Methodology for Grazing in Vineyard Systems

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1. METHODOLOGY OVERVIEW

1.1. Scope and justification

This Environmental Stewardship methodology is designed to support the use of sheep grazing in vineyard systems to provide regenerative services to the soil and herbaceous cover. As with other Environmental Stewardship methodologies, the environmental benefits are implicit in the practice. Rewards are calculated based on the practice, this is not an outcome-based methodology. The goal of this methodology document is to define the practice and constraints as well as outline how the practice will be verified. The document also specifies data collection requirements that are inherent in Environmental Stewardship methodologies to improve our knowledge of the practice.

The intent of this methodology is to encourage adoption of regenerative agricultural practices, in this case sheep grazing, and collect data to improve our understanding of ecosystem health benefits from these practices. The methods are straightforward and easy to understand and the project approval process will be relatively quick when compared to methodologies such as those focused on carbon sequestration. Credits derived from this methodology will be split to reward both the grazers and the vineyard owners.

Research and a long history of practice has shown that planting appropriate ground cover between rows of vines and introducing sheep grazing as a means to control control vegetative growth results in many benefits such as restoring ecosystem functioning (de Faccio Carvalho et al. 2021) reducing pesticide, herbicide, and fuel use, decreasing mowing, and building soil organic carbon and soil fertility (Ryschawy et al. 2021, Schoof et al. 2021, Niles et al. 2017) as well as grape quality (Wilkes n.d.).

1.1.1 History and other characteristics of the project

For each project the project proponent will need to provide information that describes characteristics that help to put the project and its regenerative potential into perspective. This should include, but is not limited to, historical land management practices, the current state of the environment and future vision of the project, project out as far as practical. A brief statement of expected outcomes from implementing this methodology should also be included.

1.2. Defining the practice

This section defines the methods required to qualify for credits using this sheep grazing in vineyard systems methodology. The intent for supporting this practice is to improve ecosystem functioning within a managed vineyard system. Management activities are expected to induce net positive ecosystem benefits. If input is necessary to more fully understand the methodology those questions should be directed to Regen Network at science@regen.network.

The primary goal of implementing this methodology is to improve ecosystem health within a vineyard. If there is any reason to believe that implementing this methodology would result in a negative impact on ecosystems within or around the vineyard, the project proponent will not be permitted to register the project with Regen Registry.

1.2.1 Project and grazing boundaries

The project boundary defines the area within which all grazing may take place over the duration of the project. Non-grazing areas can be included for convenience but the project proponent must provide documentation that the project has permission to graze throughout the entire project area. It is not expected that the project boundary will change over the duration of the project. The project area can be fragmented into multiple parcels. All project boundaries need to include the following attribute information: Project name, project start date, and a unique identifier for each parcel within the project boundary.

Within the project boundary, grazing areas will need to be defined that indicate precisely where each grazing event that is to be credited took place. These grazing areas can be changed from year to year and must be submitted with the grazing data at the end of each grazing period. All grazing areas will need the following attribute information: grazing start date and time, grazing end date and time, number of sheep grazed, unique identifier for each grazing area, data and time of pre-grazing and post-grazing photos.

All project and grazing boundaries must be submitted as polygons using a common GIS data format such as ESRI Shapefile, GeoJSON, or Keyhole Markup Language. Each polygon needs to include relevant attribute data as noted above.

1.2.2 **P*roject duration***

The project duration defines the number of years the project proponent commits to continue this grazing practice. The minimum acceptable number of years is three and the maximum is five. The five year maximum is in place to reduce the risk of continuing a practice that has been revised or dropped from the registry due to poor performance or other reasons. To continue to receive credits for this grazing practice after the project duration ends, the project proponent would need to re-register the project using the most suitable methodology at that time.

1.2.3 Grazing requirements and constraints

These requirements are in place to ensure grazing adheres to the widely accepted practice of grazing during vine dormancy (Ryschawy et al. 2021, Schoof et al. 2021, Niles et al. 2017). The thresholds described below are from available data and primarily stakeholder input. These requirements and constraints are intended to reduce the possibility of overgrazing. If a project proponent deems any of these thresholds to be inappropriate a petition justifying the need for an exception can be sent to the methodology developer, Regen Network, for consideration.

1.2.3.1 Grazing period, frequency and **duration**

Grazing must be conducted within the grazing period. A single grazing period, of no more than five months, must be defined in the project document. The period is the annual temporal window within which grazing will be permitted to qualify for grazing credits. In most cases this will correspond with vine dormancy in a vineyard but other timing strategies for periods are also acceptable.

Within a grazing period, credits will only be allocated for only one grazing event per grazing area to avoid overgrazing.

1.2.3.2 Herd density and grazing time per **parcel**

Herd density must be between 20 and 225 sheep per acre (0.4 ha). Grazing with fewer sheep than the lower limit will disqualify that grazing event from receiving credits since the density is likely too low to generate sufficient ecosystem benefits. Minimum stocking rates are difficult to define but based on conversations and published recommendations (e.g., Salzer et al. n.d.) for short, typically 3 to 4 day, rotation periods we decided 20 sheep per acre (0.4 ha) should be a minimum. This lower limit, currently below most recommended optimum densities, is likely to change as we learn more about the impact of high density sheep grazing on soil.

