

Aggregating Small Forests and Farms for Ecosystem Services Markets and Conservation Programs

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Prepared for:



By:



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Executive Summary

The Chesapeake Bay has the largest land-to-water ratio of any coastal water body in the world.¹ As a result, what happens on the thousands of small farms and forests within the watershed has a profound effect on water quality in the Bay. Large, connected, and unfragmented landscapes are essential to protecting water quality and resilient ecosystems. However, conserving large landscapes is especially challenging in this region, which consists primarily of smaller parcels of privately owned land. The aggregation of multiple small landowners can increase the scale of conservation by unlocking new funding sources and enabling smaller landowners to participate more efficiently in conservation programs and rapidly growing markets for ecosystem services. Aggregation programs can help level the playing field - giving small landowners an opportunity to benefit from increases in conservation funding.

A new report from Ecosystem Marketplace finds that in the first eight months of 2021, voluntary carbon markets have already increased 60 percent in value from last year, driven by corporate net-zero pledges and growing interest in carbon markets to achieve Paris climate goals.² Conservation, restoration and management of forests, farmland and wetlands can deliver significant emission reductions and are a vital part of these markets. Helping small landowners in the Chesapeake Bay region tap into these growing markets would accelerate conservation in the region.

Within the Chesapeake, aggregation could be particularly effective for encouraging the uptake of best management practices on agricultural and forest lands to reduce nutrient runoff and pollution into the Bay and its tributaries. Aggregation can enable landowners to participate more efficiently in conservation programs and markets for ecosystem services. This is especially true for markets, like carbon offset markets, that are prohibitively expensive for landowners to enter if they own fewer than 5,000 acres. Aggregation is one avenue to open up this important new conservation funding source to family forest owners, small farmers, and all those who own smaller parcels of land.

This report, which was generously funded by The National Park Service and sponsored by The Chesapeake Conservation Partnership (CCP), documents examples of how organizations across the country are helping to aggregate small landowners to participate in ecosystem services markets and conservation programs. Through research and interviews with conservation practitioners (see Appendix C: Interview List), the report documents 20 programs and highlights four case studies noting lessons

¹ *Facts and Formation - Chesapeake Bay (U.S. National Park Service).*

<https://www.nps.gov/cbpo/learn/nature/facts-and-formation.htm>. Accessed 13 Aug. 2021.

² Forest Trends' Ecosystem Marketplace Insights Report: *Markets in Motion State of the Voluntary Carbon Markets 2021 Installment 1*, September 2021.

learned that could apply to pilot aggregation programs in the Chesapeake Bay watershed and beyond.

Research indicates that several factors are common among effective aggregation programs, whether they enable access to carbon markets or simply encourage conservation. Common to all successful aggregation practices are **Trusted Conveners** and **Active Landowner Outreach**. Among carbon market aggregation projects, **Catalytic Funding, Pre-Identified Buyers, and Sufficient Incentives** are key. Projects should also seek to utilize the appropriate **Aggregation Structure** for their set-up and should incorporate **Equity** into project design.

- **Trusted Conveners** provide a bridge between aggregators and landowners. Because they have existing relationships with landowners, these individuals or organizations ensure a good-faith, trusting partnership between aggregators and landowners. Consulting foresters, farm service providers, land trusts or other well-connected local organizations often play this role.
- **Active Landowner Outreach** sets a project up for success from the start. Landowner motivation, existing landowner networks, land type, and geography are all factors to consider in aggregation project design.
- **Catalytic Funding** is needed to launch a program because of the staff time and resources required. Conservation Innovation Grants (CIG) and Regional Conservation Partnership Program (RCP) funding from the Natural Resources Conservation Service (NRCS) often serve this role, and The Nature Conservancy also offers Natural Climate Solutions accelerator grants that offer financial support. Foundations and private companies are another potential funding source. Lastly, state funds, like the Clean Water and Drinking Water State Revolving Funds (SRF) have been used to provide seed funding for aggregation programs.
- **Pre-identified Buyers** should be lined up to ensure there is market demand before progressing too far in an aggregation project. When credit pricing is still undetermined, landowners should receive a conservative estimate to avoid disappointing results later on.
- **Sufficient Incentives** are required to ensure that landowners receive enough revenue to be interested in participating in conservation programs and ecosystem services markets. As prices for carbon offsets can vary greatly and are sometimes too low to cover the entirety of a landowner's costs to implement the practices, programs can connect the landowners with additional funding from other sources, provided conditions for additionality are met. Carbon registries require that projects prove additionality, i.e. that the purchase of the credit is leading to the sequestration of additional carbon that would not otherwise have been sequestered.
- **Aggregation Structure** can take a number of forms, and aggregators should be thoughtful in selecting the right one to manage risk for landowners and

themselves, ensure efficient administration, and have terms attractive enough to interest landowners. Particularly, an understanding of who is selling the credit and who is bearing the risk is important.

- **Equity** should be integrated into holistic aggregation project planning through ensuring equal access to markets and networking with communities historically left out of mainstream conservation programs. Aggregation schemes can also be actively designed to help under-resourced landowners, such as heirs property owners, generate revenue to hold on to their land.

Introduction

Conservation across the Chesapeake Bay watershed, which covers much of Virginia, Maryland, and Pennsylvania, all of the District of Columbia, and part of Delaware, New York, and West Virginia, is vital to protect the health of the Bay ecosystem, provide clean water and air for its residents, and keep working lands working and economically profitable. But more funding is needed in order to accomplish the needed restoration and conservation across the 64,000 square miles of the Chesapeake Bay Watershed. Much of this land is in private ownership, making individual landowners key to its sustainable management. The region also faces an increasingly parcelized land ownership pattern, where many landowners each hold small pieces of land. As of 2017, the number of family forest owners had increased by 25 percent over 2007, with close to 70 percent of those owning fewer than 10 acres of land.³ Across three Bay states, Virginia, Maryland, and Pennsylvania, an average of 14,000 acres of farmland was lost to conversion a year over the last decade.⁴ In order to conserve these properties and meet watershed-wide conservation goals, organizations and governments must work with small, private landowners to encourage and incentivize sustainable practices.

This report analyses aggregation programs - that is, programs that seek to assemble multiple smaller landowners to more efficiently enable their participation in conservation programs and markets for ecosystem services. Some markets, like carbon offset markets, can be prohibitively expensive for landowners to enter if they own fewer than 5,000 acres. Aggregating multiple small landowners to achieve a critical mass of land is one avenue by which to open up this important new conservation funding source to family forest owners, small farmers, and all those who own smaller parcels of land. Because it involves working with a large number of landowners, instead of one or two individuals, it can also scale up conservation in geographies with parcelized ownership. Within the Chesapeake, aggregation could be particularly effective for

³ *Forests | Chesapeake Bay Program*. <https://www.chesapeakebay.net/issues/forests>. Accessed 13 Aug. 2021.

⁴ *State of the Bay 2020*. Chesapeake Bay Foundation, <https://www.cbf.org/document-library/cbf-reports/2020-state-of-the-bay-report.pdf>. Accessed 13 Aug. 2021.

encouraging the uptake of best management practices on agricultural and forest lands to reduce nutrient runoff and pollution into the Bay and its tributaries.

