Adopted revisions to Ecology's US Forest Offset protocol

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Introduction

The following report summarizes Ecology's adopted revisions to our US Forest offset protocol, informed by input from Ecology's US Forest Offset protocol technical working group and Environmental Justice working group. The adopted revisions outlined below reflect Ecology's research on this protocol. In addition to these revisions described in this report, Ecology has made some revisions intended to improve clarity and process efficiency in the adopted protocol which may not be included in this summary but can be found in the adopted protocol document "Ecology US Forest Offset Protocol 1.0".

The scope of Ecology's US Forest Offset rulemaking is to adopt this updated US Forest Offset protocol in the Climate Commitment Act Program Rule (WAC 173-446). In addition, the US Forest Offset rulemaking includes revisions to the offsets section of the Climate Commitment Act Program rule which are separate from the US Forest Offset protocol.

Ecology's goals for this rulemaking include:

- Improving project feasibility for smaller landowners
- Increasing viability of less common project types and ownership types
- Removing unnecessary or unintended barriers or exclusions to project development
- Improving applicability of the protocol to forests in Washington state
- Ensuring accuracy and appropriate conservatism in project crediting

The adopted revisions identified in this document are intended to support those goals in the following ways:

Goal	Associated revisions
Improving project feasibility for smaller landowners	Revision 2, 7, 8, 9, 10, 12, 14
Increasing viability of less common project types and ownership types	Revision 1, 16, 18
Removing unnecessary or unintended barriers or exclusions to project development	Revision 10, 12, 13, 14, 16, 17, 18
Improving applicability of the protocol to forests in Washington state	Revision 7, 10, 11
Ensuring accuracy and appropriate conservatism in project crediting	Revision 1, 2, 3, 4, 5, 6, 15, 19

The following revisions are intended to be responsive, as appropriate, to:

1. Input received from Ecology's technical and environmental justice working groups
2. Public comments received during the initial Cap-and-Invest Program rulemaking, and the first informal draft of the US Forest Offset Protocol
3. Input received from Tribes in staff-to-staff meetings and Tribal comments
4. Relevant innovations and updates in the voluntary carbon market made since publication of the existing protocol in 2015
5. Recommendations made in the California Air Resources Board (CARB) 2021 Offset Taskforce report
6. Critiques or proposed alterations to the existing protocol from peer-reviewed research.

Revision 1. Adopt selected process, structure, and quantification revisions from CAR US Forest Offset 5.1 protocol

The prior version of the US Forest Offset protocol developed by the California Air Resources Board (CARB) and adopted by Ecology in 2022 is closely based on the Climate Action Reserve's (the Reserve) US Forest Offset protocol version 3. In the time since CARB's protocol was last revised (2015), the Reserve has published a 4.0, 5.0, and 5.1 version of this protocol.

The revised US Forest Protocol reflects some revisions made to CAR's US Forest Offset protocol between version 3 and the current version 5.1. Revisions reflected in CAR's 5.1 protocol that Ecology believes may have a meaningful impact on project development, quantification, eligibility, and crediting are addressed individually in the subsequent sections. For example, Ecology adopted reduced verification requirements for smaller projects in line with the CAR's US Forest Offset 5.1 protocol, which is discussed separately in this report. Less significant updates reflected in the US Forest Offset 5.1 protocol, such as clarifications to terminology, are not covered separately in this report.

In some instances, Ecology retained references to supporting tools and documentation on the Climate Action Reserve's website, which may be used by project proponents and verifiers as appropriate.

Alignment with: CAR US Forest Offset protocol 5.1

Revision 2. Revise Improved Forest Management – private lands projects baseline quantification and crediting approach

Ecology's US Forest Offset protocol requires the establishment of a baseline, which is intended to reflect the conditions of the project area over time if the project was not enrolled in the carbon market. The difference over time between the carbon stocks on site and those in harvested wood products compared with the carbon stocks in the established baseline represents the impact of the project. The difference between the baseline (the presumed "business-as-usual" scenario, absent the development of the forest offset project) and the actual carbon within the project boundaries determines eligibility for offset credit issuance.

Baseline setting for forestry projects is a critical component of the integrity of forest carbon offsets and is highly complex. Ecology worked with Dogwood Springs Forestry, with contributions from Washington Conservation Action and the Climate Action Reserve to develop a revision to the baseline setting component of Improved Forest Management (IFM) projects on private lands described in section 6.2.1 of the protocol. This update to the baseline quantification approach includes several modifications from the prior version of Ecology's protocol:

- Through the revised approach, "common practice" values are derived by Ecology from the US Forest Service EVALIDator Tool. This approach improves transparency and enables more timely updates to common practice values to better reflect the dynamics of changing social, legal, and market conditions affecting forest management. Ecology will publish and periodically update common practice values based on outputs from the EVALIDator Tool.
- The common practice values are comprised of onsite live and dead trees and include both above-ground and below-ground carbon pools (defined as Standing Carbon Stocks), whereas the prior version of our protocol initiates the approach with only above-ground live carbon pools and proceeds to include the other pools through various steps. This revision is intended to simplify the quantification approach by making it more intuitive.

