Using Forest Carbon Offsets for State Revolving Fund Loan Repayment

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1. Introduction

This report assesses the potential for using forest carbon offsets (also known as forest carbon credits) to repay loans from Clean Water State Revolving Funds (Clean Water SRFs) and Drinking Water State Revolving Funds (Drinking Water SRFs). The report is part of a larger research effort examining how to expand opportunities to use SRF funding to pay for large-scale land conservation.[1]

Nonpoint source pollution is the leading cause of water quality impairment in the United States (EPA 2015).[2] As demonstrated by the success of New York City's efforts in the Catskill and Delaware watersheds, land conservation can be an extremely effective way to prevent nonpoint source pollution from reaching water supplies. Land conservation projects may be eligible for SRF loans when there is a strong case showing preservation will prevent water quality degradation through reducing erosion and runoff and protecting natural water filtration.

In this phase of the project (Phase II), The Trust for Public Land has explored four states (California, Oregon, Washington, and Colorado) that were deemed to have the strongest potential for using SRF loans (both Clean Water and Drinking Water) for land conservation. There were four interconnected goals for Phase II: (1) Understanding the current use of and priorities for these funds; (2) Exploring ways to increase demand for SRF loans for land conservation; (3) Coordinating with states about potential policy changes to support using SRF loans for land conservation projects; and (4) Examining ways to overcome barriers to using SRF loans for land conservation.

One especially important barrier to using SRF loans for land conservation is the need for a dedicated source of funding to repay SRF loans. This report addresses the potential for income from forest carbon offsets to serve as this dedicated source of funding. There have been carbon credit markets for over a decade, and in 2012, California created the first economy-wide cap-and-trade compliance-based market for carbon offsets in the United States. This is the first compliance-based market through which forest projects in the four study states are eligible to sell offsets. As described below, though there are some major challenges, participation in carbon markets can allow forest owners to create a new forest product "out of thin air" to finance land conservation and climate-friendly stewardship (Best 2014).

2. State Revolving Funds

SRF programs provide financing for a variety of water quality related projects in the form of loans. Each state has a great deal of flexibility in developing criteria for ranking projects, setting interest rates, and providing loan subsidies. While the Clean Water and Drinking Water SRFs have the potential to play an

[1] For the purpose of this project, land conservation projects include those that result in the placement of lands into conservation easements or the purchase of lands in fee for preservation.

[2] Nonpoint source pollution is caused by water (from rain and snow) moving over and through the ground collecting and carrying diffuse pollutants including sediment, fertilizers, salts, pesticides from agriculture; bacteria and nutrients from septic systems; and oil and other toxic runoff from various industrial sources.

important role in reducing nonpoint source pollution, funding for land conservation in particular has been very limited (TPL 2011).

There are a number of important barriers to using SRF funds for land conservation. These include:

- **Priority setting** – there is an absence of a federal mandate to create consistent policies promoting land conservation for water quality protection, and a lack of consistent motivation or latitude at the state level to promote such projects;
- **Legal barriers** – some states do not allow funding for land conservation or do not allow loans to private entities like land trusts;
- **Financial and economic barriers** - too much competition for loans with point source projects, difficulty of demonstrated revenue stream;
- **Technical and administrative barriers** – higher transaction costs, difficultly in monitoring and quantifying nonpoint source pollution abatement, absence of set-asides for land conservation/nonpoint source projects; and
- **Lack of awareness** – little outreach from state programs to let potential project proponents know when funding is available for land conservation.

The Clean Water SRF was created in the 1987 amendments to the Clean Water Act to "provide communities a permanent, independent source of low-cost financing for a wide range of water quality infrastructure projects" (EPA 2015a). According to one estimate, the Clean Water SRF loan program has $1 trillion in financial capacity (Curley 2015). In 2009, less than 4% of all Clean Water SRF funding had gone to reduce nonpoint source pollution (TPL 2011). SRF loans are available to projects that protect water quality, but the vast majority of funded projects are for expansion of grey infrastructure such as water treatment plants rather than green infrastructure such as watershed land conservation.

Several states including Ohio, Georgia[3], New Jersey[4], and Virginia[5] have specific SRF programs to finance land conservation as a means to address nonpoint source pollution. The Ohio Water Resource Restoration Sponsorship Program in particular has provided over $162 million in funding for conservation of stream corridors and wetlands and is widely considered a model for linking grey and green infrastructure projects (Ohio EPA 2014). Ohio's sponsorship program resolves the credit risk issues that make many SRF programs reluctant to make loans for land conservation.

The Drinking Water SRF was created by the 1996 amendments to the Safe Drinking Water Act to "provide financial support to water systems and to state safe water programs" (EPA 2015b). Like the Clean Water SRF, Congress appropriates funding and then the EPA awards capitalization grants to each state. In the case of the Drinking Water SRF, capitalization grants are based on the results of the most recent Drinking Water Infrastructure Needs Survey and Assessment. For both the SRF programs, states make a 20% match to the capitalization grants available for loans.

The Clean Water SRF program allows for a percentage of total funds to be set-aside for nonpoint source or estuary projects. As compared with the Drinking Water SRF program, the Clean Water SRF program tends to have more opportunities for loan principal forgiveness and reduced loan rates. While the Drinking Water SRF program can set-aside funds for source water protection, this funding is often either

[3] Georgia Land Conservation Program

[4] New Jersey Environmental Infrastructure Financing Program

[5] Virginia Land Conservation Loan Program

used for small planning grants or is untapped by applicants. In addition, ranking criteria for Drinking Water SRF programs are typically less conducive to funding land conservation projects than those for Clean Water SRF programs.

State Programs: California, Oregon, Washington, and Colorado

As noted previously, the four states evaluated in Phase II of this project are California, Oregon, Washington, and Colorado. Tables 1 and 2 below compare the basic characteristics of the Clean Water and Drinking Water SRF programs in each of these states.