Ecosystem Services Markets

A wide variety of ecosystem services markets exist today and the field is rapidly expanding. These markets, at their core, place a monetary value on environmental benefits and sell those, sometimes to offset environmental harm elsewhere and other times for the value the benefits provide. Within the Chesapeake, there are already some active markets. The regulatory requirement establishing a total maximum daily load (TMDL) of nitrogen, phosphorus, and sediment pollution into waterways has led to an active nutrient trading program across farmland in the region. Some states have also cultivated markets of their own. For example, Virginia excels in wetland and stream mitigation banking, and operates a nutrient banking program. Washington D.C. established a first in the nation stormwater retention trading program.⁵

While there is a diversity of ecosystem services markets, this report focuses on one of the most established: carbon offset markets. Carbon markets allow corporations or others who emit greenhouse gases into the atmosphere to offset those emissions by paying landowners to store increased amounts of carbon within their forests, soil, grasslands, or wetlands. Carbon offsets can be generated from a variety of land types found throughout the Bay watershed, making them applicable across the region. Forest carbon is the most established market, with carbon sequestration boosted by either improved forest management (IFM) or deferral of timber harvests. Soil carbon is a newer and growing market, with practices like no-till farming and planting cover crops to generate carbon credits. A list of major soil carbon market makers is found in Appendix B. Some organizations, like Tierra Resources, are also exploring blue carbon markets targeting the carbon sequestered in wetlands. Carbon markets are growing rapidly, making them a prime opportunity to increase conservation funding across the watershed.

Carbon offset markets could provide an important source of revenue to prevent land conversion and promote best management practices on forests and farmland in the Chesapeake Bay region. Within the United States, carbon offset markets take two main forms: the California compliance market and voluntary markets. The California compliance market, run by the state's Air Resources Board, is enabled by state legislation requiring California polluters to offset a certain percentage of their emissions. While credits sold to this market often fetch a higher price due to the regulatory requirement to purchase them, the state also has limits on how many credits can be

⁵ Timothy Male, Joel Dunn, Ruby Stanmyer, Hunter Hopcroft. 2021. "Private Conservation Finance: The Chesapeake Bay's Global Lead and How to Expand It," Environmental Policy Innovation Center, Washington D.C.; and Chesapeake Conservancy, Annapolis, Maryland.

purchased from out of state. Voluntary markets, on the other hand, have no regulatory basis. Growing numbers of companies and organizations, like Amazon, have committed to reaching net-zero emissions in their operations. Purchasing voluntary carbon offsets can help offset purchasers reach these goals while they work to reduce their carbon emissions. Most carbon aggregation projects are sold on voluntary marketplaces, which have grown dramatically in recent years. The chart below from Ecosystem Marketplace shows that voluntary offsets in the Forestry and Land Use category, by far the largest segment of the voluntary carbon markets, are on track to nearly double from 2020 to 2021.⁶

Table 4. Voluntary Carbon Market Size by Project Category, 2019 - 31 August 2021

| | 2019 | | | 2020 | | | | 2021 (through August) | | | |
|---|-----------------|---------------------|-------------|-----------------|---------------------------------|---------------------|-------------|-----------------------|---------------------------------|---------------------|-------------|
| | Volume (MtCO2e) | Price per ton (USD) | Value (USD) | Volume (MtCO2e) | Volume % Change from Prior Year | Price per ton (USD) | Value (USD) | Volume (MtCO2e) | Volume % Change from Prior Year | Price per ton (USD) | Value (USD) |
| FORESTRY AND LAND USE | 36.7 | \$4.33 | \$159.1M | 48.1 | 30.9% | \$5.60 | \$269.4M | 115.0 | 139.4% | \$4.73 | \$544.0M |
| RENEWABLE ENERGY | 42.4 | \$1.42 | \$60.1M | 80.3 | 89.4% | \$0.87 | \$70.1M | 80.0 | -0.3% | \$1.10 | \$88.4M |
| ENERGY EFFICIENCY/ FUEL SWITCHING | 3.1 | \$3.87 | \$11.9M | 31.4 | 921.0% | \$1.03 | \$32.3M | 16.1 | -48.9% | \$1.57 | \$24.2M |
| AGRICULTURE | - | - | - | 0.3 | - | \$9.23 | \$2.8M | 3.4 | 876.8% | \$1.36 | \$4.6M |
| WASTE DISPOSAL | 7.3 | \$2.45 | \$18.0M | 8.3 | 13.0% | \$2.76 | \$22.9M | 2.7 | -67.5% | \$3.93 | \$10.6M |
| TRANSPORTATION | 0.4 | \$1.70 | \$0.7M | 1.1 | 165.2% | \$0.64 | \$0.7M | 2.1 | 99.3% | \$1.00 | \$2.1M |
| HOUSEHOLD DEVICES | 6.4 | \$3.84 | \$24.8M | 3.5 | -45.4% | \$4.95 | \$17.3M | 1.8 | -49.8% | \$5.75 | \$10.4M |
| CHEMICAL PROCESSES/ INDUSTRIAL MANUFACTURING | 4.1 | \$1.90 | \$7.7M | 1.3 | -68.7% | \$1.90 | \$2.5M | 1.1 | -11.2% | \$3.22 | \$3.5M |

Source: Ecosystem Marketplace, a Forest Trends Initiative.

Note: Volumes are calculated from EM Respondents that reported trade data as of 31 August 2021. Respondents did not always respond to all survey questions; differences in the totals (for example, between the total annual volume and the sum of project category volumes) can be attributed to this. Throughout the remainder of 2021 and beyond as more organizations report to EM for the first time, and as existing EM Respondents report new transactions, these figures for 2020 and 2021 will likely continue to be updated. This will be reflected in future installments of EM's SOVCM report and on the EM Data Intelligence & Analytics Dashboard (<https://data.ecosystemmarketplace.com>).

Credits sold on the California marketplace follow the state's guidelines for measuring and verifying the amount of carbon sequestered. Voluntary marketplaces rely on several different registries, which generate scientifically-rigorous protocols for measuring, validating, and verifying the amount of carbon sequestered by implementing a set of practices on a given land type. The registry for each project studied here is listed in Appendix A: Aggregation Project Matrix, with protocols publicly available online. Each project must be able to prove additionality, or that the purchase of the credit is leading to the sequestration of additional carbon that would not otherwise have been sequestered.

⁶ Forest Trends' Ecosystem Marketplace Insights Report: *Markets in Motion State of the Voluntary Carbon Markets 2021 Installment 1*, September 2021.

Because these protocols usually call for technicians to visit properties selling credits to measure characteristics of forests or soils, it can be quite expensive to validate credits in order to be able to sell them. On small properties, the costs of verification can surpass the revenue generated from credit sales. However, an economy of scale means that landowners with 5,000 or more acres are usually able to turn a profit on carbon credits. Aggregation of smaller landowners is one way to allow these landowners to profitably access carbon markets, which would otherwise be cost prohibitive. While aggregation is the focus of this report, innovations in geospatial technology also increase small landowner access to ecosystem service markets by reducing monitoring costs.

