Oregon's Forest Resource Trust
Forest Establishment Program

Fast Facts

Activity: Forestation

Launch Date: 1993

Purpose: Provide landowners with financial assistance to establish forests that offset greenhouse gas emissions within the state.

Forest Ownership: Private non-industrial and local government ownership in Oregon. Program requires 10-5,000 acres on medium or high producing soils, and 10-15,000 acres on low producing soils.

Program Funding: Single major carbon offset purchase, donations and state appropriations

Protocol: Developed by Oregon Department of Forestry

Registry: None at this time. Oregon Department of Forestry keeps record of credits.

Aggregator: Oregon Department of Forestry

Verifier: Oregon Department of Forestry measures and monitors the projects. No 3rd party verification required at this time.

Payment Mechanism: Deferred payment loan for forestation in exchange for carbon credit "rights".

Market: Retired by state of OR

Participation: 1028 acres, 34 landowners in Oregon

Climate Benefits: Estimated 428,000 tCO_2 from the 880 acres that were enrolled in 2003. No estimate has been calculated for the additional 148 acres that have been enrolled since then.

Co-Benefits: Sustainable forest management, watershed protection, fish and wildlife habitat, timber production.

Overview

With 28 million acres of forestland, or approximately half of the state's land base, forestry plays an important role in Oregon. Currently, there are more than 166,000 non-industrial private forest (NIPF) landowners in the state who collectively own approximately 16% of Oregon's forests. Oregon was the first state to develop its own market and protocol for forest carbon offsets. As the founder of the Forest Resource Trust (FRT), the State of Oregon is in many ways a leader in providing incentives for NIPF landowners to manage for carbon sequestration.

A program of the Oregon Department of Forestry (ODF), the FRT was established by the Oregon Legislature in 1993 as an innovative financial tool to help NIPF landowners establish and maintain healthy forests on lands in non-forest use, but capable of supporting forests. The Forest Establishment Program, the first and only program to be developed by the FRT as of 2012, is designed to establish new, working forests to provide economic and ecological benefits as well as carbon sequestration. The Forest Establishment Program targets NIPF landowners, consistent with FRT goals, and works to remove the barriers of upfront costs and technical assistance to ensure that NIPF landowners can participate.

This case study describes the Oregon Forest Resource Trust Forest Establishment Program. It describes the administrative partnerships and programmatic structure unique to the program, as well as its development, challenges and lessons learned along the way. It also provides data on accomplishments so far, and details the roles of players in bringing carbon offset projects to market.

Included in this case study is a market chain map and an brief exploration of opportunities and barriers experienced by nine participating landowners. This case study contributes to broader research being conducted at the University of

Vermont, which focuses on opportunities and barriers to, as well as models for, carbon market participation by small-scale and community-based forestry.

Background

Timber Stand Establishment

In 1991, the concept of the Forest Resource Trust was initiated by a group who came together under the direction and inspiration of Secretary of State Phil Kiesling. The original intent was not to reduce carbon emissions or mitigate climate change, but rather to develop a mechanism to convert large areas of undeveloped lands in Oregon into new forests. Based on the recommendations of bankers, forestry analysts, private forestland owners, environmental organizations and public agencies, the FRT works as a venture capital arrangement between the Oregon Board of Forestry and NIFP landowners to establish a potentially profitable timber stand (1). As Oregon's forests are rich and capable of generating significant profits for landowners, particularly in western Oregon, these new forests would enhance the economic assets of future generations. The Trust was established by the Oregon Legislature in 1993 and adopted as an ODF program. The FRT won support easily, in part because of Oregon's long history of investing in its forests (1).

Consistent with FRT goals, the Forest Establishment Program was conceived as a way to increase potential timber profits for landowners, local governments and the state, as well as improve the ecological health of the state through forestation. Again, carbon sequestration was not a consideration at the beginning. The ODF Board of Forestry, which has oversight of the FRT, adopted rules and statutes defining the Forest Establishment Program as a program that would be funded through the FRT. The first 20 projects were implemented in 1994 using part of $3.5 million dedicated to the FRT through state appropriations from Oregon State Lottery funds, as well as donations from private businesses.

In the mid-1990s, however, the state removed $2.5 million from the FRT and re-appropriated to other spending priorities. This action left 12 landowners seeking to enroll unfunded. A few years later, Oregon's policy link between carbon dioxide emissions and forests was indirectly created by the Oregon Energy Facility Siting Council's "Best of Batch" site license competition. The Council adopted this competition as a creative way to comply with legislation that resulted from controversy surrounding the "need for power" standard for power plants in Oregon. The "need for power" requirement obliges power plants applying for a site certificate to demonstrate, through cost-benefit analysis, that the requested power increase is needed for a particular utility. As a compromise between abolishing the controversial "need for power" requirement and keeping the status quo, the 1995 Oregon legislature adopted a one-time exemption for up to 500MW of new natural gas-fired power plant capacity from having to demonstrate need (2). Multiple sites competed for this one exemption.

