Prentiss & Carlisle update

2nd Quarter 2014

Industry News

- ***After widespread deforestation, China bans commercial logging in northern forests*** (Apr 22nd)
  After more than a half century of intensive deforesting, commercial logging has been shut down in China's largest forest area to protect soil and water quality, which is significantly affected by forest loss. China lost some 6.1 million hectares of forest cover from 2000 to 2013 alone.
  — *Mongabay.com*

- ***As Wealthy Families Turn to Hard Assets, Portfolio Managers Get Creative*** (Apr 24th)
  Real assets, like farmland and timberland, are providing new growth in private investment management as many high net worth clients seek stability and yield.
  — *Institutional Investor*

- ***North American wood pellet exports to Europe double in 2 years*** (Apr 24th)
  A rapid expansion of pellet production capacity in the U.S., which is almost entirely driven by demand for biomass in Europe, has increased pellet exports from 800,000 tons in 2011 to 2.9 million tons in 2013.
  — *Biomass Magazine*

- ***Advances expected to help protect forestry jobs, fuel expansion*** (May 7th)
  By upgrading equipment and implementing improvements in technology, several hope to boost productivity and produce higher-skilled, better paying jobs in the Canadian forestry industry.
  — *Vancouver Sun*

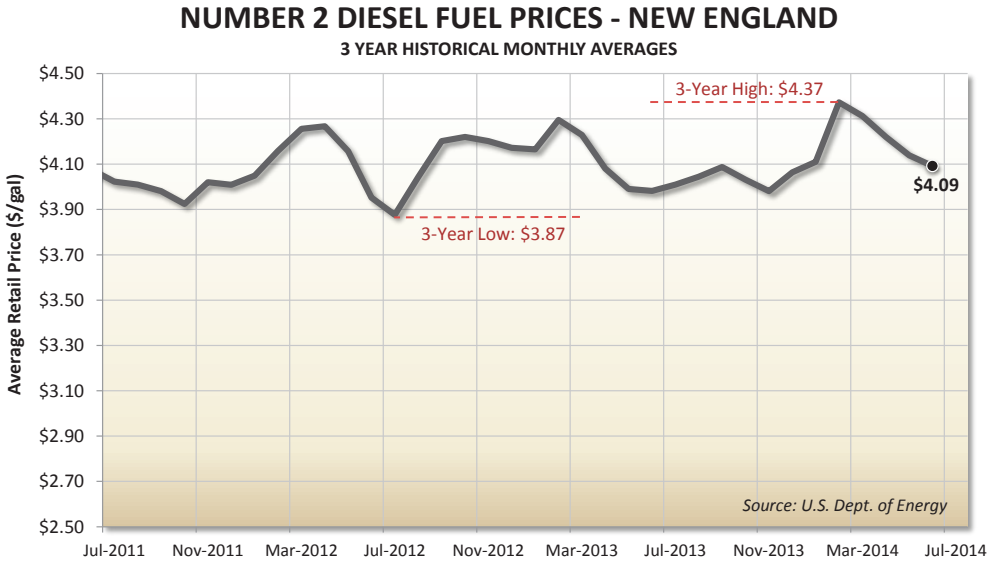
Industry Overview

Forestland Operations

For the past 10 years or more, most foresters would tell you that we just aren't getting the type of winters "we used to see" in the Northeast. For the first 8 of those years, they would have been right. Noticeably shorter and warmer winters had certainly reduced the traditional prolonged crush of wood flow in the cold seasons. Although we've moved the same amount of timber that we used during those years – or more – we found ourselves having to do so within a shortened time window. The last two years, however – and last winter in particular – have bucked this trend. This last winter was one of the longest stretches of good operating conditions in recent memory. In the words of one of our foresters, this was a "good ole' fashioned winter."

One quarter ago, we could only guess at how this was going to play out in the late spring. Now we know that lots of rain and a colder – than – normal spring left a lot of moisture in the forest for longer than most people anticipated – and, with the snowpack serving as an ground insulator, the frost took a long time to leave. Even as of two weeks ago, one forester noted that road construction crews were still finding pockets of frost in the ground in certain areas of northern Maine. While the long winter kept us able to move timber products longer than usual, it resulted in a delay in the process of reentering the forest for summer harvests and put us a few weeks behind on summer roadwork.