Research by The Nature Conservancy published in the Proceedings of the National Academy of Sciences demonstrates that natural climate solutions can provide one-third of the global emissions reductions needed to meet the Paris climate agreement's goal for 2030.⁷ Trees and other plants have already perfected the carbon sequestration process over hundreds of millions of years of evolution - we're unlikely to see a better carbon capture and storage technology than that which nature provides. In the US, nature has the potential to remove 21% of the nation's carbon pollution⁸ and small forest and farmland owners, which make up the majority of landholdings in the Chesapeake Bay region, should be a part of the solution.

⁷ Griscom, Bronson W., Justin Adams, Peter W. Ellis, Richard A. Houghton, Guy Lomax, Daniela A. Miteva, William H. Schlesinger, et al. 2017. "Natural Climate Solutions." *Proceedings of the National Academy of Sciences of the United States of America* 114 (44): 11645–50.

⁸ Ibid.

Aggregation Basics

While the dominant focus of this report is on aggregation that enables small landowners to benefit from the growing market for carbon offsets and ecosystem services, it covers a range of different projects -- from informal aggregations, like programs that target a critical mass of small landowners to help them implement best management practices (BMPs) on their properties, to structured aggregations using legal arrangements to bind multiple landowners together to sell carbon credits. Informal projects can often pave the way to allow for structured ones by building relationships and trust with landowners.

Aggregation schemes also vary by program and geography. Governments, non-profits, and for-profit enterprises can all act as successful aggregators in regions where they are trusted partners to working landowners. One study found that Vermont landowners preferred to work non-profit organizations,⁹ while in other geographies local governments or private companies are most effective. Because landowner sentiment and organizational networking vary so widely by region, there is no one best aggregator. When designing projects, organizations should use their knowledge of their service area to determine who may be the most effective and trusted aggregator.

Despite differing aggregators and structures, there are several factors common among successful and effective aggregation programs, whether they are focused on enabling access to carbon markets or simply on encouraging conservation. Common to all successful aggregation practices are **Trusted Conveners** and **Active Landowner Outreach**. Among carbon market aggregation projects, **Catalytic Funding**, **Pre-Identified Buyers** and **Sufficient Incentives** are key. Projects should also seek to utilize the appropriate **Aggregation Structure** for their set-up and should incorporate **Equity** into project design.

Aggregation projects involve a variety of key roles to achieve those success factors, which can either be filled by one organization or through a partnership between several. Building on the existing strengths and experience of organizations can simplify the launch of an aggregation effort and position it for success. Those with deep relationships with key landowners or with landowner service providers can act as the liaison and handle outreach and communications. Organizations with ties to offset buyers, often corporations, can ensure there is a market for offsets and line up purchase agreements. Because multiple landowners are involved and each of them will need to sign a contract, aggregators will also need a project manager to coordinate logistics, track deadlines and any applications used, and ensure the project is moving forward.

⁹ White, Alisa E., et al. "Small-Scale Forestry and Carbon Offset Markets: An Empirical Study of Vermont Current Use Forest Landowner Willingness to Accept Carbon Credit Programs." *PLOS ONE*, edited by Chris T. Bauch, vol. 13, no. 8, Aug. 2018, p. e0201967. *DOI.org (Crossref)*, <https://doi.org/10.1371/journal.pone.0201967>.

Success Factors

Trusted Conveners

From initial outreach to signing contracts, successful aggregation projects involve individuals or organizations already trusted by landowners. Projects often involve legal arrangements governing which activities are acceptable on a landowner's property for a set term of years, can take years to develop, and can sometimes change quite a bit from start to finish. Having respected and trusted conveners working with the aggregator helps ensure landowners are willing to stick through the often complicated process and that both sides trust the other to operate in good-faith. If they are embedded in their local communities, the aggregator themselves can play this role or they can partner with aligned practitioners or organizations who are better networked or more connected with their target landowners. For organizations who plan to rely on outside conveners, identifying those partners is a key step and role. Local consulting foresters often fill this niche for forest landowners, and, for farmers, extension agents or agriculture service providers can do so.

Active Landowner Outreach

Aggregation projects tend to be more successful when they reach out to a defined and well-chosen group of landowners. Among the considerations are landowner motivation, geography, existing networks, and land type.

Understanding what motivates landowners is vital to ensure the project aligns with their needs and priorities. If their motivation is primarily financial, the price paid for conservation practices or carbon credits becomes the most important factor, whereas if they are more conservation motivated, there may be more flexibility on pricing. Because finding the appropriate aggregation structure relies on understanding landowners' risk tolerance and goals, organizations should seek to learn these at the beginning of a project. Land trusts, because of their local nature and strong relationships with landowners, can be helpful partners in identifying target landowners and target areas. Organizations with GIS capabilities can also help target land types most likely to align with the aggregation project.

In addition to motivation, working with a group of landowners that is already connected in a network can ease communications for the aggregator and ensure landowners can discuss questions, hesitations, and benefits with each other, independent of the aggregating organization. Instead of connecting individually with dozens of landowners, organizations can concentrate outreach on one or two forums if

there is an existing connection between landowners. This can also lead to “kitchen table” connections, where one landowner passes on information about conservation programs they participate in to their friends and network.

For carbon projects, it also helps to identify landowners within a defined and limited geographic area whose forest types or farm operations are similar. A unifying factor across all landowners allows the efficiency benefits of aggregation to be realized by applying one consistent protocol and monitoring scheme. The economy of scale that provides the onus for aggregation disappears if the individual parcels cannot be combined as one for the sake of monitoring.

Catalytic Funding

Launching an aggregation program, even in geographies with the prior two factors already in place, requires a large amount of staff time to set up and some financial resources. Staff must dedicate time to carefully designing the program and ensuring landowners understand it, lawyers must review risk and contracts. Because it is an emerging area of practice, few of these tasks are easily replicable and must instead be generated by the aggregator. Most organizations rely on an initial injection of outside funding to cover their costs as they get a program up and running. Aggregators and partnering organizations should incorporate applying for and managing these funds in project planning and role assignment.

There are several common sources of funding for aggregation efforts, each of which has a focus easily translatable to aggregation projects. Conservation Innovation Grants, administered by the Natural Resources Conservation Service (NRCS), are designed to “support the development of new tools, approaches, practices, and technologies to further natural resource conservation on private lands.”¹⁰ They have been used both to help launch the scientific backing for carbon projects and to fund individual aggregating organizations. The Nature Conservancy (TNC), a major player in promoting Natural Climate Solutions (NCS), runs an accelerator program which offers both financial support and mentorship to organizations with innovative and scalable ideas for carbon sequestration and emissions reductions.¹¹ TNC’s NCS accelerator program has helped several organizations launch programs helping small landowners access carbon markets.

¹⁰ *Conservation Innovation Grants | NRCS.*

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig/>. Accessed 13 Aug. 2021.

¹¹ “Natural Climate Solutions Accelerator Grant.” *The Nature Conservancy*,

<https://www.nature.org/en-us/what-we-do/our-priorities/tackle-climate-change/climate-change-stories/natural-climate-solutions-accelerator-grant/>. Accessed 13 Aug. 2021.

