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U.S. markets for ecosystem restoration: Enabling investment in nature-based solutions



Gwen Busby, PhD

*Head of Research and Strategy,
Nuveen Natural Capital*



Daniel Coggin

*Head of Mitigation Banking Services,
Nuveen Natural Capital*

Balancing the impacts of economic development on the landscape with the conservation of natural resources will be critical for ensuring continued economic security worldwide. Because over half of the world's economy is dependent on nature, the loss of valuable land and water resources threatens the wellbeing and livelihoods of people everywhere.¹ The U.S. has an estimated \$2.1 trillion of GDP in nature-dependent sectors, one of the highest exposures in the world.² At the same time, the U.S. also has one of the largest environmental credit markets in the world, creating an opportunity for natural capital investors to mitigate the risk of nature loss.

As the business sector works to address risks linked to nature loss and make practices more environmentally friendly, investors are increasingly seeking opportunities to contribute to nature-based solutions (NBS). NBS are actions that protect, restore, and improve management of ecosystems in ways that directly address global environmental challenges like biodiversity loss, climate change, and pollution. In addition, NBS investments have the potential to generate financial returns where they produce quantifiable environmental benefits and markets exist to monetize those benefits.

In the U.S., environmental law from the 1970s laid the foundation for market-based frameworks that were designed to ensure development does not damage or destroy critical land and water resources — like wetlands to clean and filter water, streams to support fisheries, and habitat for diverse wildlife species. The U.S. has a “no net loss” policy that requires unavoidable impacts from damage to land and water resources be offset by restoration of similar areas. This policy helps to ensure development does not result in an overall decrease in the environmental and economic benefits society gains from these resources.

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Credit markets for ecosystem restoration create opportunities for investors to access NBS investments diversify and grow natural capital portfolios. Here we provide an introduction to ecosystem restoration markets in the U.S. including an overview of their policy foundation, the market-based framework, and project development. We conclude with a discussion of how an allocation to ecosystem restoration offers potential portfolio-level benefits as well as explore some of the unique risks compared to traditional timberland or farmland.

MARKETS FOR ECOSYSTEM RESTORATION

Across the U.S., there are environmental credit markets for wetland, stream, and species habitat mitigation. These compensatory mitigation markets exist because of long-standing federal laws — the Clean Water Act of 1972 and the Endangered Species Act of 1973. These laws were designed to protect U.S. land and water resources and ensure “no net loss” of environmentally and economically significant areas caused by development projects. Some state laws go above-and-beyond standard federal protections — for example, California’s laws have expanded protections for species as have Florida’s laws for streams and wetlands.

Over the past three decades, markets for ecosystem restoration enabled by federal law have developed and grown in the U.S. By one estimate, stream, wetland, and species habitat mitigation markets currently generate nearly \$4B of annual revenue. This revenue is generated by the sale of mitigation credits to offset unavoidable impacts from development projects. Between 2000 and 2024, the number of stream and wetland mitigation bank transactions has increased steadily, by about 6% per year.³

Markets for restoration are supported by a robust compliance system that creates demand for mitigation credits. Environmental permitting for land development projects—like highways and roads, residential construction, pipelines, or mining activity—first requires all proposed projects must first avoid and then minimize any potential impacts to protected resources. The final piece in the mitigation hierarchy then requires any remaining or unavoidable impacts be offset by the restoration and protection of an ecological similar area in the same watershed.

Developers of proposed projects with unavoidable impacts have three basic options to meet offset requirements for their project to be permitted. First, they may undertake the restoration independently, an approach known as permittee

Figure 1: Markets for ecosystem restoration

	REGULATORY FRAMEWORK	MARKET SIZE	ESTIMATED ANNUAL REVENUE
Wetland and stream mitigation	- Established as part of the Clean Water Act (CWA) of 1972 - Section 404 requires “no net loss” of wetlands and streams - Administered by the Army Corps of Engineers	2,414 wetland and stream mitigation banks established between 1995 and 2024	\$3.5B
Species habitat mitigation	- Established as part of the Endangered Species Act (ESA) of 1973 “Incidental take” requires mitigation - Administered by the US Fish & Wildlife Service - State-level endangered species acts may complement federal law	176 species habitat banks established between 1995 and 2024 - Concentrated activity in California	\$350M

Sources: Number of wetland, stream, and habitat banks from RIBITS as of 11 June 2025. Estimated annual revenues from: Ecosystem Market Place, State of Biodiversity Mitigation 2017, Markets and Compensation for Global Infrastructure Development.

