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Investing in biodiversity

Markets to finance the protection, better management and restoration of nature

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INTRODUCTION

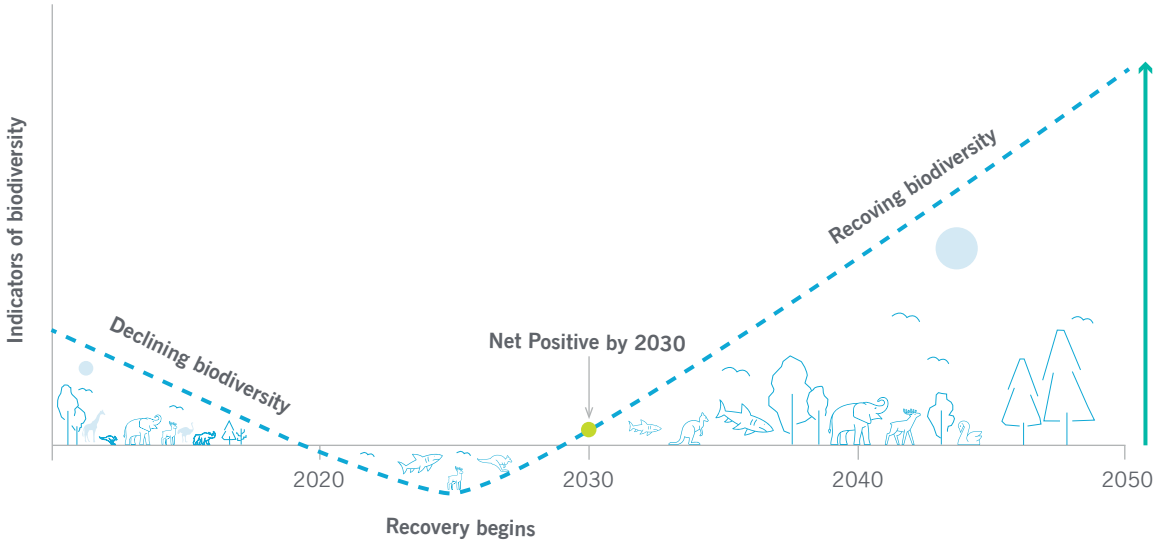
Unprecedented global action to address the decline in nature and its causes is underway, and investments in biodiversity will be a critical part of these efforts. The global rate of species extinction is unlike anything the world has seen since the time of the dinosaurs – today, one million plant and animal species are threatened with extinction, many within decades.[1] Because over half of the world's economy is dependent on nature,[2] these losses threaten the wellbeing and livelihoods of people all over the world.

Human activity is the primary cause of biodiversity loss – land use change is the biggest driver, but other factors such as climate change, pollution and invasive species contribute to biodiversity's dangerous decline. Addressing this global challenge will require changes in the way we value biodiversity and manage land. With that in mind, a landmark agreement to halt and reverse biodiversity loss by 2030 (Figure 1) emerged from the United Nations Biodiversity Conference (COP 15) in 2022. The international agreement—or Global Biodiversity Framework (GBF) — is anchored by the 30x30 commitment to place 30% of the planet under protection and restore 30% of degraded ecosystems by 2030.

To achieve the ambitious 30x30 targets, signatories to the GBF aim to mobilize private capital in addition to existing public funding. Estimates of current annual funding to protect, better manage and restore nature range from about $154 to $166 billion a year, most coming from government spending. Funding for this type of work will need to increase to $384 billion a year by 2025 to halt biodiversity loss and limit global warming to below 1.5°C.[3] Achieving these goals, well beyond the $200 billion per year expected by 2030 from GBF commitments, will also require new private investment and policies that encourage private landowners and land managers to take action.

Figure 1: Nature positive by 2030

Global goal for nature: Target nature positive compared to 2020 levels



Data source: Adapted from Locke et al., 2020.

Market-based approaches designed to incentivize the protection, improved management and restoration of nature can both expand the reach of policy to private landowners and encourage investment that helps achieve global and national biodiversity conservation targets. Both governments and independent organizations have a role in designing and supporting these market-based approaches. Environmental markets put a price on protecting and restoring nature, creating incentives to facilitate private capital into investments that improve, not diminish, biodiversity. And with the right incentives in place, protecting, improving and restoring ecosystems for biodiversity can become a source of return for landowners and not another cost of doing business.

