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# Pricing Carbon in Oregon:

## Forestry Offset Protocols

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## FORESTRY OFFSET PROTOCOLS

### HIGHLIGHTS

- Various jurisdictions and carbon registries have developed forest offset protocols potentially applicable in Oregon.
- Protocols exist outside California that have the potential to benefit Oregon, such as avoided wildfire emissions through prescribed burning and forest treatments, and employing reduced impact logging methods.
- A number of financial assistance options exist that could help forest managers overcome initial costs of adopting offset generating practices.

### INTRODUCTION

A total of 24 US states and Canadian provinces have participated in the development of, or implementation of cap and trade programs for greenhouse gas (GHG) emissions.<sup>1,2,3</sup> Oregon does not currently have such a program, but the state legislature has considered ‘cap and invest’ bills for the past several sessions, most recently the Clean Energy Jobs Bill of 2018. Although the bill did not pass, important questions emerged about how a cap and invest program might affect farming and forestry practices and economics.

Both House and Senate versions of the bill include requirements that 50% of implemented offset projects provide direct environmental benefits to the state; allow for the aggregation of small carbon offset projects; and establish an offset protocol advisory committee under the Department of Environmental Quality to design offset protocols that provide direct environmental benefits to the state, impacted communities, tribes, and working lands.

Oregon has approximately 30 million acres of forested area, of which approximately 10.9 million acres are managed by private landowners.<sup>4</sup> Forest management in the state is regulated by the Oregon Forest Practices Act which has provisions for water protection, wildlife protection, and reforestation, as well as limits on clearcutting and chemical usage.<sup>4</sup>

<sup>1</sup> RGGI. (2018). *State Statutes & Regulations*. Available: <https://www.rggi.org/program-overview-and-design/state-regulations>. Accessed 20 April 2018.

<sup>2</sup> U.S. Department of Energy. (2007). *Midwestern Greenhouse Gas Reduction Accord*. Available: <https://www.osti.gov/biblio/21036864>. Accessed 20 April 2018.

<sup>3</sup> Western Climate Initiative. (2013). *Partner Climate Action Plans*. Available: <http://www.westernclimateinitiative.org/climate-action-plans>. Accessed 20 April 2018

<sup>4</sup> Oregon Department of Forestry. (undated). *Working Forests*. Available: <http://www.oregon.gov/ODF/Working/Pages/default.aspx>. Last Accessed 27 April 2018.

To date, the forest sector, with the exception of paper product facilities, has been exempted from proposed emissions caps, but is eligible to generate carbon offsets.

**Offsets** are generated by activities that reduce emissions, or increase carbon sequestration to compensate for the emissions of other entities, generating tradable credits.<sup>5</sup> A variety of offset markets exist globally and within the US. These can be split into **voluntary** (those which entities can voluntarily enter to offset their emissions) and **compliance** (entities must participate to comply with regulation) offset markets.<sup>6</sup> Forest carbon offset projects fall under three main categories: *reforestation*, *improved forest management*, and *avoided conversion* of forested land to non-forested land. Offset project protocols generally outline the following details:

- Activities eligible to generate carbon credits;
- Methods for quantifying GHG sequestration in terms of actual carbon dioxide equivalents;
- How to demonstrate that the activity would not have occurred in the absence of an offset project (additionality); and
- Project monitoring and time commitments.

This issue brief will provide information on protocols implemented by other governments and programs, specifically those most relevant to forestry in Oregon.

A total of seven different carbon offset programs were reviewed:

- The Offset Credit System of Alberta, Canada;
- The Compliance Offset Program of California;
- The National Carbon Offset Standard of Australia;
- The American Carbon Registry;
- The United Nations Clean Development Mechanism (which is also followed by European Union markets);
- The Climate Action Reserve; and
- The Verified Carbon Standard

## RESULTS

Approximately 14 protocols from the above-mentioned offset programs were identified as potentially applicable to Oregon. Table 1 offers a summary of forestry protocols and programs.

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<sup>5</sup> Kollmuss, A., Zink, H., & Polycarp, C. (2008). Making sense of the voluntary carbon market: A comparison of carbon offset standards. *WWF Germany, Stockholm Environment Institute/Tricorona*.