Table 1. Clean Water SRF Program – State Comparison				
Program Element	**California**	**Oregon**	**Washington**	**Colorado**
Administering Agency	California EPA, State Water Resources Control Board	Oregon Department of Environmental Quality	Department of Ecology	Colorado Department of Public Health and Environment Water Quality Control Division in partnership with Colorado Water Resources and Power Development Authority and Department of Local Affairs
Annual Capitalization Grant Allotment (2013)	$30 million	$10 million	$23.2 million	$10.7 million
Total Funds Available (2013)	$601 million	$15 million	$125 million	$304.6 million
Loan Rates (Plus Fees)	1.9% (plus 1%)	0.94%-2.44% (plus 0.25-0.5%)	1.1-2.3%	2.0 %(plus 0.8%)
Nonprofits Eligible to Apply	Yes	No	Yes	No
Eligible Applicants	Any city, town, district, or other public body created under state law, a Native American tribal government or an authorized Native American tribal organization	Public agencies	Public bodies and not-for-profit organizations	Public agencies
Ranking Criteria	- CWA 303(d) listed water bodies - Preventative measures against additional water quality degradation - Protect environmental, recreational, or agricultural resources	- Help meet water quality standards - Improve/sustain an aquatic habitat to support native, threatened, or endangered species - Incorporate/expand green stormwater infrastructure	- Must detail overall water quality impacts of project (including goals and measures of success)	- 303(d) listed water bodies - Apply BMPs to mitigate against erosion, sedimentation, pollution runoff - Incorporate innovative planning methodologies, including conservation easements and/or land use restrictions
Conservation/Nonpoint Source Project Requirements	Projects must address water quality objectives, provide protection or enhancement of beneficial uses, or comply with the Antidegradation Policy. Eligible non-point source projects or programs must address regional or area-wide water quality problems.	Non-point source water pollution control projects are allowed, and these include land acquisition for wetland habitat preservation, riparian habitat restoration, source water protection, and conservation easements. These projects must implement an element of a state or local plan directed at addressing water quality issues. All new projects are required to demonstrate environmental benefits.	Nonpoint source pollution control projects are allowed, and include groundwater/aquifer/wellhead planning and/or protection, lake restoration planning and implementation, riparian/wetland restoration planning and implementation, public outreach and education, and watershed planning and implementation. These projects can address issues including surface water runoff from agricultural, urban, or forest areas.	Eligible projects include land purchases and those that improve water quality in an impaired water body, implement a watershed/nonpoint source management plan, or implement a source water protection plan.
Additional Incentives	- Loan forgiveness available to disadvantaged communities - Loan forgiveness for green projects	- Principal forgiveness for nonpoint source control and estuary management projects	- Principal forgiveness for nonpoint source control and estuary management projects	- Additional subsidy for projects that rank highly in Financial/ Affordability and Water Quality Improvement

Table 1. Clean Water SRF Program – State Comparison				
Program Element	**California**	**Oregon**	**Washington**	**Colorado**
		- Green Project loan forgiveness and reduced interest rate - Disadvantaged communities loan forgiveness	- Green Project loan forgiveness and reduced interest rate - Disadvantaged communities loan forgiveness	ranking criteria categories - Green Project reduced interest rate - Disadvantaged communities reduced interest rate
Disadvantaged Communities Definition	A disadvantaged community has a MHI less than 80% of the statewide MHI.	Qualifying applicant is based on MHI, and is determined using this formula: Affordability rate = (Applicant's MHI x affordability index)/12.	Hardship is based upon population size and MHI	Disadvantaged when the combined monthly water and wastewater system rates are greater than/equal to 2.3% of community's MHI.
Disadvantaged Communities – Program Features	- Principal forgiveness - Extended loan term	- Principal forgiveness	- Principal forgiveness - Lower interest rates	- Lower interest rates

Table 2. Drinking Water SRF Program – State Comparison				
Program Element	**California**	**Oregon**	**Washington**	**Colorado**
Administering Agency	California EPA, State Water Resources Control Board	Oregon Health Authority administers the Safe Drinking Water Revolving Loan Fund and works with the Oregon Department of Environmental Quality on the Drinking Water Protection Fund.	Washington State Department of Health, Public Works Board, and the Department of Commerce	Colorado Department of Public Health and Environment Water Quality Control Division in partnership with Colorado Water Resources and Power Development Authority and Department of Local Affairs
Annual Capitalization Grant Allotment (2013)	$78.77 million	$8.98 million	$21.5 million	$14 million
Total Funds Available (2013)	$60.6 million will disperse approx. $200 million in new loans	Maximum loan of $100,000 per project	$108 million	$54 million
Loan Interest Rate		80% of state/local bond index rate	1.5%	2.0%
Percent of Funds for Source Water Protection	n/a	2.23% (set aside in 2013)	15% (maximum)	10% (maximum)
Eligible Applicants	- Utilities - Eligible applicant has to be able to enter into a debt contract with the State, and can be a community water system or a non-profit non-community water system.	- Utilities - Privately- and publicly-owned community water systems and non-profit transient and non-transient non-community water systems are eligible.	- Utilities - Eligible applicants include both publicly-owned and privately-owned public water systems.	- Utilities - Governmental agencies (municipalities, water and sanitation districts, improvement districts, water districts, and metropolitan districts) are eligible applicants. Private not-for-profit drinking water systems are also eligible applicants if a governmental entity assumes the debt.

Table 2. Drinking Water SRF Program – State Comparison				
Program Element	**California**	**Oregon**	**Washington**	**Colorado**
Relevant Ranking Criteria	- Priority funding for small systems - Affordability (based on MHI) - Severity of health risk alleviated by project	Program does focus on protection of drinking water resources, as demonstrated by criteria such as: - Area and level of sensitivity of the drinking water source - High-risk sources of contamination within the drinking water source area - Risk reduction potential - Projects within sensitive areas	- Level of public health risk the proposed project would eliminate and the type of project being proposed - Providing regional benefits - Providing solutions for multiple areas of public health risk	Based on health risks, points for: - Population size - Financial need - Water conservation - Source water protection - Health risks
Requirements for Nonpoint Source Projects	Source water protection measures are eligible, but land acquisition (except for land or land access that is integral to the construction of source, treatment or distribution facilities) is ineligible.	Restoration and/or conservation projects within the drinking water source area, projects for reforestation or replanting in sensitive or riparian areas, implementation of conservation easements to protect sensitive source areas, and the purchase of lands within the drinking water source area are eligible projects.	Land/Conservation easement acquisition for source water assessment protection is an eligible type of project but the land must be integral to the project and from a willing seller.	
Definition of Hardship or Disadvantaged Communities	Community with MHI is 80% or less of the statewide MHI, 60% or less is considered severely disadvantaged	Based upon the affordability rate (the ratio of the average annual water rate (based on 7,500 gal.) to the local MHI.	Affordability is based upon an applicant's MHI, operational expenses, and water rates	Based on population (5,000 or less) and MHI (if 80.0% or less of the statewide MHI, then eligible).
Disadvantaged Community Program Features	- Grants/Principal Forgiveness	- Grants/Principal Forgiveness - Extended Loan Terms - Lower interest rates	- Grants/Principal Forgiveness - Lower interest rates	- Extended Loan Terms - Lower interest rates

3. Forest Carbon Offsets

Why Forest Carbon Offsets?

Forests can both emit and sequester carbon dioxide (CO2), a major driver of climate change (CARB 2011). Through photosynthesizing CO2 and storing carbon as biomass, trees act as a sink for greenhouse gas (GHG) emissions. Carbon is also stored in forest soils, understory plants, and organic matter on the forest floor (CARB 2011). When forests are disturbed and trees are harvested, stored carbon is oxidized and CO2 is released. Nearly two-thirds of forests in the United States are privately owned and potentially threatened by over-harvesting or conversion that would create additional GHG emissions (Forest Service 2015). Forest loss currently accounts for an estimated one fifth of GHG emissions worldwide, making it the second largest contributor after fossil fuel combustion (van der Werf et al. 2009).