State funds, like the Clean Water and Drinking Water State Revolving Funds (SRF) have also been used to provide seed funding for aggregation programs. For example, the Soil and Water Outcomes Fund, a case study cited in this report, was seeded by a \$7.5 million investment from the Iowa SRF and the Iowa Finance Authority. The recently-passed Bipartisan Infrastructure and Jobs Act significantly increases funding to states' Clean Water and Drinking Water Revolving Fund

Beyond the funding sources mentioned above, there may be opportunities to seek funding from private foundations and individuals to pilot aggregation programs. Grants from foundations and individuals may be particularly important in the project planning and pilot phase before an organization is ready to apply for public grants. Given that many aggregation programs will eventually generate revenue through the sale of carbon offsets or other ecosystem services, private funders may be particularly drawn to the idea of seeding a project that is ultimately self-sustaining.

Pre-Identified Buyers

Carbon offsets are a market-based mechanism and rely on a buyer to generate revenue. Before entering into aggregation contracts with landowners, organizations must be certain there is a buyer for the credits. A comprehensive report on conservation finance, *Enduring Arches*, highlighted the importance of establishing demand early on and identifying the buyer as a key element of successful projects.¹² Some organizations who want to launch aggregating programs may not have the connections on their own to line up buyers for carbon credits. In those cases, organizations have found success by partnering with larger, conservation finance focused organizations or marketplaces.

Identifying a buyer early on is not just important for knowing you can sell the credits, but also for the price landowners will receive for credits. Because landowners may be weighing if a carbon program can generate more income than their existing harvest regime, they need concrete revenue numbers to plan around. It can be tricky to balance reaching out to landowners early enough to confirm a feasible supply of saleable credits, while also ensuring market demand. In cases where landowners need to know estimated revenue in order for the aggregator to decide if a carbon-project is even possible in their geography, organizations have better resulting offering conserve estimates based on their understanding of current carbon market trends, and can later inform landowners they can expect a greater payoff, not a lesser one.

¹² *Enduring Arches: Building Conservation Finance Projects for Impact*. Gordian Knot Strategies and the Conservation Finance Network, Apr. 2021.

Sufficient Incentives

Prices on the voluntary market can fluctuate greatly depending on the practices and buyer (see Appendix A: Aggregation Project Matrix), and may not cover the entirety of a landowner's costs to implement the practices and maintain their property. Credits could run as low as \$3/acre for soil projects and \$20/acre for forestry projects. In order to further incentivize conservation practices in a way that makes fiscal sense for landowners, many aggregation programs combine payments from multiple sources for each landowner.

NRCS funding, often through EQIP (Environmental Quality Incentives Program) or CRP (Conservation Reserve Program), is frequently layered with carbon offset sales for both soil and forest carbon projects. Some projects have been designed specifically to allow landowners to access NRCS Regional Conservation Partnership Program (RCP) funding and carbon offset funding at the same time through the aggregator. Organizations with existing experience coordinating NRCS projects can leverage their past experience to help successfully design payment options for aggregation projects that conform to federal regulations and funding limitations. NRCS regulations currently allow for this, as do many registry protocols, with some restrictions to ensure additionality. However, projects that intend to either passively allow or actively support landowners enrolling in multiple programs to access more funding should be proactive about communicating to the public the different funding sources and that each plays in encouraging carbon storage.

While scientists largely agree on the measurement of forest carbon and which practices increase it, there are major questions surrounding how soil carbon is currently measured, how long it is sequestered for, and if the practices which currently generate credits have any effect on the level of carbon in soils.¹³ Soil carbon credits are backed by scientifically tested protocols, however there is not yet clear consensus on the effectiveness of those protocols. While the credit-generating practices offer many co-benefits, like reduced fertilizer use and reduced pollution into waterways, organizations should fully understand the protocol they use and be confident in its scientific backing in order to ensure they are sequestering additional carbon through the credits.

¹³ Popkin, Gabriel. "A Major Climate Idea Is Based on Some Shaky Science." *The Atlantic*, July 2021, <https://www.theatlantic.com/science/archive/2021/07/soil-revolution-climate-change/619611/>.

A Note of Caution about Additionality

As carbon markets grow and become a larger part of corporate strategies to reach net-zero, they attract more scrutiny from legislators and the public to ensure they are providing the benefits they claim. Given the urgency of reducing emissions to mitigate the worst impacts of climate change, such oversight is essential in ensuring carbon markets have the impact they aspire to. However, if a project is not clear about its use of multiple payments, it can give the impression that a landowner is getting paid twice for the same activity, invalidating the credit by taking away its additionality. A series of articles published by Bloomberg and ProPublica raised significant questions about the environmental value of credits sold by The Nature Conservancy and others.¹⁴ In order to avoid questions about the legitimacy of both specific offsets and carbon markets generally, programs should clearly communicate the distinction between different funding sources and registries should continue to strengthen protocols to ensure additionality.

Land trusts should be especially careful about additionality when engaging landowners who already have conservation easements. Carbon markets often attract conservation minded landowners who need revenue in order to steward their land according to their conservation-oriented principles. Because of this, some landowners who participate in carbon markets own land that is already under a conservation easement, which can also raise questions of additionality. The relationship between easements and offsets depends on the specific terms found in each. Some easements bar all timber harvesting, meaning landowners would not be eligible for carbon credits because the easement already ensures that carbon stock will stay standing and prohibits many of the practices involved in IFM. Lands with less strict easements are often eligible for carbon markets, though, as long as selling the credit verifiably increases the carbon stock from what the easement requires. The landowner and the aggregating organization must both be certain that the easement is allowed by whichever protocol is used and that the practices implemented are both allowed by the easement and enhance the carbon sequestered beyond baseline levels.

Aggregation Structure

Aggregation projects utilize a variety of legal structures and lead organizations should be thoughtful in selecting the right one to manage risk for landowners and themselves, ensure efficient administration, and have terms attractive enough to interest

¹⁴ Elgin, Ben, and Zachary Mider. "The Real Trees Delivering Fake Corporate Climate Progress." *Bloomberg Green*, Dec. 2020, <https://www.bloomberg.com/news/features/2020-12-17/the-real-trees-delivering-fake-climate-progress-for-corporate-america> and <https://www.bloomberg.com/features/2020-nature-conservancy-carbon-offsets-trees/>

landowners. Two main considerations in legal structure are who sells the credit and who carries the risk. Regarding the former, some aggregation programs facilitate landowners themselves to enter into a direct contract to sell the offset while others have the aggregator selling the credit and disbursing payment to landowners. While the second option can minimize risk to landowners, it can also reduce the payments landowners receive as most organizations keep a percentage of the offset sales in order to cover their risk and administration costs. Knowing if a given set of landowners is more interested in maximizing returns or minimizing risk can help determine which model to pursue.

Additionally, landowners can either be paid based on the carbon stored or, if the aggregator is selling the credits, based on carbon-sequestering practices implemented by the landowner. The former ensures that the carbon storage targets are actually hit by the landowner, removing some risk for the lead organization. In this model, landowners aren't paid until the practices are completed, meaning they must front the money to implement them. The latter model can ensure that landowners get consistent and clear upfront payments. The Nature Conservancy and American Forest Foundation's Family Forest Carbon Program (FFCP) uses this payment for practices model. They pay landowners a set price to perform certain management activities on their forestland, then sell the credits generated by those practices. This can be a more approachable structure if landowners do not have readily available cash to pay for forest management or are hesitant to enter into contracts based on carbon generation.

