological and operational data openly to facilitate verification and credit issuance.
Political cycles and management turnover will not disrupt ongoing monitoring or the permanence of nature-based assets.

A6. Transition Path

The portfolio transitions gradually from extractive forestry toward natural-capital management.
Tangible biodiversity and carbon gains materialize within 5–10 years, aligning with investor reporting cycles.
Secondary markets will exist for mature NAC or biodiversity-linked assets, ensuring liquidity at exit.

Case Context: Legacy Portfolio

- **Fund Launch**: September 2021 as a broad green finance program.
- **Performance**: Delivered an average return of 6.5% per annum since founding.
- **Portfolio Construction:**

Asset Class	Allocation	Notes
Equities: Public Stocks Filtered for ESG	€4M	Global equities screened for environmental criteria (but not biodiversity-specific).
Fixed Income: Green Bonds	€1.5M	Bonds labeled green; includes forestry-backed and climate mitigation debt.
Real Assets: Green Infrastructure	€2M	Includes renewables (wind, solar), grid modernization, low-carbon transit.
Real Assets: Forestry and Land Holdings	€1.5M	Direct investments in Finnish and international timberland; limited biodiversity screening.
Cash	€1M	Held for liquidity management.

  - **Geographic Exposure:** 55% Finland, 30% European Union, 10% North America, 5% global emerging markets.

Global Public Equities (35%) | Base Return: 10.6% | Bull-Bear Case Return: (4% - 14%)

Following Norway's GPF-G approach, we focus on global equities excluding Finland to reduce exposure to Finnish macro shocks and mitigate systematic forestry risk. Our geographic allocation mirrors NBIM's disciplined framework, with 60% in North America, 20% in EU ex-Finland, 20% in APAC, and 10% in emerging markets (NBIM, 2025). We will first transition existing holdings to align with this geographic split and then rescreen allocations using the BFFI framework, adjusting from the 40% legacy allocation to our proposed target of 35% global equities. Looking ahead, we plan to adopt TNFD recommendations and draw inspiration from the ASN Biodiversity Fund to enhance evaluation criteria and apply the BFFI framework more rigorously (TNFD, 2025). By 2035, as biodiversity regulation and disclosure improve, we expect to implement more thematic screens with confidence, ensuring alignment with GFB targets (MSCI, 2023).

Sustainability Linked Fixed Income (20%) | Base Return: 3.3% | Bear-Bull Case Return: (2% - 4.5%)

BWF recognizes the key role that debt markets can play not only for providing stable income and a liquid asset, but also as a nature-positive outcome based tool. Raising the fixed income sleeve from 15% to 20% marks a deliberate rebalancing—designed to offset the higher innovation risk and longer return horizons of the Fund's alternative investment initiatives. The allocation follows the Norges Bank Investment Management framework for geographic diversification, 30% Europe (ex-Finland), 50% North America and 20% Emerging Markets (EM), balancing regional depth with yield opportunities (NBIM, 2025). Within this structure, BWF tilts decisively towards two priority solutions highlighted in WEF's Finance solutions for nature report: Sustainability-Linked Bonds (SLBs) and Green Bonds (World Economic Forum, 2025). This market continues to deepen: as of December 2024, green bonds accounted for 57% of total labeled issuance, and forecasts suggest sustained growth in 2025 despite global macroeconomic headwinds (TheWorldBank, 2025). Europe remains the innovation hub, driven by the EU Green Bond Standard, while North America offers scale and liquidity. In emerging markets, select high-yield exposure provides incremental income while fostering transition financing in developing economies. BWF will experiment selectively in the emerging biodiversity-linked bond space, monitoring market development and expanding exposure as demand grows (AXA Investment Managers, 2025).

Real Assets: Green Infrastructure (20%) | Base Return: 9.4% | Bear-Bull Case Return: (6% - 12%)

Beyond holding infrastructure assets for their offer of long-term, stable and inflation-linked cashflows, significant allocation to investments in Green Infrastructure will be imperative for BWF to meet Finland's binding 2035 net-zero emissions target (World Economic Forum, 2025). The existing portfolio prioritizes renewables (wind, solar), grid modernization & low-carbon transit–all assets that we intend to keep as long as they contribute to reducing carbon intensive activities, particularly with project durations in line with the 2035 commitment. We specify 70% domestic allocation for this sleeve, putting Finland's goals at the forefront, while the remaining 30% is in the EU as it presents an attractive location (IFSWF Review, 2024).

Real Assets: Forestry (10%) | Base Return: 9% | Bear-Bull Case Return: (5% - 11%)

BWF will reduce its forestry allocation from 15% to 10%, applying a rigorous BFFI screen to remove legacy assets that fall short of strengthened biodiversity criteria. Capital released will be redeployed into the higher-biodiversity impact investments described below. The refined forestry sleeve: 65% Finland, 20% North America and 15% Emerging Markets (e.g. Brazil, Indonesia, Gabon), concentrates exposure in assets that combine sustainable timber value with measurable biodiversity gains, benefiting from knowledge-sharing that surfaces global best practices and enables clearer, reportable stewardship outcomes to reduce regulatory and reputational risk (New Forests, 2022).