Carbon markets have been created in order to enable transactions that set costs for activities that increase GHG emissions and reward activities that sequester carbon (Ecotrust 2015). A wide variety of polluting industries generate GHG emissions. In contrast, letting trees grow older and larger, accelerating reforestation, and preventing forest loss help sequester carbon. As stated by one advocate, forest carbon credits provide landowners with the opportunity to "derive an ongoing income from growing trees rather than cutting them" (Wroblicka 2014).

Market Types

There are two kinds of markets for forest carbon credits: compliance and voluntary. In compliance markets, GHG emissions are controlled through regulations. In voluntary markets, companies and individuals can purchase carbon credits for a variety of voluntary reasons and are not bound by the same regulatory standards (Ecotrust 2014).[6]

In 2005 the multilateral Kyoto Protocol established a cap-and-trade system for participating countries (Johnson 2011).[7] Under the Protocol, the 15 original European Union (EU) member states created the EU Emissions Trading Scheme (EU-ETS). The EU-ETS now covers approximately 45% of the GHG emissions from 28 current EU countries (European Commission 2015). The EU-ETS is the world's largest compliance-based cap-and-trade program for GHG emissions (CORE 2015). However, the EU-ETS does not allow the use of carbon offsets from forestry projects because of concerns about reversibility, high transaction costs, and uncertainties about quantification, monitoring, and verification (Carbon Market Watch 2015, European Commission 2015, UK Forestry Commission 2015).

The Regional Greenhouse Gas Initiative (RGGI) was the first compliance-based cap-and-trade program in the United States. The program began auctioning emissions permits in 2008, and nine northeastern and Mid-Atlantic states are current participants in the program (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont) (IETA and EDF 2013). The RGGI

[6] For an example of a voluntary market transaction, see http://www.ecosystemmarketplace.com/articles/disney-to-expand-br-voluntary-carbon-offset-buying/.

[7] The United States did not ratify the Kyoto Protocol treaty and is not a participant.

allows approved US forest projects to generate carbon offsets through reforestation,[8] improved forest management, and avoided conversion (RGGI 2015).[9]

California's cap-and-trade program is the first compliance-based carbon market open to forest projects in California, Oregon, Washington, and Colorado. California's cap-and-trade market was created as part of implementing California's Global Warming Solutions Act of 2006 (AB 32). The goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. The cap-and-trade market began selling offsets in 2013. The program is now the second largest compliance-based carbon market in the world, after EU-ETS, and offsets approximately 85% of the state's carbon pollution (Hsia-Kiung 2014). The California cap-and-trade market allows offsets to cover up to 8% of regulated emissions and is open to landowners in 48 states. By June 2015, the California cap-and-trade market had raised $2.2 billion dollars (Carroll 2015).

Because it was preceded by several major climate credit registries, the California Air Resources Board created a program for existing registries to assist projects in participating in California's compliance-based market (Early Action Offset Programs) (CARB 2015d). Carbon credit registries convert verified emissions reductions into assets that can be sold in carbon markets (Markit Group 2009). Ideally, registries improve the credibility and transparency of forest carbon offset transactions. Several major carbon offset registries pre-date the creation of California's Compliance Offset Program and its Forest Carbon Protocols. These registries include the American Carbon Registry, Climate Action Reserve, Verified Carbon Standard, and the Gold Standard. The first three of these have been approved for the California Air Resources Board to issue and track credits that can be transitioned to California's cap-and-trade program (CARB 2015c).

Market Value

The global market for forest carbon offsets reached a high of $237 million in 2011 (Peters-Stanley et al. 2013). In 2012, voluntary offset buyers were responsible for 95% of all market activity (27 $MtCO_2e$[10]) and 92% of the value of the offset market ($198 million) (Peters-Stanley et al. 2013). Compliance-driven purchases represent an increasing share of the market as new regulation-based markets such as California's cap-and-trade program expand (Forest Trends 2014).

California's cap-and-trade program and other compliance-based markets have influenced voluntary offset prices (Forest Trends 2015, Best 2014). The global average for voluntary carbon credits has consistently declined since 2011 when participant nations failed to ratify another phase of the Kyoto Protocol (Forest Trends 2015), and prices of voluntary offsets reached an all-time low of $3.8/$tCO_2e$ last year (Gonzalez 2015).

The table below shows 2012 and 2013 volumes, values, and average prices for carbon offsets in global voluntary and compliance markets. According to Ecosystem Marketplace, in average prices for offsets in the United States from the California Air Resources Board ranged from $9.50 to $15 in 2013; for the American Carbon Registry prices were $7.50 to $12; for Climate Action Reserve they were approximately $10; and for Verified Carbon Standard they were $4 to $18 (Forest Trends 2014).

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8 In New York and Connecticut only.

9 Another regional effort to create cap-and-trade programs, the Western Climate Initiative, subsequently became a non-profit coordinating body. Only California, British Columbia, Ontario, Quebec, and Manitoba are current participants (WCI 2016).

10 Million tonnes of carbon dioxide equivalent.

According to New Forests (2015), $4,205,000,000 in allowances were sold in California's cap-and-trade market between November 2012 and February 2015, but the supply of offset credits in the market is constrained relative to demand.[11] The general assumption is that it is relatively easy to find buyers for credits in compliance markets, and prices in the California cap-and-trade market are expected to rise as the cap is tightened and regulated sectors increase (Ecotrust 2015).

Table 3. Comparison of 2012 and 2013 Forest Carbon Markets' Transactions, Volumes, Values, and Average Prices, All Markets

Table 1: Comparison of 2012 and 2013 Forest Carbon Markets' Transactions Volumes, Values, and Average Prices, All Markets

MARKET*	Volume		Value		Average Price	
	2012	2013	2012	2013	2012	2013
Voluntary	22.3 M	29.0 M	$147 M	$140 M	$7.6	$4.8
California**	1.5 M	1.7 M	$12 M	$16 M	$8.2	$9.4
Australia CFI**	2.9 M	1.5 M	$38 M	$32 M	$13.3	$20.8
CDM/JI	0.5 M	0.0 M	$0.6 M	$0.2 M	$1.1	$8.0
NZ ETS	0.2 M	0.0 M	$1.9 M	-	$7.9	-
Other	0.6 M	0.4 M	$15.6 M	$3.9 M	$25.3	$9.8
Voluntary Total	27 M	29 M	$198 M	$140 M	$7.7	$4.8
Compliance Total	1 M	4 M	$18.1 M	$52.4 M	$10.5	$9.7
Grand Total	28 M	32.7 M	$215.8 M	$192.1 M	$7.8	$5.2
Primary Market	22 M	30 M	$137 M	$153 M	$7.5	$5.0
Secondary Market	6.3 M	2.2 M	$57 M	$16 M	$9.8	$6.9

Notes: Based on 32.7 $MtCO_2e$ in transactions reported by 136 forest carbon offsets project developers and retailers.
*See acronyms list for explanation of market abbreviations. Totals in this chart may not add up perfectly due to rounding.
**The California and Australia markets were pre-compliance in 2012 but transitioned to compliance in 2013.