Though the legislature gave the Oregon Energy Facility Siting Council (EFSC) administrative responsibility, it gave no guidance on how to choose the recipient of the exemption from among competing applicants. They proposed an approach that took into account Oregon's climate change strategy, as well as a legislative directive that the impacts on global climate change be considered during the energy facility siting process. Potential applicants for this one exemption were evaluated on their proposed strategies for reducing the environmental impact of their project, with priority given to the greatest estimation of greenhouse gas emissions "sequestered, avoided, or displaced by the applicant's mitigation efforts or cogeneration" (2).

The Klamath Cogeneration Project won the competition by demonstrating the lowest net carbon dioxide emissions levels through efficiency, co-generation, and specific offset projects, including an investment of $1.5 million of CO_2 emission reduction offset monies into Oregon's Forest Resource Trust (2). Though the $1.5 million was originally forecasted to produce 1.52 million tCO_2 on 3,125 acres, ODF revised this forecast to 1.16 million tCO_2 and 2,400 acres in order to reserve funds for program administration and technical assistance (1). Since the "Best of Batch" competition was based on a one-time legislative exemption, no other power plants have been required to reduce emissions through this mechanism.

The Best of Batch program provided ODF with the opportunity to use the FRT to address climate change, while at the same time leveraging carbon offset monies to further programmatic goals. The $1.5 million investment was placed into the FRT in 1999. As a result, the FRT's Forest Establishment Program became, at that time, the nation's largest carbon offset program. Offsets produced using the Klamath Cogeneration Project carbon monies are retired by the Oregon Department of Energy on behalf of the Oregon Energy Facility Siting Council after the ODF measures and reports them.

The Program

The Forest Establishment Program operates as a deferred-payment loan program that is paid back at low interest in the event that the landowner profits from the financial assistance (i.e., if timber is harvested from forests created with FRT funding and profits are generated). If this occurs, landowners must repay the Trust with fifty percent of net receipts for thinning. If the land is in final harvest, he/she must repay all Trust costs plus four percent simple interest as pro-rated against the area harvested. In this manner, both the state and the landowner stand to profit. (3)

New forests can be established on agricultural, range, pasture and other non-forested lands suitable for forest cover. Essentially, there are no "out-of-pocket" expenses for the landowner, since the loan covers up to one hundred percent of the direct costs of site preparation, tree planting, seedling protection, competitive release activities, forestry consultant services and other practices necessary to reach a "free-to-grow" forest. "Free-to-grow" means planted trees have a good chance of outgrowing undesired competing grass and brush to become part of a vigorous, healthy forest (4). Since the Forest Establishment Program values timber supply, riparian (streamside) and other woodland restoration projects are allowed under FRT funding if the assessment of the project's commercial forest area can cover the cost of establishing the non-commercial forest area (5).

Landowners choosing to participate in the Forest Establishment Program enter an one hundred-year contract specifying that when the land changes ownership, FRT obligations will continue from one owner to the next. By participating in the Forest Establishment program and receiving financing, the landowner agrees to assign rights to the project's carbon dioxide emission reduction benefits (including carbon offsets) to the FRT (see market chain map) (5).

Program administrators envisioned that, as loans are repaid, the fund would not only be replenished and used to enroll new landowners, but the interest could cover program administration costs. In this manner, the FRT operates as a revolving loan that, in theory, could fund new forest establishment projects, as well as sustain the program, in perpetuity.

Program staff mainly presented the Forest Establishment Program to landowners as one option in a suit of forest assistance programs to promote tree planting or sustainable forestry, rather than as an opportunity to sell carbon offsets. As well as providing technical assistance, state foresters conducted most of the outreach for the program. Because the program is cost-free, it removes cost-related barriers that could prevent smaller landholders from participating. Indeed, the program was marketed to smaller landowners. Originally, maximum ownership was 5,000 acres (though this changed later).

Partners and their Roles

Oregon Board of Forestry:

The ODF Board of Forestry supervises all matters of forest policy within Oregon. It approves rules and statutes pertaining to the FRT, such as the development of the Forest Establishment Program, and is responsible for the management of the FRT program.

The Oregon Department of Forestry:

ODF coordinates and facilitates all aspects of the FRT, including technical and financial assistance and outreach. ODF is responsible for implementing the FRT and policies adopted by the Board of Forestry, which includes developing a measurement and monitoring plan for reporting carbon offsets arising from forestation projects funded through the Forest Establishment Program. ODF is permitted to use a portion of FRT funds for administrative purposes.

