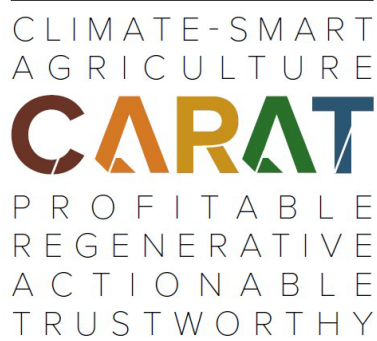


CARAT CLIMATE-SMART PLAN



*Prepared for:
Owner/Operator*

Farm Address / Contact Information:

Prepared by:



3050 Yellow Goose Road, Suite 001, Lancaster, PA 17601
Phone: 717-393-2176 Fax: 1-888-850-6015

CARAT: CLIMATE SMART PLAN

OPERATOR:

LOCATION:

A CARAT plan is a whole-farm conservation plan that when implemented will enhance soil health, increase carbon sequestration, and reduce greenhouse gas (GHG) emissions. The planner and client develop the carbon plan by addressing resource concerns with a focus on opportunities for carbon sequestration of the entire operation. Resource concerns on the farm are thus addressed through the application of targeted, site-specific conservation practices with known and / or quantifiable greenhouse gas benefits. A carbon plan can include supporting conservation practices that do not necessarily have a direct benefit to soil health, carbon, or greenhouse gas, but are essential to the function of the plan.

Objective Statement:

Baseline Information of Farm:

- Number of Dairy Cows and Replacements on the farm (animal groups).
- Type and size of housing for each animal group
- Type of ventilation for each animal group
- Type of manure transfer if applicable
- Type of manure treatment / solid separation if applicable.
- Type and size of manure storage for each animal group.
- Type of feeding practices / strategies if applicable

This information is also shown on the schematic site plan drawing of the production area.

CROP

FARM NAME

Nutrient Management (590)

Precisely managing the amount, source, timing, placement, and form of nutrient and soil amendments to ensure ample nitrogen availability and avoid excess nitrogen application reduces N₂O emissions to the atmosphere. Manage the amount, source, placement, form, and timing of the application of nutrients and soil amendments to minimize agricultural non-point source pollution to surface and ground water resources. Lime and fertilize all fields to soil tests, considering the nutrient value of manure and leguminous crops when figuring the amount of fertilizer to be applied. Nitrogen and phosphorous should be managed to meet crop nutrient needs, as well as to prevent excess nutrient loading in the soil.

Field	Planned Amount	Month	Year	Applied Amount	Date

PASTURE

Farm Name

Prescribed Grazing 528

Grazing will be managed according to a schedule that meets the needs of the soil, water, air, plant and animal resources and the objectives of the resource manager. Manage grazing or browsing animals in order to maintain or improve the health and vigor of the desired forage plants. Maintain or improve livestock health and productivity, reduce accelerated soil erosion, maintain or improve soil condition, and water quality, quantity, and availability through proper management of the forage stands. Promote economic stability through proper grazing use and land sustainability. Follow the attached grazing plan for stocking rates, size of animals, acres to be grazed and other details in order to achieve the landowner objectives and to protect the natural resources. Refer to the conservation plan map for field location of the Prescribed Grazing System. Further information including the Operation and Maintenance Plan is found on the Job Sheet for Prescribed Grazing.

Field	Planned Amount	Month	Year	Applied Amount	Date

BUFFERS

Farm Name

Riparian Forest Buffer (391)

Plant a buffer which is predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies. Increase carbon storage in plant biomass and soils. The riparian forest buffer shall be positioned appropriately and designed to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purpose(s). This will reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow. The riparian forest buffer shall be positioned appropriately and designed to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purpose(s).

Field	Planned Amount	Month	Year	Applied Amount	Date

HEADQUARTERS

Farm Name

Feed Management 592

Diets and feed management strategies can be prescribed to minimize enteric CH₄ emissions from ruminants; it may come in the form of supplements and inhibitors as well as prescriptive management. Managing the quantity of available nutrients fed to livestock and poultry for their intended purpose. A feed management plan will be provided which will document the quantities and sources of nitrogen and phosphorus that will be fed, the type feeding practices used on the operation, and feed analyses and ration formulation information prior to and after implementation of feed management on the operation. Operation and maintenance: Periodically review feed management plan to determine if adjustments or modifications are needed. Maintain records to document plan implementation. Routinely analyze feed to document the rates at which nitrogen and phosphorus were fed. Maintain records of any manure analysis that is done after the feeding strategy was implemented to determine manure nutrient content.