- Because common practice values are intended to represent an average of privately owned forest lands within the ecological region that the project is located, a project's baseline cannot fall outside 1.645 standard deviations of the mean of plot values within a forest type in an ecological region. The average 90% confidence interval within a forest type in an ecological region is approximately +/- 20%. This means that, on average, an additional sample taken of a particular forest type in an ecoregion is expected to fall within 20% of the common practice value provided in the dataset about 90% of the time. Because common practice values are intended to reflect an average of the type(s) of forest(s) in the project area, when the project area's initial carbon stocks are above common practice, the project's baseline cannot be more than 20% below the project's initial carbon stocks. If the project would otherwise use common practice values to establish the minimum baseline and the common practice value(s)s are more than 20% below the project's initial carbon stocks, then baseline will be adjusted upward so as not to fall more than 20% below the project's initial carbon stocks. The intent of this provision is to appropriately establish baselines for forests that are more highly stocked than the regional average. This revision is not intended to exclude highly stocked forests from enrolling in the market, but rather to reflect a more appropriate baseline for these forests.
- Credits are issued based on an assumed sloped line from the Start Date Standing Carbon Stocks to common practice over the course of the 10-year crediting period, rather than as a lump sum in the first issuance to the project. This is intended to reflect the most realistic business-as-usual scenario and is similar to the existing crediting approach for avoided conversion projects. Ecology may approve issuance of offset credits reflecting a more rapid harvest from current standing stocks to common practice if supported by an existing forest management plan that meets the requirements of section 6.2.1.2 in the Protocol, or if the enrolled project area is less than 1,000 acres.
- The revised approach allows use of an Ecology tool to outline legal constraints within the project area to improve transparency of the additionality tests. Project proponents may either complete an analysis of legal constraints using this tool, or through modeling as outlined in Appendix B.22 of the Protocol. Legal constraints must be included within the project baseline.
- The project's baseline must be recalculated at the end of each crediting period. Because the crediting period for IFM projects on private lands is reduced from 25 years to 10 years, and the baseline quantification includes identifying legal constraints and evaluating financial viability, a project's baselines will be dynamic; the baseline will change over time in response to changing policies or timber markets.
- The revised approach requires establishment of a high stocking reference for IFM projects on private lands. This is an extension of the high stocking reference requirement in the prior version of the protocol that is required for offset projects with initial standing carbon stocks below common practice. A high stocking reference level is intended to ensure that forests are not harvested more intensively prior to project enrollment and then crediting for re-growth that would have occurred absent the project.

Taken together, these revisions significantly alter baseline development, and thus credit issuance for IFM projects on private lands, which are expected to make up the majority of credit issuances. Ecology believes this will be the most significant change adopted through this rulemaking.

Alignment with: Novel approach adopted, ACR US IFM 2.1 (partial), CAR US Forest Offset 5.1 protocol (partial)

Revision 3. Revise leakage rate assumption for Improved Forest Management projects

Leakage refers to emissions that are displaced rather than avoided because of offset project activities. For example, if a reduction in timber harvesting in the offset project area causes increased harvesting elsewhere, this displaced harvesting would be considered "leakage". To ensure that offsets issued through the protocol represent real, permanent, quantifiable, and verifiable emissions reductions, it is important that the offset protocol adequately address account for leakage. Through this rulemaking Ecology has adopted revisions to the quantification of leakage in the protocol.

There are two types of leakage that are commonly observed related to Improved Forest Management (IFM) projects:

1. Activity shifting leakage: Forest carbon activities that directly cause harvests to be shifted to another location outside of the project boundaries, cancelling out some of the project's carbon benefits. If a landowner enrolls a deferred harvest project on one tract of land in the carbon market, and then more intensively harvests another tract of land that they own to compensate for the lost harvest, this would be considered activity shifting leakage
2. Market shifting leakage: When a project changes the supply and demand for timber products, leading to higher prices and other market actors shifting their activities. Market shifting leakage could occur if deferred or reduced harvests in a project area led to less supply in the market, which in turn increases market prices, inducing other producers to increase production.

In an effort to prevent activity shifting leakage, the adopted protocol requires that project proponents enroll all forested areas in their ownership within the HUC-14 hydrological unit into the program. The intent of this requirement is to prevent landowners from shifting harvest activities to other comparable properties they own.

Leakage rates are impacted by a variety of factors such as project size and the dynamics of local or regional markets for the associated wood products. Smaller projects are likely to cause less market shifting leakage than larger projects. Projects in regions with high intensity forestry production are more likely to cause market shifting leakage than projects in regions with lower intensity forestry production. However, Ecology does not believe that sufficient research exists at this time to quantify leakage at the project scale.

In the absence of a robust approach to project-specific leakage, application of a default leakage rate assumption remains the logical approach to consider market shifting leakage in credit issuance, while not creating additional quantification burdens for project proponents. Literature published in recent years has suggested the leakage rate of IFM projects could be higher than in the prior version of the US Forest protocol adopted by Ecology. In order to ensure Ecology's issued offset credits reflect a conservative business-as-usual scenario as required per WAC 173-446-020, Ecology has adopted a revision to the leakage rate for IFM projects in the protocol from 20% to 40%. Specifically, Ecology

revised the Secondary Effect Emissions calculation equation 5.10 from a 20% leakage rate (.20) to a 40% leakage rate (.40)[1] reflecting findings of comprehensive forest leakage analysis published in 2020.

In addition, Ecology adopted equations 6.13.B and 6.13.C from the Climate Action Reserve US Forest Offset protocol 5.1. These equations allow for a positive carryover of leakage when the actual amount of carbon harvested in a reporting period at a project site exceeds the estimated average baseline amount of onsite carbon harvested in a reporting period. This may happen because project interventions (such as extending rotations) increase the amount of merchantable timber on a project site, and thus when those trees are harvested the amount of carbon harvested in that reporting period exceeds what would have been expected in a business-as-usual scenario. This positive carryover can reduce future leakage deductions but cannot be used to issue additional offset credits. In no circumstances can the net balance of leakage deductions be positive – the amount of carbon harvested from a projects site over the life of the project must always be less than the modeled baseline scenario.

Alignment with: Novel approach adopted; CAR US Forest Offset protocol 5.1 (partial)

Revision 4. Adopt revised common practice statistics, and updated assessment area dataset.

Common practice values are an important component of project baseline setting for Improved Forest Management projects. These values are derived from Forest Inventory and Analysis (FIA) datasets, based on plot-based field surveys. Ecology has provided revised common practice statistics sourced from the US Forest Service EVALIDator tool. To this end, a dataset has been published alongside this rule. Ecology's common practice statistics are comprised of FIA plots on privately owned land, within the same ecoregion and within the same forest type. An example of these figures for the "Puget Trough" ecoregion is provided below.

