



ESMC’s EcoHarvest Program: Intervention Protocol Summary – April 2026

This ESMC EcoHarvest Intervention Protocol Summary is relevant for companies following an intervention GHG accounting approach and provides a high-level overview of outcome generation, program eligibility, enrollment, data requirements, and how outcomes can be used for corporate reporting. Intervention and inventory GHG accounting are complementary, so both ESMC protocols can be used in tandem. This document is updated on a regular basis as the ESMC protocol continues to develop.

What Outcomes Can Be Generated?

The ESMC EcoHarvest Program issues GHG outcomes for increased soil carbon and reduced/avoided greenhouse gas (GHG) emissions using an intervention or inventory accounting framework, water quality improvements, and biodiversity units. The program provides multiple opportunities for agricultural producers to generate outcomes. Certain outcomes can be generated annually for GHG reporting of supply chain (Scope 3) emissions or narrative reporting, as well as analogous water quality and biodiversity corporate sustainability reporting.

Outcome Type	Inventory GHG Outcomes	Intervention GHG Outcomes	Water Quality	Biodiversity
Corporate Supply Chain/ESG Reporting	<ul style="list-style-type: none"> • Scope 3 Emissions Factors • Scope 3 Removals 	<ul style="list-style-type: none"> • Enhanced Soil Organic Carbon Removals • Enhanced/avoided GHG emission reductions 	<ul style="list-style-type: none"> • Tons sediment reduced • Pounds nitrogen reduced • Pounds phosphorus reduced 	<ul style="list-style-type: none"> • Ecosystem Function • Habitat Quality

How Is ESMC Program Eligibility Determined?

Producers must meet the following criteria to participate in the EcoHarvest Program:

- Agricultural producers are interested in adopting soil health systems and conservation practices that benefit their agricultural operations while improving environmental outcomes.
- Enrolled land must be within an approved ESMC Program Region and have an ESMC approved production system, practice change. Producers must provide proof of outcomes ownership rights.
- Producers must voluntarily implement new eligible practices in each field following enrollment
Note – to generate intervention accounting outcomes a practice change is required to establish a baseline (business as usual) scenario:

- Practice changes planned for the project enrollment year must not have been implemented on the field in the last 10 years, although fields that have included such practices on a trial basis in the past may still be eligible.
- Agricultural practices that are legally required are not eligible.
- Enrolled land must not have been deforested or in natural grassland in the past 10 years.
- Enrolled land must not be a wetland or other protected area. Fields cannot be enrolled in another ecosystem service program that generates credits, outcomes, offsets, or claims related to soil carbon sequestration and/or changes in GHG emissions, however co-claiming is allowed under certain circumstances (this is detailed in the Sale and Reporting of ESMC Outcomes Section of this guide).

Which Management Activities Are Eligible?

The following table outlines potential outcomes types which can be generated by eligible agricultural management practices.

Agricultural Management Practice	Greenhouse Gas	Water Quality	Biodiversity
Tillage Reduction (conservation tillage, no till)	X	X	X
Nutrient Management	X	X	X
Split application			
Use of inhibitor/enhanced fertilizer			
Reduction in Nitrogen fertilizer application			
Improved Nitrogen Use Efficiency			
Cover Cropping	X	X	X
Conservation Crop Rotation	X	X	X

Which Emissions Sources and Crops can be Modeled?

Soil organic carbon flux, soil methane emissions, and direct N₂O emissions for row-crop production can be modeled using ecosys, a process-based ecosystem model (provided on behalf of HabiTerre). Note that indirect N₂O emissions are also reported but not modeled entirely in ecosys.

Habiterre uses a tier-based system to describe the level of detail related to modeling each production system in ecosys based on the status of model validation for a specific crop or functional group. A summary of included production systems by tier is included below:

Table 1. Current Crop Classification by Tier (CONUS, Grain)