Natural Capital (7%) | Base Return: 8.5% | Bear-Bull Case Return: (2% - 12%)

BWF will pioneer a new asset class for Finland: Natural Asset Companies (NACs), transforming ecological health into measurable and investable value (Intrinsic Exchange Group). This sleeve demonstrates limited correlation with equity and fixed income markets and represents the Fund's most forward-looking commitment: to make natural capital a core component of national wealth (OpsMatters, 2025) (Appendix 8.3: A5). Co-designed with Finland's Ministry of Finance, METSO and Helmi programs and Intrinsic Exchange Group, BWF will prioritize establishing the Borealis NAC, a €500 million domestic pilot designed to aggregate sustainable forest management under one vehicle (Intrinsic Exchange Group, 2025). By aligning with Finland's 2035 Net-Zero and COP15 biodiversity goals, the NAC aims to reverse ecosystem degradation while safeguarding the long-term productivity of the forestry economy. A further €200 million will be allocated to global NACs, demonstrating early support for the emerging market and enabling knowledge exchange as international standards develop.

Private Equity (3%) | Base Return: 11% | Bear-Bull Case Return: (5% - 18%)

As a nascent sector, biodiversity investing is still very much in its infancy, with only 24 pure-play biodiversity funds worldwide as of late 2024 (MSCI, 2024). Our 3% private equity sleeve therefore targets early-stage nature-based solutions and tools. Roughly half of this allocation will go into direct private ventures and half into leading biodiversity impact funds (such as Dutch Robeco Biodiversity Equities Fund and Brazilian TFFF). This dual approach lets BWF back cutting-edge technologies (e.g. ecosystem monitoring sensors, natural-solutions infrastructure) while building internal expertise from experienced impact managers, positioning BWF to adopt best-in-class screening, measurement and assessment tools as they emerge.

Verdant Strategies

Asset	Weighting	Expected Return	Standard Deviation	Sharpe Ratios		Sources
Equity	**35.0%**	10.6%	13.8%	0.76		NBIM
FI	**20.0%**	3.3%	5.8%	0.57		NBIM
Green Infra	**20.0%**	9.4%	7.3%	1.30		NBIM
Forestry	**10.0%**	9%	3.20%	2.81		New Forests, Fiera Capital, AcreTrader
NAC	**7.0%**	8.5%	8.00%	1.06		New Forests, Fiera Capital, AcreTrader
PE	**3.0%**	11%	18.00%	0.61		Temasek, Robeco, MSCI
Cash	**5.0%**	0.5%				Robeco
	100.0%					
	2%	Risk-free rate				FRED
	8.1%	Expected Return				
	7.1%	Expected standard deviation				SSGA Estimate
	0.86	Sharpe Ratio				

Resources & Risk Framework

Resources and Methods for Estimating Expected Return and Risk

The portfolio's core asset classes—listed equities, fixed income, and green infrastructure—were allocated and evaluated using a framework inspired by Norges Bank Investment Management (NBIM). NBIM's historical returns by asset class were used as reference benchmarks for estimating the expected return and standard deviation of each corresponding asset class within our portfolio.

For forestry and natural capital (NAC) exposures, return and risk estimates were derived from published research and market reports by AcreTrader, NewForest and Fiera Capital. These sources provided indicative return ranges and volatility estimates specific to timberland and natural capital investments.

The private equity (PE) allocation was constructed using a blended approach: expected returns were derived as a weighted average of 50% historical private equity index returns (MSCI Private Equity Return Tracker) and 50% returns from biodiversity and nature-based private market funds, reflecting the thematic orientation of the portfolio.

Note on Academic Rigor: The analytical framework employed in this project was primarily qualitative, with quantitative estimates drawn from secondary data and industry benchmarks.

Data Sources & Benchmarks

- NBIM: https://www.nbim.no/en/the-fund/investments/
- Fiera Capital: https://www.fiera.com/en/insights/natural-capital-white-paper
- AcreTrader: https://www.acretrader.com/
- Temasek: https://www.temasekreview.com.sg/downloads/Temasek-Review-2025-full-version.pdf
- Robeco: https://www.robeco.com/en/insights/expected-returns
- MSCI: https://www.msci.com/our-solutions/indexes/private-equity
- FRED: https://fred.stlouisfed.org/series/IRLTLT01FIM156N
- SSGA: https://www.ssga.com/library-content/assets/pdf/global/mas/2024/investment-trends-among-sovereign-wealth-funds.pdf
- New Forests: https://newforests.com/wp-content/uploads/2022/07/Return-Characteristics-of-the-Forestry-Asset-Class-1.pdf

Risk Framework

1. Concentration Risk - Domestic vs Global

To mitigate exposure to Finland's forestry sector, BWF caps forestry exposure at 15% and diversifies into global biodiversity markets through allocations in sustainability-linked bonds, green infrastructure, and Natural Asset Companies (NACs). This ensures Finland remains the fund's ecological centerpiece while avoiding correlated domestic shocks.

Outcome: A balanced geographically diversified portfolio (27% Finland, 34% North America, 21% EU ex-Finland, and 18% APAC & EM) hedges home-market volatility while maintaining domestic influence, whilst providing macro and ecological diversification benefits.

2. Regulatory & Policy Risk - Short Term Cashflow vs Policy Compliance

The EU Nature Restoration Law, Biodiversity Strategy 2030, and Sustainable Finance Taxonomy reshape sustainable finance. Non-compliant forestry projects risk being labeled unsustainable, jeopardizing access to capital markets. Anticipating changing requirements, BWF addresses this through:

- Scenario planning for regulatory tightening (carbon caps, biodiversity quotas).
- TNFD-aligned reporting and taxonomy screening to ensure compliance flexibility and preparedness for future biodiversity-related disclosures.
- Strategic diversification into biodiversity-linked bonds and Natural Asset Companies (NACs) that meet EU disclosure and impact requirements.