Common practice statistics are simply the average carbon per acre across FIA plots within the same ecological region, ownership type, and forest type. EVALIDator provides a few advancements. EVALIDator provides plot data for standing live and dead carbon, as well as belowground carbon. EVALIDator also includes more updated FIA plot data (as recent as 2021 in the Pacific Northwest region). Ecology intends to adopt updated assessment area data as available. The tool also allows for more seamless periodic updates as updated data becomes available. Lastly, the tool allows for the calculation of confidence intervals for common practice statistics which are used as a component of revision 1.

[1] Carbon leakage in energy/forest sectors and climate policy implications using meta-analysis - ScienceDirect

Table 1. Example of draft Common Practice values from Ecology Assessment Area Datafile

Ecoregion	Forest Type	Total Common Practice (CP) Value (mTCO2e)	Above Ground Live CP (mTCO2e)	Below Ground Live CP (mTCO2e)	Above and Below Ground Dead CP (mTCO2e)
Puget Trough	Alder / maple group	147.9	120.8	22.9	4.2
Puget Trough	Douglas-fir group	176.4	138.7	31.7	6
Puget Trough	Elm / ash / cottonwood group	146.4	117.5	22.5	6.4
Puget Trough	Hemlock / Sitka spruce group	244.7	198.1	41.7	4.9
Puget Trough	Nonstocked	8	5.9	1.3	0.8
Puget Trough	Other: Aspen / birch group, Lodgepole pine group, Other hardwoods group	147.2	118	24.2	5

Ecology has adopted portions of the updated Assessment Area dataset published by the Climate Action Reserve in 2019. Ecology has provided alternative common practice values for this dataset via the aforementioned approach.

Alignment with: Novel approach adopted, CAR US Forest Offset protocol 5.1 (partial)

Revision 5. Revise property appraisal requirements for avoided conversion projects, including third party verification of appraisal

Avoided conversion projects must be appraised by a qualified appraiser in order to identify and quantify the highest-value alternative land use for the project area. To be eligible to enroll in the offset market, the value identified by the appraiser must be more than 40% greater than the value of the current forested land use. If the appraised value is between 40- 80% greater than the current forested land use value, a discount factor is applied to the issuance of credits to reflect uncertainty about the likelihood of conversion. Projects where the appraised value of the alternative land use is more 80% greater than the current forested land use may receive offset credits equal to the full difference between the current carbon stocks and the projected carbon stocks after conversion (minus deductions). When the highest value identified use is residential conversion, the appraisal plays a role in the annual conversion estimates (table 6.4 of the protocol). Appraisals must be conducted in accordance with the Uniform Standards of Professional Appraisal Practice and the appraiser must meet the qualification standards outlined in Internal Revenue Code, Section 170(f)(11)(E)(ii).

Reflecting the critical role of appraisals in avoided conversion projects, Ecology has revised appraisal requirements in the following ways.

1. Adopted additional requirements from the Reserve's 5.1 Protocol section 3.3.2.3. This revision makes several clarifications and additions to the existing verification requirements including requiring that appraisal reports include verifiable data on the development potential of the land, and that such reports include a separate valuation for ongoing forest management signed by a certified or registered professional forester.
2. Require two (rather than one) appraisals to be submitted by the project proponent. Each appraisal must be completed by a different appraiser. Appraisers must not be employed by or affiliated with the same firm. The project would use the appraisal that presents the lower of the two highest appraised alternative land uses.

Alignment with: CAR US Forest Offset protocol 5.1 (partial alignment); novel approach adopted

Revision 6. Set buffer pool contributions in consideration of regional risks

Ecology's adopted US Forest Offset protocol directs a portion (between approximately 10-20%) of offset credits from every forest carbon offset issuance to the shared "buffer pool." The buffer pool is intended to function as an insurance mechanism to guard against unintentional reversals, such as fire, disease, natural disasters, or proponent insolvency.

The risk is assessed to be higher for privately owned forest projects that have not completed fire risk reduction work. Projects on public lands or Tribal lands that have a fire risk mitigation strategy approved by an applicable local for state fire will have a lower assessed buffer pool contribution. The risks associated with wildfire can be reduced through approved fire risk mitigation work, but the baseline fire and disease risk in the prior version of the protocol is assessed equally for all projects, regardless of location or forest type. The protocol assumes a default 4% risk rating for wildfire, and 3% for disease or insect outbreaks, indicating a 4% and 3% chance, respectively, that a forest carbon offset credit will be reversed due to wildfire or diseased over the 100-year life of the credit.

Many of the voluntary offset protocols updated since the original publication of the prior version of Ecology US Forest Offset protocol (including protocols developed by ACR and Verra) have adopted buffer pool contribution rates that generally assume a higher probability of loss due to wildfire or disease. Many of these voluntary offset programs have also adopted project-specific fire risk quantification methods, which seek to estimate the baseline fire risk and disease risk on a more local level.

Ecology adopted revisions to the buffer pool contributions in this protocol to assess wildfire and disease risk at a more localized level, using crosswalks derived from empirical models and publicly available datasets. Ecology is also adopted increases to the average buffer pool contributions in the program. Ecology contracted with Spatial Informatics Group (SIG), a national leader in fire risk modeling, to establish an appropriate dataset and quantification approach for fire and disease risk. Key data inputs include TreeMap 2022, USFS Annual Burn Probability (ABP), and the National Insect and Disease Risk Map (NIDRM). Wildfire risk is estimated at the HUC-10 scale by simulating forest carbon loss using FVS-FFE models under severe wildfire scenarios and linking it to ABP-derived likelihood categories. The resulting severity and likelihood midpoints are multiplied to determine a project's wildfire risk

multiplier, which is then scaled to a buffer pool contribution percentage. Because this approach estimates relative risk, not absolute risk the maximum contribution is 12%.