Forest Resource Trust Advisory Committee:

The FRT Advisory Committee is a standing committee to the Board of Forestry that assists in managing the FRT and developing principles and standards for forest carbon accounting.

Oregon Department of Energy, Oregon Energy Facility Siting Council (EFSC):

The EFSC is a state-appointed board that includes both public membership and Oregon Department of Energy staff. It evaluates the impacts of new energy facility sites on the environment, public health and safety (6). The Siting Council retires reported carbon offset credits arising from FRT projects per the requirements of the site certificate of the Klamath Cogeneration Project.

Private Consulting Foresters:

ODF contracts landowner outreach to three consultants. Eligible landowners can hire other consulting foresters to develop their project plan and/or manage it.

Private Contractors:

Multiple private contractors assist with project implementation and perform activities such as tree

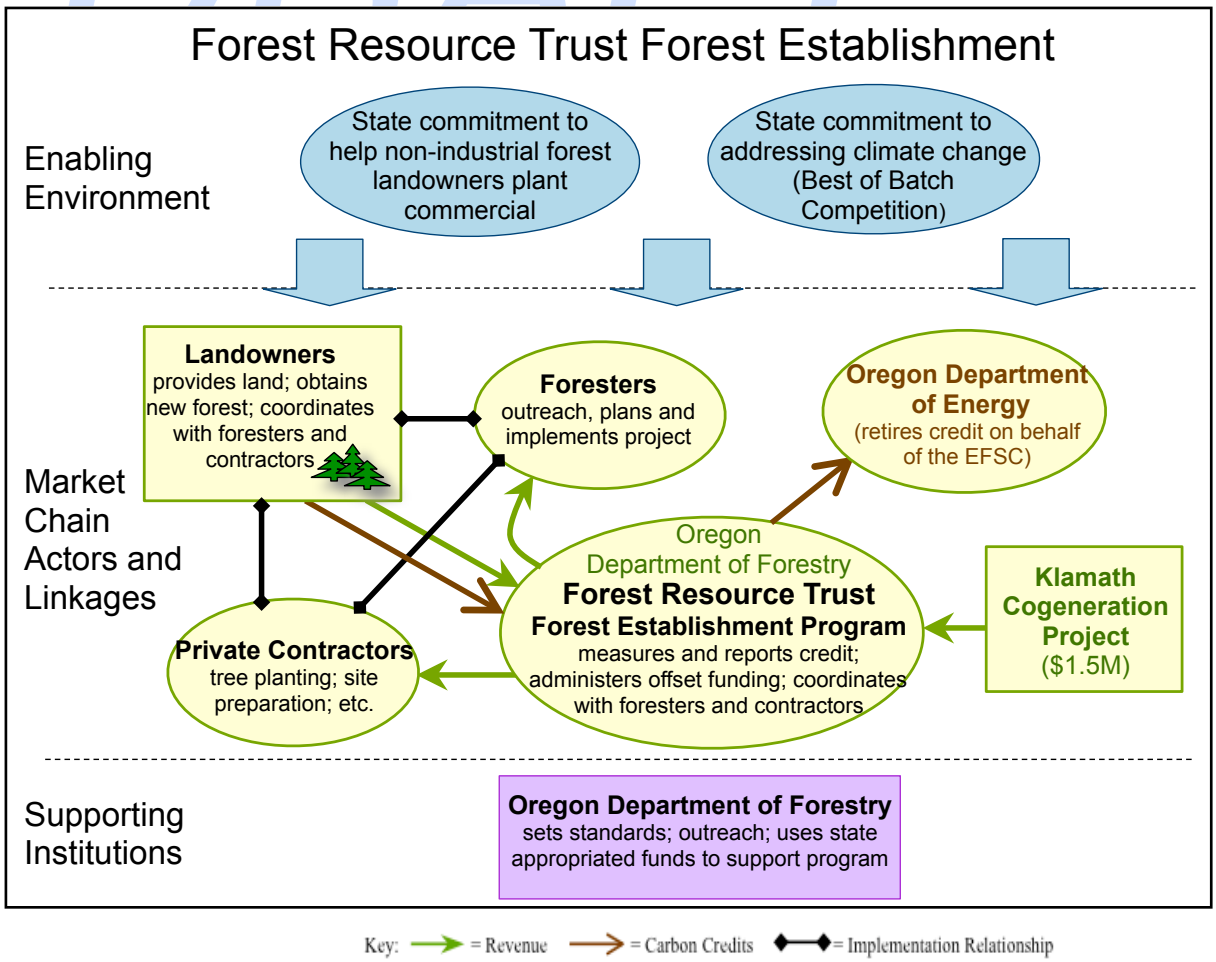
planting, site preparation, herbicide spraying and seedling protection from animal damage.