Outcome: Short-term compliance costs are accepted to preserve long-term market eligibility and green-finance credibility.

Risk Framework

3. Greenwashing & Measurement Risk - Ecological vs Reputational

BWF integrates the Biodiversity Footprint for Financial Institutions (BFFI) and Iceberg Data Lab metrics to quantify biodiversity outcomes and avoid reputational risk. Investments are verified under ICMA Green and Sustainability-Linked Bond Principles, ensuring transparency, traceability, and measurable ecological performance, preventing inflated ESG claims.

Outcome: Credible reporting ensures reputational resilience and strengthens BWF's position as a credible nature-positive investor.

4. Financial Risk - Ecological Projects vs Market Liquidity

BWF's dual-mandate structure balances liquid market assets (55%) with long-duration ecological projects (45%). The staged timeline: Foundation (2025–27), Expansion (2027–30), Consolidation (2030–35), and Stewardship (2035–50) ensures liquidity while funding
innovation. Diversified fixed income and biodiversity-linked instruments provide steady income streams and maintain a 6.5% expected return target over the long term.

Outcome: Liquidity cushions fund innovation; long-duration projects compound ecological and financial dividends.

Risk Framework

5. Ecological & Operational Risk

Recognizing the physical risks of climate change and biodiversity collapse, BWF enforces strict ecological criteria: no monocultures, preference for native species restoration, and adaptive management across forestry and NAC projects. Drawing on global precedents such as the New Zealand Super Fund, BWF invests in precision forestry and biodiversity-monitoring technologies to mitigate pest, soil degradation, and carbon sink reversal risks.

Outcome: Even with slower carbon uptake, this approach ensures ecosystem resilience and long-term soil health. Short-term carbon gainsare moderated to secure enduring biodiversity value and forest productivity. This ensures compliance with EU habitat directives secures ecosystem resilience and preserves carbon-sink credibility under the 2035 Net-Zero framework.

Decision Framework & Trade-Off Resolution

Each trade-off—carbon sequestration vs. biodiversity, short-term yield vs. forest resilience, domestic concentration vs. global diversification—is managed through BWF's Dual Mandate Matrix, which weighs both financial materiality and ecological integrity, transforming Finland's natural capital into a blueprint for resilient, biodiversity-driven sovereign finance.

Yield Trade-Off: A 16% reduction in short-term logging is offset by biodiversity-certified export premiums and credit revenues.
Ecological Trade-Off: Slower carbon sequestration is accepted to ensure long-term ecosystem resilience.
Portfolio Trade-Off: Global biodiversity investments hedge domestic ecological and policy risks.

Managing Risks and Key Tradeoffs

Trade-Off	BWF Resolution	Rationale
Logging Yield vs Resilience	16% yield cut; biodiversity-certified exports	Maintains profitability while improving habitat quality Meets EU biodiversity criteria while maintaining export value
Domestic vs Global	15% forestry cap; global biodiversity projects	Diversifies risk and EU systemic exposure
Short-Term Cashflow vs Regulation	Allocate to SLBs & NACs	Future-proofs portfolio under EU Taxonomy
Ecology vs Finance	55% liquid / 45% long-term	Balances returns and mission Ensures liquidity under EU prudential rules
Carbon vs Biodiversity	Native restoration > monocultures	Secures long-term ecological stability Aligns with EU Nature Restoration Law

FOUNDATION

Objective: Establish the groundwork for biodiversity finance and portfolio transition.

- Align holdings to the new target allocation
- Apply biodiversity screens
- Establish TNFD-aligned governance & disclosure systems
- Scenario-plan
- Educate stakeholders

Outcome: A transparent, ESG-integrated foundation ready for nature-positive investing.

EXPANSION

Objective: Scale innovation and deploy nature-based assets.

- Launch the Borealis NAC pilot
- Expand biodiversity-linked & green bonds
- Develop global partnerships
- Pilot precision forestry & biodiversity-monitoring technologies
- Begin gradual harvest reductions

Outcome: Innovation phase converts biodiversity from theory to investable asset class.

CONSOLIDATION

Objective: Standardize biodiversity metrics and integrate them portfolio-wide.

- Adopt full TNFD reporting
- Rebalance toward proven biodiversity funds & successful NAC structures
- Link compensation & performance to biodiversity KPIs
- Expand global NAC exposure
- Implement systematic biodiversity risk mapping

Outcome: Unified biodiversity accounting system underpins both financial and ecological reporting.

MATURITY

Objective: Mature and de-risk the portfolio for compounded ecological + financial performance.

- Shift allocation toward stable, nature-based income streams
- Harvest ecological & financial dividends
- Publish Annual Biodiversity & Financial Impact Reports
- Maintain long-term monitoring through sovereign governance
- Export the Borealis Model globally

Outcome: Steady returns, global influence, and permanent restoration of Finland's natural capital.

Guidance for BWF's Borealis Blueprint

To ensure the Borealis Blueprint was aligned with emerging global standards and grounded in financial system realities our impactful solutions are built off guidance from the WEF's *Finance Solutions for Nature: Pathways to Returns and Outcomes*.