Source: Forest Trends' Ecosystem Marketplace. *State of the Forest Carbon Markets 2014.*

How do Forest Carbon Credits Work?

There are three types of forest projects that can generate forest carbon credits: (1) Reforestation; (2) Avoided Conversion; and (3) Improved Forest Management (Yankel 2014). Avoided Conversion and Improved Forest Management projects are generally the most relevant to funding land conservation. Avoided Conversion projects are those in which areas that could be converted to agriculture or housing are permanently protected for forest use, usually through the use of conservation easements. Practices that fall under the umbrella of Improved Forest Management include extending harvest rotation; retaining more green trees and snags at harvesting; using thinning or partial harvest rather than clearcutting; adopting wider buffers around streams and/or drinking water source areas; retaining harvest residues or "slash" onsite (depending on wildfire risks); limiting or stopping harvest in areas with steep or unstable slopes; and creating "reserves" or "wild" areas with little or no commercial harvesting

[11] California Carbon Allowances are auctioned quarterly and trade in secondary commodity futures markets. California carbon offsets trade over the counter at a discount of 15-25% (NewForests 2015).

(Ecotrust 2015). See Figure 1 below for a representation of Avoided Conversion projects. Figure 2 shows Improved Forest Management Projects.

Figure 1. Avoided Conversion (TPL 2014)

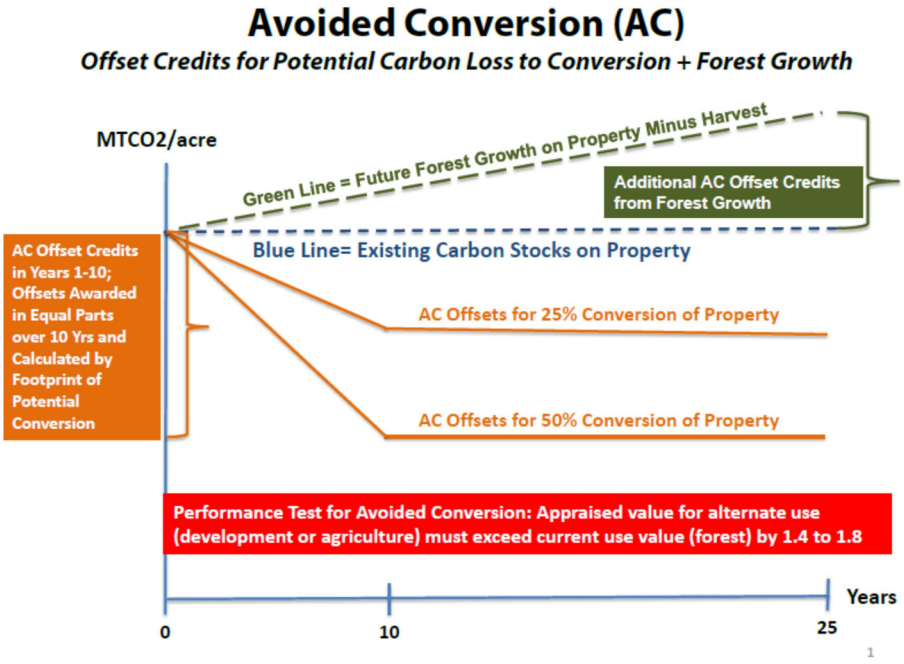
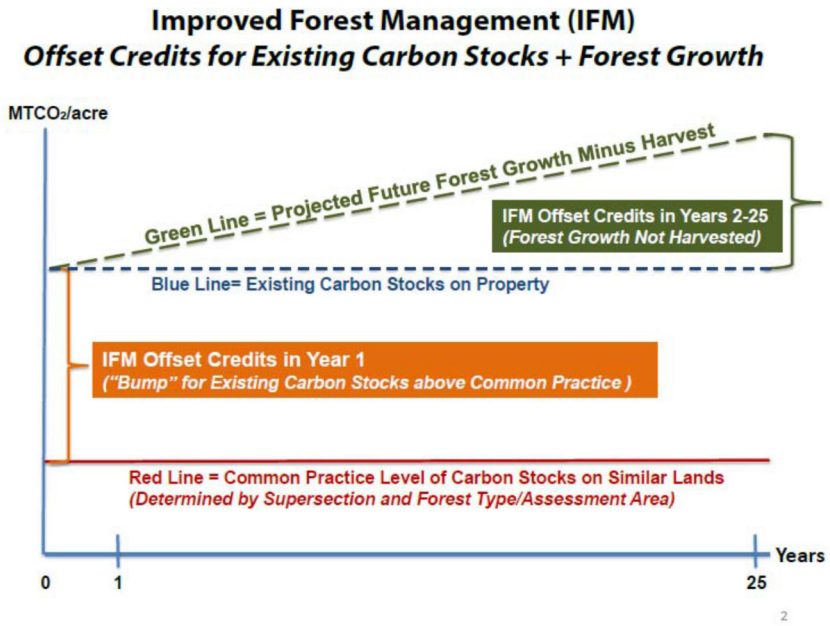


Figure 2. Improved Forest Management (TPL 2014)



Carbon offsets are measured in metric tons of carbon dioxide equivalent (tCO2e). Tree biomass is 50% carbon, and CO2 is 27% carbon; therefore, two tons tree biomass is equivalent to one ton of carbon and 3.67 tCO2e (Ecotrust 2015).

In order to meaningfully offset GHG emissions, forest carbon credits need to meet the following criteria outlined by World Resources Institute (2011) and corroborated by others (Calmut et al 2010, CARB 2011 and 2014, Ecotrust 2015, Forest Trends 2011). The benefits of forest carbon offset projects must be:

- **Real**. Projects have to meet standards for actually reducing emissions, including avoiding/minimizing negative leakage. "Leakage" refers to unanticipated CO2 emitting activities that are shifted to other areas as a result of a forest carbon project.
- **Additional.** Additionality means that CO2 sequestration would not have happened without the project. The project must reduce emissions/increase sequestration beyond "business as usual." Activities that are required by law,[12] that are part of common practice,[13] or that save landowners money should not be considered part of the project in order to generate credits.
- **Verifiable.** The offset project needs to be monitored and verified regularly by a qualified and independent third party. The CO2 offset has to be quantified accurately and precisely based on extensive information about forest carbon inventory and the impacts of management practices.
- **Permanent.** Emissions reductions cannot be temporary and reversible. This is somewhat complicated since forests are biological systems subject to natural events that can release carbon, such as pest infestations or wildfires. One way to address this is by creating "buffer pools" setting aside offset credits in case of future (unintentional) reversals. For Avoided Conversion projects, the use of conservation easements also contributes to permanence.[14]
- **Enforceable.** Credit ownership has to be clearly established and tracked to avoid double counting. Most standards rely on registries to track credits and facilitate enforcement. The California Air Resources Board's Compliance Offset Protocol requires 100 years of annual monitoring, forest carbon inventories, and reporting to third-party auditors.