Market Chain Map

The market chain map summarizes the roles of participants and contributors to market-based initiatives (9). The Enabling Environment section indicates the external factors that facilitated the development of this urban forest carbon program. The Market Chain Actors and Linkages section includes the producers (rectangles), purchasers (rectangles), facilitating intermediaries (ovals), flow of funds (green arrows) and flow of carbon credits (brown arrows). The Supporting Institutions section lists entities that provided critical support, but were not part of the market transaction. Because forest carbon markets are newly emerging, the same organizations may show up in more than one capacity as they work to develop all of the components needed for a successful, market-based program. The tree icons indicate trees planted.

The Oregon state government (i.e., ODF and the Oregon Department of Energy) plays an instrumental role in creating the market by ensuring the credits are funded, created, measured, reported, and retired, either directly or indirectly through coordination with other actors. As well as being the sole supporting institution, ODF is the primary intermediary in the Market Chain Actors and Linkages who, through the FRT, distributes private funds to landowners and on-the-ground contractors and measures and monitors carbon offsets. In the Enabling Environment, the state's commitment to help NIPF landowners plant commercial forests drove the creation of the program. The Best of Batch competition motivated the Klamath Cogeneration Project to invest carbon offset monies. Because of the design of the market chain, landowners can establish a forest without any upfront cost and, in exchange, forfeit their rights to the carbon credits generated by the new forest. Unlike other aggregating institutions, the ODF is not linking these landowners to an independent "free" market, but rather is linking landowners to a market in large part created by the state.

The case of the FRT highlights the relationship between the state and the private sector. The private sector is incorporated in the market chain at the implementation level as the offset producers. They provide the land base on which to execute the project (landowners) and the labor and expertise to carry out the project (contractors). Both the private sector, i.e., Klamath, and the public sector, i.e., state appropriations, provide the financial means to create projects and run the program. Interestingly, non-profit organizations are not actors in the market chain.



Barriers Addressed and Lessons Learned

Since its inception, the FRT has undergone many changes to better meet the goals and needs of the players. This evolution has not been without challenges. Some of those challenges and solutions are listed here.

Costs to Participate

The cost of participation can be a barrier for small-scale participants who seek to access carbon offset markets. As stated previously, because loans cover one hundred percent of the costs of establishing a forest, there are no "out-of-pocket" expenses for landowners participating in the FRT. Thus, the cost barrier is removed for small-scale landowners.

Beginning Outreach Efforts

FRT was originally designed by an advisory committee and was not "beta tested". In hindsight, the program may have been better received if landowner and field staff input had been incorporated into the design (7).

Complexity

Perhaps the most notable challenge faced by the FRT has been very low enrollment (see Table 1). What has perplexed state partners is that, with no initial investment required and low minimum enrollment acreage, there should have been few financial barriers for small- and medium-scale forest landowners to participate. Experience taught state partners that the complexity of the program was a barrier to these potential enrollees.

In 2006, the Board of Forestry directed the ODF to reconvene the Forest Resource Trust Advisory Committee to review the program, improve its vitality and simplify the process to make it more attractive to landowners (8). Consequently, several changes were implemented in 2007. For one, a sophisticated revenue sharing option was eliminated and replaced with the current system, and compound interest was changed to simple interest. Additionally, a requirement for a timber lien on forest products arising out of forestation projects was removed. Landowners had stated concerns over what was perceived as a long-term government obligation engendered by the lien (see Landowner Perspective section). Removing this term helped to alleviate that concern.

Jim Cathcart, who manages the program, encourages other states to "keep it simple" and look to existing program models to facilitate enrollment of NIPF landowners (7).

Scale vs. Cost

During the review period mentioned above, the Board of Forestry also included a provision that increased the allowable ownership size of sites with lower productivity in order to expand eligibility to more NIPF landowners. The previous maximum ownership acreage of 5,000 acs. precluded many potential suitable lands of lower site productivity from participation, because it simply would not be profitable for them to participate. Thus, ownerships of up to 15,000 acs. of low productivity forest lands were included.

Institutional Capacity: Funding

Though program developers envisioned that the revolving loan facet of the FRT Forest Establishment Program would sustain it financially, the Trust has faced difficulty securing permanent funding. Of the $1.5 million of Klamath funding, only $120,000 remains for use in forestation projects, and yet recruitment levels are very low.

