

WATER MANAGEMENT
Washington County, Kansas

The soils of the survey area are rated in the Water Management table according to limitations that affect their suitability for water management. Soils are rated for pond reservoir areas, drainage, irrigation, terraces and diversions, and grassed waterways. Restrictive features that affect each soil for the specified use is also provided in the table.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. 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. Slightly limited indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. Moderately 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. Limited indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate to high 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.

Limitation class terms, such as very limited or limited, etc., limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

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. 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 traffic ability.

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 salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

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, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table 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 or to a cemented pan, 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, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a very limited hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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

WATER MANAGEMENT--Continued
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(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

| Map symbol and soil name | Features affecting-- | | | |
|-------------------------------------|--|---|--|--|
| | Drainage | Irrigation | Terraces and diversions | Grassed waterways |
| 027GC: Geary----- | Limitation: deep to water | Limitation: slope | Limitation: erodes easily | Limitation: erodes easily |
| 027SU: Sutphen----- | Limitation: deep to water | Limitation: flooding percs slowly | Limitation: percs slowly | Limitation: percs slowly |
| 117KA: Kennebec----- | Limitation: deep to water | Limitation: flooding | Favorable | Favorable |
| 117PB: Pawnee----- | Limitation: frost action percs slowly slope | Limitation: erodes easily percs slowly | Limitation: erodes easily percs slowly | Limitation: erodes easily |
| 117PC: Pawnee, eroded-- | Limitation: frost action percs slowly slope | Limitation: erodes easily percs slowly slow intake | Limitation: erodes easily percs slowly | Limitation: erodes easily |
| 117WA: Wabash----- | Limitation: flooding percs slowly | Limitation: flooding percs slowly wetness | Limitation: percs slowly wetness | Limitation: percs slowly wetness |
| 117WB: Wymore----- | Limitation: frost action percs slowly | Limitation: percs slowly wetness | Limitation: erodes easily wetness | Limitation: erodes easily wetness |
| 117WC: Wymore, eroded-- | Limitation: frost action percs slowly slope | Limitation: percs slowly slope wetness | Limitation: erodes easily wetness | Limitation: erodes easily wetness |
| AED: Arents, Earthen Dam----- | --- | --- | --- | --- |
| Be: Benfield----- | Limitation: deep to water | Limitation: percs slowly slope thin layer | Limitation: area reclaim erodes easily | Limitation: area reclaim erodes easily |
| Cg: Cass----- | Limitation: deep to water | Limitation: flooding soil blowing | Limitation: soil blowing | Favorable |
| Ch: Cass----- | Limitation: deep to water | Limitation: flooding soil blowing | Limitation: soil blowing | Favorable |
| Co: Colo----- | Limitation: frost action | Limitation: wetness | Limitation: wetness | Limitation: wetness |
| Cr: Crete----- | Limitation: deep to water | Limitation: erodes easily percs slowly | Limitation: erodes easily | Limitation: erodes easily percs slowly |
| Cs: Crete----- | Limitation: deep to water | Limitation: erodes easily percs slowly | Limitation: erodes easily | Limitation: erodes easily percs slowly |
| Ct: Crete----- | Limitation: deep to water | Limitation: erodes easily percs slowly slope | Limitation: erodes easily | Limitation: erodes easily percs slowly |
| Cx: Crete, eroded--- | Limitation: deep to water | Limitation: erodes easily percs slowly slope | Limitation: erodes easily | Limitation: erodes easily percs slowly |
| Ed: Edalgo----- | Limitation: deep to water | Limitation: percs slowly slope thin layer | Limitation: area reclaim erodes easily | Limitation: area reclaim erodes easily |
| Eu: Eudora----- | Limitation: deep to water | Limitation: flooding | Limitation: erodes easily | Limitation: erodes easily |
| Ho: Hobbs----- | Limitation: deep to water | Limitation: flooding | Favorable | Favorable |