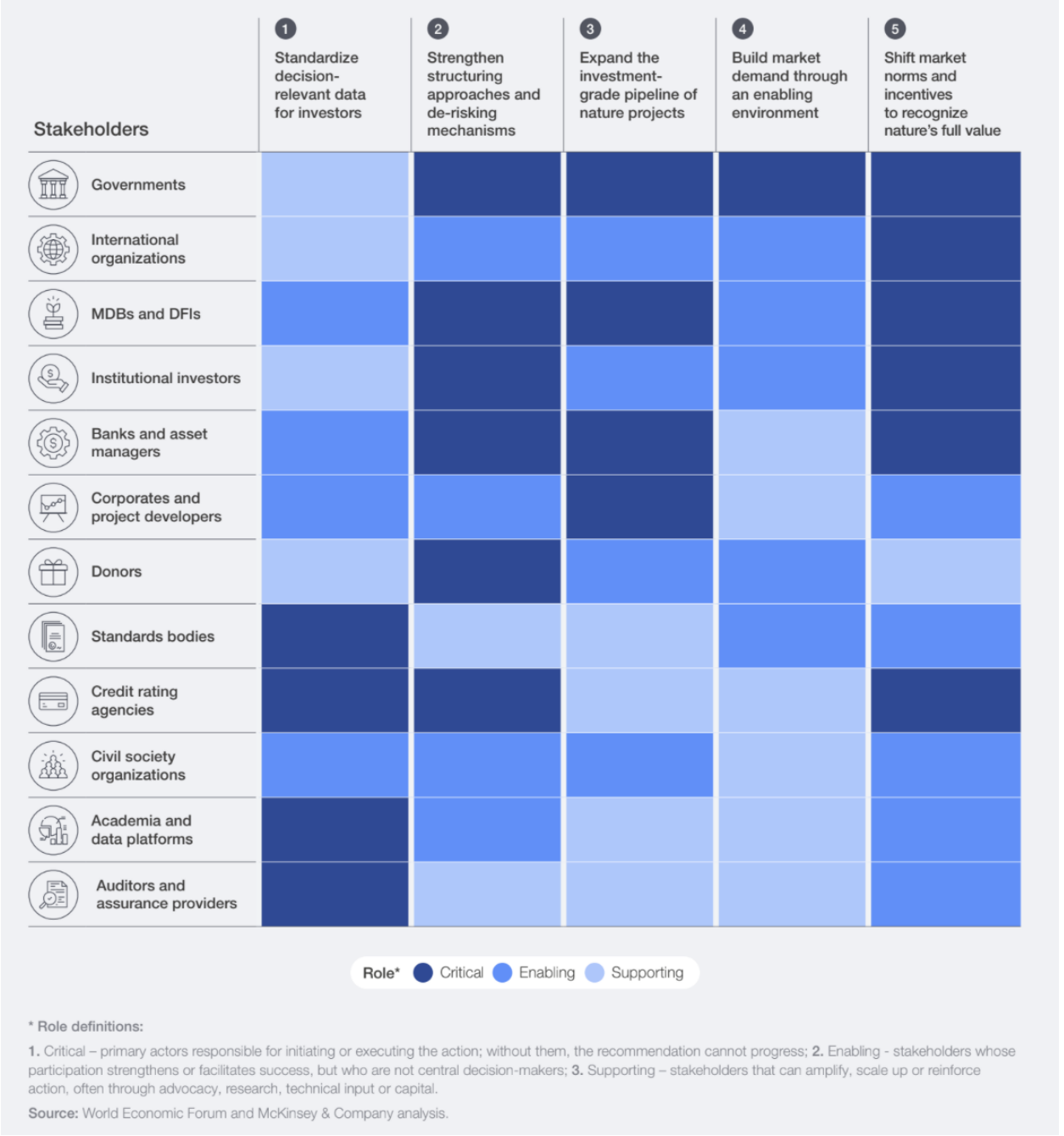
Significant Opportunity

The report positions nature as the next frontier of institutional investment, estimating that a nature-positive economy could unlock over USD 10 trillion in annual business value by 2030. It emphasizes that the finance sector has a critical role in achieving global biodiversity and climate goals, outlining five actions public institutions and sovereign funds must take to mainstream biodiversity finance:

- **Standardize data:** create consistent biodiversity metrics and accounting frameworks
- **De-risk investments:** use blended finance and public-private structures to lower risk
- **Expand the investable pipeline:** aggregate fragmented, early-stage nature projects into investable portfolios
- **Build demand through enabling regulation:** link finance to biodiversity targets like the GBF 30x30
- **Shift norms:** adopt a 3D fiduciary lens balancing risk, return and impact

10 Priority Solutions

The WEF identifies 37 finance mechanisms across four categories (financial instruments, funds and facilities, enabling mechanisms and fiscal measures) and prioritizes ten solutions based on scalability and nature impact. Our Borealis Blueprint draws directly from several of these top solutions (Natural Asset Companies, biodiversity and environmental credits, impact funds and sustainability-linked instruments), adapting them through a Finnish, impact-focused lens to form the foundation of our approach.