Part of the problem lies in the fact that program administrators underestimated the cost of project development. The initial estimate of forestation costs was calculated around $625/acre, but program administrators found that actual costs were closer to $1,500/acre. Another contributing factor is the low enrollment. With enough landowners participating, interest payments on loans could contribute to program administration, but because of low enrollment, the principle fund itself has been used for this purpose. Finally, in the past, staff foresters from the ODF provided technical assistance with completion of the tree planting project and were available to provide guidance about project management responsibilities for the landowner (7). However, significant budget cuts to the ODF no longer allow this.

Table 1: Participation 1995-2009

Area enrolled	1028 acs.
Active projects	34 (NIPF)
Average project size	31 acs
Largest project	75 acs.
Acreage pending processing	148 acs.

Table 2: Carbon Accounting Method from the Oregon State University College of Engineering

$10,000 establishes a 10 acre forest (first generation)

- 65 years of growth - harvest + reforestation after harvest = tons CO_2 accrued after 65 yrs.
- 65 yrs. of growth + 35 yrs. of growth = tons CO_2 accrued after 100 yrs. (*no accounting for 2nd rotation harvest at 130 yrs*)
- Landowner pays $10,000 back after final harvest at 65 yrs.

Same $10,000 establishes another 10 acre forest (second generation)

- 35 yrs. of growth = tons CO_2 accrued (*no accounting for 2nd rotation harvest at 130 yrs.*)

First generation + second generation = total CO_2 accrued for 100 yr. project costing a total of $10,000

Without sufficient financial resources, it is unlikely that the program will be able to provide the outreach and technical support needed to substantially increase enrollment. Hence, assuring steady revenue for the program is critical to the viability of the FRT. The ODF is working with the FRT Advisory Committee to develop a strategic fund-raising plan.

Addressing Climate Change

The FRT protocol robustly addresses permanence, additionality, and leakage. Permanence is addressed not only through the hundred-year contract described above, but also by calculating carbon storage over a perpetual even-aged harvest and reforestation cycle (1). In Oregon, the Forest Practices Act (OAR 629-610-0020) requires that forests must be reforested after a harvest. In this manner, carbon emissions from a timber harvest are replaced through reforestation and subsequent carbon sequestration and storage in the newly planted stand.

Additionality is established by planting strictly on non-forested lands suitable for commercial forest that would otherwise likely remain as such. A baseline is set for each project based on the type of vegetation present on the site at the time of application. Furthermore, land must be free of all Forest Practices Act reforestation requirements in order to qualify for the Forest Establishment Program (4). In this manner, no land with an established forest and no recently harvested land can participate.

There is little potential for leakage through the FRT because the acreage forested was previously non-forested land, and thus does not detract from the land base used for high-value range and agricultural crops (1). Third party verification is not required at this time; however, the state verifies that the work was completed according to plan specifications.

In one way, however, the FRT's carbon accounting approach could be improved. The latest estimate of 428,000 metric tons of sequestered CO_2 by 880 acs. of forest was calculated using accounting forecast methods developed by Oregon State University College of Engineering (see Table 2). In this system, the project length is assumed to be one hundred years, and since loan repayment at harvest is meant for redeployment to finance new projects, a doubling of acres after harvest at 65 years is assumed. The total carbon sequestered is equal to the carbon sequestered by the first forest established with a given amount of money, plus the carbon sequestered by the second forest. The carbon offset credits created by the second generation of projects would also be used to offset emissions from the Klamath Cogeneration Project (7).

Rotation harvests of the second generation of forests and their attributed carbon depletion are not accounted for under the Oregon State University College of Engineering method. Consequently, carbon offsets are overestimated. Cathcart advocates for a stock-flow carbon accounting as the standard reporting system, which would correct this overestimation by averaging the carbon produced and depleted over long-term repeated timber harvest and regeneration cycles (1).

Risk

Risk is reduced in two ways. First, the FRT features an opt-out, whereby landowners can withdraw from the program at any time within the first 25 years by repaying the loan. Second, the FRT provides landowner risk protection in case of catastrophic loss or negative financial impacts from new regulations. Loan repayment obligations may be reduced, or the forest will be restored to pre-loss conditions at no expense to the landowner (3).

Looking Forward

The most recent changes to the Forest Resource Trust acknowledge the importance of integrating work accomplished by other agencies in developing conservation plans and strategies. They now prioritize proposed projects identified in existing state plans. Furthermore, the ODF has begun initial analyses of existing conservation strategies in Oregon, noting where specific actions taken on private forest lands are

encouraged but require infrastructure to deliver financial and technical assistance. ODF could coordinate the efforts and funds of various entities that have similar objectives in the same conservation area by identifying the role FRT might play in implementing those strategies (8).