Biotic risk is similarly quantified by comparing NIDRM-based basal area mortality projections against a defined project failure threshold. Risks are converted into buffer contributions, with a maximum contribution of 8%, via lookup tables based on HUC-10 watershed risk levels.

Ecology can facilitate continual updates to buffer pool contributions reflecting changes in climate and forest health by updating these datasets. Updates to these datasets will not require a rulemaking. Ecology also adopted the Vegetation Management Treatment contribution reduction structure from the Climate Action Reserve's 5.1 Protocol, with some revisions.

These revisions significantly increase the potential maximum contribution to the shared buffer pool. This revision also significantly increases the wildfire and disease buffer contribution reductions that a project can receive for comprehensive, approved, implemented, and verified risk reduction work. Taken together, these revisions are intended to more accurately reflect the risk of carbon loss within the project area and increase the incentive for project proponents to implement risk mitigation measures.

Alignment with: ACR Reversal Risk Tool 2.0 (partial), CAR US Forest Offset protocol 5.1 (partial), novel approach adopted.

Revision 7. Adopt aspects of project aggregation guidance from CAR 5.1 Protocol

Ecology is directed in RCW 70A.65.170(4)(b) and (d) to consider offset protocols that make use of project aggregation and other mechanisms to facilitate project development by small forest landowners. Project aggregation is the process through which multiple tracts of land may enroll in the carbon market as a single project, thus reducing some of the fixed costs associated with project development for the individual landowners.

The cost structure of offset project development can create barriers for small forest landowners to participate in the market. Inventory and verification costs are not proportionate to project acreage; smaller projects experience a disproportionate cost burden from project inventory and verification costs. Ecology's prior adopted protocol did not prohibit project aggregation – a project area could be contiguous or separated into tracts. Multiple pieces of forest land owned by different owners could "aggregate" and enroll as a single project as long as they don't extend across more than two adjacent supersections. However, in the prior version of the protocol, enrolling separate parcels into the market as a single project may not generate much cost savings compared with enrolling each tract individually – due to inventory, sampling, and verification requirements in the protocol which would typically require that each individual tract be treated as a standalone project for the purposes of sampling. In the prior version of the protocol the Forest Carbon Inventory Confidence Deduction states that forest carbon inventory methods need to be designed to not exceed a 20% sampling error compared with the inventory estimate, and there is a crediting deduction for any error above a 5% difference from the inventory estimate. Mitigating error to achieve this standard generally means a large amount of sampling and measurement at the tract level, which in turn increases costs for inventory and verification.

The Climate Action Reserve's 5.1 protocol supports project aggregation, via the Climate Action Reserve's programmatic Guidelines for Aggregating Forest Projects, by reducing sampling intensity for individual projects within an aggregate – which reduces both inventory and verification costs. The Reserve's guidelines allow the target sampling error for each individual project's inventory (the level above which a confidence deduction is applied) to increase based on the number of projects in the aggregate.

The intended impact of this approach would allow the total number of sample plots on a project of a certain size to remain roughly consistent regardless of whether the project was made up of a single landholding or multiple tracts of land. This approach retains a 5% target sampling error for the aggregate, while allowing higher target sampling errors at the individual sites in the aggregate. The target sampling errors for the individual sites in the aggregate is scaled based on the number of projects enrolled in the aggregate. For one non-aggregated project the target sampling error is 5% - as in the existing compliance protocol. This approach to aggregation also revises verification requirements for aggregated projects – requiring all landholdings in the aggregate to receive on-site verification at least once every 12 years (as opposed to six years in the existing protocol). All sites in the aggregate must receive site verification at the time of project enrollment, and at least 50% of sites must receive 3rd party verification at least every six years.

Ecology has adopted an amended version of the Climate Action Reserve's Guidelines for Aggregating Forest Projects as an appendix to the US Forest Offset protocol and adopting associated sections from the Reserve's 5.1 protocol. Ecology adopted a few alterations to this aggregation guidance for use within the Cap-and-Invest Program:

1. Retaining the requirement that all lands enrolled in a project not extend across more than two supersections;
2. Requiring that no single forest owner in the aggregate enroll more than 5,000 acres (for private lands) or 10,000 (for Tribal or public lands, or private lands with a qualified conservation easement);
3. Limiting the project-level target sampling error for projects in the aggregate to no more than 10%. Because these guidelines will result in a reduction in the number of sampling sites required for aggregated projects, Ecology believes it is appropriate to ensure that enrolled projects are ecologically similar, and to restrict large landowners (who would typically be feasible as standalone projects) from using this aggregation option.

Alignment with: CAR US Forest Offset protocol 5.1 (partial)

Revision 8. Reduce verification frequency intensity for smaller projects

Ecology is directed in RCW 70A.65.170(4)(d) to adopt protocols that "make use of aggregation or other mechanisms, including cost-effective inventory and monitoring provisions, to increase the development of offset and carbon removal projects by landowners across the broadest possible variety of types and sizes of lands, including lands owned by small forestland owners." In addition to the adoption of the aggregation approach described above, Ecology can further support project development by smaller landowners by reducing verification frequency and intensity for projects with few or no new offset accruals, in line with CAR's 5.1 US Forest Offset protocol.

Ecology adopted a reduced verification frequency for small offset issuances from every 6 years to up to 12 years for projects generating less than 10,000 credits each year or until 120,000 credits have accumulated. A site visit will still be required for the initial verification. In line with CAR's 5.1 US Forest Offset protocol, projects that experience an intentional reversal, regardless of the volume of credit issuance, will be required to complete a site verification on a 6 year verification cycle. Ecology also reserves the right to require a project to adhere to a 6 year verification if Ecology determines that the project proponent may be reporting artificially low numbers to delay site verification visits.