At this point, with the warmer weather and the trees now transpiring, we're clearing the period of saturated ground and we've entered a somewhat more normal weather pattern for June and July. Provided we are able to avoid prolonged wet weather in the short term, operations should

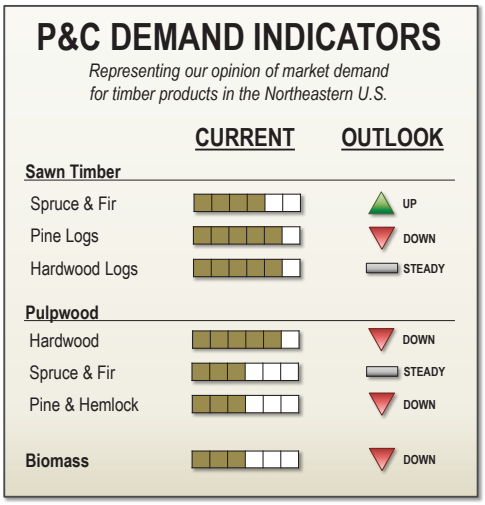


be moving along at a solid clip through next quarter. This is good news for logging contractors who were anxious to start up this spring and whose cash flow depends on their ability to keep equipment running on good ground. We do our best to keep logging crews operating once we restart for the season, despite the fact that it can result in more relocations as the weather stabilizes.

Winter's peak in diesel fuel prices (see chart on previous page) seems to have abated slightly, although the New England indexes are still tracking quite far above what most people would have considered normal 3-4 years ago. In our last newsletter we reported that we had made increases to the fuel premium paid to our contractors – this quarter's decline of fuel indexes has led to a readjustment back down to prior levels.

Forest Product Markets

With certain minor exceptions, mills in the Northeast appear to have planned well for a long spring. Proper inventory management during mud season can be make-or-break for those needing consistent supply to keep production moving.



This is also the time of year where we are entering the spoiling season for many forest products. The heat and humidity of the summer can promote growth of different types of fungi on felled trees, which can introduce stain and significantly erode the value of a given log. While certain species are more susceptible than others to this phenomenon, we like to see most products delivered within two weeks of the timber being cut. All mills – no matter what they are producing – prefer fresher product, and if the foresters & contractors are not staying on top of managing wood flow it has the potential to cut into stumpage returns.

Sawn Products

Production schedules at most sawmills appear to have remained quite steady, if not robust. Despite some recent economic outlook worries, the larger recovery trends on home construction appear positive to us and the industry is encouraged. The NAHB, for example, recently adjusted its housing starts forecast downward from last month, but their estimate still represents a 12% increase over 2013. As a result of this optimism, most sawmills are producing at or near the limits of capacity. We hear of some that are even maintaining high production levels despite a thinning order file.

Softwood Sawstock

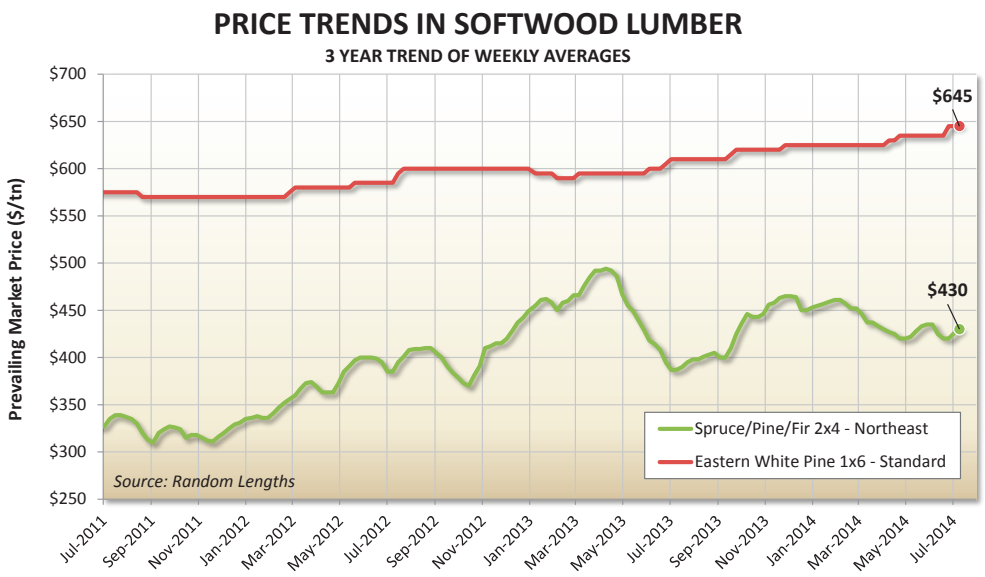
Coming into spring, raw material inventories of our regional dimensional sawmills were a bit larger than usual – a direct result of the extended winter. At this point, the spruce & fir inventories have corrected and, based on our observations, appear to be right about on plan for the season. While it's likely that these sawmillers' margins aren't what they were during early winter, all indications are that they are still in relatively good health and in turn consuming a lot of volume. The strong demand that characterized these markets during winter has not abated, and regional softwood log pricing has remained relatively consistent for the landowner over the last 6 months.