*Environmental markets put a price on **protecting and restoring nature,** creating incentives to facilitate private capital into investments that improve, not diminish, biodiversity.*

This paper examines existing and developing market-based pathways for land-based investments to positively impact biodiversity. We begin with an overview of environmental market frameworks developed to support biodiversity outcomes, with examples spanning voluntary and compliance market frameworks and a range of geographies. Next, we assess the current state of biodiversity credit markets, some key challenges and major developing frameworks. Finally, we explore what biodiversity markets mean for investors and some of the risks unique to these markets.

ENVIRONMENTAL MARKETS FOR BIODIVERSITY

A range of environmental markets for biodiversity exist. Some are country specific, a few are global. Market-based incentive structures include payments for land rights, incentive payments for environmentally friendly management practices and tradable certificates for ecological restoration. Figure 2 describes some of the major environmental markets for biodiversity

Figure 2: Market frameworks to support biodiversity

	Framework	Market Type	Incentive structure	Source of return	Permanence of biodiversity benefits	Land management focus	
						Protect	Improve/ restore
U.S.	Conservation land sales	Voluntary	Land sale	Payment from public or private sector to landowner for land rights	Varies	+	
	Conservation easements	Voluntary	Partial sale of land rights	Payments from public or private sector to landowner for e.g. development rights	Perpetuity	+	
	Conservation Reserve Program	Voluntary	Direct payment	Payments to landowner from federal or state agencies to remove environmentally important land from production and establish native species for conservation	10-15 years	+	+
	Mitigation bank credits	Compliance	Tradable certificates	Public or private developer of project impacting wetlands, streams or habitat purchase credits from mitigation bank owner to compensate for unavoidable impacts	Perpetuity		+
Australia	NSW Conservation Management Program	Voluntary	Direct payment	Payments to landowner from NSW Biodiversity Conservation Trust to protect, restore and manage native vegetation and biodiversity	Varies		+
	NSW Biodiversity Offsets	Compliance	Tradable certificates	Public or private developer of project impacting threatened species and habitats may purchase offsets to compensate for unavoidable impacts or pay into the Biodiversity Conservation Fund	Perpetuity		+
U.K.	Biodiversity net gain credits	Compliance	Tradable certificates	Developers may purchase biodiversity units from a site where habitat is created or enhanced to achieve on-site and/or off-site gains of 10% in the same area as the development	30 years		+
Brazil	Legal Reserve certificates	Compliance	Tradeable certificates	Private landowners with insufficient area in legal reserve to reach the required amount may purchase certificates from other landowners in the same area with excess area in legal reserve	Perpetuity	+	
Global	Carbon credits + biodiversity co-benefits	Voluntary	Tradable certificates	Payments for nature based carbon credits for measurable and independently verified emissions reductions and removals plus certified biodiversity co-benefits	40 years	+	+
	Biodiversity credits	Voluntary	Tradable certificates	Payments for credits to landowner for actions that result in measurable and scientifically verified biodiversity outcomes (private and public sector programs in development)	Varies	+	+

Data source: NNC Research

Note: List of market frameworks for biodiversity conservation and restoration is not meant to be exhaustive.

conservation and restoration by type and source of return for the landowner. While all market frameworks create incentives for positive biodiversity outcomes, their relative focus on protection compared to restoration as well as the permanence of biodiversity benefits depends on the framework and is also assessed below.

U.S. market frameworks

Conservation land sales and easements

Conservation land sales and easements are two mechanisms for public or private sector actors to protect biodiversity and other environmental values on private land through the acquisition of full or partial property rights. A conservation land sale

conveys full property rights from the seller to the buyer, and the mechanics of the transaction are not unlike typical private land sales. A conservation easement is a voluntary legal agreement, commonly used in the U.S., that permanently limits development to protect conservation values. For timberland owners, conservation easement sales can be a way to generate revenue and protect biodiversity while maintaining land ownership and ongoing forest management. For example, a "working forest" conservation easement allows forestry operations and harvesting to continue while prohibiting land development or land use conversion.

Conservation land and easement buyers are typically land trusts or U.S. state or local environmental agencies. Purchases can be publicly funded by a government agency or privately purchased by an individual or organization. A buyer's willingness to pay is a function of both the property's characteristics and the buyer's access to funding. In recent years, U.S. federal conservation funding programs have received significantly increased support from passage of the Great American Outdoors Act (2020) and the Infrastructure and Investment Jobs Act (2021).

