GHG & Co-Benefits in Grazing Systems Credit Class

Ecosystem focus: Grasslands

REGEN
NETWORK

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This document is intended to be used in combination with:

- Regen Registry Program Guide
- Methodology for GHG and Co-Benefits in Grazing Systems

Definitions

1. Credit Designer - an individual or organization that is developing a new Credit Class or updating an existing one.
2. Methodology Developer - an individual or organization that is developing a new Methodology or updating an existing one.
3. Monitor - an individual or organization that is contracted to measure the benefits / indicators defined in a given Credit Class based on the requirements in the Approved Methodology.
4. Verifier - an individual or organization that is contracted to execute the verification requirements stipulated in a given Credit Class.
5. Broker - an individual or organization that is offering brokerage services to credit owners.
6. Project Proponent - the project developer or land steward that is applying to register a project on the registry.
7. Buyer - an individual or organization that is purchasing credits from the registry.
8. Validator - independent operators of the nodes that secure Regen Ledger.
9. Project Developer - the individual or organization that is in charge of managing the project and is the main point of contact with Regen Registry. The Project Developer can be the land steward or a third party.
10. Land Steward - the individual or organization that is performing the work on the ground. This can be a farmer, rancher, conservationist, forester, fisherman, etc.
11. Land Owner - the individual or organization that holds title to the land where the project is occurring in. This can be the Land Steward or a third party that rents the land to the Land Steward.
12. Project Registration Date - the official date when a project commences.
13. Approved Methodology - the corresponding approved methodology(s) for a given Credit Class.
14. Credit Class - similar to a standard in other registries, it defines the structure, procedures, and requirements related to a certain credit type.
15. Project Plan - the template that each project proponent fills out in order to register a project on the registry.
16. Co-Benefit - the Intergovernmental Panel on Climate Change (IPCC) defines co-benefits of climate change mitigation as the positive benefits related to the reduction of greenhouse gases. We define it more broadly as a benefit that is achieved along with the main indicator tracked and promoted in a given credit - which need not be reduction of GHG necessarily. For example a biodiversity credit might mainly promote the protection of a certain species and at the same time offer co-benefits, such as protection of water resources.

17. Baseline - an estimate of the measurement of a certain benefit / indicator tracked in a given credit had the project not been implemented. A baseline can be static, dynamic, project specific, or based on performance standard (or a combination of those)[1].
18. Verification - a systematic, independent, and documented assessment by a qualified and impartial third party of the benefits' assertions for a specific reporting period.
19. Supplement - an appendix to the Credit Class or Approved Methodology that contains requirements related to a specific geographic locale or a specific case.
20. Crediting Term - is the finite length of time for which a Project Plan is valid, and during which a project can generate credits.
21. Project Activity - the applied management or conservation practice that a project proponent is undertaking in order to improve the benefits tracked in a given Credit Class.
22. Project Initial Monitoring Date - the date when the baseline measurement was performed.
23. Project Page - the dedicated page for a given project on the registry. It provides an overview of the project, the activities taken place, timeline, images, maps, documentation, and more.
24. Permanence Reversal Buffer - a dedicated buffer account that is allocated a percentage of credits from each issuance in order to mitigate permanence related reversal risk, i.e. GHG removal reversal, that has occurred over the permanence period of the project.
25. Approved Activities - the set of land management or conservation activities that are eligible activities for a given Credit Class.
26. Approved Methodology - the methodology(s) that this Credit Class sanctions.
27. Program Guide - the main document specifying the rules and procedures of Regen Registry.
28. Established Registries - other credible registries in the carbon market that Regen Registry recognizes and accepts for certain purposes such as onboarding verifiers. These registries are:
    a. VCS (Verra)[2]
    b. Gold Standard[3]
    c. American Carbon Registry[4]
    d. Climate Action Reserve[5]
    e. CDM[6]
    f. Australian Emission Reduction Fund - Carbon Farming Initiative[7]

[1] https://ghgprotocol.org/sites/default/files/standards/ghg_project_accounting.pdf
[2] https://verra.org/
[3] https://registry.goldstandard.org/
[4] https://americancarbonregistry.org/
[5] http://www.climateactionreserve.org/
[6] https://cdm.unfccc.int/index.html
[7] http://cleanenergyregulator.gov.au/ERF/project-and-contracts-registers/project-register