This rule change reduces ongoing project verification costs for small projects, which are a significant expense as well as a source of delay in credit issuance. Allowing small project proponents to undergo fewer site verifications will generate significant cost savings, while retaining the role of project verification prior to any credit issuance. This rule change does not change the requirement that every offset project data report receive 3rd party verification, or that projects submit monitoring reports. Rather, this change would provide the proponents the flexibility to either request issuances of offset credits as infrequently as every 12 years, and schedule site visits accordingly, or pursue less costly desk verification (rather than onsite verification) between site visits to receive more frequent credit issuances.

Alignment with: CAR US Forest Offset protocol 5.1 (partial)

Revision 9. Reduce verification intensity for projects seeking no credit issuance

In addition to the adoption of an aggregation framework and reducing verification frequency for small projects, as described above, Ecology adopted the Climate Action Reserve's US Forest Project 5.1 approach to verification of project monitoring when no credits are issued. The Reserve's protocol allows proponents to pursue a desk verification, rather than a site verification of monitoring reports, if no credits are being requested at the time when a site visit would normally be required. The desk review must include all monitoring reports submitted since the last verification. If canopy cover has declined by more than 5% in the project area, or if the project has experienced a reversal, then a site visit will be required.

This rulemaking revises the existing language in WAC 173-446-530 which states "For offset projects that do not renew their crediting period, verification must still be conducted at least once every six years for the remainder of the project life. However, after a successful full offset verification of an offset project data report indicating that actual on-site carbon stocks (in MT CO2e) are at least 10 percent greater than the actual on-site carbon stocks reported in the final offset project data report of the final crediting period that received a positive offset verification statement, the next full offset verification service may be deferred for 12 years."

This revision includes adoption of sections of CAR's US Forest 5.1 protocol. This revision significantly reduces the costs of long-term monitoring of smaller offset projects because verification costs are likely to carry a disproportionate cost burden for smaller projects.

Alignment with: CAR US Forest Offset protocol 5.1

Revision 10. Allow project boundary reductions, treated as an intentional reversal

The prior version Ecology adopted protocol required that Improved Forest Management and Avoided Conversion projects finalize their project area by the conclusion of the initial verification; reforestation projects were allowed to finalize their project area by the conclusion of the second verification period. Project boundary reductions (termination of a portion of the project) are not explicitly permitted in the protocol, however CARB has provided project proponents guidance to allow removal of acreage from a project in some circumstances – specifically when there has been a mapping error or a portion of the project was found to be owned by the federal government and thus ineligible. Project boundary expansions are not permitted after the project area has been finalized.

Ecology's technical working group noted that there are variety of reasons why a project proponent may wish to change project boundaries, in addition to identification of a mapping error, such as a change in ownership of some or all of the project area. One of the goals of the forest offset program is to incentivize changes to forest management practices and facilitate long term maintenance of those practices. Providing greater flexibility for project boundary changes (with appropriate compensatory crediting) reduces the likelihood that changes in project ownership or other circumstances would result in a full project termination.

The Reserve's US Forest Offset protocol 5.1 allows for boundary reductions, treated as an intentional reversal. In the event of an intentional reversal proponents must surrender credits equal to the associated decrease in carbon stocks in the project area within four months of approval of the verification. The Reserve's 5.1 protocol does not include a mechanism for project boundary additions. Ecology adopted the allowance for project boundary reductions, treated as intentional reversals, in section 4.3 of the Reserve's 5.1 protocol.

Alignment with: CAR US Forest Offset protocol 5.1

Revision 11. Revise natural forest management criteria

Ecology's adopted US Forest Protocol has more restrictive forest management requirements than Washington's Forest Practice rules, including a 40-acre even-aged harvest limit. Tribes and other prospective project developers have indicated that the 40-acre maximum is not aligned with typical practices for Washington's Douglas fir forests, which are usually harvested in larger even-age blocks. In the U.S. Forest Protocol revision, Ecology adopted an adjustment to the even-aged harvest maximum size.

Even-aged harvest has been a controversial forestry issue for decades. There are several key factors to consider when determining harvest size limits in carbon offset protocols:

- *Ecological impact and benefit.* Clearcutting can reduce ecological diversity, water retention, soil health, and habitat. Thus, even-aged harvest limits are intended to maximize forestry's environmental benefits and minimize environmental harm associated with timber. Forest offset protocols typically seek to further sustainable forestry standards, like limits to harvest size, in part because high species diversity and ecological forest practices tend to enhance carbon storage.
- *Regional forest ecology.* Tailoring management standards to regional forest ecology is a related priority in forest offset protocols. In Washington, forests historically experienced larger scale, patchy disturbance events due to wildfire. Ideally, forest management in the region would mimic this type of disturbance to maintain forest health. In other areas of the U.S., forest disturbances include smaller-scale impacts from disturbances such as insects and wind throw. Harvest size limits in those areas should seek to replicate those smaller-scale disturbances.
- *Forest Project development feasibility.* Carbon offset protocols must also ensure that project development is feasible given standard forest management practices. If Washington uses overly constraining harvest limit standards, it may reduce the number of enrolled projects - unintentionally limiting the carbon offset creation that the protocol seeks to promote.

In response to input from forest landowners and recent research on the ecological forest management in the region,[2] Ecology has adopted elements of the even-aged harvest requirements in the Climate Action Reserve's US Forest Protocol 5.1, with some alterations. The maximum even-aged harvest unit size in the Reserve's protocol increases with greater basal area retention within the harvest unit.

[2] Franklin, J.F., Donato, D.C. Variable retention harvesting in the Douglas-fir region. *Ecol Process* **9**, 8 (2020). https://doi.org/10.1186/s13717-019-0205-5

Ecology received several recommendations from commenters that Ecology should require that all projects follow Washington Forest Practice Rules, in lieu of specifying management practice requirements in the offset protocol. Because Washington Forest Practice Rules do not apply to all forestry projects eligible for enrollment in the Cap-and-Invest Program, Ecology did not adopt this rule change. The adopted maximum clearcut size is listed in Table 2.