With the argument for aggregation projects growing, there is a call to create new structures to improve the efficiency of projects for both landowners and aggregators. While no projects currently use the specific structure, a new protocol for soil carbon was recently designed to facilitate aggregated carbon projects by positioning carbon storage as a transferable right landowners can sign over to third-parties.¹⁵ This allows for aggregators to hold the carbon rights for multiple properties, sell offsets generated by them, and disburse a portion of the proceeds back to landowners. As organizations continue to pilot aggregation projects, innovations in structure are likely to continue to ensure risk and revenue are distributed effectively.

Equity

As with any conservation project, equity should be incorporated in holistic project design for aggregation schemes, particularly as offsets raise questions of fairness through their very structure. Because companies and purchasers use carbon offsets to cancel out emissions within their operations, some view offsets as giving polluters a

¹⁵ *Soil Enrichment Protocol Version 1.0*. Climate Action Reserve, 2020, <https://www.climateactionreserve.org/wp-content/uploads/2020/10/Soil-Enrichment-Protocol-V1.0.pdf>.

license to keep polluting in one area while promoting open space and conservation in others. This is particularly important given the disproportionate siting of high-polluting factories and processing plants in communities with majority Black, Indigenous, and Latinx residents and low-income populations.¹⁶ However, aggregation schemes can help promote equity within the offset system by allowing small, non-industrial landowners to enter the market.

One obstacle to equity within aggregation projects is the practice of working with existing networks of landowners. Projects that plan to leverage their existing connections in order to enroll landowners should proactively analyze who is left out and should make efforts to build relationships with new communities so those communities do not lose out on market access. For comprehensive information on how organizations can partner with diverse communities and build equity into program design, see *Weaving the Strands Together: Case studies in inclusive and equitable landscape conservation* by The Salazar Center.¹⁷ One of the key insights from the Salazar Center study is the importance of leadership from historically marginalized communities. Potential funders of aggregation efforts and conservation collaborators should support the leadership and broader engagement of marginalized populations by funding grassroots organizations like community land trusts to undertake this work.

In addition to following best practices for equity, aggregation schemes could be actively designed to help under-resourced landowners generate revenue to hold on to their land. Much like The Center for Heirs' Property Preservation helps prevent Black land loss in the US South by promoting active, sustainable, income-generating forest management to Heirs Property owners, aggregating organizations could enroll landowners in offset programs with a similar goal.¹⁸ The Swinomish Forest Bank, led by Ecotrust, is facilitating access to markets for members of the Swinomish nation in Washington, where parcelization has increased through generations.¹⁹ It expects to combine both traditional timber income with carbon credits to support the Tribe's conservation and economic development goals. While in early stages, this project could serve as a model for future aggregation schemes through its focus on justice. Organizations well-connected to diverse communities, and organizations led by people

¹⁶ Moses, Elizabeth, and Carole Excell. *Pollution Is a Racial Justice Issue. Let's Fight It That Way*. Oct. 2020. www.wri.org, <https://www.wri.org/insights/pollution-racial-justice-issue-lets-fight-it-way>.

¹⁷*Weaving the Strands Together: Case Studies in Inclusive and Equitable Landscape Conservation*. The Salazar Center for North American Landscape Conservation and the Network for Landscape Conservation, 2021, https://salazarcenter.colostate.edu/wp-content/uploads/sites/4/2021/01/Weaving-the-Strands-Together_Case-studies-in-inclusive-and-equitable-landscape-conservation.pdf.

¹⁸ "Center for Heirs Property Preservation | South Carolina." *Center for Heirs Property Preservation*, <https://www.heirsproperty.org/>. Accessed 13 Aug. 2021.

¹⁹Davies, Brent. "The Swinomish Bank on Community Forest Management." *Ecotrust*, 24 Sept. 2015, <https://ecotrust.org/the-swinomish-bank-on-bringing-back-community-forest-management/>.

of color or low-income people, can play a key role in ensuring equity in project design and respectful, mutually beneficial relationships between aggregators and landowners.

Case Studies

Camp Ripley Sentinel Landscape

Covering 805,000 acres in Central Minnesota, the Camp Ripley Sentinel Landscape (CRSL) has effectively utilized informal landowner aggregation to increase conservation at scale. Conservation in the sentinel landscape is a partnership between the military installation, state agencies, local Soil and Water Conservation Districts (SWCDs), and conservation NGOs like The Nature Conservancy. While there is not currently a program to facilitate participation in carbon markets, partners work with landowners on other conservation efforts to protect water quality, prevent conversion of working lands, and increase resilience around the military base. The landscape is largely forestland and farmland, with about a third of land surrounding the base in holdings of between 60-100 acres.²⁰ With so many private, small, working-land owners, the geography is ripe for aggregation. Conservation partners working in the landscape have used aggregation to protect 38,000 acres since 2004, completing roughly 30 easements per year totaling around 2,500 acres according to CRSL coordinator Todd Holman.

Funding for conservation comes from a variety of sources, and landowners often receive funding from multiple programs. Most of those conservation easements received state funding through the Reinvest in Minnesota (RIM) program. While this results in a one-time payment to landowners for the easement purchase, landowners often need some additional recurring funding in order to keep their working lands in production. The conservation partners at Camp Ripley help connect landowners to state funding for BMP implementation and EQIP funding from NRCS, which offers cost-share assistance for sustainable land management practices, and secure as much funding as possible through RCPPs. This payment combination allows landowners to maximize both their ability to pay for sustainable practices and their willingness to implement them. As carbon markets expand, there is also potential to layer offset sales as an additional revenue source.

To connect landowners to those resources and encourage them to conserve their land, the CRSL relies on two Soil and Water Conservation Districts (SWCDs) which have strong, long-lasting relationships with many landowners. They are both knowledgeable about conservation programs and trusted by many local landowners thanks to years of conscientious work and respectful partnerships. While in some geographies across the United States landowners would react poorly to having a local government

²⁰ *2020 Sentinel Landscapes Accomplishment Report*. US Department of Agriculture, US Department of Defense, US Department of Interior, https://sentinellandscapes.org/media/0rukteuq/2020-sentinel-landscapes-accomplishments-report_final_28jul20.pdf.

organization as their primary conservation contact, in this part of Minnesota they are widely respected and valued. Additionally, in some geographies, SWCDs may not have the resources to lead aggregation outreach efforts: the SWCDs in this region receive dedicated funding to cover staff time.

The landscape lends itself well to aggregation because of its clearly-defined geography. While some Sentinel Landscapes, including the Middle Chesapeake, cover millions of acres across multiple states, Camp Ripley is smaller and more manageable. By narrowing the pool of landowners, the SWCDs can target programming and funding more effectively according to specific landowner needs and motivations in the region. Because they know the landowners they work with well, they know that their conservation goals are aligned with both the military goals which led to the creation of the sentinel landscape and the local economic development goals, which value the continued existence of working lands. With local sentiment in favor of preventing land conversion, the SWCDs can rely on strong support for programming.