WATER MANAGEMENT--Continued
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| Map symbol and soil name | Features affecting-- | | | |
|--------------------------|--|--|---|---|
| | Drainage | Irrigation | Terraces and diversions | Grassed waterways |
| Kp: Kipson----- | Limitation: deep to water | Limitation: slope thin layer | Limitation: area reclaim large stones slope | Limitation: area reclaim large stones slope |
| Ks: Kipson----- | Limitation: deep to water | Limitation: large stones slope thin layer | Limitation: area reclaim large stones slope | Limitation: area reclaim large stones slope |
| Sogn----- | Limitation: deep to water | Limitation: area reclaim slope thin layer | Limitation: area reclaim slope depth to rock | Limitation: area reclaim slope depth to rock |
| Lc: Lancaster----- | Limitation: deep to water | Limitation: slope depth to rock | Limitation: depth to rock | Limitation: depth to rock |
| Lh: Lancaster----- | Limitation: deep to water | Limitation: slope thin layer | Limitation: area reclaim | Limitation: area reclaim |
| Hedville----- | Limitation: deep to water | Limitation: slope thin layer soil blowing | Limitation: area reclaim slope depth to rock | Limitation: area reclaim slope depth to rock |
| Lo: Longford----- | Limitation: deep to water | Limitation: percs slowly slope | Limitation: percs slowly | Limitation: percs slowly |
| Lx: Longford, eroded | Limitation: deep to water | Limitation: percs slowly slope | Limitation: percs slowly | Limitation: percs slowly |
| Mc: Mayberry----- | Limitation: frost action percs slowly slope | Limitation: percs slowly slope wetness | Limitation: erodes easily wetness | Limitation: erodes easily wetness |
| Mh: Morrill----- | Limitation: deep to water | Limitation: slope | Favorable | Favorable |
| Mm: Morrill----- | Limitation: deep to water | Limitation: slope | Limitation: slope | Limitation: slope |
| Mp: Morrill----- | Limitation: deep to water | Limitation: slope | Limitation: slope | Limitation: slope |
| Jansen----- | Limitation: deep to water | Limitation: slope | Limitation: slope too sandy | Limitation: slope |
| Mu: Muir----- | Limitation: deep to water | Favorable | Favorable | Favorable |
| Sa: Sarpy----- | Limitation: deep to water | Limitation: fast intake droughty | Limitation: too sandy soil blowing | Limitation: droughty |
| Tu: Tully----- | Limitation: deep to water | Limitation: percs slowly slope | Limitation: erodes easily percs slowly | Limitation: erodes easily percs slowly |
| Ty: Tully----- | Limitation: deep to water | Limitation: percs slowly slope | Limitation: erodes easily percs slowly slope | Limitation: erodes easily percs slowly slope |
| W: Water----- | --- | --- | --- | --- |
| We: Wells----- | Limitation: deep to water | Limitation: slope | Favorable | Favorable |

WATER MANAGEMENT--Continued
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(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

| Map symbol and soil name | Pct of map unit | Pond Reservoir Area | | Embankments, Dikes, and Levees | | Excavated Ponds (Aquifer- fed) | |
|-------------------------------|--------------------------|---------------------------------------|-------|--|--------------|---|----------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 027GC: Geary----- | 83 | Somewhat limited Seepage | 0.70 | Somewhat limited Piping | 0.01 | Very limited Deep to water | 1.00 |
| 027SU: Sutphen----- | 99 | Not limited | | Somewhat limited Hard to pack | 1.00 | Very limited Deep to water | 1.00 |
| 117KA: Kennebec----- | 95 | Somewhat limited Seepage | 0.70 | Somewhat limited Piping Depth to saturated zone | 0.71 0.09 | Somewhat limited Deep to water Slow refill Cutbanks cave | 0.54 0.30 0.10 |
| 117PB: Pawnee----- | 88 | Not limited | | Very limited Depth to saturated zone Hard to pack | 1.00 0.62 | Very limited Deep to water | 1.00 |
| 117PC: Pawnee, eroded----- | 88 | Not limited | | Very limited Depth to saturated zone | 1.00 | Very limited Deep to water | 1.00 |
| 117WA: Wabash----- | 88 | Not limited | | Very limited Depth to saturated zone Hard to pack | 1.00 1.00 | Very limited Slow refill Cutbanks cave | 1.00 0.10 |
| 117WB: Wymore----- | 88 | Somewhat limited Seepage | 0.05 | Very limited Depth to saturated zone Hard to pack | 1.00 0.52 | Very limited Deep to water | 1.00 |
| 117WC: Wymore, eroded----- | 85 | Somewhat limited Seepage | 0.05 | Very limited Depth to saturated zone Hard to pack | 1.00 0.52 | Very limited Deep to water | 1.00 |
| AED: Arents, Earthen Dam- | 100 | Not rated | | Not rated | | Not rated | |
| Be: Benfield----- | 85 | Somewhat limited Depth to bedrock | 0.30 | Somewhat limited Thin layer Hard to pack | 0.98 0.12 | Very limited Deep to water | 1.00 |
| Cg: Cass----- | 89 | Very limited Seepage | 1.00 | Somewhat limited Seepage | 0.99 | Very limited Deep to water | 1.00 |
| Ch: Cass----- | 89 | Very limited Seepage | 1.00 | Somewhat limited Seepage Thin layer | 0.43 0.16 | Very limited Deep to water | 1.00 |
| Co: Colo----- | 95 | Somewhat limited Seepage | 0.70 | Very limited Depth to saturated zone | 1.00 | Somewhat limited Slow refill Cutbanks cave Deep to water | 0.30 0.10 0.00 |
| Cr: Crete----- | 99 | Somewhat limited Seepage | 0.57 | Not limited | | Very limited Deep to water | 1.00 |
| Cs: Crete----- | 95 | Somewhat limited Seepage | 0.05 | Somewhat limited Hard to pack | 0.81 | Very limited Deep to water | 1.00 |
| Ct: Crete----- | 88 | Somewhat limited | | Somewhat limited | | Very limited | |

