

Forest Carbon for the Private Landowner (1): Basics of carbon offsets, markets and trading

Sarah Hines*

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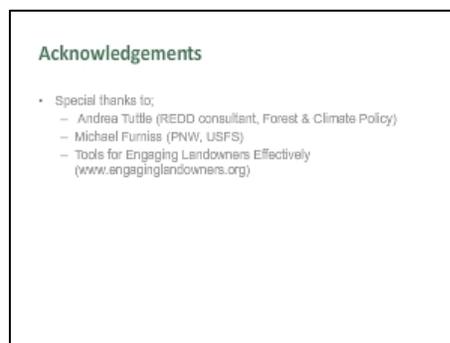
Slide 1. Forest Carbon for the Private Landowner

Hi, my name is Sarah Hines. I'm an ecosystems services specialist with the Northeastern Area State and Private Forestry and the Northern Research Station. And I'm here today to talk a bit about forest carbon and the private landowner part 1, basics of carbon offsets, markets, and trading. And this is exciting. This is where a science and policy really come together and science helps to inform policy to result in positive climate outcomes. And notice I didn't say positive forest outcomes, but fortunately those two really go hand in hand. So I'm here today to set the context and hopefully place forests in that larger context so we can help to understand why they can be such a significant player in markets.



Slide 2. Acknowledgments

So I'd just like to start off by acknowledging some of the people who helped with this presentation, Andrea Tuttle and Michael Furniss,



Slide 3. Learning Objectives

...and go through some of our learning objectives. So first we'll be considering briefly overall options for greenhouse gas reductions and mitigation. And then we'll go on to explore a little bit about private forest landownership patterns and trends here in the United States. And then that will hopefully set the stage for learning a bit more about the basics of carbon offsets, markets, and trading. And hopefully you'll walk away with an understanding of how carbon markets and private forests relate.



* This document transcribes the presentation given by Sarah Hines. The presentation is part of General Technical Report NRS-93, "Forest and grassland carbon in North America: A short course for land managers." The full report, comprised of 15 presentations, is in DVD format and can be obtained at <http://nrs.fs.fed.us/pubs/order/40110>. The presentations and related materials can also be accessed at <http://www.fs.fed.us/ccrc/carboncourse/>

Slide 4. Setting the Stage

So setting the stage. We have a variety of options for greenhouse gas reductions. We have regulations and these can take the form of mandated new technologies, mile per gallon standards, renewable energy portfolios, et cetera. There are a number of ways of putting a price on carbon, and that includes taxes and markets, and we'll be sort of focusing on markets in the second half of this presentation. Cap and trade is a big buzzword that you might have heard, and it's important to note that now in 2011, even though we might not have action progressing toward that front on the Federal level, there nonetheless is activity happening. California's Assembly Bill 32 mandates greenhouse gas reductions to 1990 levels by 2020, and that's supposed to come, in part, through cap and trade.

Setting the Stage:
Options for GHG Reductions

- Regulations:
 - Mandated new technology (factories, automobiles), mpg standards, renewable energy portfolio standards
- Taxes:
 - According to C content of various fossil fuels
- Markets:
 - Voluntary markets for early actors, proactive individuals
 - Compliance markets require regulation to create scarcity/demand

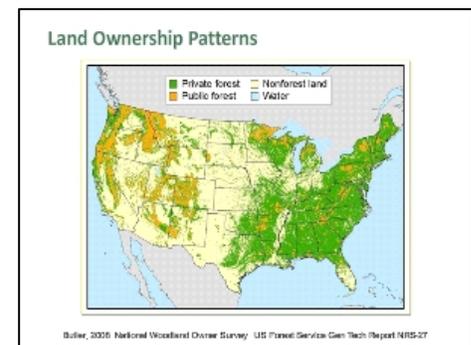
California's AB32:
GHG reductions to 1990 levels by 2020
Combination strategy - regulation and cap (covering 85% statewide emissions)

States with Renewable Portfolio Standards: **Illinois, Iowa, New York**

Diagram: EPA, California, and a power plant.