Acronyms

- GHG - Greenhouse Gases
- IPCC - Intergovernmental Panel on Climate Change (IPCC) is an intergovernmental body of the United Nations that is dedicated to providing the world with objective, scientific information relevant to understanding the scientific basis of the risk of human-induced climate change
- AFOLU - Agriculture, Forestry and Other Land Use; a category of carbon credit projects that related to agriculture, forestry and other land uses (e.g. conservation)
- RND - Regen Network Development, Inc., the entity developing and operating Regen Registry
- SDG - the UN Sustainable Development Goals

1. Introduction

Project Drawdown[8] defines managed grazing as a set of practices that sequester carbon in grassland soils by adjusting stocking rates, timing, and intensity of grazing. Livestock grazing covers over 3.3 billion hectares, or 25 percent of the world's land area, making it humanity's largest land use (Asner et al, 2004). Unfortunately, poor grazing practices have contributed to land degradation and loss of soil organic carbon. However, there are managed grazing practices that can reverse this negative trend, enhance net carbon sequestration, and improve soil and vegetation quality. These are practices such as controlled intensity and timing of grazing, enclosure of grassland to encourage resting, and/or other kinds of planned and adaptive grazing.

Under managed grazing, emissions of the greenhouse gases methane and nitrous oxide continue, but are more than offset by soil organic carbon sequestration (at least until soil carbon saturation is achieved). The estimated global benefit from managed grazing is between 16.4 and 26 Gt CO2e sequestered in the period between 2020-2050.

The intent of this Credit Class is to create a vehicle to significantly increase the amount of hectares/acres under managed grazing worldwide by providing land stewards with the necessary incentives to make this important work possible. To that end, Regen Network leverages cutting edge technologies, such as remote sensing, in order to significantly reduce the cost of monitoring GHG removals / carbon sequestration. Further, we designed this credit with farmers, in order to ensure the project requirements are not overly restrictive, onerous, or expensive. Unfortunately, existing credits in the market too often hinder the application of this best management practice and with it the potential to mitigate climate change.

2. Credit Class Basics

This credit class is a built as a holistic credit that includes multiple ecological benefits:

2.1. Carbon Sequestration and Net GHG reduction

2.1.1. Provide carbon removals through the use of regenerative agriculture which sequesters carbon into the soil. To ensure a net positive effect, aside from CO2 removals from the atmosphere, we also take into account other significant sources of GHG such as Nitrous Oxide (N2O) and Methane (CH4).

[8] https://drawdown.org/solutions/managed-grazing/technical-summary

2.2. Animal Welfare

2.2.1. Ensure animals are in a good state of welfare, i.e. healthy, comfortable, well-nourished, safe, able to express innate behavior, and not suffering from unpleasant states, such as pain, fear, and distress. Good animal welfare includes disease prevention, veterinary treatment, appropriate shelter, management, nutrition, humane handling, and humane slaughter.

2.3. Ecosystem Health

2.3.1. Improve the ecosystem health - focusing on grasslands ecosystem or biome and, in particular, temperate grasslands which globally represent a global landmass of around 3,400 million acres.

2.4. Soil Health

2.4.1. Improve the soil health as a result of good land management practices, which can positively affect:

- The amount of water from rainfall that is available for plant growth
- Runoff, water infiltration, and the potential for soil erosion
- The availability of nutrients for plant growth
- The conditions needed for germination, seedling establishment, vegetative reproduction, and root growth
- The ability of the soil to act as a filter and protect water and air quality

Each of these benefits maps to its respective indicators - as specified in the Approved Methodology.

In the case of this credit, the benefit that is monitored, quantified and used to infer the quantity of credits issued is Carbon Sequestration and Net GHG reduction. We do not incorporate the other co-benefits monitored in this quantification. The unit of measure used is tons of CO_2e, i.e. each credit represents 1 ton of CO2e.

This Credit Class follows the requirements in the Program Guide. Each section below includes specific adaptations for this Credit Class.

3. Project Eligibility

3.1. Ecosystem Type / Ecosystem Service Classification

3.1.1. Application: This Credit Class applies to grasslands, shrublands, or pasturelands only.[9]

3.1.2. Definition: Grassland is a land class category defined as land dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing. Pastureland is defined as areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation. Shrubland is defined as areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions. Woody plant communities of low forbs and shrubs are also potentially classified as grassland and shrubland. Grassland classification may also include land managed with agroforestry practices such as silvopasture and windbreaks, as well as naturally occurring tree-grass assemblages.