Tier	Definition (Summary)	Crops
Tier 1 — Premium	Full end-to-end readiness: validated modeling, complete remote-sensing gap-filling, and LCA module operational	Corn; Soybean; Wheat
Tier 2 — Waiting List (Becoming Premium)	Core modeling supported; one or more critical capabilities still under development with defined delivery timelines. LCD module ready except Cotton.	Cotton; Rice; Sorghum; Barley; Canola (Rapeseed); Oats
Tier 3 — Basic	Basic modeling support only, with default practice assumptions; typically used to support crop rotations rather than stand-alone analysis	Alfalfa; Dry Beans; Sugar Beets; Buckwheat; Wheatgrass (Kernza®); Rye; Sunflower; Triticale; Pumpkin; Pea; Chinese Pea; Flax; Lentil; Millet; Mustard; Fescue / Timothy; Camelina

Note: Tier 3 crops are considered *supported but not fully observable*, and are generally included to preserve agronomic realism in rotations dominated by Tier 1 & 2 crops

In addition to the emissions sources above captured in ecosys an emissions factor is applied (either managed by Habiterre or ESMC depending on the crop) for the following additional emissions sources:

- Indirect N₂O (nitrous oxide)
- On-farm Energy Consumption
- Upstream Fertilizer Production
- Upstream Pesticide Production

Where Can Projects Be Enrolled?

changes and production systems detailed above in the following locations:

- Continental USA
- Canada provinces of
 - AB: Alberta
 - SK: Saskatchewan
 - MB: Manitoba

- o ON: Ontario
- o QC: Quebec

How Are ESMC Outcomes Quantified?

Intervention outcomes are quantified by comparing a counterfactual (business as usual) baseline scenario (i.e., environmental outcomes on an enrolled field in the absence of new management practice implementation) to a project scenario (i.e., environmental outcome following implementation of a new eligible practice). This process is different than when GHG inventory accounting is applied, where an emissions factor from a historical base year is compared to a project year emissions factor on an ongoing basis. GHG modeling scenarios are represented by primary producer data and may be completed with secondary ESMC proxy data, when applicable. The following table outlines the quantification approach used for included emissions sources:

Outcome Type	Sources, Sinks, and Reservoirs (SSRs)	Quantification Approach
GHG (Emissions Reductions, Soil Organic)	Soil Organic Carbon (carbon dioxide—CO ₂)	ecosys modeling and soil sampling
	Decomposition of Manure (methane—CH ₄ , N ₂ O)	ecosys modeling for land application of manure
	Direct N ₂ O Emissions (N ₂ O)	ecosys modeling
	Indirect N ₂ O Emissions (N ₂ O)	ecosys modeling and emission factors
	Upstream Fertilizer Manufacturing Emissions	Emission factors
	Fossil Fuel Emissions from Combustion and Electrical Consumption (CO ₂ , CH ₄ , N ₂ O)	Emission factors
	Pesticide Emissions (CO ₂ , N ₂ O)	Emission factors
	Soil CH ₄ Emissions	ecosys modeling
	Irrigation (N ₂ O)	Emissions factors
Water Quality	Not based on SSR framework.	ESMC Water Quality (PLET) Calculator Load based (Mass balance) pollutant modeling.
Biodiversity	Not based on SSR framework.	ESMC BEAT Calculator Functional/Ecological modeling (not mass balance)

What Data Are Required and How Are Data Managed?

Producer data requirements vary by outcome type, practice change, and other factors. At a high level, data are typically required on a field basis for both current and past years for the following:

- Field attributes including location, size, presence of tile drainage

- Crop type(s) and associated yield
- Planting and harvesting activities
- Tillage
- Cover crops
- Fertilizer and pesticides
- Irrigation
- Grazing and herd management
- Electricity and fuel

A quality assurance and quality control process is conducted for all producer data entered into the ESMC monitoring, reporting, and validation (MRV) platform. In some cases, ESMC is also able to provide select secondary data (i.e., ESMC proxy data) via public data sources or remote sensing.

Are There Outcome Specific Requirements?

ESMC's Protocol includes outcome specific modules that provide requirements and information that is only applicable to a particular outcome unit type.