- ***Recovery at most North American forest and paper producers continued through 2013: results for Q1 2014 mixed*** (May 5th)
  Net earnings were up for the majority of the North American forest products companies in 2013. However, financial results were generally down for forest products companies in the rest of the world. The strongest performance in Q1 of 2014 was in the U.S.
  — *Canada NewsWire*

- ***Plum Creek embraces mixed-use forestry in it 850,000 acres of North Woods*** (May 19th)
  One of the largest landowners in Maine applies science, skill, and a little bit of art in the management of its forest.
  — *MaineBiz Magazine*

- ***Last Millinocket paper machine up for auction*** (May 20th)
  After an unsuccessful two-year search for a strategic partner to operate the Millinocket mill, Cate Street Capital, owner of Great Northern Paper Co. LLC, has decided to put the No. 11 paper machine up for auction.
  — *Bangor Daily News*

- ***Maine climate warming up quickly, analysis shows*** (Jun 4th)
  The average temperature in both Maine and Vermont rose by 2.5 degrees from 1984 to 2013, roughly double the average warming nationwide. Warmer climates are changing the presence of wildlife and affecting farmers and fisherman in northern New England.
  — *Portland Press Herald*



We're sensing some nervousness among our regional spruce & fir mills that they will be facing supply challenges as a result of elevated pricing of hardwood pulpwood (see discussion below). The concern stems from the risk that contractors & landowners will be more inclined to produce hardwood pulpwood at better margins, rather than producing the normal volume of spruce & fir. We believe this represents a short-term risk to the supply/demand equilibrium that has been in place for softwood timber. That said, our philosophy as a land manager is to develop a plan and stick to it. While we're not opposed to taking advantage of a spot market, we do so within the parameters of our land management objectives.

This is considered the off-season for most of our regional pine markets, and in fact we typically expect the market for red pine to go essentially dormant until September. Furthermore, because of summer vacation and holidays, many pine markets use this time to take extended time off. The tide will shift quite suddenly as soon as the spoiling season is over and mills are anxious to refill their log decks. The pine that we are moving this time of year is managed very closely, and is usually stored submerged under water once it hits the mill yard.

Despite this being a slow time of year for pine, demand from those who are using it during the last quarter was just about as high as we have seen it in recent years. Our sense is that these markets are headed northward on pricing – this is quite a contrast to a few years ago when mills were having a hard time selling even their select grades. Making us even more optimistic is our observation that several pine mills in the Northeast are reinvesting capital in their facilities & processes to help with production throughput and recovery.