Cold Hollow to Canada

Led by Vermont Land Trust (VLT), the Cold Hollow to Canada project aggregated ten owners to improve carbon sequestration on 8,600 forested acres in northern Vermont via their participation in carbon markets. Developed over the course of three years, the project provides a replicable model of how to structure carbon aggregation projects and how to work with landowners in the face of uncertainty. Funding from The Nature Conservancy's Natural Climate Solutions accelerator grant supported the project.

VLT did extensive research to determine the best place to launch a carbon aggregation project before settling on the Cold Hollow Mountains. Project leaders chose Cold Hollow because forests in the region have strong sequestration potential and landowners tend to already be motivated by the idea of ecological forestry. The region is also home to the Cold Hollow to Canada Regional Conservation Partnership (RCP), an existing network of conservation organizations, which already had strong relationships with forest owners and had helped some of them implement better practices through RCPP funding. Through their involvement with the RCP, the landowners already knew each other and had experience working with conservation organizations. This proved key for the project success. As the structure and pricing of the project evolved, the landowners set up independent meetings by themselves to talk through their questions and hesitations and ensure their interests were advocated for. VLT was consistent in their communication with landowners, sending out weekly email updates to keep them in the loop and aware of progress.

Charlie Hancock and Nancy Patch, founders of the RCP, proved essential to the ultimate success of the project because of their relationships to both the landowners and VLT. Hancock, a local consulting forester, and Patch, the county forester working

for the state Department of Forests, Parks, and Recreation, worked in the region for years and were trusted deeply by landowners. This became especially important as the project underwent many changes over the course of its development. They acted as a trusted go-between that helped maintain trust and morale among landowners when things were changing rapidly.

After feeling there was too much personal risk involved in the partnership structure initially proposed by VLT, the group of landowners were able to work with VLT to develop a legal structure they were more comfortable with. After listening to landowner concerns, VLT created a subsidiary called the Vermont Forest Carbon Company (VFC). Landowners sign carbon rights agreements that transfer carbon generated from management practices to VFC, who then sells the credits. As the liable organization, VFC receives a small portion of credit sales as a hedge against risk. The structure worked for landowners who agreed that lowering risk was more important than maximizing their personal revenue.

One of the uncertainties landowners and VLT navigated throughout the process was pricing. VLT worked in partnership with The Nature Conservancy to line up buyers for the credits to be generated. Landowners were understandably curious early in project development what revenue streams may look like, as many of them were primarily motivated by the financial returns. VLT initially presented a conservative estimate of credit prices, so, while the price changed throughout the project, it kept going up. By not over-promising, VLT avoided disappointing landowners over the course of a changing project.

Cold Hollow to Canada leveraged existing relationships and trusted partners to launch the aggregation program and create a replicable model for future iterations. While project development took several years, it's payoff went beyond just connecting small landowners to carbon markets. The relationships formed with landowners throughout the process have also led to more traditional conservation easements in the area, further amplifying the conservation returns of this aggregation project. For more information about this project, see The Lincoln Institute's case profile *Cold Hollow to Canada: A Vermont Forest Carbon Cooperative for Climate Change Mitigation*.²¹

NCX

Operating as a private venture-backed company, NCX is a marketplace that connects landowners to carbon offset purchasers. They currently work across 16 states in the US Southeast, Appalachia, and Great Lake states, enrolling 670 landowners with 2,350,000

²¹ Macleod, Kavita K. Cold Hollow Carbon: A Vermont Forest Carbon Cooperative for Climate Change Mitigation, Lincoln Institute for Land Policy, Jan. 2021, https://www.coldhollowtocanada.org/fileadmin/files/Case_Profile_Cold_Hollow_Carbon_VT_03_24_21_.pdf.

million acres. While focused on opening carbon markets to small landowners, Natural Capital Exchange, or NCX, does not rely on structured aggregation as a cost-minimization strategy. Instead, technological advancements have enabled NCX to minimize costs by using high-quality proprietary basemaps as a key data source in measuring carbon baseline and stocks. Because they work with a large number of small, private landowners, the same success factors contribute towards their efficiency.

With technology providing cost savings, NCX uses individual contracts with landowners instead of a structure that binds the landowners to each other. Unlike many other carbon programs, where 40 years would often be the minimum contract length, landowners agree to merely defer harvesting their forest for one year, according to a protocol approved by Verra's registry. This shorter term is attractive to landowners, many of whom are older and reluctant to pass on land to their children subject to rigid contracts governing its use. In this structure, landowners can use the carbon payments as a substitute for what they would have earned by harvesting timber, allowing them to keep trees standing. While some question the permanence of carbon storage in this structure, it does allow for a greater mass of landowners (and therefore forests) to participate and could attract landowners who are less focused on conservation and may be more reliant on income generated from their lands. A one-year term also means that buyers can feel confident that the terms of their purchase will be fulfilled, whereas longer contracts are subject to risk from both natural disasters or non-compliance by landowners as time goes on. While NCX operates across a broad geography, the uniform contract terms and set enrollment cycles simplify the administration of working with hundreds of landowners while allowing the scalable impact that aggregation provides.

Much like their terms, NCX's process of pricing credits for their buyers is unique and landowner-friendly. They use an auction system to ensure efficient pricing for both buyers and sellers. Each landowner interested in selling credits sets a bid for how much they would want to receive for deferring harvest. Once bids are submitted, NCX offers the price that will drive enough landowners to sell to meet the demand from their identified buyers. By letting landowners set their price for the market demand, NCX avoids confusion around pricing or uncertainty about if a landowner wants to participate.

NCX also utilizes trusted conveners as outreach mechanisms to landowners. Landowners can work directly with NCX to enroll their acreage, but NCX also works with consulting foresters to generate landowner interest. Foresters not only have existing relationships with landowners, sometimes going back years, but they also all work with multiple clients. That means that if NCX gets one consulting forester aligned with their marketplace, that one forester could bring in multiple landowners as participants. Because foresters are knowledgeable about both the economics of traditional,

harvest-based forestry and the science of forest management, they can serve as a resource to landowners and help answer questions.

NCX is a model of both technological innovation and core principles for working with multiple small-landowners. By utilizing a uniform structure for all landowners, offering appealing terms that align with landowner motivations, and maximizing the effectiveness of outreach by partnering with consulting foresters, their program has found success.

Soil and Water Outcomes Fund

The Soil and Water Outcomes Fund (SWOF), a joint partnership between ReHarvest, a subsidiary of Qualified Ventures, and AgOutcomes, a subsidiary of the Iowa Soybean Association, helps farmers access revenue from both soil carbon and water quality markets. Thanks to the guidance of AgOutcomes, they have designed a program that responds to farmer needs while serving two markets. Launched in 2020 in Iowa, SWOF is currently working with farmers in Iowa, Ohio, Illinois, and the Chesapeake Bay watershed. While a new program, they have already shown significant results: their Iowa pilot was responsible for a 10% increase in cover-cropping throughout the state.