**TABLE 1. Summary of Protocol Types and their Frequency amongst different Offset Programs.**

(Key: AB = Alberta, CA = California, AUS = Australia, ACR = American Carbon Registry, CDM = Clean Development Mechanism, CAR = Climate Action Reserve, VCS = Verified Carbon Standard)

Protocol Type	AB	CA	AUS	ACR	CDM	CAR	VCS
Reforestation							
Improved forest management							
Avoided conversion/ deforestation							
Reducing emissions through prescribed burning							
Reduced impact logging practices							

The California Air Resources Board (ARB) has perhaps the most well-known forest offset protocol and apply only on non-state and federal lands. Activities eligible to generate credits must be in addition to local forest practices requirements and include:

- *Reforestation*: for land that has less than 10% canopy cover for at least 10 years prior, or that has been significantly disturbed to the point where at least 20% of its above-ground tree biomass has been lost.<sup>6</sup>
- *Improved forest management*: practices may include increasing overall forest age; thinning diseased or suppressed trees to increase productivity; controlling short-lived species and competing brush; maintaining a high stock level; and increasing tree stocking in areas that are understocked.<sup>7</sup>
- *Avoided conversion* of forest to non-forested land that is privately owned.<sup>7</sup>

The American Carbon Registry (ACR) works closely with the California Air Resources Board, and therefore has similar forestry offset protocols.<sup>7</sup> These are:

- *Avoided planned deforestation*: this is also eligible for forested wetlands and floodplains;<sup>8</sup>
- *Improved forest management* for non-federal lands: practices that reduce emissions

<sup>6</sup> ARB. (2015). *Compliance Offset Protocol U.S. Forest Projects*.

<https://www.arb.ca.gov/regact/2014/capandtrade14/ctusforestprojectsprotocol.pdf>. Last Accessed 5 March 2017.

<sup>7</sup> ACR. (undated). *California Offset Program*. Available: <https://americancarbonregistry.org/california-offsets/california-offset-program>. Last accessed 27 April 2018.

<sup>8</sup> American Carbon Registry (ACR). (2012). *American Carbon Registry REDD Methodology Modules*. Available: [https://americancarbonregistry.org/carbon-accounting/standards-methodologies/redd-methodology-modules/redd-mf\\_1-0\\_final.pdf](https://americancarbonregistry.org/carbon-accounting/standards-methodologies/redd-methodology-modules/redd-mf_1-0_final.pdf). Last accessed 5 Mar 2018.

- compared to a scenario where the highest net present value is obtained;<sup>9</sup>
- *Afforestation and reforestation* of degraded lands.<sup>10</sup>

The Clean Development Mechanism has protocols for the reforestation or afforestation of wetlands and non-wetlands, for both large-scale and small-scale projects.<sup>11</sup> The eligible activities under these protocols are not specified, which is perhaps by design to allow room for the diversity of methods that may be used across the different countries where CDM applies.<sup>12</sup> All that is required is that activities increase above-ground and below-ground biomass, and optimally improve woody debris, soil carbon, and leaf litter.<sup>12</sup> However, there is a validation process to ensure that these activities do indeed increase carbon sequestration, including the measurement of root-shoot ratios, tree diameter increments and basic wood densities, as well as the use of biomass expansion factors or allometric equations.<sup>12</sup>

The Verified Carbon Standard has 13 separate protocols/methodologies for offset credit generating activities.<sup>12</sup> Many of these apply specifically to developing countries and therefore may not be relevant in Oregon. Protocols that are applicable include:

- Reducing emissions by increasing the rotation age of forest patches before harvest;
- Avoiding the conversion of forests to non-forests, where conversion is otherwise planned;
- Preventing the logging of forests that would have otherwise been logged, effectively converting it to protected forest;
- Preventing degradation of forests by activities such as high-grade logging. Note that this protocol only applies to situations where selective logging is the already existing baseline scenario.
- Curbing deforestation in areas where unplanned deforestation is taking place.
- Reducing emissions through prescribing burning activities, which in turn could lower the intensity of late seasonal fires. This protocol was designed for the eastern Miombo ecoregion of Africa, but could potentially be modified for eastern Oregon's dry forests.<sup>13</sup> While studies have reached varying conclusions regarding the overall carbon impacts of fuels treatments, California is investing in such efforts using funds generated through its cap and trade system.<sup>14</sup>

