Guidelines for detailed soil surveys in Ontario

Learn about the guidelines for conducting soil surveys for the assessment of agricultural crop capability and suitability. This technical information is for municipalities, landowners and consultants in Ontario.

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Introduction

More detailed, property specific soil surveys are sometimes needed when a land use change (for example, an official plan amendment) is being considered. The *Planning Act, 1990* establishes that decision makers, such as municipalities and the Ontario Land Tribunal, must be consistent with the Provincial Planning Statement. This Statement provides direction on the protection of prime agricultural areas and establishes policy criteria to be considered when non-agricultural uses are being contemplated in Ontario's prime agricultural areas.

It is important to differentiate between prime agricultural areas and prime agricultural land.

Prime agricultural area are areas where prime agricultural lands predominate. This includes areas of prime agricultural lands and associated Canada Land Inventory Class 4 through 7 lands, and additional areas where there is a local concentration of farms which exhibit characteristics of ongoing agriculture. Prime agricultural areas may be identified by a planning authority based on provincial guidance or informed by mapping obtained from the Ministry of Agriculture, Food and Agribusiness and the Ministry of Rural Affairs.

Prime agricultural land means specialty crop areas and/or Canada Land Inventory Class 1, 2 and 3 lands, as amended from time to time, in this order of priority for protection.

Guidelines

The guidelines provide direction for land resource consultants and their clients undertaking detailed soil surveys for the assessment of agricultural crop capability and suitability. Detailed soil surveys can also be used in precision agriculture, land management decisions and developing an understanding of field and landscape characteristics. For these guidelines, a detailed soil survey is one compiled at a working map scale of 1:10,000 or greater. They are also a set of basic requirements to ensure that planners, landowners and consultants have the necessary detailed agricultural land resource information presented and reported in a standard form to make planning decisions or to advocate for changes to planning decisions.

The need for detailed soil information for some local decisions often arises from concerns with:

- the accuracy of the published soil information mapping, classification and agricultural interpretations
- situations where the published information is too general for decisions about a specific area

Published soil information refers foremost to the Soil Survey Complex database and secondly to the county and municipal soil reports and maps. Electronic copies of the soil survey reports (and maps) for Ontario are available free online from Agriculture and Agri-Food Canada and paper copies can be ordered through Publications Ontario.

Soil survey components

The components of a soil survey are as follows:

1. Complete the soil survey according to generally accepted soil survey procedures and base it on an adequate density and distribution of soil profile and landscape inspections. A general guideline is one ground inspection per 2 cm^2 on the final map (Mapping Systems Working Group, 1981). At a scale of 1:10,000, this is one inspection per 2 hectares. Include inspection locations and data with the soil map and report. The manual, Characterizing sites, soils and substrates in Ontario[1] provides guidelines for classifying soils and the landscapes in which they occur.
2. Correlate soils of the subject area with the soils classified in the published soil survey map and report for that county or municipality.
3. Interpret agricultural capability for common field crops (corn, soybeans, small grains, forages) using soil capability for agriculture in Ontario. Land and soils which are classified as prime agricultural land (CLI classes 1 to 3) have necessary capital improvements in place or it is physically feasible for the landowner/manager/farmer to make the necessary improvements. If it is not feasible to make improvements that would enable mechanized row cropping, the land may be considered as less than prime (CLI class 4 or 5).
4. The question of feasibility often arises about land with wetness limitations for which more drainage improvement is required for productivity to be optimized. Each case must be considered individually. Agricultural drainage system mapping information (constructed drains, tile drainage and/or controlled drainage) for the subject area is a necessary reference to help argue and answer the question of drainage improvement feasibility and is available in the Agricultural Information Atlas.
5. If the subject area lies within or adjacent to a larger area of specialty crop production, then evaluate its soil suitability for specialty crops. Specialty crops refer to fruit, vegetable and other crops grown commercially in Ontario, and which cannot be grouped with the general common field crop types listed above. Specialty crop areas are where specialty crops are predominantly grown such as tender fruits (peaches, cherries, plums), grapes, other fruit crops, vegetable crops, greenhouse crops and crops from agriculturally developed organic soil (Provincial Planning Statement).

Additional publications and guidelines

More recent soil survey reports (Brant, Elgin, Haldimand-Norfolk, Middlesex, and Niagara) include ratings of soil suitability for some specialty crops. The ratings published in these reports may also guide the interpretation of reasonably correlated soils in adjacent counties whose soil reports contain no such specialty crop interpretations.

The publication, A compilation of soil, water and climatic requirements for selected horticultural crops in

southern Ontario[2] outlines general landscape and moisture needs for more than 40 different tree fruit, small fruit and vegetable crops. It comprises many of the soil principles used to arrive at the soil suitability ratings given in soil survey publications cited in (a).

Irrigation and/or artificial drainage are often necessary, depending on the site and crop. Consider climatic regions as the longer the frost-free period and the greater the heat units available, the greater the range and productivity of crops the land tends to support.

Soils which are interpreted to be prime (Class 1-3) for the common field crop types of corn, soybeans, small grains and forages have viable suitability for a range of specialty crops. This is most true of sandy and loamy soils. Clayey soils are suitable for a lesser range of specialty crops but may be well suited for some crops.

Qualifications

Hire an experienced pedologist for any survey work being done to ensure that all of the components for the detailed soil survey are properly completed.

Contact us

For more information on the Ontario soil survey work:

- call toll-free: 1-877-424-1300
- email: ontariosoilsurvey@ontario.ca

Resources

Soil Classification Working Group. 1998. The Canadian System of Soil Classification; 3rd edition. Agriculture and Agri-Food Canada Publication 1646, 187 pp.

Mapping Systems Working Group. 1981. A Soil Mapping System for Canada: Revised. Land Resource

Research Institute. Contribution Number 142. Research Branch, Agriculture Canada, Ottawa. 94pp.

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Footnotes

- [1] R.J. Heck, D.J. Kroestch, H.T. Lee, D.A Leadbeater, E.A. Wilson & B.C. Winstone. 2017. Characterizing Sites, Soils & Substrates in Ontario: Volume 1, Field Description Manual. School of Environmental Sciences, University of Guelph. Guelph, ON.
- [2] E. W. Present. 1990. A Compilation of Soil, Water and Climatic Requirements for Selected Horticultural Crops in Southern Ontario. Ontario Institute of Pedology. Land Resource Research Centre. Research Branch. Agriculture Canada. Guelph, Ontario.

Ministry of Agriculture, Food and Agribusiness and Ministry of Rural Affairs

Unleashing the potential of Ontario's rural, agriculture and food systems by developing vibrant rural economies, making sure our agriculture is sustainable, and supporting the growth of our agri-food system.

Questions or comments

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