ESMC GHG Intervention Accounting Module

- Greenhouse gases (GHGs) include a number of sources, sinks, and reservoirs of CO₂, CH₄, and N₂O.
- Outcome units are quantified and reported annually, and payments are made annually.
- Market leakage will be assessed as a decrease in yields due to the implementation of eligible practices; if a leakage threshold is exceeded, a deduction will be applied to the resulting outcome.
- Outcomes are quantified using emissions factors and ecosys (an ecosystem process-based model) by comparing a project scenario to a counterfactual baseline. The ecosys model is validated for ESMC program region, practice change, crop type, and soil type to correct for model bias and estimate structural uncertainty.
- The producer cannot displace agricultural activities that could result in increased GHG emissions or loss of soil organic carbon to non-ESMC enrolled fields.
- Protocol requirements related to the monitoring and storage length of sequestered carbon will align with the GHG Protocol (GHGP) Land Sector Removals Standard.
- The ESMC program and outcomes can be third-party validated/verified depending on the needs of a sponsoring company.

ESMC Water Quality Module

- Water quality outcomes include reductions in nitrogen (N), phosphorus (P), and sediment losses from agricultural production systems.
- Outcome metrics (total lbs of nitrogen reduced, lbs of phosphorus reduced, and tons of

sediment reduced) are reported and are applicable to the total acreage enrolled in a project. Outcomes are quantified and reported annually. Payments to producers may be made annually.

- Outcomes are quantified using the ESMC PLET, which is an empirical, coefficient-based modeling approach that applies standardized regional loading coefficients and BMP-specific reduction efficiencies to estimate pollutant losses and reductions.
- Baseline and project scenarios are represented using producer-reported data, supplemented with ESMC proxy data where applicable, to estimate changes in pollutant loading resulting from practice implementation.
- The producer cannot displace agricultural activities that could result in increased nutrient or sediment losses to non-ESMC enrolled fields.
- Protocol requirements will align with relevant watershed-scale nutrient reduction goals and water quality frameworks (e.g., regional nutrient reduction strategies and TMDLs where applicable).
- The ESMC program and outcomes can be third-party validated depending on the needs of a sponsoring company.
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- Complete documentation on the Water Quality Module is [here](#).

ESMC Biodiversity Module

- Biodiversity outcomes reflect changes in ecosystem function, habitat quality, and support for key functional groups resulting from agricultural management practices.
- Outcome metrics (e.g., Biodiversity Units (BU) and change in Biodiversity Units (Δ BU)) are reported and are applicable to the total acreage enrolled in a project. Outcomes are quantified and reported annually. Payments to producers may be made annually.
- Outcomes are quantified using the Biodiversity Estimation for Agriculture Tool (BEAT), which is a functional trait-based modeling framework that estimates changes in Weighted Functional Presence (WFP) across key ecological groups (e.g., pollinators, soil organisms, birds, and plants).
- Baseline and project scenarios are represented using land use, habitat characteristics, species occurrence data, and producer-reported management practices, supplemented with ESMC proxy data where applicable, to estimate biodiversity changes resulting from practice implementation.
- The producer cannot displace agricultural activities that could result in degradation of habitat or biodiversity outcomes to non-ESMC enrolled fields.
- Protocol requirements will align with emerging biodiversity frameworks and standards for corporate sustainability reporting and nature-related disclosures.
- The ESMC program and outcomes can be third-party validated depending on the needs of a

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- Complete documentation on the Biodiversity Module can be found [here](#).

Are Soils Required to Be Sampled?

If removals are going to be claimed by the corporation, soil sampling is required within the first year of enrollment to establish initial values for soil organic carbon (SOC), bulk density, and pH. Sample site selection is determined using ESMC's soil stratification application. Soil sampling will typically be repeated every 5 years in alignment with the GHGP LSRS. If it is determined that soil sampling for intervention claims needs to exceed GHGP LSRS requirements, ESMC approaches this on a project-by-project basis.

How Can Outcomes Be Used for Corporate Reporting?

Corporates seeking to make voluntary commitments to reduce their GHG emissions and improve their environmental impact can do so using ESMC's science-based, standards-based protocols. To make progress towards GHG inventory accounting targets, ESMC recommends following the ESMC GHG inventory protocol. Intervention GHG outcomes are available as detailed in this protocol summary to support companies with understanding the full impact of practice adoption.

Corporate Reporting of Intervention GHG Outcomes

- ESMC can use intervention accounting on a case-by-case basis to support companies in understanding the full scale of practice impact by establishing a counterfactual baseline and making comparisons with a project scenario.
- This impact can be reported outside of the GHG inventory of a company, and ESMC can support third-party verification of this impact at the request of a project sponsor.