<sup>9</sup> American Carbon Registry (ACR). (2018). *Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands*. Available: <https://americancarbonregistry.org/carbon-accounting/standards-methodologies/improved-forest-management-ifm-methodology-for-non-federal-u-s-forestlands/ifm-methodology-v1-3-april-2018-w-cover.pdf>. Last Accessed 27 April 2018.

<sup>10</sup> American Carbon Registry (ACR). (2017). *Methodology for the Quantification, Monitoring, Reporting and Verification of Greenhouse Gas Emissions Reductions and Removals from Afforestation and Reforestation of Degraded Land*. Available: <https://americancarbonregistry.org/carbon-accounting/standards-methodologies/afforestation-and-reforestation-of-degraded-lands/acr-ar-of-degraded-land-v1-2-2017.pdf>. Last Accessed 5 March 2018

<sup>11</sup> UNFCCC. (2016). *CDM Methodology Booklet*. Available: [https://cdm.unfccc.int/methodologies/documentation/meth\\_booklet.pdf](https://cdm.unfccc.int/methodologies/documentation/meth_booklet.pdf) Last accessed 5 Mar 2018.

<sup>12</sup> Verified Carbon Standard. (2018). *Methodologies*. Available: <http://verra.org/methodologies/>. Last Accessed 27 April 2018.

<sup>13</sup> Verified Carbon Standard. (2015). *Methodology for Avoided Forest Degradation through Fire Management*. Available: <http://verra.org/wp-content/uploads/2018/03/VM0029-Methodology-for-Avoided-Degradation-through-Fire-Management-v1.0.pdf>. Last 27 April 2018.

<sup>14</sup> [http://calfire.ca.gov/resource\\_mgt/resource\\_mgt\\_fuelreduction](http://calfire.ca.gov/resource_mgt/resource_mgt_fuelreduction)

- Reducing emissions through ‘reduced impact logging practices’ such as: improved log bucking, directional felling, skid trail planning, monocable winching, pre-harvest inventorying to improve harvest planning, reducing the width of haul roads and reducing the size of log landings.<sup>15</sup> Emissions reductions for this protocol are determined based on the difference between a set crediting baseline for each activity, and the measured impact of these activities in the actual project.<sup>21,16,17</sup> Some of these practices are have long been employed by ecologically minded forest managers in Oregon.

The Climate Action Reserve (CAR) has a forest offset protocol for projects involving reforestation, avoided conversion of forested land to non-forested land, and improved forest management. Projects must decrease forest carbon emissions or increase forest carbon sequestration, or both.<sup>18</sup>

### **BASELINES AND ADDITIONALITY**

The methods offset protocols use in defining baseline conditions against which offset projects are measured vary. For instance, three general concepts are used in the main improved forest management (IFM) protocols currently in use in the US: **(1)** defining a common practice for a given region using regional forest inventory data, **(2)** defining common practice using timber net present value (NPV) calculations, and/or **(3)** defining the average rotation length for a given region. Each approach uses a different method of arriving at a similar definition for a project’s baseline condition.

Many protocols require a degree of permanence for activities. This is a requirement that project activities continue for a set period of time that is deemed as permanent.<sup>19</sup> Examples of how different programs define permanence for forestry offset protocols are listed below:

- ARB requires forest offset projects maintain carbon levels for which they have been paid for 100 years after the last crediting period.<sup>6</sup>
- ACR requires improved forest management projects continue for 40 years.<sup>9</sup>
- VCS requires carbon sequestered due to offset activities continue to be sequestered for 100 years.<sup>20</sup>

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<sup>15</sup> Verified Carbon Standard. (2016). *Methodology for Improved Forest Management through Reduced Impact Logging*. Available: <http://verra.org/wp-content/uploads/2018/03/VM0035-RIL-C-Methodology-v1.0.pdf>. Last accessed 27 April 2018.