3.2. Land Ownership Type

This Credit Class accepts projects with all land ownership types, including private, public, and tribal, provided the Project Proponent demonstrates adequate documentation of land ownership or approval by land owners (see Verification section for more details).

3.3. Adoption Date

Current available data from scientific literature on sequestration rates from agricultural grasslands (e.g. Prescribed Grazing) is limited[10], but based on the available data and industry knowledge, it can take up to 10 years to build up enough carbon stock that will warrant credit issuance.

Therefore, in order to accommodate this period, this Credit Class will accept an Adoption Date that goes back up to 10 years prior to the Project Registration Date. In order to claim an Adoption Date before the Project Registration Date, the Project Proponent must have maintained clear historical records to that effect, as specified in the Approved Methodology.

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[9] RND Taxonomy Document

[10] See for example NRCS data for Prescribed Grazing in Table 3 adapted from Swan et al [2015] https://www.c-agg.org/wp-content/uploads/Chambers_Paustian_Lal_Soil_Carbon_and_4_per_1000-1.pdf

3.4. Crediting Term

3.4.1. The Crediting Term for this Credit Class is 10 years with an option to renew. Each renewal period will be 10 years and there is no limit to the number of renewals.

3.4.2. The project duration does not include the Permanence obligation (see Permanence section), which is additional.

3.5. Project Area

3.5.1. The project area permits sampling the soil on the land consistently with the requirements in the Approved Methodology.

4. Project Rules and Regulations

4.1. Approved Methodology

The approved methodology for this Credit Class is the Methodology for GHG and Co-Benefits in Grazing systems[11].

4.2. Aggregate Projects

4.2.1. Sites must have similar soil types and be located within the same pre-defined geographic region, following the USGS National Land Cover Database Classifications outlined in the Taxonomy Document[12]

5. GHG Removal and Emission Reduction Requirements

[11] https://docs.google.com/document/d/1l_Mg-y1b_tG4sgsGmmzwmtOenaDsAesegbVDcUcW1VA/edit?usp=sharing

[12] RND Taxonomy Document

5.1. Additionality

Generally, this Credit Class follows the requirements in the Program Guide's respective section. The following sections include the specific adaptations for this Credit Class:

5.1.1. For the purposes of establishing additionality, the Credit Class requires the Project Activity (in this case, the newly applied practice) to be one of the grasslands carbon farming Approved Activities.

5.1.2. Definition: Approved Activities include the following:

- Any management activity approved by the Carbon Farming Initiative[13] related to grasslands and/or grazing.
- Any conservation practice approved by the California Department of Food and Agriculture (CDFA) for the Healthy Soil Program[14] related to grasslands and/or grazing.

5.1.3. The Approved Methodology specifies how the baseline and the additional carbon emission and/or removal is calculated.

5.1.4. It is important to note that the additional carbon sequestered in this case is carbon removed from the atmosphere into the soil through the regeneration of degraded land, and not only reduced future emissions, which is the most common case for current carbon offsets sold on the market.

5.2. Leakage

In many cases, carbon sequestration to land reservoirs is associated with reductions in GHG emissions both within and outside project boundaries. In the context of this Credit Class, the relevant carbon pools for approved project activities included in agricultural land management (ALM)[15] are 1) Soil Organic Carbon and 2) above ground tree biomass. Market leakage in Agricultural Land Management projects involving grassland management activities is likely to be negligible, because the land in the project scenario remains maintained for commodity production, and therefore does not need to be included in the GHG emissions accounting, unless determined above to be de minimis. Project Proponents that expect leakage above de minimis shall account for that in the Project Plan.

[13] https://www.legislation.gov.au/Details/F2018L00089
[14] https://www.cdfa.ca.gov/oefi/healthysoils/docs/CDFAHealthySoilsPractices.pdf

[15] https://verra.org/wp-content/uploads/2018/03/AFOLU_Requirements_v3.6.pdf section 4.3 Table 2

6. Verification

Adaptations for this Credit Class are available for specific locales in the Supplement section.