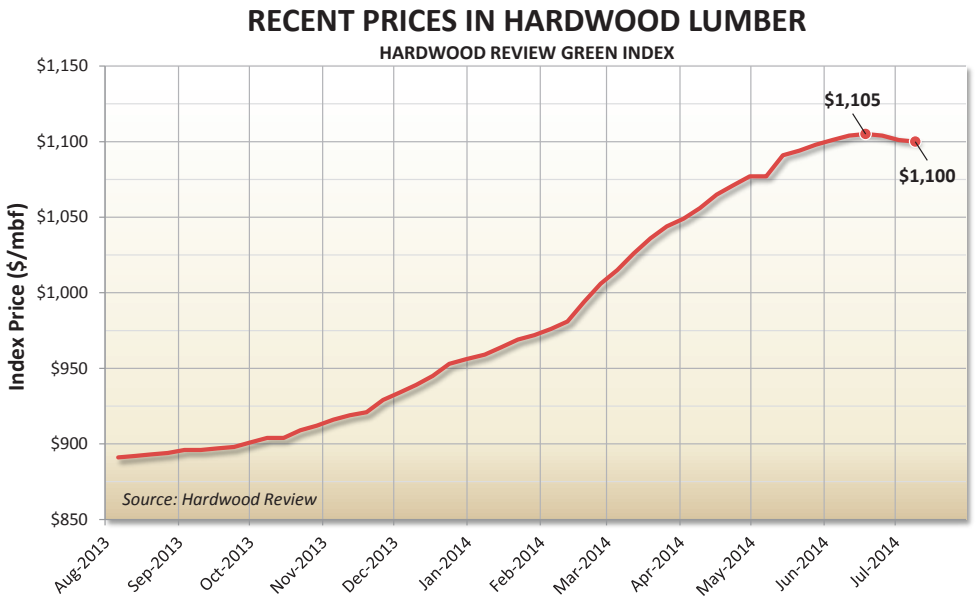
Hardwood Sawstock

The strong demand for hardwood grade logs that we have enjoyed over the last year or so has remained with us for the past quarter. Timber inventories at our regional hardwood mills has been quite slim; some of this is intentional supply chain management from the log buyers, and some due to slower than normal deliveries during the spring. Oddly, in some locations, we're seeing an inversion in the traditionally-accepted values of grade logs. For example, pricing for hardwood veneer logs, traditionally one of the highest-quality grades available, has not kept pace with the significant increased pricing of some high-end sawlogs. With some of these higher-grade logs, sawlogs are being sold at or above lower-grade veneer pricing. This is likely not a trend that will continue for an extended time, because we're seeing some veneer mills react by adjusting their pricing up to more competitive levels to ensure they get the supply they need.

- ***For forests, an earlier spring than ever*** (Jun 5th)
  Over the last two decades, spurred by higher temperatures caused by climate change, forests throughout the Eastern U.S. have experienced earlier springs and later autumns than ever before. This increases the growing season of forests, but is amid a barrage of detrimental impacts of climate change on the Earth's ecosystems.
  — Phys.org Science News Wire

- ***Wisconsin's paper industry braces for uncertainty*** (Jun 7th)
  Demand for coated printing-grade paper, one of the state's biggest industries, is on the latest leg of a sharp multiyear, digitally-driven decline, sparking speculation of a renewed round of mill shutdowns.
  — Paper Cuts

- ***Opinion: While Maine spins it wheels on wood pellet exports, our neighbors are eating our lunch*** (Jun 10th)
  Facilities in Canada and the Southeastern U.S. are investing in huge biomass and wood pellet plants to provide a steady stream of pellets to ports for transatlantic ship routing to high-demand markets in Denmark, the Netherlands, the U.K. and Germany. Maine is consuming almost as many wood pellets as it is producing, which leaves a small margin for export.
  — Bangor Daily News



Maple grade logs – particularly hard maple – continue to be in high demand and command exceptionally strong pricing. Regional mills are very hungry for the wood and are able to saw and move their product quickly. Like pine, maples are susceptible to staining during the summer months, and as a result sawmills work very hard to get the product from log form to dry form as quickly as possible to minimize quality degradation.

While we push to keep the products with a shorter shelf life moving quickly, one kind of product is not affected by the stains and spoiling season: low-grade timber. That is, products destined for more industrial uses such as railroad ties, landscape timbers, and timber-mats which don't have to be trucked immediately after being cut. The regional growth of this market in the last few years has been impressive and we believe the timber-mat business in particular to be more viable than ever. Five years ago Maine was a net importer of timber mats; we would not be surprised if this flow has reversed direction. Interest in producing railroad ties locally has noticeably increased as well. The trees in the Northeast U.S. are pretty conducive to making these types of products.

Pulpwood Products

Hardwood Pulpwood

Hardwood pulpwood represents the largest segment (by volume) of timber we sell in the Northeast, and for the last several quarters, demand has been unabated. Most hardwood pulp mills came into the second quarter with desperately thin raw material inventories, and the pricing being realized by timber producers has been at a peak, reflective of this heavy demand. Inventories of hardwood pulpwood at mills currently remain low, but the picture should start to change as the drier summer weather stabilizes wood flow. Therefore, demand should temper slightly.

One product made with hardwood that we don't often mention is engineered wood products, such as Oriented Strand Board (OSB) panels. A fair amount of hardwood goes into this market, but our region has traditionally not supported much market competition. Each season that passes, however, we have seen a slight uptick in competition and production capacity for engineered products – another sign of a recovering construction industry. Mills that manufacture these products regularly compete with hardwood pulpwood and poplar groundwood consumers, which has added to the demand for the hardwood fiber.