Conservation Reserve Program

The Conservation Reserve Program (CRP) is one of the largest private land conservation programs in the U.S., with more than 24.8 million acres enrolled in 2023.[4] This USDA-funded program targets farmland owners of productive cropland where conservation or restoration practices can

Figure 3: U.S. mitigation bank photos showing before and after restoration

a. Coastal wetlands restoration in Louisian

b. Stream restoration in eastern Kentucky

Data source: Ecosystem Investment Partners.

be implemented on environmentally sensitive land to protect wildlife habitat, improve water quality or conserve soil resources, for example. In exchange for these management changes, program participants receive annual rental payments, partial reimbursement for costs or incentive payments. The contract period for land enrolled in the program is typically 10-15 years.

Mitigation bank credit markets

A mitigation bank is an area of wetlands, stream or habitat that has been enhanced or restored to balance unavoidable impacts from development. A market-based system of credits and debits ensures that there is no net loss of these ecologically important, federally protected areas within the system. The compliance credit market is overseen by state and federal regulatory agencies, which approve mitigation bank projects that earn credits as well as assess unavoidable impacts from development that incur debts. Credits are performance-based and released over time as improvements and restoration of wetlands, streams and habitat is proven out. Buyers of credits typically include public or private developers of infrastructure, industrial, energy, commercial or residential projects. Credits are traded within ecologically defined markets to ensure benefits from restoration are equivalent to impacts, ensuring no net loss.

> ***A market-based system of mitigation bank credits and debits*** *ensures that there is no net loss of ecologically important, federally protected areas within the system.*

Australian market frameworks

In Australia, the New South Wales Biodiversity Conservation Trust (BCT), established in 2017 and with financial support from the state government, plays a major role in voluntary and compliance markets that support biodiversity locally. At the national level, the Nature Repair Act of 2023 establishes a framework for a voluntary biodiversity credit market but the rules and standards for the market are still in development (and for this reason not included in Figure 2).

The BCT's Conservation Management Program (CMP) targets private landowners with priority conservation assets—threatened species and ecological communities, wetlands, koala habitat or climate refugia. Private landowners participating in the CMP enter into a conservation agreement with the BCT to protect, restore and manage native vegetation and biodiversity on their land. In exchange for managing the land in accordance with the agreed conservation management plan, landholders receive annual payments. The conservation agreement is registered on the land title and according to NSW BCT, 70% of the program's funded conservation agreements are in perpetuity.[5]

The BCT also administers the Biodiversity Offsets Scheme, a compliance market framework designed to balance unavoidable impacts on biodiversity from development or vegetation clearing with equivalent biodiversity gains on restored and protected land. Compared to the U.S. mitigation bank credit market, the BCT has a unique role in facilitating the market—working with landowners to support the development of projects and securing offsets on behalf of developers from existing projects or through credit tenders and fixed price offers. And complementing Offsets Scheme, the BCT has a co-investment and revolving fund programs to support direct investments in conservation properties. Through these innovative approaches, the BCT aims to actively seek out and target top priorities that increase the scale of impact and directly ensure permanent conservation.

U.K. Biodiversity Net Gain

The Biodiversity Net Gain compliance market framework was part of the U.K.'s 2021 Environment Act and its phased implementation, by size and type of development, was initiated in 2024. The offset market created by the program is similar to the U.S mitigation bank crediting system in many ways with one major exception–the U.K requires impacts are more than offset by equivalent restoration. All major building developments must deliver a 10% biodiversity net gain compared to the site's pre-development baseline. Options to achieve BNG are through the creation of on-site biodiversity gains, through off-site gains, or via the

purchase credits from the government. For credit purchases, the government will use funds raised to invest directly in habitat creation. All credited net gains, whether on-site, off-site or purchased, must be maintained for 30 years.

Global carbon market frameworks

Though global voluntary carbon credit markets are designed to primarily support climate action, nature-based projects – approaches that increase carbon sequestration and storage in plants and soil – provide a multitude of co-benefits. Nature-based carbon projects that restore native vegetation, protect wildlife habitat and improve water quality all in addition to sequestering and storing carbon directly benefit biodiversity. Recognizing this potential, carbon credit registries have certifications for projects that demonstrate tangible biodiversity benefits in addition to climate benefits.

For example, projects registered under Verra's Verified Carbon Standard (VCS) can be certified in conjunction with the Climate, Community and Biodiversity Standard (CCB). The CCB Standard positively identifies land management projects that deliver net positive benefits for climate change mitigation, local communities and biodiversity. First established in 2005, the CCB labels were aligned with Verra's VCS process in 2014 to streamline the registration of credits seeking dual certification.