In an effort to discourage overgrazing, grazing more than the upper limit will result in a reduction of the number of sheep grazed when calculating credits. The formula for calculating the number of sheep grazed in a specific grazing area for calculating credits if the maximum number is exceeded is:

Adjusted # sheep grazed = maximum allowed - (# actually grazed - maximum allowed)

1.2.4 Reporting requirements

Each grazing event must be recorded using the information noted in section 1.2.1. In addition, photographs must be taken of the pasture within 24 hours before grazing starts and again within 24 hours after grazing ends for each grazing event within a grazing area. The photographs should be framed and have sufficient detail to clearly see that the area was in need of grazing and that the area had been sufficiently grazed. Multiple before and after photographs can be submitted as long as they were acquired within 30 minutes of each other. The photographs must have accurate timestamps and they must be accurately labeled so they can be easily matched to the correct grazing event and grazing area.

A report with the above-mentioned information must be submitted to Regen Ledger by the project proponent within 90 days of the end of the grazing period detailing grazing events during that grazing period. The report must include the project reference number, project proponent contact information, photographs with accurate time stamp and labels documenting each grazing event and grazing event data stored as attributes in a polygon GIS file as noted in section 1.2.1.

1.2.4.1 Missing data in the report

Grazing area polygons that are missing, not accurately digitized, contain topology errors, or those that lack start or end date/time information will be eliminated from credit calculations. We will allow for a maximum of 10% or the grazing area polygons to not have associated start and end photographs. If more than 10% of the grazing area polygons do not have photographs associated with them, the smallest area, polygons from the missing photographs set will be eliminated from credit calculations until the 10% threshold is met. Once the threshold is met the polygons that were not reviewed can be used to calculate credits for the period.

1.3 Verification of practices

Verification of documented grazing events will be managed by the methodology developer (RND Inc.) using the polygon grazing claims data submitted with the

report. If the polygon data are not suitable for analysis the project proponent will be notified and the issues will need to be resolved and resubmitted within 30 days of notification. Failure to do so will result in forfeiting credits for that grazing period as noted in section 1.2.4.1.

The project proponent will be notified of the verification outcome and once the outcome is approved by the project proponent the credit issuance process will begin.

Example R and Google Earth Engine scripts for verifying grazing claims using PlanetScope imagery can be found in this GitHub repository: https://github.com/regen-network/open-science/tree/master/Fibershed

1.3.1 Disagreements between the verifier and project documents

In instances when the verifier does not agree with grazing records in a grazing report the project proponent will be notified. The project proponent will have 30 days to respond providing additional evidence of specific grazing events that are being contested. Failure to provide sufficient proof of grazing will result in forfeiting the credits associated with that particular grazing event.

1.4 Ancillary data collection and analysis

This methodology incorporates the collection of data relevant to assessing the impact of the methodology on the vineyard environment with the intent of improving our knowledge of regenerative practices and their impact on the environment. Data collection will be supported by setting aside 15% of the credit value specifically for data collection and analysis. These data will only be used to monitor the environment and will not directly impact the value of the credits generated from applying this methodology. The intent of data collection is to expand our knowledge of how the practice impacts ecosystem function, especially the soil ecosystem.

1.4.1 Data collection

Details related to data collection will be required in the project document. Those details include the person or organization the project proponent will partner with to collect data as well as where the data will be stored, how it will be licensed, and who will be responsible for analyzing the data. A brief justification of the specific data being collected should also be included.

Money to support data collection will be provided from a fund specifically designed to manage Environmental Stewardship data collection. This fund will be replenished using the 15% allocation for data collection and analysis when credits are sold. All data collection plans will be reviewed by a group from the community that governs the data collection fund.

Since money from credits required to support data collection will not be available until well after a grazing period is complete, and also because the measurable impacts of the project might take time, the project proponent must agree to permit data to be collected for at least 18 months after the project duration is complete. Eventually a fund will be established to support baseline data collection before a project practice begins. When that is available the 18 month requirement noted above will not be required.

Examples of the types of data that can be collected for a project are: total organic soil carbon, microbial biomass, dissolved organic carbon, bulk density, and water holding capacity.

1.4.2. Partner institution and data analysis

Regen Registry will assist to the extent practical to help project proponents find partner institutions for data collection and analysis services. Regardless of how these partners are identified there must be a written commitment from service providers in the project document as well as a commitment that all data will be licensed with an open access license and that all data will be hosted so that it is easily discoverable and accessible by other researchers.

1.5 Credit calculations

The credit unit for this methodology is kilo-sheep-hour. The number of kilo-sheep-hour credits from the vineyard sheep grazing credit class will be calculated within 15 days after the annual grazing report is verified. Sheep-hours for each grazing event (one herd in one grazing area) will be calculated by multiplying the number of sheep in the grazing area by the number of hours grazed. The total kilo-sheep-hours is calculated by adding all of the sheep hours from each grazing area and dividing that sum by 1000.

*kilo-sheep-hours = # of sheep * hours grazed / 1000*

A calculation will also be made to determine if the density of sheep meets the requirement noted in section 1.2.3.2.

A unique characteristic of this methodology is that credits that are earned will be divided between grazers and vineyard owners. The exact split is negotiable and will vary geographically based on the supply and demand dynamics between grazers and vineyard owners. In the United States we propose using a 65%/35% split respectively for grazers and vineyard owners since demand for grazers is high and strong incentives are expected to stimulate growth.

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