As interest in carbon markets as a means of mitigating climate change has grown in the United States, the Board of Forestry has developed a vision for expanding ODF's role in carbon markets. In 2001, a law passed establishing authority for the Oregon Department of Forestry to aggregate offset credits from private landowners. It set up ODF as a potential aggregator of forestry carbon offsets by giving the State Forester the authority to enter into agreements with non-federal forest landowners for the purpose of marketing carbon offsets (10). To date, no progress has been made in implementing this initiative.

Furthermore, FRT administrators are considering ways to leverage the Oregon Carbon Dioxide Standard and The Climate Trust to secure additional funding. In 1997, the state legislature passed the first law ever adopted in the U.S. aimed at reducing levels of carbon dioxide: the Oregon Carbon Dioxide Standard. This law requires new power plants built in Oregon to offset part of their carbon dioxide emissions by any combination of efficiency, cogeneration, and offsets from carbon dioxide mitigation measures. This law also created The Climate Trust to administer funds generated by the requirements. To date, all power plants have chosen to give The Climate Trust money to purchase carbon offsets, rather than improve efficiency or build cogeneration projects, and these offsets could conceivably come from Oregon forests through the FRT.

Currently, ODF does not use a registry that would be legitimate in the existing voluntary market, but rather tracks and records credits internally. In its next phase of concentrated work, ODF plans to adopt a permanent accounting method and develop a registry. Part of this work will involve measuring and reporting the carbon accrued in forests that were financed by monies other than Klamath's $1.5 million, such as the private funds donated before the Forest Establishment Program was linked to carbon sequestration. Once a legitimate registry has been developed, ODF could sell these credits on the open market.

Landowner Perspective

Overview of Interviewees

Interviewees were chosen according to a stratified sampling across two population density regions: a metro/high density/high development pressure region or a rural/ag/timber producing region. They were also stratified across two acreage categories: < 20 acres and = or > 20 acres. Length of forest ownership of interviewees ranged from 7 to 43 years. Ages varied from 50s to 70s. Family forest ownership varied in size from 15 to 540 acres. One landowner reported earning less than $50,000 per year in household income, three earned $50,000 to $100,000, three earned $100,000 to $200,000, and one earned more than $200,000. Most landowners had been active on their land, in spite of a lack of management plans or inventories (Table 4). This lack was more due to the fact that most landowners did not own land with forest cover. Some land had been high-graded, farmed or grazed.

All FRT landowners said they would rejoin the program and recommend it to others, though one would ensure first that legal fees would be paid for by FRT fund. Of those who had concerns about joining the program, most said their concern had been addressed by the time they were ready to sign the contract.

Table 4: Indicators of Active Management before Participation

(N=9)	Yes	No	Total answers
Did you have a written forest management plan?	3	6	9
Was your forest land certified?	2*	7	9
Did you have a conservation easement on your land?	1	8	9
Had you had a recent forest inventory done on your land?	3	6	9

*Certified by Tree Farm

Co-benefits

FRT landowners were motivated by the desire to obtain a forest. Seven of the nine interviewees stated that their primary motivation for joining was to obtain technical and financial assistance with establishing a tree stand on their land. The remaining two stated that their primary goal was ecological ("to be a good shepherd of the land"), and saw establishing a forest as a way to achieve that goal.

Comments made by almost all FRT landowners indicate that joining the program represented an investment in the health of their land, rather than money in their pockets, despite the program having been designed to provide revenue at harvest. Indeed, income was not rated highly as a motivation for joining. Most interviewees were in their 50s or older, and so would not see their new forest mature to a harvestable age in their

lifetime. Some expressed the desire to prevent a harvest from occurring at all, while others stated that harvest would only happen in an ecologically sustainable manner. In the words of one of the first landowners to join the program, during contract negotiations, *"…I made it abundantly clear that I had no intention of cutting any of those trees in the future."* Some wanted a forest to promote other ecological goals that they prioritized, such as habitat restoration or soil conservation.

Some landowners were motivated by monetary considerations in part. Two landowners did mention the desire to increase the value of their land, but no landowners reported plans to selling their land. One of these two landowners hoped a forest would provide his children with income far into the future. However, the point here is that no interviewee joined the program strictly to earn money. Rather than a moneymaking venture for themselves, these small-scale NIPF landowners were motivated by co-benefits, such as investing in their children's future (five out of eight included passing their land on to heirs as one of their management goals) or promoting ecological health. Some expressed having an aesthetic or emotional attachment to their land (some inherited the land from family members). It would appear that the benefit of enjoying a forest, the feeling of satisfaction with doing what is best for the land were important results for many FRT landowners. In the words of one landowner, *"The main benefit is having the feeling that we are doing the best job – [being] the best caretaker – that we can of the property that we have."*

Chance to Address Climate Change

Many landowners felt uncertain about whether or not climate change was a result of man-made greenhouse gases. Responses broke down as follows (N=8):

- Four stated a strong belief that climate change is a direct result of man-made greenhouse gases.
- Three suggested that manmade greenhouse gases were only a contributing factor to a natural cycle, or stated that science or they themselves did not know enough to say for sure.
- One said he had doubts that climate change was a result of man-made greenhouse gases.