Slide 5. Land Ownership Patterns

So, landownership patterns in the U.S. So many of you in the forestry community are familiar with the fact that there is publicly owned forestland and also privately owned forestland, but when I talk to folks outside of the forestry community, sometimes they're not quite as familiar with this. And so it's important to note that just as a private homeowner might have a backyard and they can make autonomous decisions about what to do about that, so too do people own 40 acres of forest as their backyard, or several 100 acres, or corporations can own their own forestland and they make autonomous decisions about how to manage that. The other thing that I want to point out is the majority of the forestland in the East, over 90 percent, is privately owned. In the West the opposite is true, and that has something to do with settlement patterns in the U.S. and when Congress set aside some public lands.



Slide 6. U.S. Private Landowners

So now that we understand a little bit about the landownership base, let's look at the landowners themselves. So, first of all, we have a lot of data courtesy of the National Woodland Owners Survey conducted by Brett Butler of the Northern Research Station, and this data has been analyzed in the form of a Web site called "Tools for Engaging Landowners Effectively", and this is available at www.engaginglandowners.org. And just as corporations do segmentation analyses to understand a little bit more about who their customers are and what messages they respond to, so too have these folks done this for forest landowners. And so that really helps us because it helps us to know what beliefs and motivations and drivers these folks have. So, if we look here at the bottom left, this category of forest landowner is called the woodland retreat owner, and they value their forestland for biodiversity, for recreation, for sort of getting away from it all. They mostly just like to get off in the woods and just enjoy quiet and peace of mind. The second type of landowner is the working the landowner, and this person really sees their land as an asset and they like to get out there and get their hands dirty. They care about forest health issues. They care a little bit about taxes. The next landowner is supplemental income, and they see their land as an investment opportunity and they're interested in monetizing a variety of revenue streams including timber, perhaps maple syrup, other things like that. They're interested in forest health

US Private Landowners:
Ownership Attitudes & Motivations

- National Woodland Owner Survey (NWOS)
 - annual census of forest landowners in the US, led by Brett Butler
- Tools for Engaging Landowners Effectively (TELE)
 - Butler et al segmented landowners into four categories based on their reasons for owning land.
- How do landowner attitudes & ownership patterns relate to C markets?

Grid of photos showing various landowners.

issues, and they're interested in taxes. And then finally, we have the uninvolved landowners, and these people may have inherited land, they may be heirs, but they're not really involved in the day-to-day maintenance of the land and they often times don't live on the land. So, now that we know that we can look across the spectrum and see that none of these landowners mentioned carbon as their primary reason for wanting to own land. So, what's wrong with these people? But that's really important to know as a forestry community, because if we want to engage people about carbon and climate change we have to come at them with something that they care about. So, maybe we can use biodiversity as an on ramp or forest health issues as an on ramp to engage them in a broader discussion about forest management and positive carbon outcomes.

Slide 7. Private Forestland Conversion in the U.S.

So now that we've covered all the reasons why people love to own private forestland, what are some of the reasons that it's being converted? Well some of the drivers include poor planning for intergenerational transfer, economic pinch points, needing to pay for college or healthcare perhaps, taxes. There are many different drivers here, and it's important to note that not only do we lose the primary carbon stock when we lose that forestland, but we lose the ability for that forest to sequester carbon into the future, and there's also emissions associated with that new land use, so construction and transportation.



Slide 8. Forest Conversion will affect National Sequestration Potential & Targets

And all of this adds up to put ever more pressure on the forests that do remain, not only for the carbon sequestration benefits, but also for the cobenefits other ecosystem services. So perhaps we can think about increasing the density of living without necessarily eating away at too much more of the private forestland, but those are policy and social trends and choices.



Slide 9. Mitigation: Forest Management Options

Forest management options for mitigation. If you've been watching other lectures in this course, you've seen a menu of items similar to this, and I bring it up again because these are the major categories that really fit into carbon markets. So we have avoided emissions, enhanced sequestration, and to some extent, substitution of biomass for fossil fuels. A couple of notes on some of the acronyms. Avoided conversion is used domestically. More often you'll hear the term REDD, reduced emission from deforestation and degradation, when we're talking about international issues. Improved forest management can really take many forms and it depends on the forest type, the land use history, things like that. Urban forestry, we've heard in another lecture how important urban trees are not only for their sequestration value, but also for the avoided emissions, for mitigating the heat island effect and things like that. But unfortunately in markets they only get credit for the sequestration that they provide and not for the additional avoided emissions.