Table 2. Basal area retention requirements in draft protocol

Harvest retention (Sq. Ft. basal area/acre of all species)	Maximum sSize of even-aged harvest block (acres)
0	60
>=15 < 20	80
>=20 < 25	120
>=25 < 30	400
>=30 < 40	600
>=40	Unlimited

All projects must also follow all applicable laws and regulations, including state and federal forest management rules. In Washington, clearcut harvest units may not exceed 120 acres (which may increase to 240 acres subject to Washington Department of Natural Resources approval).

Ecology further revised the natural forest management in the protocol to remove the single species composition requirement, while retaining the requirement that projects be composed of at least 95% native species. Ecology also adopted an exemption for projects on less than 1,000 acres from the age class distribution requirements in the protocol.

Finally, Ecology's adopted protocol allows project proponents to request exemptions or variances from the forest management in the protocol. Examples of scenarios for which Ecology may approve an exemption include: conflicts between Natural Forest Management requirements and a Tribe's traditional cultural practices, or unique site or ownership characteristics that limit the viability of the harvest unit sizes and retention requirements described in the protocol.

Alignment with: CAR US Forest Protocol 5.1 (partial), novel approach adopted

Revision 12. Revise eligibility restriction of previously listed projects

The prior version of the US Forest Protocol prohibits projects that take place on land that was part of a previously listed compliance offset project, unless the previous project was terminated due to an unintentional reversal. The protocol prohibits lands that have ever been listed in a compliance program from developing an offset project in the future. Restrictions here are appropriate to eliminate the risk of double counting, however Ecology has adopted revisions to the language in this section of the protocol to prohibit forest offset projects that have previously been *registered* as part of compliance offset project for registering in a new project, rather than *listed.* Projects may *list* with a compliance program with the intention of developing an offset project but never proceed to registration and issuance of credits due to a variety of reasons such missed deadlines, changes in ownership, or natural disturbances between inventory and verification. This change allows lands that previously listed in a compliance

program but never proceeded to registration and credit issuance to be part of a future compliance offset project, allowing for project reconfiguration, boundary changes, or incorporation of ownership changes. Projects that were previously terminated due to an unintentional reversal remain eligible for re-enrollment in the market with a revised baseline.

Alignment with: CAR US Forest Protocol 5.1 (partial)

Revision 13. Revise definition of Forest Owner

"Forest Owner" is defined in the prior version of the protocol as *the owner of any interest in the real (as opposed to personal) property involved in a forest offset project, excluding government agency third-party beneficiaries of conservation easements. Generally, a Forest Owner is the owner in fee of the real property involved in a forest offset project. In some cases, one entity may be the owner in fee while another entity may have an interest in the trees or the timber on the property, in which case all entities or individuals with interest in the real property are collectively considered the Forest Owners, however, a single Forest Owner must be identified as the Offset Project Operator.*

This is an impactful definition in the protocol because forest owner(s) are the liable parties in the event of an intentional reversal. The California Air Resources Board 2021 Taskforce Report recommended a revision to this definition to specifically state that the holders of an easement that do not have management or ownership control over the timber or the land will *not* be deemed to be Forest Owners. This change is recommended in order exclude potential liability for entities such as non-governmental beneficiaries of conservation easements, water rights holders, or tenants and licensees of the property.

Ecology adopted the Climate Action Reserve's 5.1 protocol definition of Forest Owner with some revision. *"A corporation or other legally constituted entity, Tribe, city, county, state agency, individual(s), or a combination thereof that has legal control (described in section 2.2) of any amount of forest carbon within the Project Area*."

Section 2.2 of the Protocol goes on to state that: *"A Forest Owner is an individual, corporation, Tribe, city, county, state agency, other legally constituted entity, or a combination thereof, that has control of any amount of forest carbon within the Project Area. Control of forest carbon means the Forest Owner has the legal authority to effect changes to forest carbon quantities, e.g., through timber rights or other forest management or land-use rights. Control of forest carbon can occur, for purposes of satisfying this protocol, through fee ownership and/or deeded encumbrances, such as conservation easements. A Forest Owner is also any individual, corporation, Tribe, city, county, state agency, other legally constituted entity, or a combination thereof that has the power to direct or cause the direction of the management and policies of a Forest Owner, whether through the ownership of voting securities, by contract, or otherwise.*

[…]

Ecology maintains the right to determine which individuals or entities meet the definition of "Forest Owner."

There are a wide range of ownership structures that may enroll in forest offset projects. This definition appears to provide greater clarity regarding treatment of conservation easements. It identifies easement holders who have legal control of any amount of forest carbon within the Project Area as

owners and also provides the Climate Action Reserve with the authority to determine which individuals or entities meet the definition of Forest Owner in the event of ambiguity. Ecology adopted, with minor modifications, this section of the Reserve's 5.1 Protocol.

Alignment with: CAR US Forest Protocol 5.1 (partial)

Revision 14. Require that projects be developed in line with a Protocol adopted by Ecology to receive a Direct Environmental Benefits (DEBs) designation

If Washington's Cap-and-Invest Program links with other jurisdictions, the Climate Commitment Act Program Rule (WAC 173-446) allows offsets issued by a linked jurisdiction to fulfill a specific and limited role in compliance use in Washington's program. RCW 70A.65.170 (modified by SB 6058) establishes two categories of offsets in a linked jurisdiction:

"Type 1" Offsets: Offsets that provide direct environmental benefits (DEBs) to Washington, which must represent at least 50% of an entity's offset usage in the first compliance period (2023 through 2026) and 75% thereafter (per RCW 70A.65.170(3)(a)).

"Type 2" Offsets: Offsets that do not provide DEBs to Washington, which can fulfill no more than 50% of an entity's offset usage in the first compliance period (2023 through 2026) and no more than 25% thereafter (per RCW 70A.65.173(3)(b)). Type 2 offsets may only come from projects located *in* a linked jurisdiction, per RCW 70A.65.170(5)(c) (as modified by SB 6058), or projects located in Washington which do not already qualify as Type 1.