Figure 2: Mitigation mechanisms

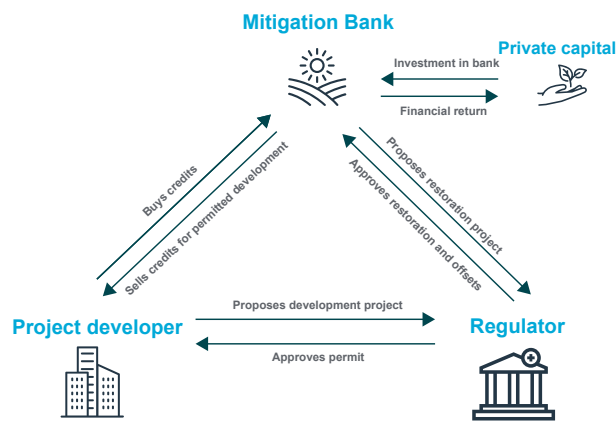
	RESPONSIBLE PARTY	SPONSOR	TRADEABLE CREDITS GENERATED
Permittee responsible mitigation (PRM)	Permittee	Project proponent or permittee	No
In-lieu fee (ILF)	In-lieu fee sponsor	Government agency or environmental NGO	Yes
Mitigation bank	Bank sponsor	Investment or restoration specialist	Yes

responsible mitigation (PRM). Alternatively, the developer may pay a fee to a government agency or environmental NGO that has developed an in-lieu fee (ILF) program to fund restoration. However, both regulators and developers alike tend to prefer a third option: the purchase of credits from a mitigation bank for both efficiency and cost effectiveness. Mitigation bank credits are generated from the restoration and permanent conservation of degraded areas that is funded by private capital, creating an investment opportunity for natural capital investors.

Mitigation bank credits can be earned by acquiring areas with degraded wetlands, streams, and/or species habitat, and investing capital upfront in the restoration of the ecosystem’s structure and function. The market-based framework for ecosystem restoration, highlighting the role of mitigation banks and the role of private capital, is shown in Figure 3. The on-the-ground restoration activities are detailed as part of a formal agreement between the regulator and the mitigation bank sponsor called a mitigation banking instrument (MBI). This detailed plan outlines the management, monitoring, and expected credits generated from the restoration activities.

Following mitigation bank approval by the regulators, credits are released over time based on the achievement of established performance milestones. Once credits are released, they can be sold to developers to offset permitted impacts. Financial returns from the mitigation bank comes from the upfront investment in degraded land that is followed by revenue from credits sales.

Figure 3: Market-based framework for ecosystem restoration



Sources: Adapted from Madsen (2024).

MITIGATION BANK DEVELOPMENT

On the ground, establishing a mitigation bank is essentially the restoration of the ecosystem functions lost or damaged by past activities. Banks are typically constructed on private land by a team of restoration specialists that includes wetland scientists, environmental engineers, and investment professionals. The first step in establishing a bank is to identify and acquire degraded land with ecological uplift potential. For example, land where a drained or converted wetland can be restored and/or enhanced. Stream restoration potential exists where, for example, the water’s course has been channelized and the stream banks are heavily eroded, floodplains are disconnected, and natural in-stream structures are missing.

Once the project area has been identified, a team of specialists develops and submits the MBI for review and approval by regulatory agencies — e.g., the U.S. Army Corp of Engineers (USACE) for wetland and stream banks and the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) for habitat banks. The MBI includes a description of the site, baseline conditions, proposed restoration work plan, post-restoration protection, long-term management plan as well as credit estimates. After the project is approved and a conservation easement is in place, helping to ensure permanent conservation of the restored area, construction of the bank can begin.

Mitigation bank credits are released over time based on the achievement of performance milestones that are independently verified by federal and state environmental agencies and outlined in the MBI.

Performance metrics are specific to the project type and location but typically measure survivability of planted vegetation, percent cover of non-native and invasive species, stream biodiversity, and hydrology. The photos below show a stream and wetland mitigation bank sites pre- and post-restoration.

In the U.S., mitigation activity is concentrated in areas with two key features: active land development and protected land and water resources. Figure 5 shows mitigation activity, as measured by total credits sold, by type and major region since 1995. Over this period, the Southeastern region has had the largest share of total wetland and stream credits sold. For the same period, the Western region has had the greatest share of species credits, considering that that the “mixed” credit type in the region reflects predominantly species credits.