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| Map symbol and soil name | Pct of map unit | Pond Reservoir Area | | Embankments, Dikes, and Levees | | Excavated Ponds (Aquifer- fed) | |
|-----------------------------|--------------------------|--|----------------------|--|--------------|---------------------------------------|-------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| Cx: Crete, eroded----- | 90 | Seepage | 0.05 | Hard to pack | 0.78 | Deep to water | 1.00 |
| Ed: Edalgo----- | 85 | Somewhat limited Seepage | 0.57 | Not limited | | Very limited Deep to water | 1.00 |
| Eu: Eudora----- | 94 | Somewhat limited Depth to bedrock | 0.11 | Somewhat limited Thin layer Hard to pack | 0.86 0.72 | Very limited Deep to water | 1.00 |
| Ho: Hobbs----- | 83 | Somewhat limited Seepage | 0.70 | Very limited Piping | 1.00 | Very limited Deep to water | 1.00 |
| Kp: Kipson----- | 90 | Somewhat limited Seepage | 0.70 | Somewhat limited Piping | 0.85 | Very limited Deep to water | 1.00 |
| Ks: Kipson----- | 70 | Very limited Seepage Depth to bedrock Slope | 1.00 0.53 0.08 | Very limited Thin layer Piping | 1.00 0.23 | Very limited Deep to water | 1.00 |
| Sogn----- | 15 | Very limited Seepage Depth to bedrock | 1.00 1.00 | Very limited Thin layer Piping | 1.00 0.50 | Very limited Deep to water | 1.00 |
| Lc: Lancaster----- | 85 | Very limited Seepage Depth to bedrock Slope | 1.00 0.53 0.08 | Very limited Thin layer Piping | 1.00 0.23 | Very limited Deep to water | 1.00 |
| Lh: Lancaster----- | 50 | Somewhat limited Seepage Depth to bedrock | 0.70 0.13 | Somewhat limited Thin layer Piping | 0.88 0.35 | Very limited Deep to water | 1.00 |
| Hedville----- | 32 | Very limited Seepage Depth to bedrock Slope | 1.00 1.00 0.08 | Very limited Thin layer | 1.00 | Very limited Deep to water | 1.00 |
| Lo: Longford----- | 85 | Somewhat limited Seepage | 0.05 | Not limited | | Very limited Deep to water | 1.00 |
| Lx: Longford, eroded---- | 90 | Somewhat limited Seepage | 0.05 | Somewhat limited Hard to pack | 0.57 | Very limited Deep to water | 1.00 |
| Mc: Mayberry----- | 85 | Not limited | | Very limited Depth to saturated zone Hard to pack | 1.00 0.42 | Very limited Deep to water | 1.00 |
| Mh: Morrill----- | 90 | Somewhat limited Seepage | 0.57 | Somewhat limited Piping | 0.54 | Very limited Deep to water | 1.00 |
| Mm: Morrill----- | 85 | Somewhat limited Seepage | 0.57 | Somewhat limited Piping | 0.54 | Very limited Deep to water | 1.00 |
| Mp: Morrill----- | 50 | Somewhat limited Seepage Slope | 0.57 0.00 | Somewhat limited Piping | 0.71 | Very limited Deep to water | 1.00 |
| Jansen----- | 45 | Very limited Seepage Slope | 1.00 0.02 | Somewhat limited Seepage Thin layer | 0.97 0.86 | Very limited Deep to water | 1.00 |

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| Map symbol and soil name | Pct of map unit | Pond Reservoir Area | | Embankments, Dikes, and Levees | | Excavated Ponds (Aquifer- fed) | |
|-----------------------------|--------------------------|---------------------------------------|-------|---------------------------------------|-------|---------------------------------------|-------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| Mu: Muir----- | 97 | Somewhat limited Seepage | 0.70 | Piping | 0.12 | | |
| Sa: Sarpy----- | 90 | Very limited Seepage | 1.00 | Somewhat limited Piping | 0.58 | Very limited Deep to water | 1.00 |
| Tu: Tully----- | 90 | Not limited | | Somewhat limited Seepage | 0.95 | Very limited Deep to water | 1.00 |
| Ty: Tully----- | 85 | Not limited | | Somewhat limited Hard to pack | 0.38 | Very limited Deep to water | 1.00 |
| W: Water----- | 100 | Not rated | | Somewhat limited Hard to pack | 0.38 | Very limited Deep to water | 1.00 |
| We: Wells----- | 83 | Somewhat limited Seepage | 0.70 | Not rated | | Not rated | |
| | | | | Somewhat limited Piping | 0.47 | Very limited Deep to water | 1.00 |
| | | | | Seepage | 0.06 | | |

