

Water Management  
Antrim County, Michigan

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Grassed waterways	Drainage
AuA: Au Gres-----	Very limited: seepage.	Very limited: depth to saturated zone, seepage.	Very limited: cutbanks cave.	Very limited: depth to saturated zone, droughty, slope.	Very limited: depth to saturated zone, cutbanks cave.
Finch-----	Very limited: seepage.	Very limited: depth to saturated zone, thin layer, seepage.	Very limited: cutbanks cave.	Very limited: droughty, depth to saturated zone, slope.	Very limited: depth to saturated zone, cutbanks cave, depth to dense layer.
Be: Beaches-----	Not rated-----	Not rated-----	Not rated-----	Not rated-----	Not rated-----
ChA: Charlevoix-----	Very limited: seepage.	Very limited: depth to saturated zone, seepage.	Somewhat limited: cutbanks cave.	Very limited: depth to saturated zone, water erosion, slope.	Very limited: depth to saturated zone, frost action, cutbanks cave.
CcB: Chestonia-----	Not limited-----	Very limited: depth to saturated zone, hard to pack.	Very limited: deep to water.	Very limited: restricted permeability, slope, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave, too clayey.
CcD: Chestonia-----	Somewhat limited: slope.	Very limited: depth to saturated zone, hard to pack.	Very limited: deep to water.	Very limited: slope, restricted permeability, depth to saturated zone.	Very limited: depth to saturated zone, slope, cutbanks cave.
CdA: Croswell-----	Very limited: seepage.	Somewhat limited: seepage, depth to saturated zone.	Very limited: cutbanks cave, deep to water.	Somewhat limited: droughty, depth to saturated zone, slope.	Very limited: cutbanks cave, depth to saturated zone.
DeC: Deer Park-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave, slope.
DrC: Deer Park-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave, slope.
Roscommon-----	Very limited: seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: cutbanks cave.	Very limited: depth to saturated zone, droughty.	Very limited: ponding, depth to saturated zone, cutbanks cave.
EaB: East Lake-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Somewhat limited: droughty, content of large stones, slope.	Very limited: cutbanks cave.

Water Management--Continued

Map symbol and soil name	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Grassed waterways	Drainage
EmB: Emmet-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, water erosion.	Somewhat limited: cutbanks cave.
Montcalm-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave.
EmD: Emmet-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, water erosion.	Very limited: slope, cutbanks cave.
Montcalm-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave, slope.
EOB: Emmet-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, water erosion.	Somewhat limited: cutbanks cave.
Onaway-----	Somewhat limited: seepage.	Very limited: piping, seepage.	Somewhat limited: deep to water, slow refill, cutbanks cave.	Very limited: slope, water erosion, restricted permeability.	Somewhat limited: depth to saturated zone, cutbanks cave.
ToA: Iosco-----	Very limited: seepage.	Very limited: depth to saturated zone, piping, seepage.	Very limited: cutbanks cave.	Very limited: water erosion, depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, cutbanks cave.
KaB: Kalkaska-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Somewhat limited: droughty, slope.	Very limited: cutbanks cave.
KcD: Kalkaska-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave, slope.
KeB: Kalkaska-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Somewhat limited: droughty, slope.	Very limited: cutbanks cave.
East Lake-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Somewhat limited: droughty, content of large stones, slope.	Very limited: cutbanks cave.
KeD: Kalkaska-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave, slope.
East Lake-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty, content of large stones.	Very limited: cutbanks cave, slope.
KkB: Kalkaska-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Somewhat limited: droughty, slope.	Very limited: cutbanks cave.

Water Management--Continued

Map symbol and soil name	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Grassed waterways	Drainage
Karlin-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Slightly limited: slope, droughty.	Very limited: cutbanks cave.
KmB: Kalkaska-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Somewhat limited: droughty, slope.	Very limited: cutbanks cave.
Montcalm-----	Very limited: seepage.	Somewhat limited: seepage.	Very limited: deep to water.	Somewhat limited: slope, droughty.	Very limited: cutbanks cave.
KmD: Kalkaska-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave, slope.
Montcalm-----	Very limited: seepage, slope.	Somewhat limited: seepage.	Very limited: deep to water.	Very limited: slope, droughty.	Very limited: cutbanks cave, slope.
KsA: Kawkawlin-----	Not limited-----	Very limited: depth to saturated zone.	Very limited: deep to water.	Very limited: water erosion, depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, frost action, cutbanks cave.
Ps: Pickford-----	Very limited: seepage.	Very limited: depth to saturated zone, seepage.	Very limited: deep to water.	Very limited: depth to saturated zone, restricted permeability, water erosion.	Very limited: depth to saturated zone, cutbanks cave, frost action.
Ro: Roscommon-----	Very limited: seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: cutbanks cave.	Very limited: depth to saturated zone, droughty.	Very limited: ponding, depth to saturated zone, cutbanks cave.
RuB: Rubicon-----	Very limited: seepage.	Very limited: seepage.	Very limited: deep to water.	Somewhat limited: droughty, slope.	Very limited: cutbanks cave.
Ta: Tawas-----	Very limited: seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: cutbanks cave.	Very limited: depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Te: Ensley-----	Very limited: seepage.	Very limited: depth to saturated zone, seepage.	Somewhat limited: cutbanks cave.	Very limited: depth to saturated zone, water erosion.	Very limited: depth to saturated zone, frost action, cutbanks cave.
Tawas-----	Very limited: seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: cutbanks cave.	Very limited: depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.

Water Management--Continued

ENDNOTE--WATER MANAGEMENT

This table gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments; dikes, and levees; and aquifer-fed excavated ponds. Rating classes terms indicate the extent to which the soils are limited by all of the soil features that affect these uses, Not limited indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. Somewhat limited indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. Very limited indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

POND RESERVOIR AREAS hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

EMBANKMENTS, DIKES AND LEVEES are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction such as core and shell are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

AQUIFER-FED EXCAVATED PONDS are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the alkalinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

GRASSED WATERWAYS are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a non erosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

DRAINAGE is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, or to other layers that affect the rate of water movement; depth to a zone in which the soil moisture status is wet or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditch banks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts. Availability of drainage outlets is not considered in the ratings.