- ***Paper and pulp mills in Maine seeking relief from tax burden*** (Jun 15th)
  Several companies operating paper and pulp mills in towns across Maine say the tax bills they are paying are more than the buildings, property and equipment are worth. Some of the companies are negotiating the assessments with the towns that determine their property tax bills. If mill valuations drop, residents of mill towns could see higher tax bills.
  — *Portland Press Herald*

- ***The Triple Crown of Biomass*** (Jun 20th)
  Without any one of the three components (policy, feedstock and infrastructure), a biomass project will never be successful.
  — *Biomass Magazine*

- ***Maine pellet producer plans expansion*** (Jun 30th)
  Corinth Wood Pellets in Corinth, Maine, is investing $7 million in a planned expansion project. According to the Maine Department of Economic and Community Development, the expansion project is expected to create 18 new jobs.
  — *Biomass Magazine*

- ***Investor withdraws at least $20 million from Thermogen wood pellet plant project in Millinocket*** (Jul 1st)
  Portland-based investment firm, Coastal Enterprises Inc, has withdrawn at least $20 million it considered committing to Thermogen Industries, the company created and managed by Cate Street Capital that plans to build a high-tech $140 million wood pellet plant in Millinocket, Maine.
  — *Bangor Daily News*

- ***Opinion: Canada urgently needs a national forest policy*** (Jul 3rd) Around the world, wherever there is a successful forest industry, we find smart and innovative policies to manage the public resources, harness opportunities and address the responsibilities. Canada must do exactly these things as well to ensure that forestry is treated as an increasingly value-added industry.
  — *Montreal Gazette*

Softwood Pulpwood

Despite the idling of a softwood pulp producer in Central Maine (Great Northern Paper), the markets are currently absorbing all the softwood pulpwood being produced. Because of the consistently strong market prices for Northern Bleached Softwood Kraft (NBSK) pulp, we've seen one regional mill reaching for pulpwood timber in excess of 100 miles to their facilities – quite a long distance.

We see further evidence of traditional hardwood pulp producers experimenting with runs of softwood pulpwood, due to both the supply situation and the market pricing situation. It's the industry reacting to the market dynamics, and we believe it to be a smart move for those limber enough to produce both. Some mills have scheduled additional softwood pulp this summer and are starting to build up their inventories for those production runs. This is helping to keep the market at equilibrium.

Pulpwood markets for hemlock and pine remain tough for the time being – and we don't expect demand to increase in the short term. Markets that do consume these pulpwood species are able to purchase enough local volume to meet current production needs. This has been the story for quite some time.

Biomass

Demand for biomass was stable during the second quarter this year, but profitability of our regional markets – particularly of the standalone wood-to-energy facilities – appears strained. Generally the demand for electricity during the so-called "shoulder seasons" of spring and fall are lower; once everyone turns on their air conditioners for the season, the picture might improve.

Benjamin D. Carlisle
PRESIDENT

Carbon Arrives: Implications For Forest Landowners

by Sam Radcliffe, Vice President

A few years ago I made a presentation on timberland valuation at the "Who Will Own the Forest?" conference sponsored annually by the World Forestry Center in Portland, Oregon. During the Q&A session, I was asked why forest-based environmental services such as carbon sequestration are not considered in a property valuation. My response: because there is no market for such services, i.e. the forest owner cannot get paid to provide such services, then these are public goods, which add no value to a property for a private investor.

That was then. Fast-forward to June 2014: P&C's client The Forestland Group announces that it has been issued 1.7 million carbon offset credits by California's cap-and-trade program for its offset project on 220,000 acres in Michigan's Upper Peninsula. It represents the largest single project registered in California's program, which began in 2012. According to the project developer, the fund that owns the property will immediately receive "significant" revenues through pre-contracted sale of the credits to companies participating in the cap-and-trade program.

In other words, carbon has arrived, so appraisers and market participants must now give serious consideration to the potential value increment that generation of carbon offsets could provide to a property. This is a very large and complicated topic full of if's, and's, or's, but's and a dizzying array of acronyms. In this space we can provide only a brief introduction to carbon offset projects, markets, and valuation issues.