However, they still joined, which can be viewed as a sign that the incentive provided by the programs is working to broaden participation beyond those individuals motivated solely by a desire to offset anthropogenic climate change, even among early adopters.

Landowners expressed some reservations about the ability of carbon offsets to effect real reductions in carbon emissions. Though no interviewee completely discounted carbon offsets as a useful method to address climate change, landowners did express a level of concern about how heavily carbon offsets should be relied upon. In the words of a landowner, *"My feeling is that [carbon offsets are] one small tool in a very, very large, complex picture."* Even so, landowners were generally supportive of the potential of offsets to help large polluters and businesses to reduce their emissions over the long term, at the same time as promoting ecological restoration and conservation. According to one landowner, *"I think that it is a viable way to get buy-in by industry to invest in reforestation in places where either farmland is being abandoned or even former forests have been ruined and then need to be replanted."* One landowners was clear that she would not have joined the program if the offsets were not being purchased by an entity that had made a commitment to reduce actual carbon emissions.

Four landowners said carbon sequestration for climate change was not an important factor in their decision to join. What is interesting is that three of these four stated that they did not know about the carbon piece until later on in the process of signing up. All three were pleased, even "proud", in the words of one landowner, about in taking part in a carbon sequestration program, despite the fact that it was not a motivating factor for them in the beginning. The manner in which the program was presented to landowners, as one option in a suit of assistance programs, no doubt played a part in some landowners' lack of initial awareness.

Costs to Participate

Though the FRT was designed so that participants would have no initial costs, most FRT landowners entered the program with an understanding that there might be some costs down the road. Indeed, four landowners said that they had paid for some expenses themselves, and one landowner stated that he had been reimbursed for his expenses. Items that interviewees paid for included spraying in areas not covered by the FRT, fuel to transport the trees to the site, road maintenance, and legal fees. A few landowners with difficult sites needed technical assistance beyond the number of years assumed to be needed to get the trees to a "free to grow" state.

Those who had paid out-of pocket expenses said they were "nominal" or "incidental" or "about what I expected". It would seem that the interviewees did not find the cost of participation a significant barrier. The exception to this was a single interviewee who spoke about paying $2,000 in legal fees to negotiate the contract. Though her "account" contained a positive balance after her forestation project was complete, the

contract contained no provision to reimburse her for this unexpected cost.

Risk (changed from opportunity cost)

With an one hundred-year contract limiting the ways in which landowners can earn income from their land, one might expect that landowners would express concern regarding lost potential sources of income for so long. However, few ongoing concerns were expressed regarding this type of cost.

Several reasons could account for this finding. First, the program fit into landowner goals. For example, landowners did not have plans to sell their land or convert it to other land uses during the contract period, or landowners viewed the contract as a welcomed barrier to development. In the words of a landowner, *"I think that a concern that we might have had was just the length of the term of the contract, and if you sell the property, then the contract really has to go with the property. [But] we don't plan to sell; we plan to be here forever!"* Some landowners believed that planting a forest was in the best interest of the health of their land and so relinquishing other land use options was not a sacrifice. Moreover, Oregon state law zoned some landowners' parcels for farming or forestry only, and forestry was their preferred option.

Second, the program was designed to minimize risks in general. Three interviewees expressed some concern about the length of the contract and/or a lien placed on the timber, and the impact these would have on their autonomy and control of their land. One landowners was concerned with a lien's effect on his ability to sell or transfer the land in the future. The FRT used this lien (before its use was discontinued in 2007) as a legal tool to, in effect, "own" the carbon. While the lien is only on the timber, it is listed on the deed. Indeed, his concern was realized when he refinanced his home a few years after joining the program; at first the bank refused to grant him the loan until he obtained written reassurance that it was related to forestry. Another landowner stated that the lien was on his property, though this is not the case. This suggests that other landowners might be harboring misinformation about the lien's function.

For many landowners, including the three mentioned above, the fact that they had the option to remove contractual obligations within the first 25 years by repaying the loan seemed to reduce their perception of risk. According to one landowner, *"One of the things that was very attractive to me was this idea that you can change your mind any time within the first 25 years, and had that clause not been in place, then we would not have joined."* Also important was the fact that the contract can be transfered in the event of a sale. None of the landowners actually planned to repay the loan and leave the program.