SWOF allows farmers to get paid for both the water quality and soil carbon outcomes generated by implementing new BMPs, like cover-cropping and no-till, on their lands. Unlike many government conservation programs, they utilize a pay-for-outcomes set-up, instead of pay-for-practices. Because they measure both the carbon sequestration and avoided pounds of Nitrogen and Phosphorus that are the result of those practices, each farmer sells the outcome to both a carbon offset buyer and a water quality buyer. Carbon payments alone are not usually high enough to cover the cost of the practice, so combining with water quality payments allows the farmers to implement BMPs in a financially viable way. The carbon buyers are often corporations, particularly those reliant on farmers in their supply chain. Water quality buyers are usually governments with a need to reduce pollution in their waterways. By selling the outcome itself into two different ecosystem services markets, SWOF allows farmers to receive funding from multiple sources while avoiding additionality concerns. They also do not allow participants to receive NRCS funding for the covered practices, to further ensure additionality. Like NCX, they use annual contracts.

To further ensure the program is responsive to landowner needs, SWOF models the expected outcomes before enrolling the farmer and pays them half of the anticipated revenue up-front. Many federal programs work on a reimbursement basis, so the upfront payment reduces risk for the farmer and ensures they have cash in hand to pay for the practices. This modeling minimizes the uncertainty for landowners, and SWOF takes on the financial risk if their model incorrectly predicts what the outcomes will be.

In addition to a shorter contract term and higher revenue streams, SWOF has also made the enrollment process easier for farmers (and buyers) thanks to technology. Whereas past soil carbon programs have required farmers to mail in soil samples from across their property, SWOF can be enrolled in via an online platform which utilizes modeling to predict outcomes. Unlike many federal programs, which involve lots of paperwork and can carry significant restrictions for the farmer, this enrollment system carries fewer burdens for farmers. The online data portal also benefits buyers, who can more easily see and track results in different watersheds and geographies to ensure alignment with corporate emissions reductions and sustainable farming plans.

Because it was designed to avoid some of the pitfalls which prevent farmers from being interested in other conservation programs, SWOF has found many trusted partners willing to reach out to farmers to encourage them to enroll. They work with a variety of conveners, largely agronomists who already work with farmers, but also pull from both their outcomes buyers and sellers. Their buyers, often corporations who already purchase crops from farmers, have been helpful in leveraging their existing relationships and connecting farmers in their supply chain to SWOF. Happy with their revenue from SWOF, many of their existing participants have also spread the word to their friends and neighbors.

In 2020 (the first year of implementation), the Fund provided payments averaging \$37 per acre to farmers implementing new conservation practices across 9,500 acres of cropland. These conservation practices generated an average of 18 pounds of nitrogen reduction and 1.5 pounds of phosphorus reduction per acre, as well as 0.75 tons of carbon sequestration.²²

SWOF shows the importance of careful project design that directly responds to landowner needs. By combining outcome-driven payments, they increase revenue to farmers and allow buyers to know with certainty that their goals are being met. By modeling outcomes, they minimize financial uncertainty. By partnering with trusted information sources for farmers, they leverage existing relationships to enroll more farmers.

²² Evaluating Best Practices from State Revolving Funds (SRFs) to Support Market- and Nature-Based Approaches for Flood Risk Reduction and Water Quality Improvement, Prepared by Quantified Ventures for Environmental Defense Fund, August 2021

Insights from the Chesapeake Bay Region

We interviewed land conservation practitioners in the region to learn more about the opportunities and obstacles to aggregation in the Chesapeake Bay watershed. Their insights are summarized below.

Existing programs and frameworks may provide a helpful platform on which to build pilot aggregation efforts. For example, the Middle Chesapeake Sentinel Landscape, covering 2,232,526 acres across Maryland, Virginia, and Delaware could provide funding and an organizing structure for aggregation in much of the Bay through Department of Defense grant programs to conserve land that impacts military outposts within the region. As in other places around the country, RCPPs can provide effective leverage for launching aggregation programs. There are many [RCPPs in the region](#), including the Chesapeake Bay Farm Stewardship and Preservation Program, Virginia Headwaters Restoration Initiative, Million Acre Challenge, Accelerating Chesapeake Bay Watershed Implementation Plans, Meeting WIP Goals in the Chesapeake Bay and Maryland Clean Water Commerce Outcomes Project - to name a few.

Carbon offsets have significant water quality co-benefits making them especially attractive for a region focused on improving water quality. Scientific studies have shown that implementing agricultural BMPs, many of which are eligible carbon offset practices, could provide two-thirds of the nitrogen and phosphorus reductions needed to restore water quality within the Bay itself.²³ Reliable carbon offset funding could provide a significant new source of revenue to incentivize farmers and forestland owners to implement practices that will also provide water quality benefits.

Partnership with national organizations like the Nature Conservancy or carbon developers could help regional land trusts and organizations access carbon markets. Local conservation practitioners noted that while they could serve as “trusted convenors” and have strong landowner relationships, they would benefit from national organizations’ access to carbon markets and forestry expertise. Landowner outreach is labor intensive and takes patience. **Multi-year funding for this on-the-ground work** will be a critical component of a pilot aggregation program.

There is some hesitancy around soil carbon markets among conservation practitioners since the science is not as developed as it is for forest carbon offsets. As soil carbon offset programs become more established, aggregation programs that focus on forests may be more attractive for pilot programs in the Chesapeake Bay region in the meantime.

²³ *Agriculture*. <https://www.cbf.org/issues/agriculture/index.html>. Accessed 13 Aug. 2021.

Trusted convenors vary throughout the region and in some places land trusts are considered too political and left-leaning to serve effectively in this role. For example, the Virginia Cooperative Extension may be an effective messenger and/or convenor for aggregation programs in some parts of the state.

Resources for Getting Started

For those interested in piloting an aggregation project in the Chesapeake Bay region or beyond, there are resources available and trends to follow in the coming months and years.

Aggregators - Many of the leading innovators in this space, some of whom are featured in this report (Quantified Ventures and NCX for example), are expanding their work in the Chesapeake Bay and beyond. Quantified Ventures' Soil and Water Outcomes Fund is [currently enrolling farms](#) in the Chesapeake Bay watershed. Interested parties could reach out to these and other organizations to look for opportunities for pilot programs and partnership. Another example is The Nature Conservancy's [Working Woodlands](#) program, which is engaging landowners who own a minimum of 2,000 forested acres. The American Forest Foundation's [Family Forest Carbon](#) Program is currently enrolling landowners in Pennsylvania, West Virginia, and select counties in Maryland who are eligible based on size and goals for their land. This program currently targets smaller landowners and currently averages 144 acres enrolled per landowner.

Public and quasi-public grant and loan programs - A number of aggregation pilot projects have been funded through the NRCS's Regional Conservation Partnership Program (RCPP) and Conservation Innovation Grants (CIG). Staying abreast of new RCPP and CIG grants that relate to aggregation would be helpful to see what other innovators are doing in this space. National Fish and Wildlife Foundation (NFWF) also supports conservation finance and market development projects.

State Revolving Funds like the Clean Water and Drinking Water State Revolving Funds (SRFs) have been used to provide seed funding for aggregation programs. The Bipartisan Infrastructure and Jobs Act doubled this funding and states may be looking to expand the use of SRFs for green infrastructure.