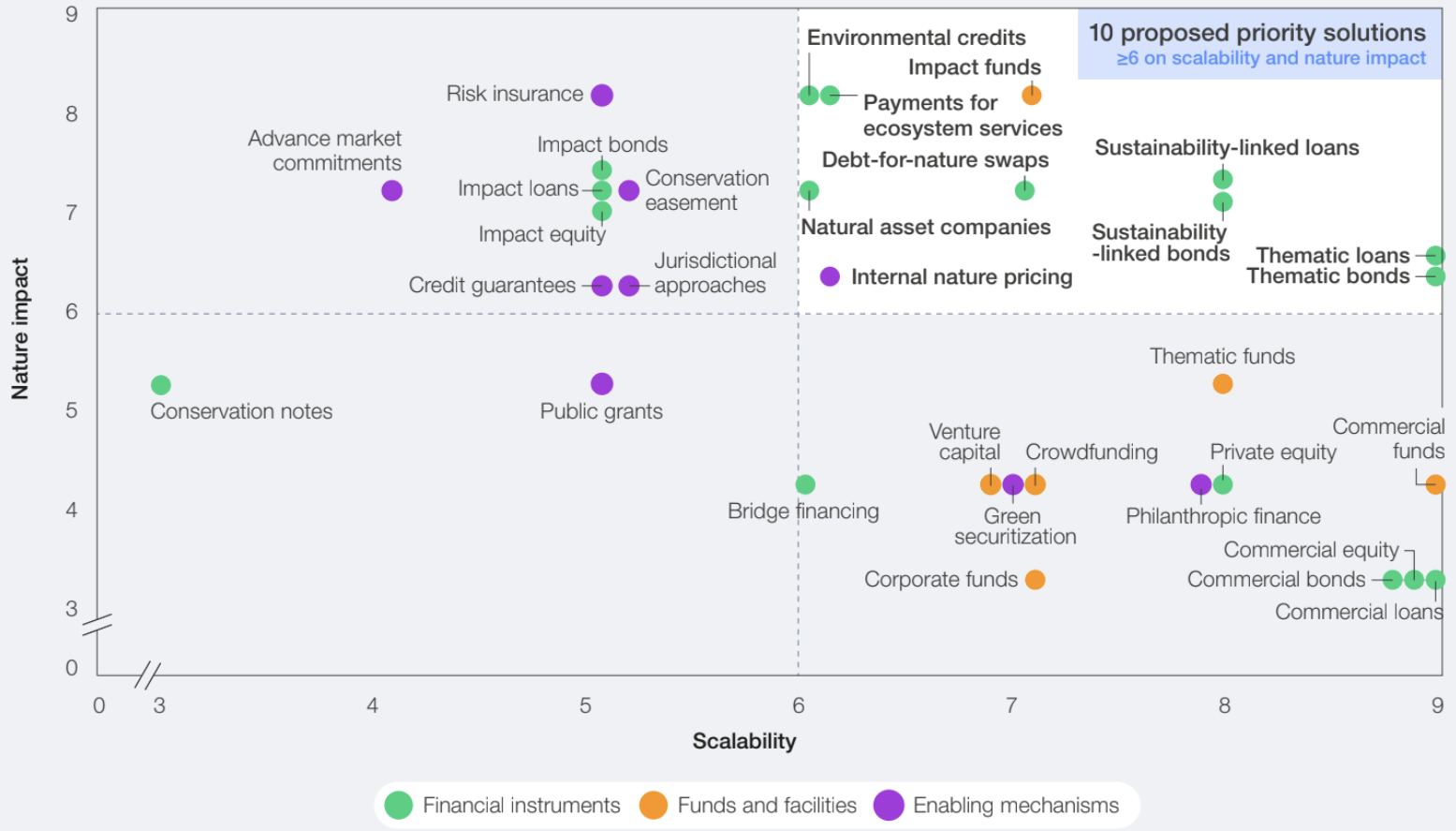
* Role definitions:

1. Critical – primary actors responsible for initiating or executing the action; without them, the recommendation cannot progress; **2.** Enabling - stakeholders whose participation strengthens or facilitates success, but who are not central decision-makers; **3.** Supporting – stakeholders that can amplify, scale up or reinforce action, often through advocacy, research, technical input or capital.

Source: World Economic Forum and McKinsey & Company analysis.