How Forest Carbon Projects Work

A carbon project generates credits that can be purchased by organizations to offset their own carbon emissions. These credits can be purchased on a voluntary basis or to comply with a regulatory requirement. In my opinion, it is the existence of compliance markets, where credit buyers have motives beyond altruism or "green marketing", that will drive demand for forest carbon projects. The U.S. compliance markets include the programs run by the California Air Resources Board (CARB) and the Regional Greenhouse Gas Initiative (RGGI), which has nine participating states in the Northeast. The programs are similar in many ways but for structural reasons RGGI offsets have achieved prices that are 60% lower than CARB prices.

The fundamental forestry carbon proposition is fairly simple: when landowners implement forest practices that result in fewer carbon emissions or greater carbon sequestration than "business as usual" practices, they are credited with the commensurate difference in carbon offsets. Three types of forestry projects qualify: Reforestation projects, Avoided Conversion projects, and Improved Forest Management (IFM) projects. Reforestation projects consist of artificially regenerating lands that are currently in non-forest use. Avoided Conversion projects involve protection of forestland from conversion to non-forest uses (e.g. residential development). Because of the scale required to overcome the considerable project costs, most U.S. forest carbon projects will be IFM projects.

IFM projects consist of forest practices that increase carbon storage over the "business as usual" level, which is termed the baseline. The baseline is defined by regional averages of inventory and growth for the specific forest types involved. To achieve an increase over the baseline, most U.S. forest projects will involve reduction of harvest levels below the sustainable harvest level defined by annual growth. This is an important point; harvest is reduced, not eliminated.

Carbon offsets are typically measured in terms of metric tons of carbon dioxide equivalent ($mtCO_2e$). Importantly, the carbon stocks that form the basis for comparison include not only the above-ground portion of live trees but also standing dead trees, the below-ground portion of both live and standing dead trees, and the carbon sequestered in forest products harvested from the project. Obviously, quantifying carbon stocks and flows for both the baseline and the project is not a standard forest inventory project – a significant amount of modeling is required.

Evaluating Carbon's Potential

A carbon project is a large undertaking with significant up-front costs, and ongoing costs of management and verification. The development, implementation and verification activities involve several third parties:

- The landowner typically does not have the systems or expertise to evaluate the financial feasibility of a carbon project, perhaps considering multiple programs for a given property. This is the initial role of a project developer.
- An initial forest inventory and periodic verification inventories must be conducted by a qualified independent forest inventory consultant using specified standards. To avoid perceived conflicts of interest, this consultant should be different than the forest manager, who is charged with implementing the on-ground practices that lead to carbon offsets.
- Both CARB and RGGI standards require forest certification (FSC, SFI or Tree Farm), which involves third party certifiers and/or auditors.
- After determining the feasibility of a project and conducting required fieldwork, the project developer prepares a Project Design Document (PDD) that completely describes the project, growth and yield projections, carbon offset eligibility and calculations, and forest management practices in a format designed to specifically address the requirements of the project protocol.
- The project must be verified to the proposed standard by an independent verifying body that is approved or accredited by the compliance agency. This verification occurs in connection with registration of the project with an offset project registry, the body that formally approves projects and issues and tracks offsets. Typically the project developer becomes the project operator, who will manage the verification and registration processes.
- The offset project registry issues registry offsets based on documents submitted by the project operator and verified by the verifying body. This application-verification-registration process continues through the life of the project (50-100 years) each time the project operator files a claim for credits.

- Finally, compliance offsets are brought to market by the project operator or a specialized broker through a process by which they are canceled in the registry and issued to the project's account with the compliance agency. The sale of an offset involves its transfer from the carbon project's account to the purchaser's account. Sales can be achieved through private negotiations or via an exchange.

Needless to say, all of these activities and involvement of third parties translate to a stream of costs and revenues that will vary by project scale and complexity. The World Resources Institute[1] prepared a pro forma analysis of a hypothetical 2,400-acre project in Virginia to be registered with the Climate Action Reserve (CAR), a well-known offset registry. Assumed costs were:

Item	Total Cost	Cost/Acre
Initial project costs of project development, technical support, inventory, verification, CAR fees	$70,000	$29.17
Annual costs of project management, verification	$12,500	$5.21
Additional field verification every sixth year	$10,000	$4.17
Re-inventory every 10 years	$25,000	$10.42

By harvesting only 40% of annual growth, the property was projected to produce an average of about 2,900 offset credits per year, although about ten times that amount were produced in the first year because the project started above the baseline. These credits were assumed to be sold for $8.50 to $12.00 per $mtCO_2e$ gross of transaction fees.