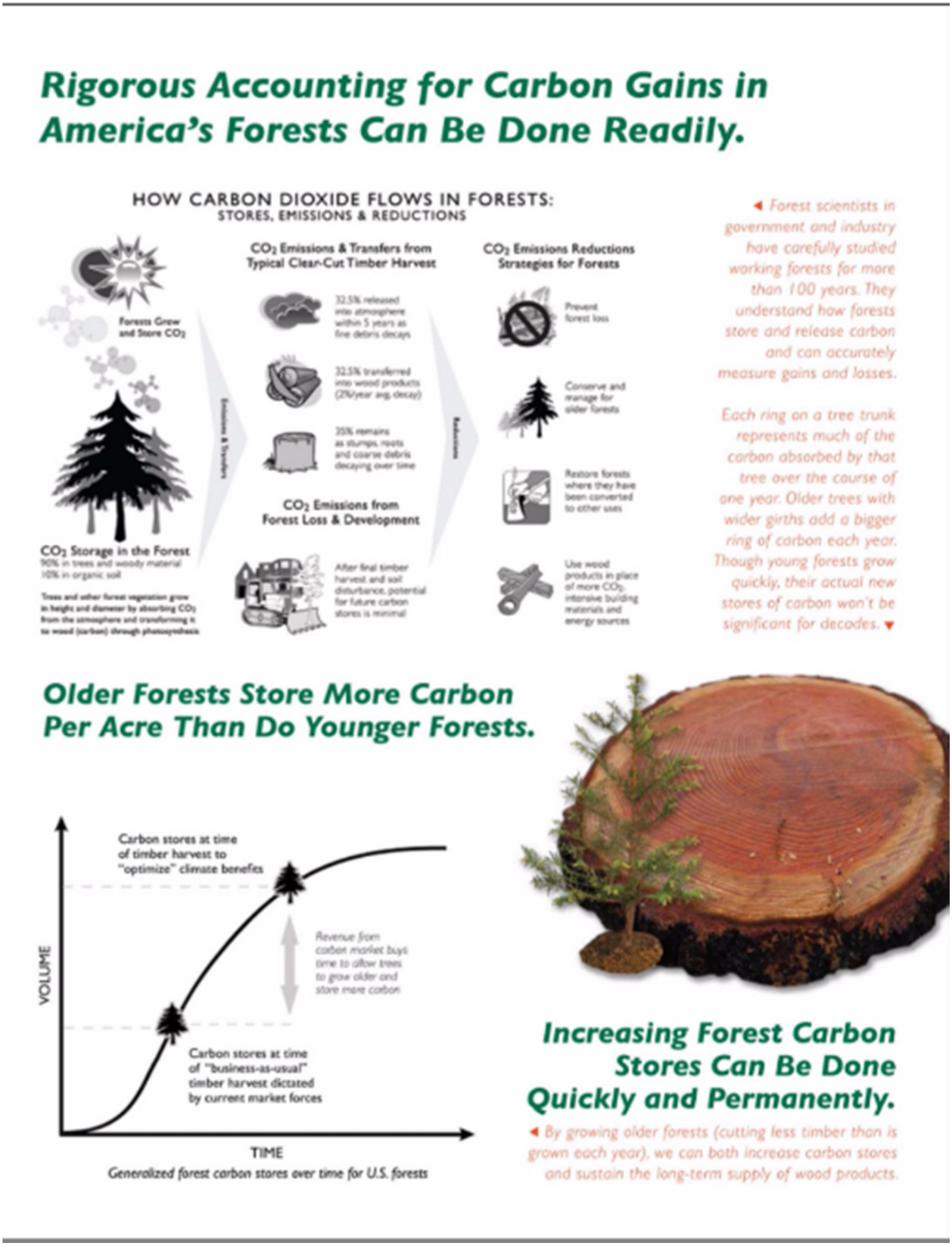
See Figure 3 for a general overview of accounting for carbon sequestration in carbon offsets (Pacific Forest Trust 2007).

[12] For example a Habitat Conservation Plan created in compliance with the federal Endangered Species Act could restrict timber harvest.

[13] The average stocks of the standing live carbon pool from within the Forest Project's Assessment Area, derived from USDA Forest Service Forest Inventory and Analysis Program plots on all private lands within the defined Assessment Area (CARB 2011).

[14] The California Air Resources Board's Compliance Offset Protocol for US Forest Projects requires landowners to record "Qualified Conservation Easements" against properties involved in Avoided Conversion Projects (CARB 2011).

Figure 3. Accounting for Carbon Gains in Forests (Pacific Forest Trust 2007)



How to Use Carbon Credits to Fund Land Conservation

As indicated above, the process of developing a carbon project can be very complicated. Here is a brief outline of the steps involved in generating carbon offsets through the California cap-and-trade market based on an internal process developed at The Trust for Public Land:

Questions to Answer

A. What Project Type is Most Appropriate?

Improved Forest Management may be most appropriate if:

- **Property has better carbon stocks than common practice**.[15] The property should be better stocked with timber than comparable private lands within the same area and forest type. A history of timber harvest will leave more room for increasing carbon stocks.
- **Landowner is willing to forgo timber revenue and management flexibility**. Landowner must agree to practice "natural management" forestry or meet other sustainability tests defined in the rules.
- **Property is large.**

Avoided Conversion may be most appropriate if:

- **Property can be encumbered by a conservation easement or transferred to public ownership.** Land must be in private hands before the project start date and must be placed under a "Qualified Conservation Easement" or transferred to non-federal public ownership.
- **Appraised market value under development or agriculture is at least 1.4 times (ideally more than 1.8) times higher than under forest use.** Real estate appraisal determines a property's highest alternative land use and the potential acreage that could otherwise be lost to conversion (to development or agriculture).
- **Forest is productive enough to claim credits from future growth.** Avoided Conversion projects can also claim credits from future forest growth. They must meet the sustainable harvest and natural forest management requirements.