Impact and Scalability

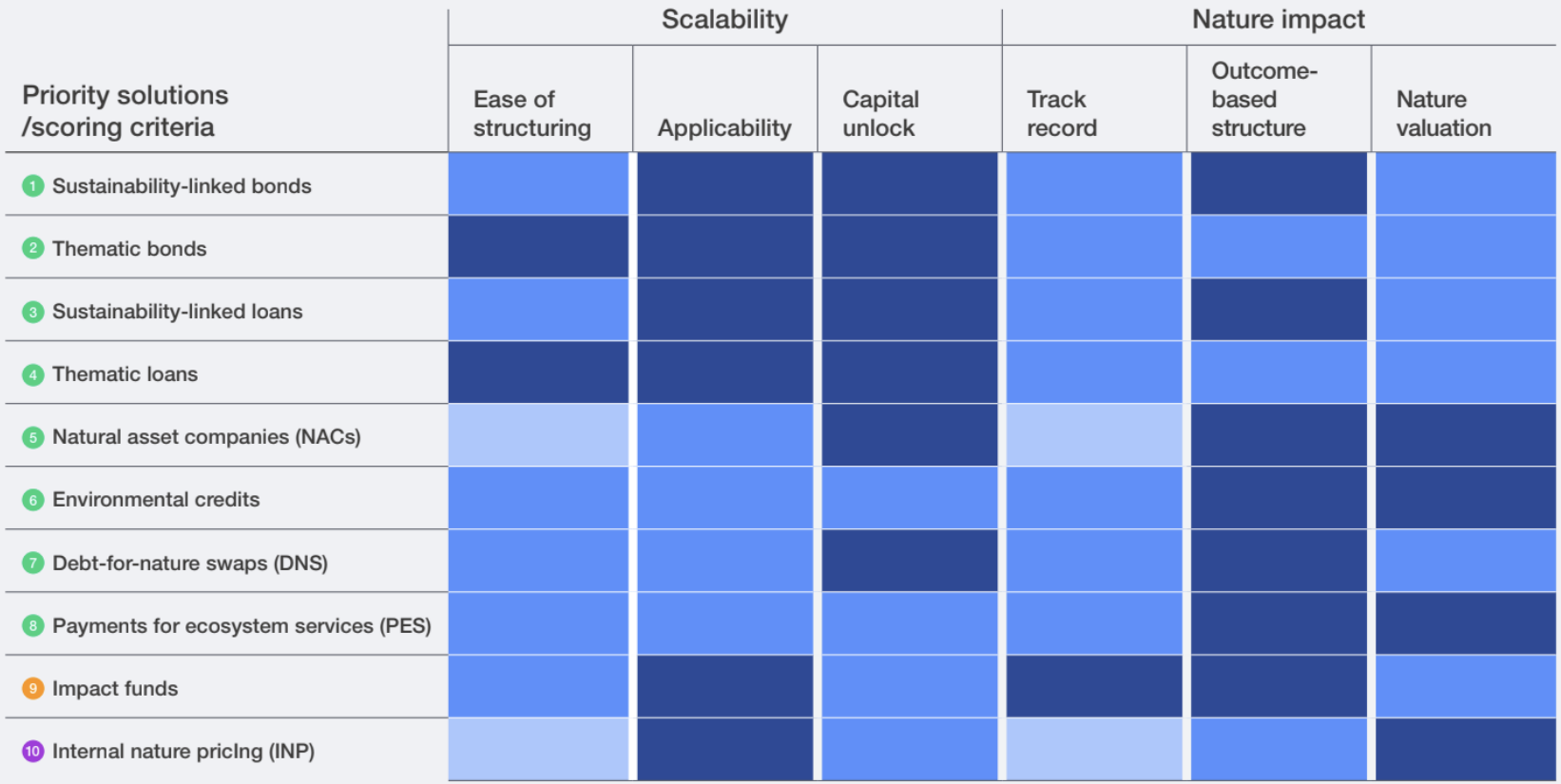
FIGURE 2 | **10 priority solutions, based on impact and scalability**



Source: World Economic Forum and McKinsey & Company analysis.