Table 3. Utility and eligibility of offset credits in a linked Washington market

Offset attributes			*Use in Washington's program in a linked market*		
Issuing jurisdiction	**Location**	**DEBs to**	**Type 1 Offsets: 50%+ (CP1) 75%+ (CP2 and beyond) Offsets that provide DEBS to WA**	**Type 2 Offsets: 50% (CP1) 25% (CP2 and beyond) Offsets that do not provide DEBS to WA**	**Justification**
WA	WA	WA	Yes	NA	RCW 70A.65.170(2)(a)
WA	non-WA	WA	Yes	NA	RCW 70A.65.170(2)(a)
WA	non-WA	non-WA	NA, Ecology cannot issue	NA, Ecology cannot issue	RCW 70A.65.170(2)(a)
CA	CA	Any	No	Yes	RCW 70A.65.170(5)(c)
CA	non-CA	CA	No	No	RCW 70A.65.170(5)(c)
CA	WA	WA	Yes	Yes	RCW 70A.65.170(5)(c)
CA	non-WA	WA	No	No	RCW 70A.65.170(5)(c)

In the existing linked California-Québec market, neither jurisdiction's protocols can be used to develop a project in the other jurisdiction due to the geographic limitations in each protocol (location in the United States, and Québec, respectively). In a linked market between California, Québec, and Washington, there is the potential for offsets issued by the California Air Resources Board (CARB) for projects located in Washington to be eligible for compliance use in Washington as "Type 1" offsets, but offsets issued by Québec would not be eligible for compliance. There are two situations where offset project developers may seek credit issuance by CARB for projects in Washington for utilization by a Washington state covered entity:

1. Early Adopter Projects: Offset projects that were developed in Washington and listed in CARB's program prior to market linkage. These credits may be sold to buyers in Washington's market as they provide DEBs to Washington but do not necessarily provide DEBs to California, thus would be more valuable to a covered entity in Washington than California. Examples include forestry projects developed by the Confederated Tribes of the Colville Reservation and Spokane Tribe of Indians, and several livestock digester projects. While the vast majority of the credits issued to these projects do not meet the reporting period cut-off date (pre-2019 credits are ineligible for use in Washington's program), these projects generate a small volume of recurring credit issuances that may be procured by Washington covered entities in the future.

2. *Protocol Selection Projects:* Offset projects located in Washington and developed after program linkage may choose which jurisdiction to list with based on which protocol is more favorable to their project, or other factors related to the jurisdiction's review and verification processes. As long as offsets issued by CARB and located in Washington can qualify as "Type 1" offsets, developers are incentivized to develop their projects through whichever jurisdiction is more favorable to their particular project. The potential for this kind of activity in a linked market has been raised multiple times in Ecology's US Forest Offset Protocol working group meetings by members concerned that program linkage will reduce the effectiveness of the revisions made to that protocol through this rulemaking process.

While Ecology's protocols are largely aligned with California's, we anticipate differences to develop over time. This potential for "venue shopping" constrains either jurisdiction's ability to strengthen or improve their protocols over time, as developers can simply opt to enroll with the more favorable jurisdiction for their particular project and attain the same value for their offsets. Even if Washington and CARB intend to closely align their offset protocols throughout the life of the program, differences in rulemaking timelines and processes may result in periods where either party may have a programmatic advantage over the other, creating opportunities for venue shopping behavior.

Washington adopted rule language to limit the potential for venue shopping between jurisdictions for projects located in Washington, while allowing flexibility for "early adopter" offset projects that were developed prior to market linkage. Ecology adopted revisions to WAC 173-446 to constrain this behavior. WAC 173-446-595 establishes the criteria through which an offset project can demonstrate that it generates "Direct Environmental Benefits" to the state of Washington. Washington adopted a new clause to this section of the rule to state:

"(4) Offset projects listed after January 1, 2027 must be consistent with offset protocols adopted by the department in order to receive a designation of providing direct environmental benefits to the state."

An associated edit to WAC 173-446-595(1) is also adopted:

"(1) Except as specified in subsection (4), offset projects that are located within the state of Washington, or that reduce or avoid GHG emissions that would otherwise occur within the state of Washington, are presumed to provide direct environmental benefits in the state."

This rule language allows credits from "early adopter" projects to receive offset credits that may be used as "Type 1" offsets through the duration of the program. Meanwhile, it limits the utility of "protocol selection" offset credits to be used only as "Type 2" offset projects in Washington's market (because they could not be assigned DEBs to Washington).

Alignment with: Novel approach adopted

Revision 15. Revise direct environmental benefits requirements for Tribal offset usage

For covered entities in Washington's Cap-and-Invest Program to maximize their offset use, a portion of their offsets must be sourced from projects on federally recognized Tribal lands. In the first compliance period, in order for a covered entity to use offsets to fulfill the maximum 8% of their compliance obligation, 3% of those offsets must come from projects on Tribal lands, while the remaining 5% may

come from Tribal or non-Tribal projects. For the second compliance period and thereafter the total amount of offsets that an entity can use for compliance reduces to 6%, of which 2% must come from projects on Tribal lands. This is separate from the requirement that all offsets used by an entity for compliance provide DEBs to Washington (in an unlinked market), and that 50% of offsets used by an entity for compliance provide DEBs to Washington (in a linked market in the first compliance period), increasing to 75% in the second compliance period and thereafter.

Ecology adopted a change in rule to clarify that this additional 3% (in the first compliance period) and 2% (in the second compliance period and thereafter) of offsets that must be sourced from projects on Tribal lands must also provide DEBs to the state of Washington. This change would mitigate a potential reduction in demand for Tribal projects that provide DEBs to Washington in a linked market, which has been identified by some Tribes as a concern.