B. Is the Landowner Willing to Commit to the Carbon Offset Terms?

Landowner must comply with project terms for 125 years. Landowners must be willing to commit to compliance with the terms of a carbon project over its entire 125-year life; this includes a 25-year carbon offset crediting period and a 100-year permanence period during which carbon stocks have to be maintained. Compliance with the carbon project includes: (1) following harvest constraints and sustainable management regimes; (2) adhering to "natural forest management" standards; (3) setting aside funding for and complying with ongoing monitoring and reporting requirements; and (4) accepting liability for "intentional reversals" and invalidation of credits sold from the project.

[15] Common practice is a standardized value, expressed in metric tons of carbon dioxide per acre, which is used to compare carbon stocks on forest ownerships to carbon levels on similar lands. Common practice is determined by the U.S. Forest Service using data from its annual Forest Inventory Analysis (FIA). The common practice numbers used to evaluate a project will be specific to the project's geography (determined by "Supersection"), forest types (grouped into "Assessment Areas" of naturally associated tree species), and Site Class (rated as high or low for each forest stand, largely determined by the quality of forest soils).

Landowner must be able to find an acceptable balance of timber harvest revenue and carbon offset revenue. During the 125-year period, landowners may not harvest below the volume of carbon stocks that were present on the property at the carbon project's starting point (Year 1). If that occurs, the project is cancelled and the landowner is liable for replacing offset credits under an "intentional reversal."

C. Can Revenues Fund Conservation Work?

Improved Forest Management offsets are front-loaded into Year 1 if the property has very high existing carbon stocks relative to common practice. These existing carbon stocks are the basis for the potentially large "first-year bump" of carbon credits that provides the majority of revenue for most Improved Forest Management projects. This potential for front-loaded revenue could theoretically align well with demand for capital to integrate into a conservation project. Improved Forest Management projects can generally deliver these Year 1 carbon credits to the landowner within 18-30 months from the time the landowner agrees to proceed with the carbon project.

Avoided Conversion offsets are awarded in equal parts over the first 10 years of the carbon project, and are, therefore, not as helpful for meeting near-term project capital needs in Year 1 of a conservation project. This is true regardless of the projected rate of conversion (how quickly forest on the property would be cleared) or the property's carbon stocks relative to common practice (there is no first year "bump" of offsets possible for Avoided Conversion projects even if carbon stocks are well above common practice). Avoided Conversion projects generally have the same 18-30 month timeline for delivering Year 1 carbon credits to the landowner, and then will deliver the same amount of carbon credits to the landowner in Years 2-10. Small amounts of additional credits will accrue from forest growth in Years 11-25.

Since offsets for Improved Forest Management projects are "front-loaded" into Year 1, they may be more helpful in conservation projects that require large amounts of capital up front. In the case of a project that receives a State Revolving Fund (SRF) loan covering up front capital costs, Avoided Conservation offsets may also be helpful in providing a guaranteed revenue stream over 25 years.

Steps in the Project Development Process

The carbon project development process involves numerous steps including initial consultation, forest carbon inventory, forest carbon modeling, development of project documentation, third-party carbon verification, issuing and selling of carbon credits, and ongoing monitoring/inventory/verification (Ecotrust 2015). The following steps are based on The Trust for Public Land's internal process for assessing and developing carbon projects to help finance land conservation.

- **Step 1. Identify Potential Project.**
  - Determine potential project boundaries and conduct preliminary analysis of forest characteristics
  - Identify if the carbon project is intended to provide capital for the conservation project? Or generate additional ongoing revenue? Or both?
  - Determine whether project would fall under "Improved Forest Management" or "Avoided Conversion" (see above).
- **Step 2. Conduct Preliminary Carbon Assessment.**

- Work with a consultant or a carbon developer to estimate carbon credit potential and possible financial returns.
- Map property to determine which geographic "Supersection" and "Common Practice Values" must be used to compare the carbon stocks on the property to stocks on similar lands.
- Conduct forest inventory by forest type and site class. Determine acres of each "Assessment Area" on the Property (e.g., "Northern Hardwoods Assessment Area").

■ **Step 3. Determine Potential for Project to Aid in Financing Conservation Project.**

- Estimate the value of potential offsets and when carbon credits would be awarded.
- Assess project funding needs.
- Determine if there are any agency policies that might prohibit ecosystem services payments or any issues related to the timing of carbon payments.

■ **Step 4. Conduct Full Feasibility Assessment.**

- Carbon developer conducts full project and baseline scenario modeling.
- Additional research into assessed property values (key basis for Avoided Conversion projects) and/or testing of carbon stocks.

■ **Step 5. List the Project on Carbon Registry and Submit for Third Party Verification.**

- List the project with an Offset Project Registry approved by the California Air Resources Board: American Carbon Registry, Climate Action Reserve, or Verified Carbon Standard.
- Once a carbon project has been listed, the carbon developer and landowner will develop detailed project documents and have the project reviewed and approved by a California Air Resources Board-approved Project Verifier.
- Project Verifiers review modeled carbon reductions for all projects and appraisals for Avoided Conversion projects.

■ **Step 6. Full Project Development and Offset Credit Sales.**

- Once the project has been verified by the Project Verifier, it will be officially registered on the California Air Resources Board offset registry and awarded an initial amount of Year 1 offset credits that can be sold to businesses in California covered by its carbon cap and trade system.
- The carbon developer will generally sell the awarded offset credits as part of its contract with the landowner, and deliver revenues to the landowner minus its fee. This is when the first revenues may be available to fund a conservation project or repay an SRF loan.

■ **Step 7. Ongoing Verification.**

- Periodic third-party verification for the period during which offsets are being generated and during the 100-year permanence period.

Challenges for Forest Carbon Credits and Conservation

Although there is great potential for using forest carbon credits to fund conservation and to pay back State Revolving Fund (SRF) loans, the cost, complexity, and long time horizon for forest carbon offset projects may limit the usefulness of this tool for many landowners and land trusts. In addition, lands that are currently managed for relatively low timber harvests for conservation reasons may be ineligible for carbon credits because "business as usual" is already maximizing carbon sequestration (Hay 2009).

According to one guide for landowners, "the costs and practical implications of ongoing forest carbon inventory and monitoring for 100 years after a project's last carbon credit is issued (during which time no additional carbon revenue would be coming in) makes certification using standards such as ARB and CAR financially infeasible for most smaller and non-industrial private forestland owners" (Ecotrust 2015). Similarly, according to Forest Trends (2011), "developing forest carbon projects is complex and often daunting for project proponents, whether they are from the private sector, government, or civil society" and "successful project development requires complying with rigorous standards of analyzing and documenting carbon benefits, working through an array of legal, business, and community relations issues, and actually carrying out the challenging work of reforestation and forest and land management activities that go beyond business as usual in order to create carbon benefits."