<sup>16</sup> Putz, F. E., Sist, P., Fredericksen, T., & Dykstra, D. (2008). Reduced-impact logging: challenges and opportunities. *Forest ecology and management*, 256(7), 1427-1433.

<sup>17</sup> ITTO. (2018). *Reduced Impact Logging*. Available: <http://www.itto.int/feature15/>. Last accessed 8 May 2018.

<sup>18</sup> Climate Action Reserve. (undated). *Forest Project Protocol V4.0: Protocol Summary*. Available: <http://www.climateactionreserve.org/how/protocols/forest/dev/version-4-0/>. Last Accessed 29 May 2018.

<sup>19</sup> Ruseva, T., Marland, E., Szymanski, C., Hoyle, J., Marland, G., & Kowalczyk, T. (2017). Additionality and permanence standards in California's Forest Offset Protocol: A review of project and program level implications. *Journal of environmental management*, 198, 277-288.

<sup>20</sup> Verified Carbon Standard. (2017). *Agriculture, Forestry and Other Land Use (AFOLU) Requirements*. Available: [http://verra.org/wp-content/uploads/2018/03/AFOLU\\_Requirements\\_v3.6.pdf](http://verra.org/wp-content/uploads/2018/03/AFOLU_Requirements_v3.6.pdf). Last Accessed 4 June 2018

The concept of additionality refers to an activity that would not have happened in the absence of some intervention.<sup>21</sup> In the context of offsets, this means that a credit-generating activity must be one that is not “business as usual” or economically profitable in the absence of an offset policy.<sup>22</sup> For example, selective logging may not yield sufficient profits to justify the practice over clearcuts. However, if an offset protocol allowed selective logging to generate extra revenue through credits, it may become more financially viable. The following is a table summarizing how different offset programs have developed criteria to demonstrate additionality for eligible activities:

**TABLE 2. Offset Program Criteria for Additionality**

(Key: AB = Alberta, CA = California, AUS = Australia, ACR = American Carbon Registry, CDM = Clean Development Mechanism, CAR = Climate Action Reserve, VCS = Verified Carbon Standard)<sup>22 23 24 25 11 26 27</sup>

An activity is <i>not</i> additional and, therefore, is not eligible for an offset program if...	Offset Programs
It is required by law or regulation	AB, CA, AUS, ACR, CAR
It is supported by other government incentives	AUS
It is a financially attractive investment	AB, CDM, CAR
It does not face technological barriers such as lack of trained personnel, R&D deployment risk or market failure	ACR
The technology is economically feasible / there are no cost barriers	AB, CA, ACR, VCS
It does not face ‘significant’ barriers to adoption	CDM
It does not face institutional or social barriers	ACR

<sup>21</sup> Mason, C. F., & Plantinga, A. J. (2013). The additionality problem with offsets: Optimal contracts for carbon sequestration in forests. *Journal of Environmental Economics and Management*, 66(1), 1-14.

<sup>22</sup> Government of Alberta. (2011). *Technical Guidance for Offset Protocol Developers*. Available: <http://acp.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/documents/TechnicalGuideOffsetProtocol-Jan2011.pdf>. Last accessed 16 April 2018

<sup>23</sup> California Air Resources Board. (2013). *California Air Resources Board’s Process for the Review and Approval of Compliance Offset Protocols in Support of the Cap-and-Trade Regulation*. Available: <https://www.arb.ca.gov/cc/capandtrade/compliance-offset-protocol-process.pdf>. Last Accessed 8 April 2018.

<sup>24</sup> Australian Government. (2017). *Review of the Emissions Reduction Fund*. Available: <http://climatechangeauthority.gov.au/sites/prod.climatechangeauthority.gov.au/files/files/CFI%202017%20December/ERF%20Review%20Report.pdf>. Last accessed 27 April 2018.

<sup>25</sup> ACR. (2010). *The American Carbon Registry Standard*. Available: <https://americancarbonregistry.org/carbon-accounting/standards-methodologies/american-carbon-registry-standard/acr-standard-v2-0-february-2010.pdf/view>. Last accessed 27 April 2018.