The CCB Standard has its own requirements and independent verification, beyond those required under the VCS. Carbon credits from dual certified projects are affixed with the CCB label and visible to the market. According to Verra, 30% of total NBS Verra carbon credits issued over the last 10 years were certified according to CCB standards.[6]

Many carbon registries also have mechanisms to recognize projects with associated U.N. Sustainable Development Goals (SDGs). There are several SDGs with direct links to biodiversity, including most prominently SDG 15, aiming to: "*protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.*" After associated SDGs are accepted by the registry, relevant SDG tags are affixed to the project and visible to the market. These SDG tags are widely used by other key independent crediting systems such as Gold Standard, ACR and Plan Vivo, while use by Verra is more limited.

DEVELOPING BIODIVERSITY CREDIT MARKETS

Biodiversity crediting frameworks are another market-based approach to incentivize investment in nature. Incentives are created through payments for credits from projects that result in measurable and scientifically verified positive outcomes for biodiversity (e.g. species, ecosystems, natural habitats). Interest in this type of nature-focused crediting framework has risen in recent years, in part because of the growth of the voluntary carbon market and amplified by the urgent need to halt and reverse biodiversity loss through financing solutions that advance GBF goals.

Several independent and government-led biodiversity crediting frameworks are in early stages of design and development, but still face challenges.

The future success of biodiversity crediting frameworks currently in development will require advancements on all sides, including:

- Establishing common principles and standards for credits and methods for quantifying benefits;
- Building a robust pipeline of projects and high-integrity supply of credits; and
- Developing viable sources of demand.

Uncertain demand is perhaps the greatest impediment to market advancement; biodiversity markets will not materialize or persist without effective demand for credits. At the time of writing, the business case for purchasing voluntary biodiversity credits and their potential value to corporates, the primary source of demand for

voluntary carbon credits, is unclear. Hypothetically, corporate demand for biodiversity credits may be motivated by de-risking nature dependencies in their supply chain making connections between nature and sustainability criteria valued by investors or shareholders, developing products and brands that align with customer preferences for nature-positive outcomes.[7] However, if demand from corporates or other buyers is insufficient, intermittent, or uncertain, development of credit supply from high-quality projects will be limited no matter how well designed a market framework might be.

> *Nature-based projects* ***provide a multitude of co-benefits,*** *a fact that is becoming more widely recognized by carbon crediting frameworks.*

In contrast, compliance markets for ecosystem restoration have a built-in source of demand as part of the market framework. In the U.S., mitigation bank credits buyers include public or private entities across a range of sectors that have incurred "debts" resulting from a permitted development projects. And in the U.K., the BNG framework creates demand from developers and requires impacts to biodiversity be more than offset. Within these compliance market frameworks, investors can use information about the sources and drivers of demand to evaluate local credit market dynamics and direct investment to restoration.

Beyond the question of demand, establishing a market framework with common set of principles, standards and methods is another challenge for biodiversity credit markets. Most fundamental to this challenge is defining the unit of measurement for the biodiversity credit itself. In carbon credit markets, a standardized unit of measurement (i.e., tons of CO2e) enables quantification of climate targets and equivalency in credit-based approaches used by corporates to complement their emissions reduction targets. For example, credit purchases representing tons of CO2e avoided emissions or removals can be directly linked to the buyer's quantified science-based targets, measured in the same units. However, given the complexity and heterogeneity within and across measures of biodiversity, for example between regions, standardization can be more difficult.

Recognizing that every biodiversity credit and underlying project will have a multitude of features, some degree of standard unitization would greatly improve market information and liquidity. Standardization of units across projects would support demand for certificates by allowing buyers to link purchases more easily to their own nature and biodiversity targets. In compliance markets for ecological restoration, this standardization has been key to ensuring no net loss of critical ecosystem types. Location, area, and ecological values are quantified in the calculation of both restoration credits and debits incurred from unavoidable development impacts. This standardization links credit supply and demand in the market and ensures equivalence. Further, from a public agency's perspective, standardizing metrics would facilitate the aggregation of positive impacts across ecological restoration projects.

Although uncertainty remains around the source of demand for voluntary market credits, private and public sector biodiversity crediting programs are developing. There are a multitude of regional and national private sector frameworks emerging across Europe, Oceania, and Latin America as well as two independent global frameworks, Verra and Plan Vivo. In addition to private sector and independent international frameworks, the governments of Australia and New Zealand also have in development national voluntary biodiversity credit market frameworks.