Even when a project is managed by a professional carbon project developer, it can often take two or more years from the time of initial conversations with landowners to the first credits being issued (Ecotrust 2015). One advocate reports that while "several land trusts have had success with registering forest projects…others are finding the process daunting, expensive or are waiting on the sidelines before wading in" (Wroblicka 2014). In another example, when Placer Land Trust in California's Sierra Foothills tried to register a carbon offset project for their Harvego Bear River Preserve, they were unable to make a strong enough case because the growth rate and decay rate for the western oaks on the property have not been as well-studied as those of faster growing commercial species (Wroblicka 2014).

The substantial costs for developing a forest carbon project include the following (as estimated by Ecotrust [2015]):

■ $1,000-$5,000 Forest Management Plan ■ $10-$15 per acre for Carbon Inventory (to be updated every 5-7 years) ■ $50,000-$100,000 for Baseline Modeling and Documentation for Third Party Verification	■ $15,000-$25,000 Contracts with Third-Party Carbon Verifiers ■ Fees from Carbon Standards to Register Projects ■ Annual Disturbance and Harvest Reporting ■ Periodic Third-Party Verification (every 5-7 years)

Many of these costs are incurred before any carbon credits can be sold (Hay 2009). In fact, total number of credits generated by a project may not even be quantified until after significant costs have been spent in the implementation process. While carbon developers may agree to take on some or all of these expenses, there may be unrecoverable costs for landowners even when potential projects are not eligible for enrollment or when they generate fewer credits than expected (Hay 2009).

Finally, the long time horizon of these projects is a challenge. Land trusts cannot currently predict whether future carbon offset sales will cover ongoing verification costs; therefore, it's likely that they would need to retain some income as an endowment to cover these long-term expenses (Wroblicka 2014). One legal commentator worries that "saddling future property owners with significant monitoring and report obligations may provide a disincentive to enroll properties in the program" (Hay 2009).

Case Studies: Using SRF Loans and Forest Carbon

The projects below used funds from carbon offsets to repay SRF loans.

Big River and Salmon Creek

In 2006, The Conservation Fund purchased 16,000 acres of redwood and Douglas-fir forest surrounding Big River and Salmon Creek in California's North Coast. Primarily because of the value of redwood timber, the North Coast of California generates a third of California's timber and nearly half of its timber revenue (TCF 2005). The ecologically rich temperate rainforests protected by the project contain critical habitat for several endangered species including the northern spotted owl, marbled murrelet, and coho salmon. In the face of reduced timber inventories resulting from years of industrial harvests, the area was threatened by potential conversion to vineyards or ranchlands (NCFCP and TCF 2011).

The purchase of the Big River and Salmon Creek area was financed in part by a 20-year, $25 million loan fixed rate loan (2.3%) secured by a deed of trust, from the California Clean Water SRF program (TCF 2015, TPL 2011).[16,17] Annual loan payments were set at $1.6 million. In order to obtain the loan, The Conservation Fund had to demonstrate that it could generate adequate income from the project for loan repayment. Initially the loan was approved based on modeling showing that sustainable timber harvesting would generate enough income. Then in 2007 the Climate Action Registry adopted Forest Project Protocol version 2.1, which allowed California forest projects to generate income from selling forest carbon offsets on the voluntary market (NCFCP and TCF 2011).

When the 2008 recession began, timber prices dropped and The Conservation Fund was able to rely more heavily on carbon offsets to generate income for loan repayment and forest management (Kelly 2016). From 2006 through 2009 carbon offsets represented 43% of the project's forest revenues (NCFCP and TCF 2011). More recently, carbon offsets have been the dominant source of income for the project (Kelly 2016).

Prior to California's adoption of a Cap and Trade Program, the offsets being generated by the Big River and Salmon Creek project were initially sold on the voluntary market. They were subsequently rolled into the California Air Resources Board's Early Action Offset Program and are now being fully transferred to the compliance cap-and-trade market (Kelly 2016). This conversion process is fairly daunting, but compliance-eligible offsets are significantly more valuable than voluntary offsets (Kelly 2016).

According to The Conservation Fund, "Carbon sales have provided significant additional support for the forests, enabling us to repay the loans we took out to protect the properties, defer harvests when log prices are low and accelerate restoration activities for fish and wildlife" (TCF 2015). The Conservation Fund expects Big River and Salmon Creek to generate $7 million in credits over 10 years (Rademacher 2013), which a representative says "allow us to be very patient and essentially wind back the clock to the way these forests were in the middle of the 20th century. Over time, we could harvest much more closely to the annual growth, but the carbon offsets let us take a break." (Rademacher 2013).

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[16] The project also involved $14.5 million in state government grants (State Coastal Conservancy and Wildlife Conservation Board) and $8.5 in capital from The Conservation Fund (North Coast Conservation Project and The Conservation Fund 2011).

[17] Conservation easement equivalent restrictions cover the entire property: an "Offer to Dedicate" and "Notice of Unrecorded Grant Agreement" required by California Coastal Conservancy and California Wildlife Conservation Board (Kelly 2015).

According to The Conservation Fund (NCFCP and TCF 2011), their forest management practices for Big River and Salmon Creek include the following:

- Use primarily single-tree selection silviculture to produce forests with trees of all age and size classes. All harvests are designed to encourage natural regeneration and retain and develop critical wildlife habitat features, such as snags, downed wood, and trees of significant size.
- Generate revenue sufficient to repay the SRF loan and cover annual costs of operations and, to the extent feasible, reinvest in restoration and enhancement measures.
- Harvest at levels significantly less than growth over the next few decades to increase timber inventory and carbon storage, resulting in at least a 34% increase in standing inventory over the next two decades.
- Expand riparian buffers to improve habitat conditions and water quality protection by increasing canopy retention requirements for all classes of streams.
- Maintain certification under the Forest Stewardship Council and Sustainable Forestry Initiative standards and report carbon sequestration increases through the California Climate Action Reserve.

Chris Kelly, California Program Director for The Conservation Fund, contends that the ability to use SRF loan funds has been "terrific" and that loan repayment using timber harvests in tandem with forest carbon offsets has worked extremely well (Kelly 2015). However, he noted that owning and managing forestland and complying with the Cap and Trade Program requirements is not easy. The Conservation Fund has five full time staff managing forests in the project area. In addition, $25 million is a significant amount of debt. While the SRF loan is secured by a deed of trust, and The Conservation Fund's corporate liability in case of default is limited to $2.4 million (150% of a $1.6 million annual payment), these terms may not always be available, and direct liability in the event of default on a loan of this magnitude could pose an "existential threat" to many non-profits (Kelly 2015). Kelly believes that use of SRF funding for conservation only works when a conservation organization retains ownership, as SRF loans in California are made only to government and non-profit organizations.