<sup>26</sup> Climate Action Reserve. (2015). *Climate Action Reserve Program Manual*. Available: <http://www.climateactionreserve.org/how/program/program-manual/>. Last Accessed 27 April 2018.

<sup>27</sup> Verified Carbon Standard. (2017). *VCS Standard*. Available: [http://verra.org/wp-content/uploads/2018/03/VCS\\_Standard\\_v3.7.pdf](http://verra.org/wp-content/uploads/2018/03/VCS_Standard_v3.7.pdf). Last Accessed 27 April 2018.

Viable alternative activities are required by law	CDM
There are alternative technologies that would achieve the same result	AB
It is a common practice	All
It is adopted by more than 40% of the sector	AB
It is deemed as common practice in the area / has a high degree of market penetration	CA, ACR, CDM, CAR, VCS
The adoption of the activity is not affected by public perceptions	AB
It has no additional impact	All
The applicant began the practice before being registered for offsets	AUS
The resulting reduction in emissions would have occurred in the absence of the activity	CDM
It does not result in emission rates that are lower than a determined industry threshold / predetermined baseline performance metric	CAR, VCS

There are two important things to note from Table 1. First, within each program a failure to meet one of the criteria does not automatically disqualify an activity. The additionality of activities are assessed in terms of satisfying a minimum number of criteria, or a hierarchy of criteria (similar to a decision tree).

Second, most protocols have additionality criteria specific to that type of project. For example, under the California forest offset protocols, reforestation projects must occur on land that has had less than 10% canopy cover for no less than 10 years to be considered additional.<sup>28</sup>

### **FINANCIAL ASSISTANCE AND INCENTIVES**

For many forestland owners and managers, initial costs and delayed benefits may be a significant barrier in transitioning to practices that have the potential to generate carbon offset credits. Developing and registering offset projects can be expensive and time consuming. Forest owners and managers in Oregon have access to a number of state and federal financial assistance programs, mostly in the form of grants and cost-share programs, that have the potential to defray up-front costs of employing carbon sequestering practices. It should be noted, however, that forests would only be able to yield benefits from both financial assistance and offset credits if an activity would

<sup>28</sup> California Air Resources Board. (2015). *Compliance Offset Protocol U.S. Forest Projects*. Available: <https://www.arb.ca.gov/cc/capandtrade/protocols/usforest/forestprotocol2015.pdf>. Last accessed 5 Mar 2018.

still be considered additional despite receiving funding from such programs. Australia’s offset program specifically prohibits this. The following is a sample of financial assistance programs available in Oregon:

**TABLE 3. Financial Assistance Available for Potentially Offset Credit-Generating Activities.**

Incentive	Description
Regional Conservation Partnership Program (RCPP)	<ul style="list-style-type: none"> <li>● Administered by USDA Natural Resources Conservation Service (NRCS) in partnership with state and private entities.</li> <li>● Leverages federal and non-federal resources.</li> <li>● Allows for regionally defined conservation priorities to direct federal and non-federal resources.</li> <li>● A current RCPP in Oregon is leveraging federal cost-share with private technical assistance to deliver forest carbon inventories.<sup>29</sup></li> </ul>
Environmental Quality Incentives Program (EQIP)	<ul style="list-style-type: none"> <li>● Administered by NRCS</li> <li>● Provides financial assistance for farmers to implement practices improving animal, plant, water, soil and other natural resources on agricultural or private forested land.</li> <li>● Contracts are up to 10 years in duration, and payments are made after EQIP activities are implemented.<sup>30</sup></li> </ul>
Conservation Stewardship Program (CSP)	<ul style="list-style-type: none"> <li>● Administered by NCRS.</li> <li>● Involves minimum payments of \$1,500 per year.</li> <li>● Includes support for forest managers. Supported activities may improve natural resources, biodiversity and buffers, pest management, soil, water and wildlife</li> </ul>

<sup>29</sup> Pinchot Institute for Conservation. (2018). *Unlocking Carbon Markets for Family Forest Owners in the PNW*. Available: <http://www.pinchot.org/gp/RCPP>. Last Accessed 1 June 2018

<sup>30</sup> Natural Resources Conservation Service. (2018). *Environmental Quality Incentives Program (EQIP) - Oregon*. Available: <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/programs/financial/eqip/?cid=stelprdb1193512>. Last accessed 5 Mar 2018.