Figure 4: Stream and wetland mitigation bank in Tennessee

(a) Stream site pre-restoration



(b) Stream site post-restoration



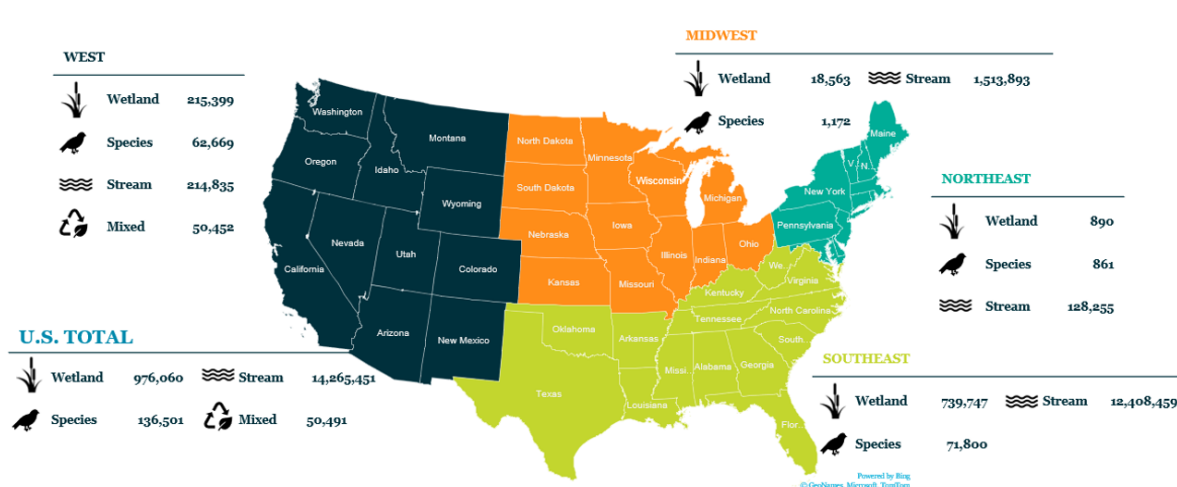
(c) Wetland site pre-restoration



(d) Wetland site post-restoration



Source: NNC.

Figure 5. Mitigation activity by type and region since 1995 (total number of credits sold)

Source: RIBITS as of 12 August 2025; NNC Research. Notes: Cumulative total includes bank and ILF credits rounded to the nearest hundred. In the West, the mixed credit type is predominantly species credits. Because of this, the market for species credits is effectively the sum of mixed and species.

The financial return from an investment in a mitigation bank is realized through credit sales. Because regulations require development project impacts are mitigated within the same watershed where they occur, demand for credits depends on the location of the bank and ultimately, determines investment return. Credit demand and pricing tends to be greatest around growing population centers and related development as well as where industrial land-use like mining and oil and gas activity exists.

WHAT DOES THIS MEAN FOR INVESTORS?

Beyond the maturity of ecosystem restoration markets and their meaningful scale in the U.S., an allocation to ecosystem restoration also has potential to improve portfolio diversification for existing natural capital investors. The lack of correlation between restoration and traditional natural capital investments comes from two sources: the prevalence of local markets for mitigation bank credits and demand drivers. Because all credit markets are local, sales and pricing depends on local credit supply and demand conditions. These local markets are insulated from broader economic trends that may influence regional or national commodity markets. In addition, mitigation credit demand comes from

diverse sources, from public infrastructure to mining activity, that are largely uncorrelated with timberland and farmland returns.

It is also important to recognize that investment in ecosystem restoration comes with a unique set of risks, most notably market and policy risk. With respect to market risk, volatility in credit demand may either reduce the number of credits sold or delay the sale of credits, and both have the potential to negatively impact investment return. Ensuring that no one sector or buyer dominates a single local market or markets for a portfolio of banks can help mitigate volatility in credit demand. In addition, a dedicated sales team with local points of contact can also help mitigate market risk, especially where local relationships drive credit sales.

By definition, compliance markets come with some amount of policy risk. In U.S. markets for ecosystem restoration, any policy change that diminishes the scope of protected land and water resources has the potential to reduce demand for offsets. For example, Section 404 of the Clean Water Act defines “navigable waters” of the United States (WOTUS) and that legal definition is subject to change. In May 2023, the U.S. Supreme Court announced a narrowing of the definition of wetlands considered part of WOTUS (*Sackett v. Environmental Protection Agency*). The 2023 ruling effectively excluded areas from

CWA protections that do not have a continuous surface connection to navigable waters. While the ruling has had a relatively minor impact of existing mitigation bank investments and permitted projects, it is expected to have some impact on the growth of the market going forward. However, policy changes at the federal level like the Sackett decision may be mitigated by the fact that most states have the ability to enact laws that are more stringent than federal CWA and ESA law.

Ecosystem restoration in the U.S. is a well-established environmental market with meaningful scale. In recent years, there has been increasing interest in the development of market-based frameworks for restoration and biodiversity outside the U.S., which may provide investment opportunities in the future.⁴ For now, the U.S. offers an opportunity for NBS investment in a mature market that warrants exploration by natural capital investors for both its environmental outcomes and portfolio benefits.

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

Endnotes

1 WEF_New_Nature_Economy_Report_2020.pdf

2 Ibid

3 RIBITS as of August 2025.

4 For an exploration of opportunities for replication of the U.S. market-based framework, see: Madsen, Becca. 2024. Guidebook to U.S. Offsets and Compensation for Wetlands, Streams and Endangered Species. Environmental Policy Innovation Center, Washington D.C.

Sources

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