Slide 10. Offsets and Credits

So offsets and credits. These are terms that you've probably heard before so let's define them. Generally they're used interchangeably and they refer to a metric ton of carbon dioxide equivalent. Technically speaking, offsets are a metric ton of CO₂ equivalent that's reduced, avoided, or sequestered to compensate for one that's emitted elsewhere, and credits are a tradable right to emit. It's really important that we create offsets and credits that are real, additional, verifiable, enforceable, and permanent. Remember the focus here is on the atmosphere and on atmospheric benefits, so we need to make sure that these things have integrity. And some of the acronyms at the bottom are specific terms that are used in different protocols to refer to offsets and credits. So just know that as you delve deeper into this, there are lots of acronyms out there, just don't be scared, definitions abound.

Offsets & Credits

...1 ton CO₂e
...a tradable right to emit

- Metric: stock (tonnes), not rate
- Compensates for an emission elsewhere
- Considered equivalent to a GHG reduction achieved at the source
- Offsets and credits must be real, additional, verifiable, enforceable, and permanent
 - Not all smoke and mirrors.
- CERs, VERs, CRTs, oh my!



Slide 11. Voluntary vs. Compliance Markets

Voluntary and compliance markets. Compliance markets are typically driven by regulation and will include entire sectors, whereas voluntary markets often come about people who want to look good, good corporate social responsibility, or do some precompliance work might engage in voluntary markets. Typically it's not entire sectors that are engaged but rather individual entities. So for example, an electric utility rather than the entire electric sector.

Voluntary vs. Compliance Markets

	Voluntary	Compliance
Motivations	Pre-compliance, public relations, individual action	Regulation (cap)
Credits	VERs (verifiable tons)	CERs, CRTs (verifiable tons)
Types of offsets	Methane Reduction, Fertilizer Reduction/No till, Forestry, NDCs, HFCs*	Depends which sectors are capped/uncapped; Forestry may be explicitly included (CAR, New Zealand) or excluded (ETS)
Location/Size of Market	National & International; forestry projects primarily international	National & International; Market locations in EU, CA; project locations in CA (& nationwide), global

Slide 12. Why Use (Forestry) Offsets?

So why use offsets in general? Well they're really a bridging mechanism to the future. We're trying to get to some low carbon future, but we can't do that overnight from both a policy and an economic perspective. So we use offsets typically as a bridging mechanism, and they can provide a little bit of flexibility.

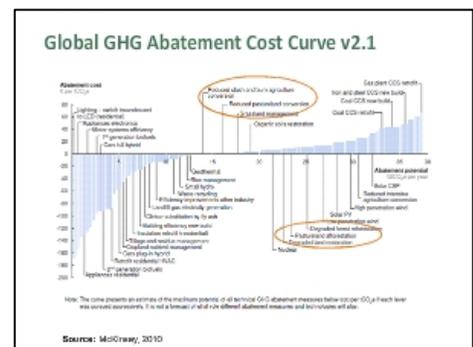
Why use (forestry) offsets?

- Reduce compliance costs
- Reduce emissions in uncapped sectors
- Provide an economic incentive to develop new technologies
- Link various carbon markets
- Facilitate transition to a low-carbon future
- Certain forestry options & practices offer a lower cost of emissions abatement and/or co-benefits



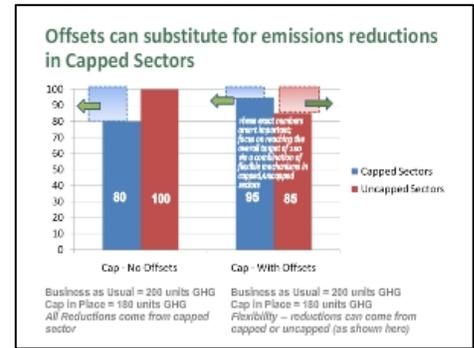

Slide 13. Global GHG Abatement Cost Curve v2.1

Why use forestry offsets in particular? Well, as you can see from this chart they're not necessarily the cheapest option. On the left here are some options that pay for themselves really, and then forest and land management comes in in the middle and within the price range of zero to \$20 per ton. We can make a lot happen with respect to forest and grassland management and land management in general, and we have the capacity to take care of about 20 gigatons per year if we employed all of these.