Philanthropic funding - beyond the public funding sources mentioned above, there may be opportunities to seek funding from private foundations and individuals to pilot aggregation programs. Given that many aggregation programs will eventually generate revenue through the sale of carbon offsets or other ecosystem services, private funders may be particularly drawn to the idea of seeding a project that is ultimately self-sustaining.

Federal legislation - The Growing Climate Solutions Act, which was passed by the U.S. Senate in June of 2021, helps producers generate and sell carbon credits by setting up a third-party certification process through the U.S. Department of Agriculture. Proponents of aggregation should track this legislation closely since it contains specific

language to encourage mechanisms and processes to aggregate the value of activities across land ownership.

State legislation - In Maryland, the Comprehensive Conservation Finance Act proposed authorizations and incentives to attract private capital investment to conservation. Although time ran out to pass the bill during the 2021 legislative session, it contained language that would ease aggregation and the legislature is taking the bill up again in 2022.

Offset protocols - ACR and VERRA (see appendix A) continue to update their protocols as they relate to aggregation. It will be important to stay up-to-date on these registries and potential they create for aggregation, and/or rules that prohibit aggregation.

Regional Greenhouse Gas Initiative - The Regional Greenhouse Gas Initiative, otherwise known as RGGI may make rules that relate to aggregation. Since four of the Chesapeake Bay states are part of RGGI, it is worthwhile to continue to track its progress and rulemaking.

Steps for Implementation

Initial research and scoping - As the case studies in this report demonstrate, there are multiple paths that land trusts and other organizations can take to launch aggregation programs. In some cases (especially in geographies where a pilot program is already on the ground), it may be as straightforward as reaching out to an existing aggregator like the Soil and Water Outcomes Fund or the Family Forest Carbon Program, to cite just two examples. In other cases, land trusts may find that they are interested in building a more customized approach. Aggregation programs that organizations build themselves are considerably more complex and time-consuming. However, they can yield significant and lasting conservation outcomes, as is the case with the Cold Hollow to Canada program in Vermont, for example.

Board and leadership education and buy-in - Because ecosystem service markets are complex and aggregation programs relatively new, organizations should be thoughtful about educating themselves and their boards about the potential benefits and risks of these programs. We've listed resources in the section above and throughout the report. But there are numerous additional books, articles, webinars and other resources available to educate staff and board members about ecosystem service markets.

Seek Catalytic Funding - Many land trusts, especially smaller ones, rely heavily on inbound inquiries from conservation-minded landowners. Aggregation projects (even ones that rely largely on partner organizations) require a more strategic approach to landowner outreach. Working with landowners takes staff time and patience. Foundation grants or public grant programs are an essential resource to support organizations as they undertake this work.

Partner outreach - As evidenced in the case studies, most aggregation programs require the joint effort of multiple organizations and people. Collaboration will be ongoing, but the initial establishment of partnerships is a critical component of getting started.

Pilot - We recommend starting small and learning as you go. A smaller-scale, shorter-term project will help your organization learn how a larger-scale project might work in practice. Good pilot programs set clear goals, determine in advance the length of the pilot, carefully choose a "test group," and document successes and challenges.

Appendix A: Aggregation Project Matrix

| Project Name | Lead Organization | Market type | Registry | Eligible Acreage | Geography |
|------------------------------|---|--|--------------------------------|-------------------------|---|
| Family Forest Carbon Program | American Forest Foundation and The Nature Conservancy | Voluntary forest carbon | Verra | 20-2,400 acres | Central Pennsylvania |
| NCX | NCX | Voluntary forest carbon | Verra | Any size | Continental US |
| Cold Hollow to Canada | Vermont Land Trust | Voluntary forest carbon | American Carbon Registry (ACR) | Over 125 acres | Northern Vermont |
| Greentrees | Greentrees | Voluntary forest carbon | ACR | Over 5 acres | Mississippi River Basin; US Southeast; Virginia |
| Forest Carbon Works | Forest Carbon Works | California compliance market, forest carbon | CA compliance | Over 40 acres | Continental US, southeastern Alaska |
| Nebraska Soil Carbon Project | The Nature Conservancy | Voluntary soil carbon | Gold Standard | Any size | Upper Big Blue and North Platte Natural Resources Districts |
| Soil and Water Outcomes Fund | ReHarvest Partners and AgOutcomes | Voluntary soil carbon; water quality credits | EcoPractices | Any size | Illinois, Iowa, Ohio, Chesapeake Bay Watershed |
| Missouri Corn and | Ecosystem Services | Voluntary soil carbon | ESMC | Any size | Missouri |

| | | | | | |
|---|------------------------------|-------------------------------|------|----------------|---|
| Soybean Pilot Project | Market Consortium (ESMC) | | | | |
| Illinois Corn Growers Project | ESMC | Voluntary soil carbon | ESMC | Any size | Central Illinois |
| <i>Scaling Blue Carbon in Louisiana</i> | <i>The Tierra Foundation</i> | <i>Voluntary blue carbon</i> | ACR | | <i>Louisiana and the Gulf Coast</i> |
| <i>Core Carbon</i> | <i>Finite Carbon</i> | <i>Voluntary soil carbon</i> | ACR | 40-5,000 acres | <i>US Southeast</i> |
| DC Stormwater Retention Credits (SRC) | DC Water | DC stormwater credit exchange | N/A | Any size | Washington D.C. |
| Revolving Water Fund | i2 Capital | Water quality | N/A | Any size | Brandywine-Christina watershed in Pennsylvania and Delaware |

Italics indicate projects in development or pre-launch.

Appendix B: Soil Carbon Market Makers

While not exhaustive, the following is a list of existing soil carbon marketplaces that connect farmers to offset buyers:

Bayer Crop Services, Carbon Initiative
CIBO, Carbon Program
Ecosystem Services Market Consortium
Gradable, Carbon Program
Indigo Ag
Nori
Nutrien, Carbon Program
Soil and Water Outcomes Fund
Truterra, TruCarbon program

Appendix C: Interview List

Kurt Krapfl, American Carbon Registry
Ian Sweeney, Agrarian Trust
Ann Mills and Mo Pasternak, Agua Fund
Kelly Leilani Main and Risa Hiser, Buy-In
Leigh Whelpton and Jackson Moller, Conservation Finance Network
Jazmin Varela, Core Carbon
David LeZaks, Croatan Institute
David Satterfield, Eastern Shore Land Conservancy
Tim Male, Environmental Policy Innovation Center
Bill Labich, Highstead
John Campagna, The Land Group
Jake Reilly, National Fish and Wildlife Foundation
Todd Sampsell, Natural Lands
Ellen Lott, The Nature Conservancy
Todd Holman, The Nature Conservancy/Camp Ripley Sentinel Landscape
Brian Shillinglaw, New Forests
John McCarthy, Piedmont Environmental Council
Dan Yeoman, ReHarvest/Qualified Ventures
Kirston Buczak, USDA Forest Legacy Program
Nick Richardson, Vermont Land Trust
Mary-Carson Stiff, Wetlands Watch