

Development of a Soil Health Calculator Tool to Quantify Impacts of Agricultural Management Practices on Soil Health in the Lake Champlain Basin

STONE
ENVIRONMENTAL
100% EMPLOYEE-OWNED

Services / Expertise

Environmental Systems Modeling
Agricultural Stewardship
APEX Modeling

Markets

State Government
Agriculture

Project Location

Vermont

Date Completed

2021

Project Owner

Lake Champlain Basin Program

Project Manager

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Project Team

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Annual Results Table		Soil Health Results			Results Guide	Download CSVs	Return Home
Farm Management Scenario	Change in Bulk Density (%)	Change in Soil Strength	Change in Organic Matter (%)	Change in Organic Biomass (%)	Compare		
▶ TMDL Baseline:	20	20	20	20			
▶ Current:	20	20	20	20			
▶ Reduced - Incorporated:	20	20	20	20			
▶ Reduced - Injected:	20	20	20	20			
▶ No-Till - Injected:	20	20	20	20			
▶ No-Till - Surface:	20	20	20	20			
▶ Buffer:	0	0	0	0			
▶ Winter Hardy - Early By 9/15:	10	10	10	10			
▶ Winter Hardy - Mid By 10/1:	10	10	10	10			
▶ Winter Hardy - Late By 10/15:	10	10	10	10			
▶ Winter Kill - Early By 9/15:	10	10	10	10			

Example of anticipated new soil health reporting interface in Farm-PREP.

STONE is currently working with the Lake Champlain Basin Program to develop a soil health calculator tool to provide quantitative and field-specific information about the impact of agricultural management on key soil health indicators. The tool outputs will be based on the USDA's APEX model. The Soil Health Calculator will incentivize best management practices adoption by providing a better understanding of the relative impact of those practices and evaluating management options tailored to specific farm/field conditions.

Stone is designing the tool for a broad range of stakeholders, including VAAFM, farmers, crop consultants, and researchers. The proposed Soil Health Calculator module could be an additional component of a State of Vermont system (e.g., VAAFM programs) for quantifying the benefits of environmental stewardship on agricultural lands and supporting state programs. Using APEX to simulate key soil health indicators is a consistent and scalable approach that could advance environmental stewardship goals and support an ecosystem services framework in the agricultural sector of Vermont. In future projects, this tool could be further developed and/or integrated with other models (e.g., DayCent, economics models) to create a system modeling tool and provide information on additional indicators and a larger suite of ecosystem services.

The Soil Health Calculator Tool will be easily accessible as either an independent component of Farm-PREP, or as part of an assessment that includes nutrient loss, erosion, and runoff results (current outputs of Farm-PREP). This expands the capabilities of Farm-PREP to provide information to a range of stakeholders on the integrated impacts of agricultural management on multiple ecosystem metrics.