Location	Planned Amount	Month	Year	Applied Amount	Date

Waste Facility Covers 367

Capture of biogas from waste management facilities reduces CH₄ emissions to the atmosphere and captures biogas that can be flared. CH₄ management reduces direct greenhouse gas emissions. A fabricated rigid, semi-rigid, or flexible membrane over a waste treatment or storage facility. Install a fabricated rigid, semirigid, or flexible membrane over a waste treatment or storage facility. An engineering plan with construction specifications will be provided for the installation of the waste facility cover. Operation, Maintenance, and Warranty: At each operation or use, inspect the facility to note any maintenance needs or indicators of operation problems. The cover manufacturer and/or installer shall warrant the cover for the intended use and design life, provide maintenance instructions, and certify that the cover is properly installed.

Location	Planned Amount	Month	Year	Applied Amount	Date

Estimated Costs of Proposed Practices & Prioritized Implementation

Signatures / Certifications of Participants

All the information provided in this agricultural climate smart plan is accurate to the best of my knowledge. I will implement the practices and procedures outlined in my plan in order to address soil health, increase carbon sequestration, reduce GHG emissions, protect the soil resource and water quality.

SIGNATURE OF PARTICIPANTS:

Owner/Operator:

NAME

Date

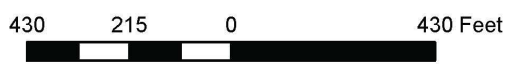
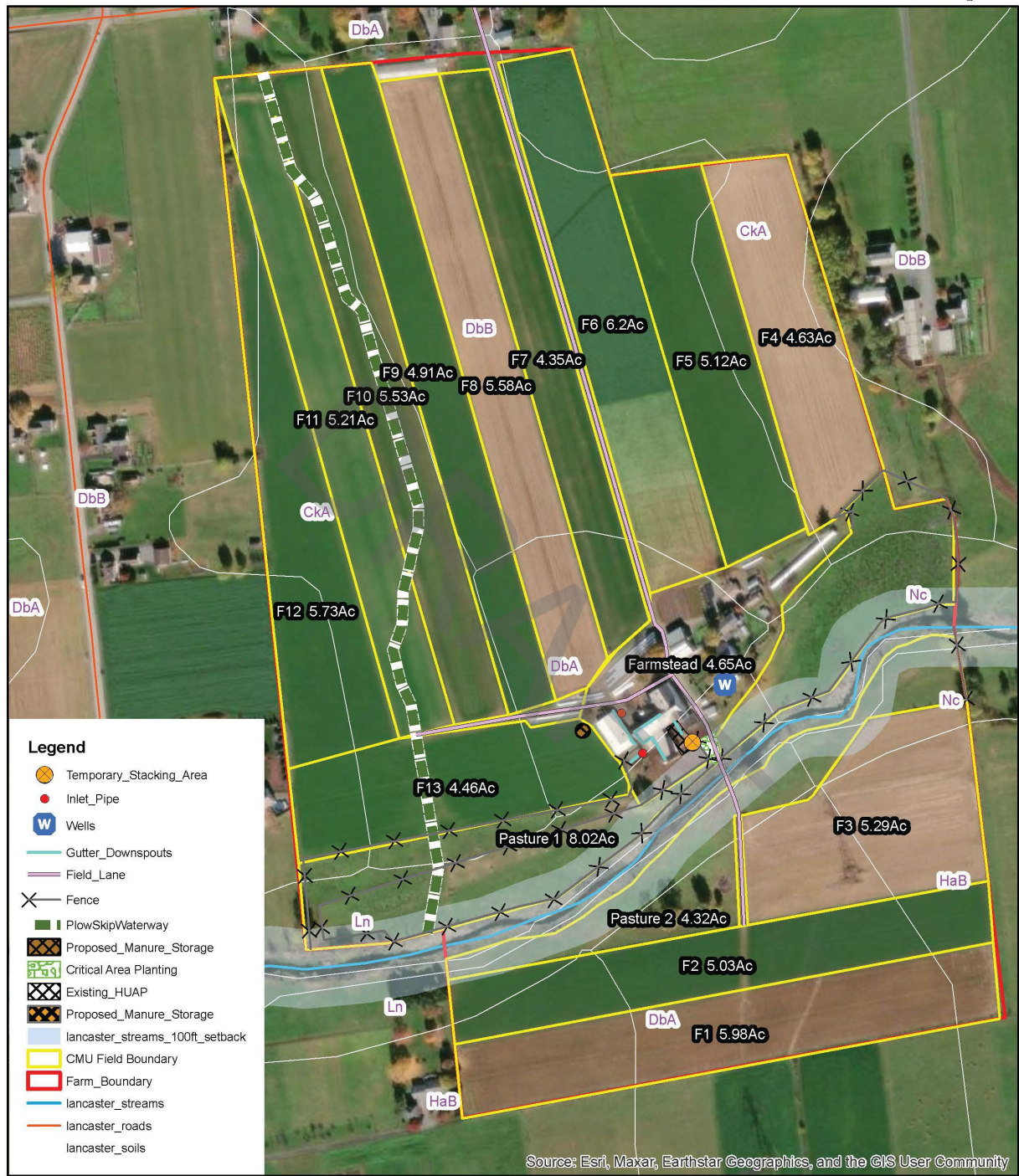
GHG Reduction Calculation Documentation and Estimated Cost