Scoring Criteria of Solutions

FIGURE 3 | **Deep dives into the 10 priority solutions**

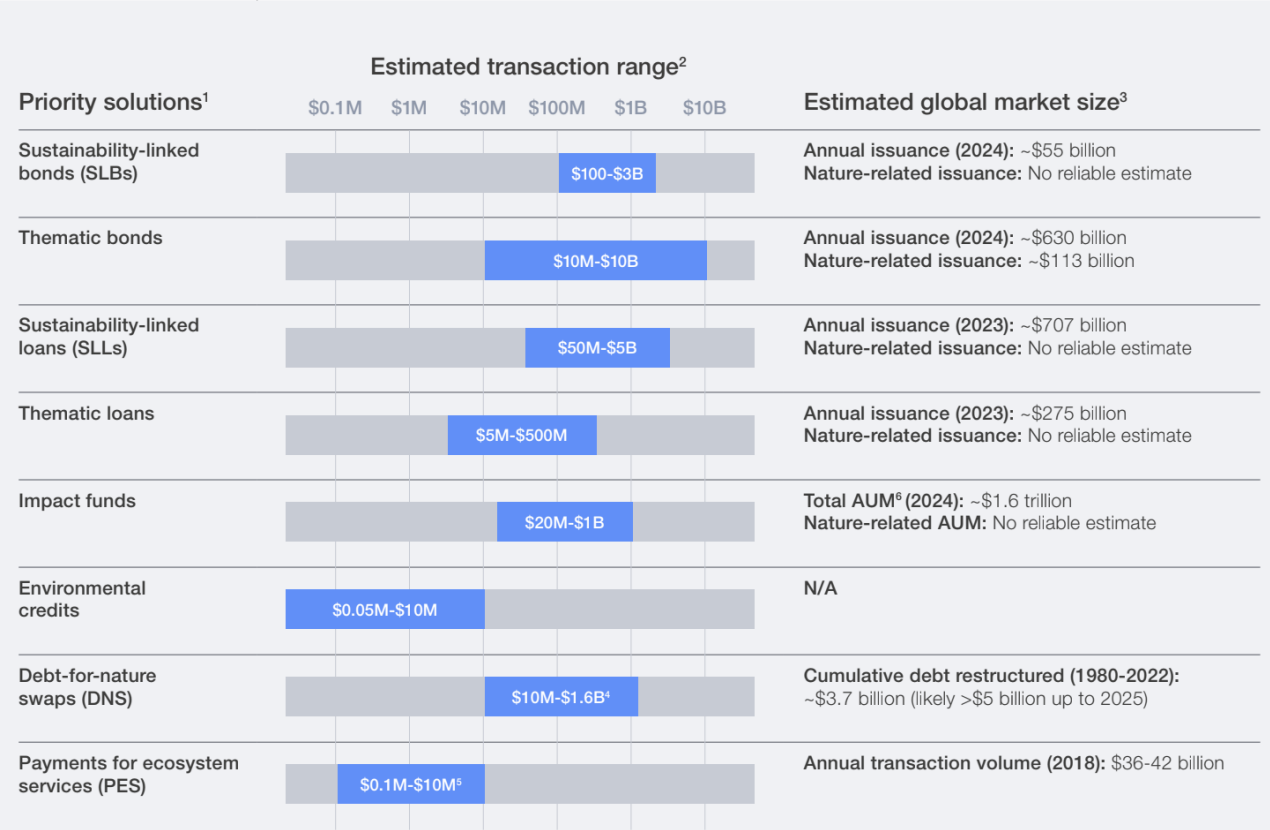


Note: For more detail on the scoring methodology, see Appendix A.

Source: World Economic Forum and McKinsey & Company analysis.

Range and Global Market Size

FIGURE 4 | **Estimated transaction range and global market size by solution**



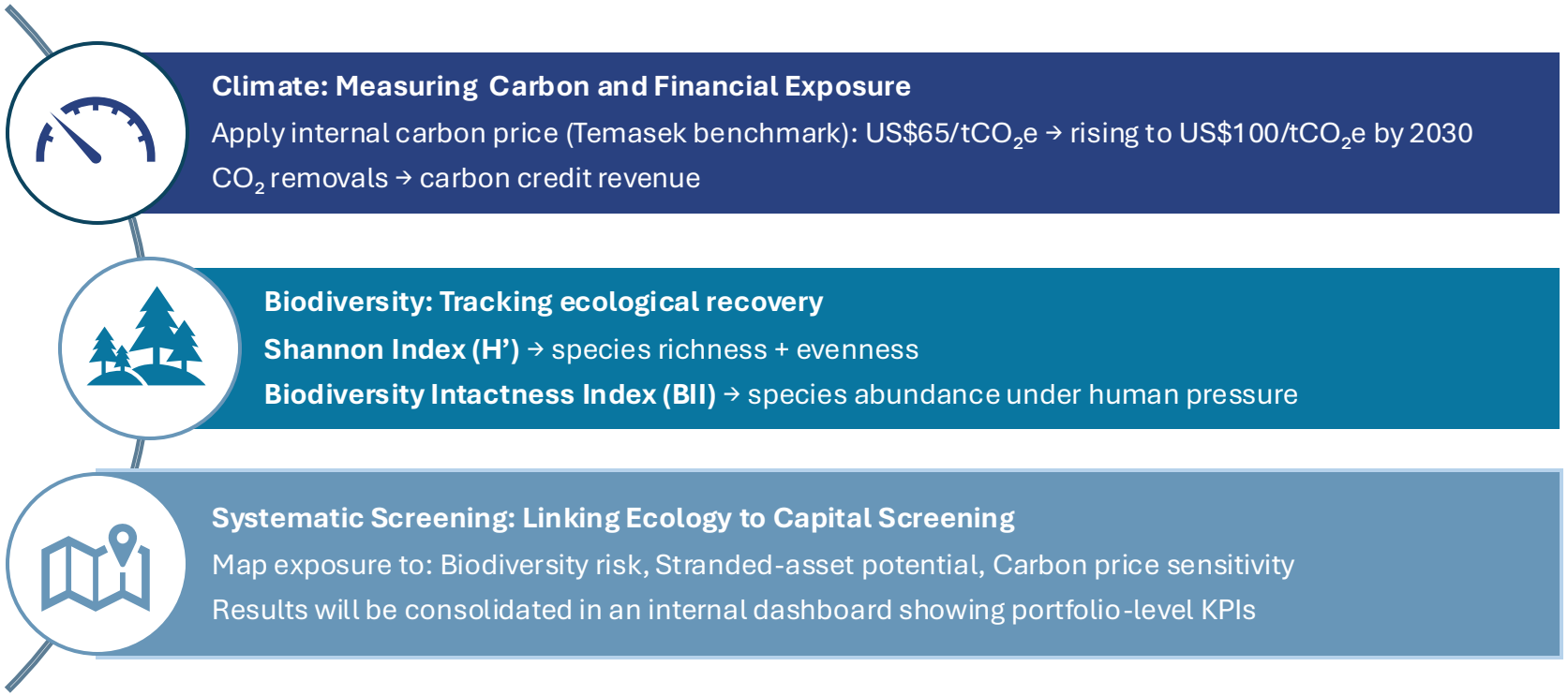
Notes: 1. This figure excludes natural asset companies (NACs) and internal nature pricing (INP) due to low or no volume of transactions for assessment; **2.** Transaction range based on review of major nature-related transactions; may bundle smaller projects and as such does not always represent project size; **3.** Market size based on best available evidence in the latest possible year; proxies and estimates used where necessary; **4.** Conservation funding raised through DNS ranges between 5-60% of total deal value, with an average of ~46% in recent transactions, according to data from The Nature Conservancy; **5.** National PES schemes, which aggregate different transactions and projects, may exceed $100 million in overall size; **6.** AUM = assets under management.