	<p>conservation.<sup>31</sup></p> <ul style="list-style-type: none"> <li>● Includes support for ongoing monitoring of conservation practices.</li> </ul>
Forest Stewardship Program	<ul style="list-style-type: none"> <li>● Funded by the USDA Forest Service and administered by Oregon Department of Forestry. This program funds development of forest stewardship plans.</li> </ul>
Conservation Innovation Grants	<ul style="list-style-type: none"> <li>● Administered by NRCS.</li> <li>● To be eligible, projects must use technologies or conservation approaches that are supported by a sufficient number of studies to imply a certain probability of success. However, pilot projects and field demonstrations for innovative conservation projects are also supported.</li> <li>● Projects requesting a maximum of \$75,000 are eligible for State CIG funds.<sup>32</sup></li> </ul>
Oregon Forest Resource Trust	<ul style="list-style-type: none"> <li>● Administered by Oregon Department of Forestry.</li> <li>● Broadly defined, the program provided funding for projects on lands capable of growing forests but currently in brush, cropland, pasture or very poorly stocked.</li> <li>● Program was originally conceived of as a link to carbon markets.</li> </ul>

## CONCLUSIONS

Many forest carbon offset protocols are currently in use and/or are applicable to Oregon. Protocol design has implications for whether emission reductions can be considered real, additional, and permanent, but also for whether landowners are willing and able to participate. Of particular relevance is how permanence, baselines, and additionality are considered. Likewise, requirements for quantifying and monitoring carbon stocks during the project lifespan, assessing risk ratings to projects, and incorporating leakage, all affect cost-effectiveness.

<sup>31</sup> Natural Resources Conservation Service. (2018). *Conservation Stewardship Program*. Available: <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/programs/financial/csp/?cid=nrcseprd1289826>. Last accessed 5 Mar 2018.

<sup>32</sup> NRCS. (2017). *Conservation Innovation Grants in Oregon*. Available: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/or/programs/financial/cig/>. Last accessed 5 March 2018.

In designing state specific guidelines, Oregon may benefit from expanding the range of protocols currently sanctioned by the California Air Resource Board. Of particular interest to Oregon forest managers may be developing protocols related to reducing wildfire emissions through prescribed burning and forest treatments, and reduced impact logging techniques. Improved forest management projects that increase carbon stocks on private forestlands by extending harvest rotations beyond the regional average, or retain more standing volume post-harvest, have already been developed in Oregon and Washington using compliance and voluntary protocols, with more in the pipeline. Carefully designed and administered protocols have the potential to incentivize forest management practices that deliver a range of social, economic, and environmental benefits such as improved water quality, recreation opportunities, wildlife habitat, and wood products.

### **POLICY RECOMMENDATIONS**

- Using the best available science, evaluate ways in which management interventions in Oregon's varied forest types affect carbon sequestration and storage.
- Develop two sets of Oregon specific protocols; **(1)** offset protocols that meet established credit standards and may be sold within or across state lines within a linked market; **(2)** "climate-smart protocols" that incentivize adaptive, carbon sequestering activities that may not be conducive to precise ton/acre style measurement (prescribed fire and forest restoration treatments may fall into this category). This second group of protocols would be used to administer state financial assistance funds arising from the sale of allowances.
- Collaborate with other jurisdictions to develop as broad a base of project protocols types as possible for Oregon.
- Examine ways to minimize offset development and transaction costs, while maintaining statistical rigor of offsets.
- Re-evaluate California Air Resource Board baselines for additionality using state-level USDA Forest Service FIA data being reviewed by the USDA Forest Service PNW Research Station in collaboration with Oregon Department of Forestry.
- Support research and development of remote carbon measurement techniques to streamline project inventory and monitoring.
- Clearly define monitoring requirements.

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