7. Co-Benefit

The initial focus of the Co-Benefits in this Credit Class are:

- Animal Welfare
- Ecological Health
- Soil Health

These co-benefits allow for a holistic assessment of the project beyond carbon sequestration based on credible and rigorous metrics (see the Approved Methodology for more specifics). The list of co-benefits will be continuously reviewed and updated in following versions, in order to account for the most relevant indicators assessing the changes in the ecological state in the project area.

7.1. Animal Welfare

7.1.1. The American Veterinary Medical Association defines Animal Welfare as "how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well-nourished, safe, able to express innate behavior, and if it is not suffering from unpleasant states such as pain, fear, and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling, and humane slaughter."

7.1.2. Being cognizant of the locale specific variations to guidelines, please refer to the Supplement Section and the Approved Methodology.

7.2. Ecological Health

7.2.1. This Credit Class is focused on grasslands ecosystem or biome (a biome is an area of the planet that can be classified according to the plants and animals that live in it) and, in particular, temperate grasslands. The grassland biome is made up of large open areas of grasses. They are maintained by grazing animals and frequent fires. Types of grasslands include savannas and temperate grasslands.

7.2.2. Temperate grasslands are known for their rich soil that yields abundant growth of grasses.

7.2.3. Humans have had a dramatic impact on the grassland biome - for instance in the United States, most of the grasslands have been converted into fields for crops or grazing land for cattle. The loss of grasslands due to agriculture has affected several species, including monarch butterflies whom have begun disappearing as more and more grasslands have been converted into farmland[16].

7.2.4. Well managed grazing operations have dual effects. First, they protect grasslands, shielding their carbon stores, and avoiding emissions from conversion to agricultural land or development. Second, they improve the health of grassland soils, sequestering carbon and improving the ecosystem health.

7.2.5. In this context, the Approved Methodology specifies how the improvement in ecosystem health is measured, tracked, and verified.

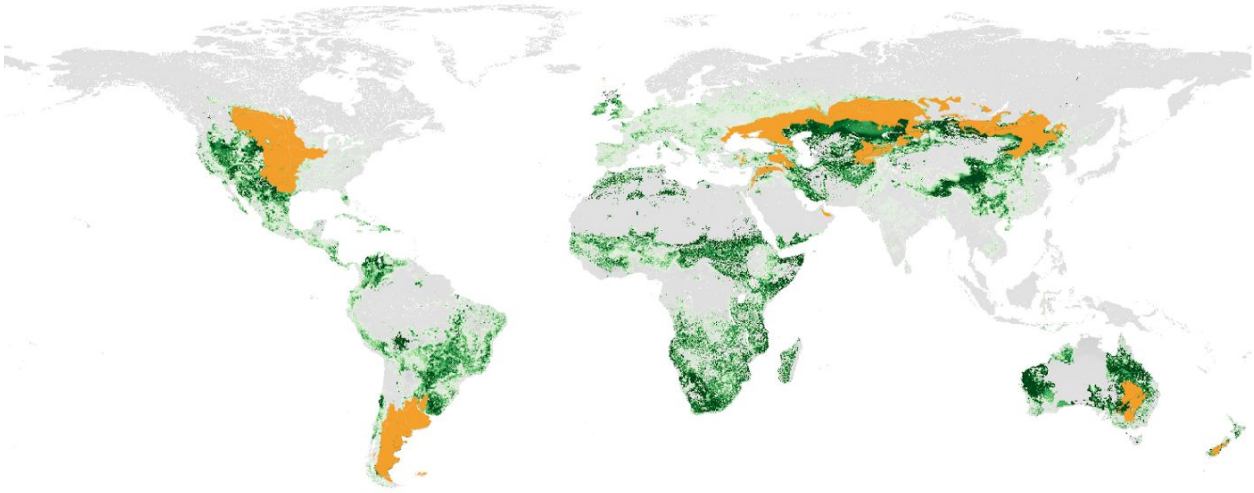

Figure 1 - Overall grasslands shown in green[17] and temperate grasslands highlighted in orange[18]

7.3. Soil Health

[16] https://www.nationalgeographic.org/encyclopedia/grassland-biome/
[17] https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2007GB002952
[18] http://maps.tnc.org/gis_data.html

Grassland health and soil health are interdependent. The capacity of the soil to function affects ecological processes, including the capture, storage, and redistribution of water, the growth of plants and the cycling of plant nutrients[19].