Source: World Economic Forum and McKinsey & Company analysis.

Biodiversity Valuation & Metrics Framework

Metrics: Climate (IPCC) & Biodiversity (Shannon Index, BII, Restoration KPIs). Portfolio wide, screen for biodiversity, stranded-asset & carbon risks. Central dashboard tracks Portfolio KPIs, guiding allocation & divestment

Disclosure & Reporting: BWF will publish an Annual Impact Report for transparent tracking of biodiversity credits generated, hectares restored and progress toward EU Biodiversity Strategy 2030 and Net-Zero 2035



Objective	Methodological Approach	Quantitative Framework
KPI 1.1 – Portfolio Carbon Intensity (tCO_2e / €M AUM)	Measures total emissions per € million invested	Target: –40% by 2030 from 2025 baseline
KPI 1.2 – Carbon Removal Capacity (tCO_2e / yr)	Total CO_2 removal achieved through forestry, NACs, and green infrastructure.	Based on SLL/SYKE method: +17.82 $MtCO_2$/yr restored via 11.9 Mm^3 harvest reduction + peatland rewetting
KPI 1.3 – Internal Carbon Price Coverage (% AUM)	Annual income from verified carbon credits, using internal carbon price benchmarks	100% of assets priced at €60–€90/tCO_2e by 2030 (Temasek benchmark)
KPI 1.4 – Carbon Credit Revenue (€ / yr)	Share of investments that integrate carbon cost/revenue valuation in their models.	3–5 % annual growth in verified carbon credit revenues through NAC + infrastructure investments
KPI 1.5 – Net-Zero Alignment Index (%)	Reduction trajectory (% vs 2025 baseline) to reach carbon neutrality by 2035.	Portfolio-level tracking tool measuring annual progress toward Finland's Net-Zero 2035 target

Objective	Methodological Approach	Quantitative Framework
KPI 2.1 – Shannon Index (H')	Species richness + evenness per restored hectare; target +10 % by 2035 (EPA methodology	Target: –40% by 2030 from 2025 baseline
KPI 2.2 – Biodiversity Intactness Index (BII)	Measures species abundance under pressure; target +8–12 % improvement by 2035 (NHM baseline 2025)	Based on SLL/SYKE method: +17.82 $MtCO_2$/yr restored via 11.9 Mm^3 harvest reduction + peatland rewetting
KPI 2.3 – Hectares Restored	+50 000 ha restored/re-wetted by 2035 through Borealis NAC, METSO, Helmi, & LIFE programs	100% of assets priced at €60–€90/tCO_2e by 2030 (Temasek benchmark)
KPI 2.4 – Biodiversity Credits Generated	Verified credits = % of total restoration + carbon projects monetized (Target: >25 % of NAC revenue by 2030)	3–5 % annual growth in verified carbon credit revenues through NAC + infrastructure investments
KPI 2.5 – % Portfolio with Biodiversity Management Plans	100 % of forestry & land assets with TNFD-aligned biodiversity plans by 2030	Portfolio-level tracking tool measuring annual progress toward Finland's Net-Zero 2035 target

Objective	Methodological Approach	Quantitative Framework
KPI 3.1 – % Portfolio Screened for Nature Risk (BFFI / TNFD)	All investments evaluated using BFFI and TNFD	Target 100 % screened by 2027; dashboards monitor biodiversity, carbon, & stranded asset exposure
KPI 3.2 – Stranded Asset Risk (% AUM)	Assets at risk from non-compliance with biodiversity or carbon regulation.	< 3 % of portfolio in non-compliant forestry or carbon-negative assets by 2030
KPI 3.3 – Green Revenue Share (% AUM)	Portion of total returns generated from green, biodiversity-linked, or sustainable projects.	≥ 50 % of returns from green infrastructure, NAC, & sustainability-linked bonds by 2035
KPI 3.4 – Carbon Price Sensitivity (€/tCO_2e)	Measures how changes in carbon price affect asset valuations; informs risk-adjusted allocation.	Modeled impact of +€10 carbon price on portfolio valuation; annual stress test
KPI 3.5 – ESG + Biodiversity Integration Score (0–100)	Composite metric combining governance, ecological, and social risk factors	Weighted 40 % E, 40 % Biodiversity, 20 % Governance; target ≥ 80 by 2030

Objective	Methodological Approach	Quantitative Framework
KPI 4.1 – Annual Impact Report Published	Discloses hectares restored, biodiversity credits generated, and carbon removals achieved.	Public release each April tracking carbon removals, biodiversity credits, and hectares restored
KPI 4.2 – Independent Verification Coverage	% of assets audited under ICMA, Green Bond Principles, or TNFD standards.	100 % audited under ICMA / GBF 2030 standards by 2030
KPI 4.3 – Stakeholder Transparency Score	Measures completeness of public disclosures (align with EU Sustainable Finance Disclosure Regulation)	Assessed under EU SFDR and TNFD guidelines
KPI 4.4 – Manager Incentive Alignment (% variable comp)	Percentage of management's variable compensation directly tied to ecological performance metrics (carbon sequestration, biodiversity index gains)	≥ 20 % of fund manager bonuses linked to biodiversity and carbon KPIs by 2030
KPI 4.5 – NAC Adoption Rate	Measures national uptake and scalability	% of eligible entity that formally adopt or register into the NAC structure

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