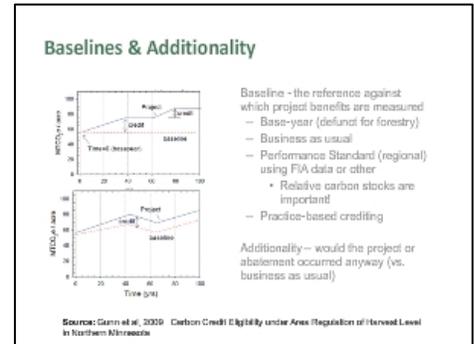
Slide 14. Offsets Can Substitute for Emissions Reductions in Capped Sectors

So one point about offsets in a cap and trade system, offsets really just provide an additional level of flexibility. So if we have a cap with no offsets, then all of the reductions have to come from the capped sector itself. If we allow offsets into the system, some of the reductions can come from the capped sector, some of the reductions can come from outside of the cap sector thereby lending an extra degree of flexibility.



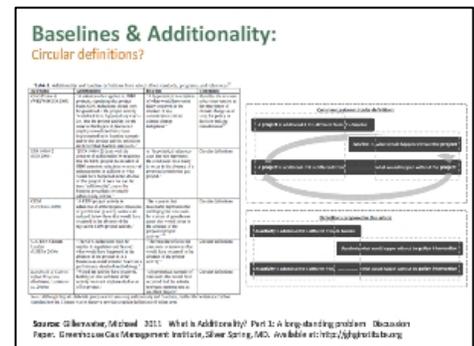
Slide 15. Baselines and Additionality

Baselines and additionality. So depending on your perspective these accounting terms I'm going to talk about next can be really interesting or they can be less than interesting. I'm just going to cover them briefly because there's a lot of information out there, and depending upon the protocol that you're looking at, these can be defined in different ways. Baseline is generally the reference against which project benefits are measured, and it can be established in a variety of ways, and again it depends on the protocol. Additionality generally refers to the benefits that accrue in addition to the baseline,



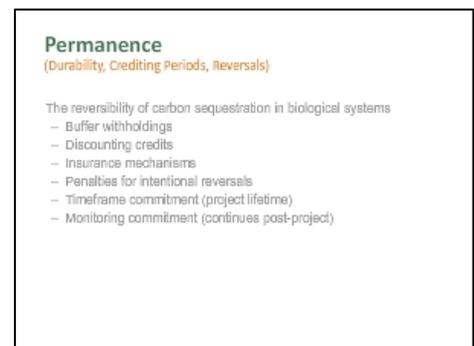
Slide 16. Circular Definitions?

...and unfortunately these terms tend to have a little bit of a circular definition. In this chart here on the left just indicates the definitions of additionality and baselines that are used in different protocols and regulations, and you can see that the lexicon is a little bit circular in this regard.



Slide 17. Permanence

Permanence is another important issue. It generally refers to the likelihood that carbon in a biological system will experience reversal, and this is important because carbon in biological systems does typically experience reversal. And so the way we deal with this is through buffer withholdings. So if a fire sweeps through or insects sweep through and devastate a stand, not all of that carbon will have been sold on the market. There's a buffer withholding and you can draw from that. If a landowner intentionally reverses the carbon, they can be legally liable for replacing it. Typically with permanence there is a time frame commitment. The project needs to take place over a certain period of time and not cease prior to that, and there's a monitoring commitment that often extends beyond the project lifetime. It can be up to 100 years beyond the project lifetime.



Slide 18. Leakage

Leakage is another important accounting issue that we need to consider, and it basically refers to the fact that carbon can be released outside of a project boundary. So for example, if you put an easement on one piece of land, that might just shift development to another piece of land, and that carbon ends up being emitted anyway. So that would be an example of project level or activity leakage. Another example is market or sector level leakage, and in that case, if we reduce harvesting overall of wood products then the supply on the market goes down, price goes up, and people shift to other building materials that might embody more carbon.

