CONSERVATION EVALUATION AND MONITORING ACTIVITY

Carbon Sequestration and Greenhouse Gas Mitigation Assessment

DEFINITION

Quantitative assessment of the carbon sequestration and greenhouse gas (GHG) mitigation scenarios for an operation with a conservation plan using COMET-Farm.

CRITERIA

General Requirements

A Conservation Evaluation and Monitoring Activity (CEMA) is the assessment, monitoring, or recordkeeping activities required to plan, implement, or determine the effectiveness of conservation practices as described herein.

The CEMA includes the performance of work and documentation of the tasks, results, interpretations, and other activities described herein.

This CEMA is used to estimate the GHG mitigation and carbon sequestration potential of conservation practice implementation on an agricultural operation, and the potential of a conservation plan focused on the client's short- and long-term goals for their operation including GHG emissions reduction, carbon sequestration in soils and perennial biomass, and voluntarily participating in ecosystem service markets.

Technical Requirements Applicable to All Land Uses

The Carbon Sequestration and Greenhouse Gas Mitigation Assessment CEMA can be used concurrently or consecutively with a conservation plan to support a conservation plan focused on reducing GHG emissions and sequestering atmospheric carbon in soils and/or perennial biomass. The CEMA is intended to be comprehensive and evaluate the NRCS conservation practices that provide the operations with carbon sequestration and GHG mitigation solutions (See Appendix).

Establish a baseline of GHG emissions and sinks, expressed in the common units of metric tons carbon dioxide equivalents (CO_2e) and estimate the potential effect of a conservation plan with the preferred mitigation and sequestration alternatives using COMET-Farm.

COMET-Farm requires the parcel location, historic management before the year 2000, baseline management from 2000-2020, and scenario management which would include a conservation plan. Management history can be adjusted to include as many years of history as is available, but better results will be generated with 20 years of history.

The COMET-Farm website has a variety of video resources on the COMET YouTube channel (COMET-Farm Training Videos) and tutorials available on the Help Page (http://comet-farm.com/HelpPage).

Additional Requirements for Cropland, Pasture, Rangeland, Orchards and Vineyards

In addition to the historic, baseline, and conservation scenario management history and plan, Cropland, Pasture, Rangeland, Orchard and Vineyard management categories should include, as applicable:

- Crops (annuals, seasonal cover, orchard/vineyard, forage), planting and harvest dates, harvest and grazing removal estimates
- Tillage type and frequency
- Irrigation type and frequency
- Manure/compost application, type, characteristics and amount
- Fertilizer application, type and amount
- Liming application
- Burning management practices

Additional Requirements for Animal Agriculture

For animal agriculture and production, details of animal production of GHG emissions include the following information, as applicable:

- Animal type(s)
- Herd size/number of animals, monthly
- Animal characteristics
- Feed and feeding situation
- Manure system type and management details

Additional Requirements for Agroforestry and Forestry

For agroforestry and forestland estimates of GHG mitigation and soil carbon sequestration (soils and perennial biomass) include the following information:

- Agroforestry and Forest location and type (general species/family)
- Diameter at breast height (DBH) or age
- Number of trees
- Historic land cover
- Age or total volume in m^3/ha or merchantable volume in m^3/ha
- Management Prescription (grow or clear cut)

Documentation

Quantify the amount of GHG reduction and/or enhanced carbon sequestration using COMET-Farm. Evaluate a minimum of two future emission reduction and/or enhanced carbon sequestration scenarios and include a copy of COMET-Farm final report selecting the final atmospheric-beneficial alternatives.

Definitions

Carbon Sequestration is the process by which atmospheric carbon dioxide is captured and stored in perennial biomass and soils of agricultural, agroforestry and forestry systems.

COMET-Farm is a whole farm and ranch carbon sequestration and greenhouse gas accounting system developed through a long-standing strategic partnership between NRCS and Colorado State University. COMET-Farm is a computer modeling platform utilized to evaluate the atmospheric impacts of various NRCS conservation practices on crop, range, pasture, forest, agroforestry land uses.

Greenhouse Gases - Carbon dioxide (CO_2), nitrous oxide(N_2O), and methane (CH_4) are the three main greenhouse gases associated with agricultural production and land management that have contributed to the continued increase in global temperatures and changing climate

conditions since the industrial revolution. All greenhouse gases are typically presented in units of carbon dioxide equivalents (CO_2e). Global Warming Potentials are utilized to convert non-CO_2 greenhouse gases to CO_2e units. Additional information can be found on the EPA's website.

Mitigation is the act of decreasing human-induced sources of GHGs that change the earth's energy balance, contributing to climate change.

DELIVERABLES

These deliverables apply to Conservation Evaluation and Monitoring Activity (CEMA) 218.