That the carbon sequestration activity in use is forestation may be another factor easing perception of risk. The FRT only allows underproducing lands to be enrolled; hence, the protocol does not require that all land under one ownership is entered into the program, unlike other forest management protocols. None of the landowners enrolled all of their land, as landowners owned land under more than one land-use scenario. One called the ability to enroll only a portion of his land a way to "hedge his bets".

Efficiently Organized through a Forestry Agency

Most FRT landowners heard about the program from a state/local forester with whom they had made contact pursuant to their goal to plant trees on their land. The fact that the FRT effectively utilized an existing network of experienced professionals is reflected in landowner comments. The efficient organization, coordination, and communication offered by the FRT were also mentioned more than once by FRT landowners. In the words of a landowner, *"…one of the really attractive things about it in addition to the actual finances was that the people at the Department of Forestry essentially offered to put together the management plan for us."* Even though most of these landowners did not seem to fully understand all the nuances of the program, they were happy with the results and valued the network of experienced, knowledgeable, trustworthy people.

Take Home Messages

The lessons learned and challenges faced by the FRT may be useful for states currently designing programs to link small-scale forest landowners to carbon markets. Several take-home messages suggested by this case study are listed below.

Reducing Barriers

As NIPF landowners have been targeted for participation in this program, considerable focus was given to removing upfront barriers in the program design, such as upfront costs, perception of risk, and technical know-how. Program administrators continue to look for ways to improve the program so as to increase participation.

Protocol Requirements

Since the development of the FRT, land-based carbon offset markets have evolved, along with them expectations for rigor. New forest offset protocols utilize more demanding standards for assuring offset validity. Some protocols have been criticized for having requirements that pose a barrier for small-scale participants. The FRT case presents a example where permanence, additionality and leakage are addressed in a manner that does not place a heavy administrative or financial burden on landowners. Moreover, despite the fact that the cost of a forestation project turned out to be twice as much as program administrators anticipated, it would seem that the price of a ton of carbon was relatively low. If forestation project cost $1500/acres, and 880 acres produced 428,000 tCO_2, then a ton of carbon cost $3.08 to produce.

However, it isn't clear whether the carbon offsets produced under the FRT protocol would qualify under other more demanding protocols for other markets, such as the Climate Action Reserve. Moreover, the FRT addresses additionality and leakage by limiting the type of carbon sequestration activity to forestation on previously unforested lands. The FRT protocol may not work for program developers looking to expand options to other markets and additional sequestration activities.

The State as the Aggregator

In the case of the FRT, the state essentially acts as the aggregator. This arrangement may provide some advantages compared to aggregation by NGOs or private businesses. First, ODF possesses technical expertise related not only to forestry, but also to ecosystems specific to Oregon. Furthermore, ODF benefits from a longstanding relationship with private landowners due to its involvement in other forestry activities (e.g. forest fire protection and forest regulation). However, not every state has a strong forestry sector or similar relationship with its constituency, which could impede replicating Oregon's FRT in other parts of the country.

Second, the state has the ability to secure a demand for offset credits through regulation, which provides landowners with a measure of protection not found in the current U.S. voluntary market, in which demand is driven by personal preferences. Furthermore, the "purchase" of carbon offset credits is transacted as a single one-lump sum. Again, this arrangement reduces risk for the landowner, particularly the small-scale landowner, in that a carbon price is, in effect, guaranteed throughout the forestation project development. Finally, the FRT provides assurance to carbon investors that oversight is being performed by the state. Landowners are not responsible for measuring and reporting their project performance.

Finally, a state agency may be well positioned to identify potential synergies with other state initiatives or legislation, exemplified by the opportunity presented by the Best of Batch.

Financing Carbon Offsets

As described above, one important implication created by the FRT's unique financial mechanism is that, as a trust proffering a revolving loan, an individual sum of money could be used repeatedly to finance new participants. Because the FRT uses interest payments for program administration costs, the the program could, in theory, be self-supporting and could repeatedly fund forestation projects indefinitely. Indeed, program administrators understand this potential, and though the FRT has not yet met this goal, it is conceivable that other similar programs could.

Conclusion

Program administrators and developers attempted to balance economic, social and ecological objectives. As the program adjusts to a changing environment, state partners continue to look ahead and anticipate new mechanisms to encourage sustainable forestry. Oregon continues to forge the way in climate change mitigation by exploring the option to expand eligible offset activities to include environmental restoration practices and other ecosystem services with potential markets. In the future, the ODF envisages an incentive program that encourages landowners to grow timber longer and capture more ecosystem services. As the FRT matures and evolves, the hope is to garner increased involvement from NIPF landowners throughout Oregon to continue to establish new forests on underproducing land, as well as restore and maintain existing forests.

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