- Print-out of COMET Planner and Comet Farm Documenting GHG Emissions Reductions

Schematic Site Plan Drawing of the Production Area or Associated Field Practices

EXAMPLE- Soil Map

LANCASTER PA



EXAMPLE - Farmstead Map

LANCASTER PA



130 65 0 130 Feet



NAME: Peter Hughes
PROJECT: Walk-Le Farm
Version: appengine cometfarm v0-10 build 4.1.8795.40849 (01/30/2024 22:41:41)
TIME: 05/08/2024 12:52:43

Dairy-Heifer Replacements			
Source_Categories	Baseline Emissions	Seperation Emissions	Seperation Change
Default Herd	614.9	618.9	+4.0
Total	614.9	618.9	+4.0
Dairy-Lactating Cows			
Source_Categories	Baseline Emissions	Seperation Emissions	Seperation Change
Default Herd	24362.6	880.1	-23482.4
Total	24362.6	880.1	-23482.4

	Baseline Emissions	Seperation Emissions	Seperation Change
Total (all animals)	24977.5	1499.0	-23478.4

COMET-Planner Report: Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions

Project Name: EXAMPLE FARM

State: Pennsylvania

County: Lancaster

Date: 2023/9/5 14:55:22

NRCS Conservation Practices					
	Acreage	Carbon Dioxide	Nitrous Oxide	Methane	Total CO2 Equivalent
Replace Synthetic N Fertilizer with Dairy Manure on Non-Irrigated Croplands	100	29	-7	0	22
Decrease Fallow Frequency or Add Perennial Crops to Rotations	100	21	1	N.E.**	22
Add Legume Seasonal Cover Crop (with 50% Fertilizer N Reduction) to No-Till Non-Irrigated Cropland	100	45	3	0	48
Add Mulch to Croplands	100	32	0	N.E.**	32
Intensive Till to No Till or Strip Till (CPS 329) + Synthetic N Fertilizer Reductions of 15% (CPS 590) on Non-Irrigated Croplands	100	51	6	0	57
Intensive Till to No Till or Strip Till on Non-Irrigated Cropland	100	54	4	0	58
Intensive Till to Reduced Till on Non-Irrigated Cropland	100	24	1	0	25
Add Perennial Cover Grown in Strips with Non-Irrigated Annual Crops	100	11	13	N.E.**	24
Totals	800	267	21	0	288

*Negative values indicate a loss of carbon or increased emissions of greenhouse gases

**Values were not estimated due to limited data on reductions of greenhouse gas emissions from this practice

For more information on how these estimates were generated, please visit www.comet-planner.com.

Conservation Evaluation and Monitoring Activity

Carbon Sequestration and Greenhouse Gas Mitigation Assessment

CEMA 218

Definition

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.

This CEMA is in reference to the quantitative assessment of the carbon sequestration and greenhouse gas (GHG) mitigation scenarios for an operation with a conservation plan using COMET-Farm.

REQUIREMENTS

Qualified Individual Requirements

The Natural Resources Conservation Service (NRCS) strongly encourages participants to know the following Qualified Individual (QI) Requirements to ensure the person they hire is a good match for their needs and objectives.

A QI for this CEMA has one of the qualifications listed below:

- The QI will have completed at least one previous COMET-Farm assessment for the type of operation to be evaluated (e.g., if the CEMA application will be for an agroforestry operation, the QI will have completed at least one previous COMET-Farm agroforestry assessment), or
- The QI will have completed the “COMET Farm & COMET Planner Introduction Presentation” and the “Carbon Farm Planning using COMET-Farm” series (Parts 1-5) videos on the COMET YouTube channel (<https://www.youtube.com/channel/UCQKxUt7MtFKeXTN94CDVZaQ/videos>)

Technical Requirements

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 and activities that provide the operations with carbon sequestration and GHG mitigation solutions. A list of these practices and activities is available at:

https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1881025&ext=pdf

Establish a baseline of GHG emissions and sinks, expressed in the common units of metric tons carbon dioxide equivalents (CO₂e) 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](https://www.youtube.com/channel/UCqWz8v8v8v8v8v8v8v8v8v8)) and tutorials available on the Help Page (<http://comet-farm.com/HelpPage>).

