ESMC
Ecosystem Services Market Consortium

Field Buffer Size Analysis Report: Summary

Ecosystem Services Market Consortium;
Report Summary Published December 2023

Ecosystem Services Market Consortium (ESMC)/Ecosystem Services Market Research Consortium (ESMRC) is a non-profit public-private partnership that is transforming decarbonization along the agricultural supply chain through collective action. Our 60+ member organizations spanning the agricultural supply and value chains have collaboratively invested, tested, and launched Eco-Harvest, a harmonized, standardized ecosystem services market for agricultural supply chains. This voluntary market program is an accredited end-to-end digitized solution to decarbonize agriculture and to meet additional natural resource needs of corporates who are making significant investments and operational changes to achieve standards-based, reportable outcomes documenting their progress annually. Eco-Harvest incentivizes, quantifies, and verifies (through independent third-party experts) carbon, greenhouse gas (GHG) and water outcomes annually, paying farmers from the sale of Scope 3 outcomes to corporates.

Automatically generating soil sampling points, via a stratification web service, will directly address one of the key constraints to scaling up ecosystem service marketplaces. Many of the questions that need to be addressed to automate stratification are known in advance. Which stratification algorithms provide the best balance of feasibility, repeatability, and reduced uncertainty? Which ancillary data layers are most appropriate for selecting sample sites? How can we determine the optimum number of sampling locations per field? Other questions are not apparent until the process of automation is underway.

This report, Field Buffer Size Analysis, identifies a solution for determining the appropriate size for a field buffer within an automated stratification framework. During a previous version of automated stratification of fields for soil sampling, a field buffer of 30 m was automatically applied to reduce variability associated with field edges and irregularities, including tree lines, drive paths, imprecisely drawn boundaries, and shifting cultivation. This 30 m field buffer can greatly reduce the available field area for sampling on smaller fields, resulting in less than 60% unmasked area in some fields. Based on the pixel size for ancillary data, 10 m and 20 m field buffers are possible, and should be used in cases where the unmasked field area falls below 60% with a 30 m buffer. Logic in ESMC's automated stratification process is introduced to adjust the field buffer to 10 m, 20 m, or 30 m as needed, ensuring that at least 60% of the field area remains unmasked, and sampling density can remain consistent across fields.

This report was commissioned by ESMC/ESMRC and authored by Dr. Dan TerAvest, Joel McClure; Our Sci, LLC under contract to ESMC, December 2022.