Yurok Tribe, Klamath River Basin

In 2011, the Yurok Tribe was able to purchase over 22,000 acres of culturally and ecologically important land in the Klamath River Basin through an SRF loan that included the proposed use of forest carbon offset funds for loan repayment and project management (Voegeli 2016). This was the first SRF loan in California awarded to a tribe. The Yurok Tribe is California's largest Indian Tribe with over 5,000 enrolled members (Eco Partners 2013). Yurok tribal lands follow both sides of the Klamath River through Douglas-fir and mixed hardwood forests from the Pacific Ocean and 44 miles to the north (Business Wire 2014).

Beginning in 2009, the Yurok Tribe worked with Western Rivers Conservancy to apply for a 30-year SRF loan for nearly $19 million to purchase 22,237 acres of forest along the Lower Klamath River in Humboldt County from Green Diamond Resource Company, an industrial timber company (SWRCB 2010). Because the Tribe qualified as a "Disadvantaged Community" under California's SRF policies, they received a zero percent interest rate on the loan. As part of the loan, the Tribe agreed to a cooperative agreement with the North Coast Regional Water Quality Control Board, State Water Board, California Department of Forestry and Fire, and Bureau of Indian Affairs to manage the land to protect water quality.

Carbon offset revenue is currently being generated by about 21,000 of the acres acquired with SRF loan funds. The original carbon offsets for the project were created through the Climate Action Reserve's voluntary offset program under its Forest Project Protocol Version 3.1 (Climate Action Reserve 2014). Offsets initially approved through the Climate Action Reserve were subsequently folded into the California Air Resources Board's Early Action Offset Program. The Yurok Tribe is now in the process of transitioning the project into the cap-and-trade compliance program to manage in conjunction with its other compliance project (Voegeli 2015). During the application process, to convince the SRF loan program of the viability of the project, Western Rivers and the Tribe found buyers for their voluntary carbon offsets before the loan was approved. Project partners do not think this would be necessary now that the market for forest carbon offsets in the United States is so much better established.

While carbon offsets have played a large role in the early financing of this project, the Yurok Tribe intends to repay the SRF loan primarily through sustainably harvesting timber. Carbon revenue has been used to "smooth out" financing for loan repayment for the first several years as the Tribe transitions to "light touch," uneven aged timber management and increases capacity for timber harvesting by tribal land managers (Voegeli 2016). Funds generated by additional carbon offsets are dedicated to loan repayment and to restoration and improvements in sustainable forest management. Partners in the Klamath River Basin project expressed the belief that forest carbon offsets are better suited to financing stewardship and restoration than land acquisition because carbon offset markets are relatively risky and harvest limitations under carbon offset requirements make it difficult to generate adequate timber revenue (Voegeli 2016).

Under its Project Implementation Agreement with the Climate Action Reserve, which establishes the Tribe's compliance obligations, the Tribe negotiated permanence terms that did not require the creation of any conservation easements on tribal lands. This was important in part because of tribal concerns about potential conservation easements affecting the ability of the Tribe to take the land into trust.

In April 2015, the California Air Resources Board issued the Tribe approximately 800,000 offset credits worth several million dollars under its cap-and-trade system (Barboza 2014). According to one project partner, while using carbon offsets "looks great from the outside" and has helped with loan repayments, it added a challenging layer of complexity to assembling the project and applying for the SRF loan that was "not for the faint of heart" (Doroff 2015). Still, according to the Chairman of the Yurok Tribe, "We have lost many of our old trees to deforestation, and numerous native plant and animal species, especially deer and elk, are struggling because of it…This forest carbon project enables the Tribe to help transition these acres back into a tribally managed natural forest system where wildlife and cultural resources like tanoak acorns, huckleberry, and hundreds of medicinal plants will thrive" (Gonzalez 2014).

4. Recommendations

SRF Loans for Land Conservation

Earlier reports from The Trust for Public Land have made recommendations for increasing the use of SRF loans for land conservation. These recommendations are summarized in Table 4 below.

Table 4. Recommendations for State Revolving Fund Policies to Promote Land Conservation

Policy Type	Policy Recommendation
Federal	
Federal Mandate	- Create a federal mandate for more funding conservation projects through State Revolving Funds

Table 4. Recommendations for State Revolving Fund Policies to Promote Land Conservation

Policy Type	Policy Recommendation
State	
Loan Policies	- Ensure that, where appropriate, programs allow loans to private entities (e.g., land Trusts) - Ensure that full fee land acquisition and conservation easement acquisition are both allowed
Funding	- Allow large-scale funding for acquisition projects, rather than only smaller planning grants - Create set-aside funding for land conservation projects - Create additional subsidies (principal forgiveness, negative interest rate loans, or grants) for land conservation - Make revolved funds available for technical assistance to loan applicants
Ranking Criteria	- Modify ranking criteria to prioritize land conservation and other nonpoint source pollution prevention - Revise policies so that nonpoint source projects are funded first - Develop and improve systems for monitoring nonpoint source pollution so that potential benefits are clear - Incorporate cost efficiency/abatement efficiency as ranking criteria
Program Model	- Encourage expanded use of sponsorship programs for SRF loans like the Ohio Model, which pairs traditional utility borrowers with land conservation partners - Adopt linked deposit loan systems
Outreach	- Increase marketing of opportunities for land conservation loans – especially when set-asides and incentives are available.

Conclusion: Forest Carbon Credits for SRF Loan Repayment

It can work. At least two large conservation projects in California, the Big River/Salmon Creek and Yurok Tribe case studies described in Section 3, have already used funds generated by carbon offsets to repay SRF loans. However, there are major obstacles both to using SRF loans to fund conservation and to creating forest carbon offset projects. As a result, using both together is very complicated. In the case of very large projects with very sophisticated proponents and enough funding to cover up front costs and coordinate the complexities of both the SRF and carbon offset processes, these tools can be a good match.

However, as one conservation group leader indicated, the process is “not for the faint of heart” (Doroff 2016). This is true in part because there are very serious consequences if everything does not go as planned. That is, project proponents will be financially liable if they default on an SRF loan or if there is any “intentional reversal” that undermines carbon offset obligations. In addition, the current compliance market is based on emissions targets through 2020, and there is no guidance yet for future reduction targets. This creates a lot of uncertainty in the longer term market for compliance offsets – a serious problem if an organization wants to use offsets to pay back a long-term loan.

Still, it is definitely worth advocating for policy changes that would make it easier to fund projects like the Big River/Salmon Creek and Yurok Tribe case studies. In addition to the recommendations for SRF loan programs listed in Table 3 above, state policies should specifically address using forest carbon offsets to provide a dedicated revenue stream to repay SRF loans so these dollars can be available for high-impact projects. In particular, states should pay for due diligence for potential forest carbon projects through SRF funds. Ideally, the goals of the Clean Water and Drinking Water SRF programs and markets for forest carbon offsets can all be met through permanent preservation and sustainable management of large expanses of threatened forests. This could be a major win-win-win for water, climate, and forest resources.

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