Two copies (hardcopy or electronic) of the COMET-Farm report must be developed—one for the client and one for the NRCS field office. At the client's request, the Technical Service Provider (TSP) or other qualified agricultural professional can deliver NRCS's copy to the NRCS Field Office. The client's copy must include all sections unless the client requests other documents from this section. The NRCS copy must include all items identified herein. An additional electronic copy of the COMET-Farm report should also be uploaded on NRCS Registry.

1. **Cover Page**
    a) Client Identification:
        1) Operation name, owner name, street address and county/state.
        2) Primary phone number of client.
    b) TSP or other qualified agricultural professional with Carbon Farm Planning certification or a combination of education (degree in natural resources, physical or environmental science), experience, and COMET-Farm training, as applicable:
        1) Name, address, phone number, email, TSP number.
        2) Names and credentials of all persons that performed substantive work.
        3) TSP certification statement with signature and date.
        4) A statement that the TSP or agricultural services provided:
            i. Comply with all applicable Federal, State, Tribal, and local laws and requirements.
            ii. Meet applicable NRCS program requirements.
            iii. Are consistent with the conservation program goals and objectives for which the program contract was entered into by the client.
            iv. Incorporate alternatives or interpretations that are both cost effective and appropriate.
    c) Client acceptance statement:
        1) A statement that the information represents existing conditions.
        2) Signature of the client and date the client received the plans.
    d) Block for NRCS reviewer acceptance (to be completed by NRCS), as applicable.
2. **Correspondence**
    a) Document the client's objectives.

b) Document each interaction with the client, include notes and results of that interaction, date, and initials of the TSP or other qualified agricultural professional.
c) Document each site visit, activity in the field, results of each site visit, all parties present, date, and initials of the TSP or other qualified agricultural professional.
d) Any correspondence between the TSP or other qualified agricultural professional and the client relating to the development of the CEMA.

3. Maps

a) Maps to include, but not be limited to:
    1) General location map of the assessment area(s) showing access roads to the location.
    2) A map to account for the entire COMET-Farm assessment area. This map may be obtained from the client.
    3) Other maps, as needed, with appropriate interpretations.
b) At a minimum, all maps developed for the CEMA will include:
    1) Title block showing:
        i. Map title.
        ii. Client's name (individual or business).
        iii. Prepared with assistance from NRCS.
        iv. Assisted By [TSP or planner's name].
        v. Name of applicable conservation district, county, and State.
        vi. Date prepared.
    2) Map scale.
    3) Information needed to locate the assessment or monitoring area, such as geographic coordinates, public land survey coordinates, etc.
    4) North arrow.
    5) Appropriate map unit symbols and a map symbol legend on the map or as an attachment.

4. Documentation

a) A copy of COMET-FARM report that includes the historic and baseline estimates of climate benefits and the estimates based on the final selected alternatives of a conservation plan focused on soil carbon sequestration and GHG mitigation.

REFERENCES

USDA Natural Resources Conservation Service. Field Office Technical Guide. https://efotg.sc.egov.usda.gov/#/

USDA Natural Resources Conservation Service. National TSP Website. https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/

USDA Natural Resources Conservation Service. National TSP Resources. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/technical/tsp/?cid=nrcseprd1417414

APPENDIX - List of 25 conservation practices with quantifiable climate benefits, plus archived practices for historic accounting and the Soil Carbon Amendment Interim Practice Standard, which is often used in carbon planning.

Climate Change Mitigation Practice Categories	Conservation Practice Standard	
Soil Health	327	Conservation Cover (ac)
	328	Conservation Crop Rotation (ac)
	329	Residue and Tillage Management, No Till (ac)
	329A	Strip Till (ac) [*Archived*]
	329B	Mulch Till (ac) [*Archived*]
	330	Contour Farming (ac)
	332	Contour Buffer Strips (ac)
	340	Cover Crop (ac)
	345	Residue and Tillage Management, Reduced Till (ac)
	386	Field Border (ac)
	393	Filter Strips (ac)
	412	Grassed Waterways (ac)
	585	Stripcropping (ac)
	601	Vegetative Barriers (ft)
	603	Herbaceous Wind Barriers (ft)
	808	Soil Carbon Amendment (ac) [*Interim*]
Nitrogen Management	590	Nutrient Management (ac)
Livestock Partnership	366	Anaerobic Digester (no.)
Grazing and Pasture	512	Pasture and Hay Planting (ac)
	528	Prescribed Grazing (ac)
	528A	Prescribed Grazing (ac) [*Archived*]
	550	Range Planting (ac)
Agroforestry, Forestry and Upland Wildlife Habitat	380	Windbreaks and Shelterbelts (ft)
	381	Silvopasture Establishment (ac)
	390	Riparian Herbaceous Buffer (ac)
	391	Riparian Forest Buffer (ac)
	612	Tree and Shrub Establishment (ac)
	645	Upland Wildlife Habitat (ac)
	650	Windbreak Renovation (ft) [*Archived*]