1) **Additional Requirements for Cropland, Pasture, Rangeland, Orchards and Vineyards.**

- a) 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:
 - i) Crops (annuals, seasonal cover, orchard/vineyard, forage), planting and harvest dates, harvest and grazing removal estimates.
 - ii) Tillage type and frequency.
 - iii) Irrigation type and frequency.
 - iv) Manure/compost application, type, characteristics and amount.
 - v) Fertilizer application, type and amount.
 - vi) Liming application.
 - vii) Burning management practices.

2) **Additional Requirements for Animal Agriculture.**

- a) For animal agriculture and production, details of animal production of GHG emissions include the following information, as applicable:
 - i) Animal type(s).
 - ii) Herd size/number of animals, monthly.
 - iii) Animal characteristics.
 - iv) Feed and feeding situation.
 - v) Manure system type and management details.

3) **Additional Requirements for Agroforestry and Forestry**

- a) For agroforestry and forestland estimates of GHG mitigation and soil carbon sequestration (soils and perennial biomass) include the following information:
 - i) Agroforestry and Forest location and type (general species/family).
 - ii) Diameter at breast height (DBH) or age.
 - iii) Number of trees.
 - iv) Historic land cover.
 - v) Age or total volume in m³/ha or merchantable volume in m³/ha.
 - vi) 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 (see **a)** below) selecting the final atmospheric-beneficial alternatives.

- 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.

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, and agroforestry land uses.

Greenhouse Gases - Carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄) 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 CO₂e. Global Warming Potentials are utilized to convert non-CO₂ greenhouse gases to CO₂e units. Additional information can be found on the U.S. Environmental Protection Agency website.

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

DELIVERABLES

The QI must provide documentation showing all the tasks indicated in the **General Requirements** section, the **Technical Requirements** section, and the following sections:

Cover Page

Cover page reporting the technical services provided by the QI. Cover page(s) must include the following:

- 1) CEMA name and number.
- 2) Participant information: Name, farm bill program name, contract number (QI obtains contract number from participant), land identification (e.g., state, county, farm, and tract number).

- 3) QI name, address, phone number, email.
- 4) A statement by the QI explaining how they currently meet the Qualified Individual Requirements for this CEMA.
- 5) A statement by the QI that services provided meet NRCS requirements, such as:

I certify the work completed and delivered for this CEMA:

- *Complies with all applicable Federal, State, Tribal, and local laws and regulations.*
- *Meets the general requirements, technical requirements and deliverables for this CEMA.*
- *Is consistent with and meets the conservation objectives for which the program contract was entered into by the participant.*
- *Addresses the participant's conservation objectives for this CEMA.*

QI Signature: _____ *Date:* _____

- 6) A Participant's acceptance statement, such as:

I accept the completed CEMA deliverables as thorough and satisfying my objectives. Participant

Signature: _____ *Date:* _____

- 7) A space for an NRCS reviewer to certify the agency's acceptance of the completed CEMA and, such as:

NRCS administrative review completion by:

Signature: _____ *Title:* _____ *Date:* _____

Notes and Correspondence

- 1) Document each site visit, its participants, the activity completed in the field, and results of each site visit.
- 2) Copies of correspondence between the QI and the participant relating to decision-making and completion of this CEMA.
- 3) Copies of the COMET-Farm report, as well as other observations, data, technology tool output, or test results prepared during completion of this CEMA.

Maps

- 1) Maps to include, but not be limited to:
 - a) General location map of the assessment area(s) showing access roads to the location.
 - b) A map to account for the entire COMET-Farm assessment area. This map may be obtained from the participant.
 - c) Other maps, as needed, with appropriate interpretations.
- 2) At a minimum, all maps developed for the CEMA will include:
 - a) Title block showing:
 - i) Map title.
 - ii) Participant's name (individual or business).
 - iii) Prepared with assistance from NRCS.
 - iv) Assisted By [QI planner's name].

- v) Name of applicable conservation district, county, and State.
- vi) Date prepared.
- b) Map scale.
- c) Information needed to locate the assessment or monitoring area, such as geographic coordinates, public land survey coordinates, etc.
- d) North arrow.
- e) Appropriate map unit symbols and a map symbol legend on the map or as an attachment.

Deliver Completed Work

- 1) The QI must prepare and provide the participant two sets of all of the items listed in the **General Requirements**, the **Technical Requirements** and the **Deliverables** sections of this document.
- 2) One set is for the participant to keep.
- 3) The other set is for the local NRCS Office.
- 4) The QI may transmit a set of the completed work to the local NRCS Office, if their participant has authorized it.

It is recommended to provide the NRCS field office an opportunity to review the CEMA deliverables, prior to asking for their acceptance.

References

USDA Natural Resources Conservation Service. Field Office Technical Guide.

<https://efotg.sc.egov.usda.gov/#/>

USDA Natural Resources Conservation Service. National TSP Resources.

<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/technical/tsp/?cid=nrcseprd1417414>