Changes in soil quality are a result of good management practices: the amount of water from rainfall that is available for plant growth; runoff, water infiltration, and the potential for soil erosion; the availability of nutrients for plant growth; the conditions needed for germination, seedling establishment, vegetative reproduction, and root growth; and the ability of the soil to act as a filter and protect water and air quality.

In that context, the Approved Methodology states the indicators used to measure soil health.

8. Purchasing and Selling Credits

8.1. Fee structure

8.1.1. Issuance

- Issuance fee - charged by RND, per issuance of credits.
- Monitoring fee - charged by RND or 3rd party Monitor, per monitoring round.
- Verification fee - charged by 3rd party verifier, per verification round.
- Sales fees - this would vary depending on sales approach used by will include typically:
    - Brokerage - charged by RND or 3rd party, per sales engagement.
    - Payment processing fee - charged by 3rd party processor[20], per payment.

8.1.2. Purchase

The fees entailed with the purchase of a credit include will vary depending on the buyer type, but generally include:

- Project management fee - charged by RND
- Payment processing fee - charged by 3rd party processor, per purchase

[19] https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd621806.pdf
[20] We currently integrate with Stripe

Supplement - Adaptations for Australia-based projects

Co- Benefits

1. Animal Welfare
    1.1. Based on the Australian Animal Welfare Standards and Guidelines[21], the Approved Methodology ranks the performance of the Project Proponent's operation as it relates to managing their animal welfare. See Regen Registry Animal Welfare template[22].
    1.2. The Australian Animal Welfare Standards and Guidelines for Cattle[23] provide consistent policies to enhance animal welfare arrangements in all Australian states and territories. The development process is supported and funded by all Australian Governments, Australian Dairy Farmers, Australian Lot Feeders Association, and Cattle Council of Australia. The guidelines are based on current scientific knowledge, recommended industry practice, and community expectations.
    1.3. Adherence to good animal husbandry principles is essential to meet the welfare requirements of animals. Good husbandry principles that meet the basic physiological and behavioural needs of cattle include:
        - a level of nutrition adequate to sustain good health and welfare
        - access to sufficient water of suitable quality to meet physiological needs
        - social contact with other cattle
        - sufficient space to stand, lie and stretch their limbs and perform normal patterns of behaviour
        - handling facilities, equipment and procedures that minimise stress to the cattle procedures to minimise the risk of pain, injury, or disease
        - provision of appropriate treatment including humane killing, if necessary, minimising the risk of predation
        - provision of reasonable precautions against extremes of weather and the effects of natural disasters
        - selection and breeding of cattle appropriate for the environment and the level of planned herd management to be provided
        - assessment of the need to undertake any husbandry procedures that may result in significant short-term pain against alternative strategies for the long-term welfare of the cattle

[21] http://www.animalwelfarestandards.net.au/
[22] Regen Registry Animal Welfare Template
[23] http://www.animalwelfarestandards.net.au/files/2011/01/Cattle-Standards-and-Guidelines-Endorsed-Jan-2016-061017_.pdf

- undertaking any husbandry procedures required for planned herd management in a manner that reduces the impact of these procedures and minimizes risks to cattle welfare.

References

Aside for the documentation mentioned in the Program Guide, this Credit Class has also relied on the following reference documentation:

GHG Related Documentation

This is a subset of the reference documentation used in the preparation of this Credit Class:

Gold Standard

- Soil Organic Framework Methodology v1.0
  https://globalgoals.goldstandard.org/soil-organic-carbon-framework-methodology/

- GHG Emissions Reduction & Sequestration Product requirements v1.2
  https://globalgoals.goldstandard.org/500-gs4gg-ghg-emissions-reductions-sequestration-product-requirements/

Nori

- Cropland Methodology
  https://nori.com/resources/croplands-methodology

Co-Benefits related Documentation

- Animal Welfare
  The Australian Animal Welfare Standards and Guidelines for Cattle
  http://www.animalwelfarestandards.net.au/files/2011/01/Cattle-Standards-and-Guidelines-Endorsed-Jan-2016-061017_.pdf

- Queensland Land Restoration Fund
  https://www.qld.gov.au/__data/assets/pdf_file/0025/116548/lrf-co-benefits-standard-exposure.pdf

- VCS CCB Standards
  https://verra.org/wp-content/uploads/2016/05/CCB-Factsheet-3.1.pdf