Among the voluntary biodiversity crediting frameworks in development, perhaps the most advanced are the two independent global frameworks from Verra and Plan Vivo, both prominent registries in the voluntary carbon market. In 2023, Verra announced its SD VISta Nature Framework and biodiversity methodology. The program is currently in the piloting phase with projects that include both conservation and restoration activities on geographically diverse natural and managed landscapes. Also in 2023, Plan Vivo launched its Biodiversity Standard PV Nature. Plan Vivo's standard is operational and

issues two basic types of credits — restoration of degraded ecosystems and conservation of globally significant biodiversity credits. From an organizational perspective and ability to leverage experience from voluntary carbon markets, these two voluntary credit registries are well-positioned for expansion into biodiversity credits markets if and when demand materializes.

WHAT DOES THIS MEAN FOR INVESTORS?

Nearly half of today's institutional investors are investing in timberland and farmland seeking positive environmental impact.[8] And we know that investments in land-based assets can generate quantifiable biodiversity benefits – e.g., by protecting conservation set-asides, improving management practices and actively restoring ecosystem structure and function. Where those additional biodiversity benefits can be verified and monetized in environmental markets, investors can have a positive impact and earn a financial return.

Developing biodiversity credit market frameworks may be a future pathway for investors to invest in ecological restoration. However, these frameworks still face many challenges, uncertainty around credit demand perhaps most fundamental. The growth and development of voluntary credit markets for carbon have several advantages, such as standard units, measurable climate targets and increasingly well-defined guidelines credit use.

For investors seeking to direct capital toward strategies that benefit biodiversity, there are a multitude of opportunities to access well-developed existing environmental markets particularly in developed market countries like the U.S. and to a growing extent Australia. In the U.S., markets for land conservation and easements support the permanent protection of natural areas and working forests. The CRP program offers farmland investors opportunities to support positive biodiversity impacts and although management changes are not permanent agreements, they are renewable. Also in the U.S., mitigation banking opportunities driven by local market dynamics and with outcomes-based crediting, offer opportunities at meaningful scale.

To date, opportunities for investing in biodiversity conservation and restoration have been greatest in the U.S. environmental markets. There are several factors driving this concentration. First, market mechanisms are well-accepted and respected as a way to achieve improvements environmental quality. Federal and state governments have allocated funding to support markets. And importantly, the U.S. has low baseline country risk. Some investors may be more willing to take on non-traditional investment strategies in the U.S. compared to emerging market countries.

However, addressing biodiversity loss (and climate) at a global scale, requires investment in biodiversity beyond a few of developed market countries. In the near-term, opportunities for the verification of biodiversity benefits linked to carbon credits is achievable at scale in emerging market countries, like Brazil, Colombia, and Indonesia, among others. There is some evidence suggesting that carbon credits with CCB certification trade at a price premium to credits without this certification. Looking ahead, opportunities to bundle verified biodiversity benefits with carbon credits in existing market frameworks has the potential to expand to other major registries beyond VCS.

> ***Investments in land-based assets can generate quantifiable biodiversity benefits,*** *and where those benefits can be verified and monetized investors can have a positive impact and earn a financial return.*

Finally, there are unique set of risks that come along with exposure to environmental markets. First, better management for biodiversity and ecosystem restoration requires specialized operational expertise, familiarity with market-based frameworks, and often understanding of local supply-demand conditions. Demand for biodiversity conservation and restoration is often local – state or regional funding sources for easements or mitigation bank credit demand – with pricing highly sensitive

to local markets conditions. Second, enduring positive impacts require a long-term commitment to maintaining biodiversity or habitat benefits, with financial or reputational implications if those commitments are not met. Finally, policy frameworks in both voluntary and compliance markets can be dynamic. In particular, changes in standards and crediting calculations with potential revisions to policy and/or methodologies introduce risks for investors tend to be more likely in less-developed environmental markets.

Environmental markets for the protection, better management and restoration of nature are a growing opportunity for investors. Investing in biodiversity has the potential to enhance returns from traditional investment strategies—and there is empirical evidence[9] that it may also reduce risk by adding exposure to uncorrelated markets. An understanding of the unique risks is necessary to realize the full benefits from exposure to environmental markets and also to achieve the positive biodiversity outcomes that are urgently needed.

For more information, please visit our website, nuveen.com/naturalcapital.

Endnotes

Sources

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