Project description or location	Project A		Project B	
	CO ₂ e	Discount	CO ₂ e	Discount
Baseline CO ₂ e emissions	1000	1000	1000	1000
CO ₂ e emissions avoided	500	500	500	500
Leakage	100	100	100	100
Net CO ₂ e emissions avoided	400	400	400	400
CO ₂ e emissions avoided (net of leakage)	400	400	400	400
CO ₂ e emissions avoided (net of leakage) (discounted)	350	350	350	350
CO ₂ e emissions avoided (net of leakage) (discounted) (with leakage)	300	300	300	300
CO ₂ e emissions avoided (net of leakage) (discounted) (with leakage) (with leakage)	250	250	250	250
CO ₂ e emissions avoided (net of leakage) (discounted) (with leakage) (with leakage) (with leakage)	200	200	200	200
CO ₂ e emissions avoided (net of leakage) (discounted) (with leakage) (with leakage) (with leakage) (with leakage)	150	150	150	150
CO ₂ e emissions avoided (net of leakage) (discounted) (with leakage) (with leakage) (with leakage) (with leakage) (with leakage)	100	100	100	100

Source: VCC Guidance for AFOLU Projects, 2020

Impacts of project activities on GHG emissions outside the project

- Project-level:
 - Discount forestry GHG offsets/credits
 - Document explicitly what leakage has / has not occurred
- Sector-level:
 - Expand coverage to more entities, sectors, states/countries
 - Accept project leakage and adjust national targets appropriately

Slide 19. Measuring, Monitoring and Verification

So there are ways of dealing with this within the accounting system, as well. And then measuring, monitoring, and verification, an extremely important part in the process of creating legitimate credits and offsets with integrity. Often times performed by a third party, there are cost accuracy considerations. Again, depending upon the protocol that you use, there are specific instructions as to how to carry out measuring, monitoring, and verification.

Measuring, Monitoring & Verification (MMV)	
• Critical step in creating legitimate offsets	
• Performed by a certified 3 rd party	
• Measuring	<ul style="list-style-type: none"> Cost/Accuracy Considerations: direct measurement, models, lookup tables, or a combination, depends on circumstances Not all C pools are critical/mandatory
• Project monitoring	<ul style="list-style-type: none"> Helps ensure the project is being implemented according to the PDD
• Verification	<ul style="list-style-type: none"> Ensure that reductions have been made (Real Additional Verifiable) and accounted for according to protocol being used. Supports transparency and integrity of process and of the tons being issued Ensure that standards are being applied consistently across projects

Slide 20. Cost Considerations for Landowners

So tying it back to the landowner just a little bit, there are lots of cost considerations for a landowner who might want to engage in this. There are start-up costs and ongoing costs. In terms of the minimum efficient size, there really isn't a policy restriction on what size tract of land you need to engage, but there typically is an economic consideration, and I don't want to put an exact number on it because that's impossible to do. But often times larger landowners have a much easier time going forth economically with this than smaller landowners.

Cost	Description
opportunity costs	revenue foregone from harvest through higher retention, longer rotation, etc.
land carbon inventory	costs for measuring, monitoring, and verification of land carbon stocks, and for maintaining data accuracy for carbon growth and yield credits
land management plan	costs for developing and implementing a land management plan for the landowner, including plan to measure and monitor carbon
carbon credit banking	costs for banking carbon in the project through a market or other mechanism, and for ensuring that the carbon is being stored and managed
carbon credit certification	costs for certifying that the carbon is being stored and managed
verification fees	costs for verification of carbon storage and management
regulatory fees	costs for carbon to be included in a regulatory regime, to help project track and prevent fraud
carbon registration fees / aggregation fees	applicable
carbon trading	costs for carbon trading in a market and other related costs

Source: Payments for Forest Carbon: Opportunities and Costs for Small Forest Owners

Slide 21. Key Lessons

So the key lesson here is that I hope you've gained a better understanding of how private forests and carbon markets relate. I hope that you understand the basic forest landownership patterns and trends in the United States and the different segments of landowners and their motivation, and the idea that it's really critical to start talking to landowners about something that they care about and see if carbon can be wrapped up in that. So really it's a matter of what makes sense for whom and where, and many lands have a role to play in mitigation, but some have a greater potential than others for engaging in the carbon market. So I hope you stay tuned for part 2, which is coming up next. Thank you.

Key Lesson:	
Gain a better understanding how Private Forests & Carbon Markets Relate	
+	Basic understanding of private forest land ownership patterns & trends
+	Understand different segments of landowners, their interests & motivations.
+	Basics of carbon offsets, markets, and trading
=	what makes sense for whom, and where?
=	many lands have a role to play in mitigation, some have greater potential than others for engaging in the carbon market
Up next...	Forest carbon for the private landowner (2): protocols, project examples, and opportunities