WAC 173-446-600(7) lists the requirements for the portion of a covered or opt-in entity's compliance obligation that may be met with offset credits. That section is out of scope for the US Forest Protocol rulemaking. Therefore, this potential change in rule to revise DEBs requirements for Tribal offset usage **would occur through the Cap-and-Invest Program Updates and Linkage rulemaking.**

Alignment with: Novel approach adopted

Revision 17. Revise CITSS registration requirement at the time of project listing

WAC 173-446-520(1) states that "Before an offset project can be listed by ecology or an offset project registry, the party with legal authority to implement the offset project must be registered with ecology as an offset project operator under WAC 173-446-055." This provision requires that the offset project operator complete registration as a general market participant in the Compliance Instrument Tracking System Service (CITSS). This provision ensures the offset project operators are able and prepared to receive Ecology offset credits into a CITSS account before listing the project. However, because projects take a significant amount of time to develop, many projects will submit a listing form to their selected offset project registry several months or even multiple years before they are prepared to request an issuance of Ecology offset credits. The provision requires that offset project operators have a CITSS account in place months or even years before they will have a reason to use the account. This may result in delays with project listing, as the process of establishing a CITSS account may take multiple months. Delays to project listing may be costly, burdensome, or even result in project ineligibility in some instances. For example, the US Forest Protocol requires that conservation easements established as part of an offset project must be recorded no more than one year prior to offset project commencement. To reduce delays in the offset project listing process, Ecology has adopted the following revision to WAC 173-446-520(1):

(1) Registration requirements for offset project operators or authorized project designees who are submitting an offset project for listing. Before an offset project can be listed by ecology or an offset project registry, the party with legal authority to implement the offset project must be registered with ecology as an offset project operator under WAC 173-446-055, or attest in writing to subsection (v). To register as a general market participant, the registered offset project operator or its authorized project designee must:

[...]

(v) If the party with legal authority to implement the offset project has been granted approval by Ecology to list the offset project before completing registration under WAC 173-446-055 the following attestation must be submitted:

> ***I understand that before this offset project applies to Ecology for issuance of offset credits, the party(ies) with legal authority to implement the offset project must complete registration per WAC 173-446-520. I understand that if the party(ies) with legal authority to implement the offset project apply for issuance of offset credits before completion of registration per WAC 173-446-055, Ecology will decline to make a determination under WAC 173-446-555(3) that the information submitted is complete or that the greenhouse gas reductions meet the requirements of Chapter 173-446 WAC, and therefore Ecology will not issue offset credits for the Project.***

Alignment with: Novel approach adopted

Revision 18. Revise timing of Tribal dispute resolution requirement for project registration

For projects on Tribal lands, Ecology also requires that Tribes enter into a dispute resolution agreement with Ecology prior to project listing (as well as prior to CITSS registration). These agreements may involve Government-to-Government consultation, at Ecology's or the Tribe's request, and require significant involvement from multiple parties within the agency and Tribe. As with the CITSS registration requirement, this poses a delay and barrier to project listing, which is the precursor to the multi-year project development process. To reduce barriers to Tribal project enrollment, Ecology adopted the following change to WAC 173-446-520(1)(iv):

(iv) For federally recognized tribes who elect to participate as offset project operators pursuant to RCW 70A.65.090(5), the following attestation may be submitted in lieu of the attestation required by (b)(iii) of this subsection: "I understand I am voluntarily participating in this program. ***I understand that before this offset project applies to Ecology for issuance of offset credits, the tribal government on whose behalf I am authorized to make this submission will*** ~~*The tribal government on whose behalf I am authorized to make this submission has*~~ *entered* ~~*into*~~ *into a written agreement, negotiated on an individual basis between Ecology and the tribal government, that establishes a dispute resolution process and/or other compliance mechanisms in order to ensure the enforceability of all program requirements applicable to the tribe in its role as an offset project operator."*

Alignment with: Novel approach adopted

Revision 19. Revise treatment of harvested wood products

The US Forest Offset protocol requires that Improved Forest Management (IFM) and Avoided Conversion projects determine the total estimated amount of carbon stored in harvested wood products as part of baseline calculations. These estimates intend to average the harvested wood products as carbon storage potential of products in both in-use and landfill-based wood products as part of the project over a period of 100 years.

Members of Ecology's technical working group noted circumstances in which a successful IFM project could result in increased harvested wood products yields due to project activities. Conversely, the working group noted that decreasing harvested wood products would lower quantified project impact and credits, while increasing harvested wood products would increase quantified project impact and credits in such scenarios. These scenarios would lead to crediting imbalances that are only balanced far later in project activities. Further, it was noted that the prior version of the methodology does not account for the high variability of residence times for harvested wood products in landfills and that the current 100-year timeframe may be an overestimation due to this high variability, with products with low residence times having significantly higher contribution in the prior treatment of harvested wood products.

In recognition of these challenges, Ecology adopted the Reserve's US Forest Offset protocol 5.1 treatment of harvested wood products, which includes modest revisions to the quantifications and crediting associated with harvested wood products.

Ecology adopted the following revisions:

- In order to properly account for harvested wood products, the updated methodology will focus on calculating the amount of carbon delivered to mills, the portion of the carbon that is converted to wood products using a coefficient that estimates the mill's efficiency, and determining the wood product classes manufactured by the mill, as different wood products have different decay rates. While this is consistent with the previous version of the protocol, Ecology has made an effort to provide clear guidance on harvested wood product inclusion, in line with similar guidance provided by the Reserve.
- Ecology revised the baseline calculation of harvested wood products for IFM projects on private lands. Rather than requiring that proponents model baseline harvests, the revised approach provides the option of a conservative estimate for the volume of harvested wood in the baseline scenario.
- Ecology adopted protocol language to allow for the use of a harvested wood products calculator (developed by the Climate Action Reserve for use in the Reserve's US Forest Offset protocol 5.1 and adapted by Ecology with minor alterations) to standardize quantification methods. This tool has been adapted by Ecology from a tool developed by the Climate Action Reserve. Any further adaptation or reproduction requires prior written consent from the Climate Action Reserve

Alignment with: CAR US Forest Offset protocol 5.1 (Partial)