Discounting the 100-year cash flow stream at 5% yielded a net present value of $155 per acre. However, that calculation does not take into account the opportunity cost of a higher timber harvest level. Assuming harvest is set at 90% of growth and annual growth is .60 cords per acre, the annual harvest foregone in the carbon project is .30 cords per acre. With those harvest assumptions, the breakeven average price per cord is about $26. Any price higher than that makes the carbon project financially inferior to the conventional forest management approach.

Considerations for Land Owners

Now that carbon credit production is a viable alternative for large forest properties, what issues arise for property owners, buyers, lenders and appraisers?

Feasibility: Clearly the number one question: is carbon production on the subject property financially feasible? There are a number of carbon project developers who offer free pre-feasibility studies that may be sufficient to answer this question or to at least provide a "probable" answer. But these studies may not include the opportunity costs (revenue foregone) associated with implementing the "business as usual" case, so there is plenty of analytical work left.

Risk: Carbon projects present several kinds of risk to the property owner:

- Counter-Party Risk: Entering a 100-year contract with anyone is risky enough, but this is a relatively new industry with few barriers to entry. Penalties for early termination of a carbon project contract can be severe.
- Political Risk: Carbon markets would not exist in the absence of government policy. Changes in policy could completely change the economics of a project. Not only cap-and-trade but also general forest policies could have an impact. For example, if a state adopted regulations that reduced the ability of landowners to harvest timber, then those regulations would cause the project baseline to shift upward because they would change "business as usual" practices.
- Price Risk: Related to political risk, carbon prices are not freely determined in the market, because they are directly related to the emissions caps set by regulators. Even in the absence of government intervention, it is difficult to forecast either trends or volatility in this nascent market.
- Measurement Risk: The number of carbon credits earned is dependent on the difference between the baseline and the property's actual carbon stores. Estimation of those stores is dependent on an initial field inventory and subsequent periodic re-inventories, along with models related to the carbon in unmeasured forest components and growth and yield models. Forest inventory is a stochastic process subject to various types of error, and simply chance alone could lead to a mis-estimation that changes the economics of the carbon project. Of particular concern is the risk that a re-inventory causes a reversal in carbon stocks 10 years into the project.

- Risk of Reversals: A reversal in carbon stocks can be caused by weather, fire, insect or disease events. Carbon project protocols typically require a portion of credits earned to be set aside in buffers, which are intended to act as insurance pools to be drawn upon in the case of carbon reversals. However, in the event those pools are not large enough, the landowner would be required to re-pay the deficit in dollars rather than buffer pool credits.

Valuation Methodology: The income approach in the form of a discounted cash flow analysis is a straightforward methodology for valuing a carbon project. However, it may be possible to creatively implement the other valuation approaches (comparable sales and cost) as well. There are a number of methodological issues that should be considered when the objective is to estimate market value:

- Should carbon-related cash flows be evaluated at the same discount rate as other cash flows?
- What empirical evidence or expert opinion is available to forecast carbon prices?
- Is the management plan associated with the existing carbon project the optimal (value-maximizing) plan given current and projected market conditions? Would the cost of modifying the plan be adequately offset by increased revenues?
- Does the long length of the carbon contract require that a longer projection period be examined?
- When comparing a subject property encumbered by a carbon project with comparable sales that are unencumbered, how can the price adjustment be made? Does experience with conservation easements provide some guidance?
- In the cost approach, an estimate of the property's Gross Timber Value is usually the most critical component. If under a carbon project, should a portion of that timber be evaluated at carbon prices rather than timber product prices? How should the dead and below-ground carbon be accounted for as a property asset?

Clearly, property owners, buyers, lenders and appraisers have their work cut out for them when evaluating whether or not a carbon project is suitable. P&C stands ready to provide the critical thinking, modeling capability and quality field services necessary to help clients explore this new dimension of forestland ownership.

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[1] Logan Yonavjak, Paula Swedeen and John Talberth, 2011. "Forests for Carbon: Exploring Forest Carbon Offsets in the US South" WRI Issue Brief 6 http://www.wri.org/sites/default/files/pdf/forests_for_carbon.pdf

[2] See P&C's 2014Q1 newsletter http://www.prentissandcarlisle.com/assets/PCnwslttr_1QTR-14.pdf for a discussion of inventory uncertainties and their impact on value.