

Scott County Prime Farmland Mapping Project

Prepared for the Scott County Planning Department and
Jordan Area Visioning Alliance (JAVA)

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Introduction

The concept of prime farmland is often a major consideration in conservation efforts seeking to preserve farmland that lies in the path of urban development. In 2001, the Natural Resources Conservation Service (NRCS) released a National Resources Inventory that documented a loss of about 10 million acres of prime farmland between 1982 and 2001 (NRCS, 2003). As populations grow and cities expand, more farmland will be converted to urban uses, removing land from agricultural production. Although using NRCS designations of land that is “prime farmland” can help to prioritize land for protection, other soils that are not considered prime by NRCS standards may be suitable for alternative agricultural systems. As the local foods and sustainable agriculture movements continue to grow and provide an alternative form of agricultural for metropolitan areas, it may be necessary to either expand the concept of prime farmland or use an alternative metric when prioritizing agricultural land for preservation.

There are several categories of NRCS-designated prime farmland relevant to Scott County. These include parcels where all areas are considered prime, parcels where only drained areas are prime, parcels where only areas protected from flooding or not frequently flooded during the growing season are prime, and parcels where only drained areas that are either protected from flooding or not frequently protected during the growing season are prime. Another category defined by the NRCS is “farmland of statewide importance.” These lands are nearly prime and produce high yields when managed according to acceptable methods (NRCS, 2007).

Active management of agricultural land is not taken into account when prime land is determined. Although much land in Scott County is designated “only drained areas are

prime,” the degree to which these lands are actually drained and therefore useful as agricultural land is difficult to determine. In addition, designation as prime farmland does not take into account the existing uses or the type of land cover that occupy the land. Areas with scattered development or forests might rest on prime farmland, but it would be unreasonable to assume that such areas would be converted for agricultural production.

The prime farmland designation focuses on soil types that provide all of the necessary qualities for the production of food, feed, forage, fiber, and oilseed crops. It is important to understand, however, that soils not identified as prime by the NRCS may still be productive as cropland. The crop productivity index (CPI) is another rating system that ranks crop land on its relative capacity for intensive row crop production. The CPI is a rank of soil types and does not take into account local factors including climate, growing degree days, or precipitation rates, all of which may affect growing conditions. This measurement does assume, however, that lands are adequately managed, not irrigated, artificially drained where required, not frequently flooded on lower lying soils, and not leveled or terraced (Minnesota Land Economics, 2008).

When considering alternative farming practices, conventional definitions of prime farmland may not be entirely accurate in predicting the productive quality of some soils. For example, Scott County has large deposits of muck soils spread throughout the county that are not considered prime by the NRCS or highly productive by CPI rankings. However, these soils might be highly suitable for the production of root vegetable crops such as onions, potatoes, or carrots, even though they would require excessive treatments to produce an adequate quantity of row crops such as corn or soybeans (National Cooperative Soil Survey, 2007). Although muck soils might be a nuisance by conventional row-crop

farmers, vegetable growers looking to provide products for local markets might find these lands quite suitable for production. Other sustainable farming methods might use certain lands that are not considered prime farmland to simultaneously produce crops of value and restore ecological systems. For example, farmers may be able to restore eroded slopes by planting perennial grasses for biofuels or managed pasture.

Map Descriptions

The following set of maps comprises an exploration of Scott County agricultural land. First, land is analyzed based on the concepts of prime farmland and CPI. These maps are then placed in context of lands that are incompatible with agricultural uses due to existing uses, land covers, and long-range planning goals. The next set of maps consider ecological factors, as well as the potential for alternative agricultural practices that are sensitive to ecological considerations and the potential for alternative cropping related to various “nonprime” soil features. Finally, traditional and alternative agricultural capacities are combined to demonstrate an alternative perspective on prime farmland that may be suitable for Scott County.

NRCS-Designated Prime Farmland

This map depicts areas in Scott County that are designated by the NRCS as prime farmland.

The NRCS defines prime farmland as

land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.” (NRCS, 2007)

These NRCS data are commonly used and are a widely accepted measure of determining soil quality for agricultural uses. They do, however, contain some limitations.

Land uses and land covers are not considered when determining prime farmland, which could cause misconceptions in an analysis of raw data. The city of Belle Plaine, for example, contains a large area of prime farmland, but it is mostly covered by urban development and therefore could not be considered usable for agriculture.

This map shows that the majority of the county is covered with areas of prime farmland. Southern and central areas of the county appear to have the greatest proportion of lands designated as “all areas are prime,” including the townships of Belle Plaine, Helena, and Sand Creek. The western townships of Blakely and Belle Plaine have large swaths of soils that are prime if drained combined with prime soils. The eastern portion of the county has larger areas of lands that are not considered prime.

Crop Productivity Index

The crop productivity index (CPI) measures relative soil productivity for corn production on a scale of 0 to 100. CPI is a weighted statistical mean average of soil productivity for each soil type throughout the state, but is not specific to local conditions. The relative productivity of a given soil type represents an average productivity across the state of Minnesota (Minnesota Land Economics, 2008). The CPI is often used as a metric to measure agricultural suitability of a land parcel. Although CPI might be a good indication of soil productivity for conventional industrial agricultural practices, it is not necessarily the proper indicator for those looking to produce specialty crops or use alternative farming techniques.

On this map, CPI is represented using a gradient from yellow to brown. The lightest brown color represents a CPI range of 57 to 70. This range was chosen for the first brown

shade because 57 is the lowest CPI of the soil types that are deemed 'all areas are prime' by the NRCS. Following the assumption that a CPI of 57 represents land that is prime, other lands with a higher CPI can also be considered prime. In contrast with the NRCS designation of prime farmland, the CPI indicates that much of the land in Scott County is well-suited for agricultural production. Although CPI is a weighted and average state mean, the NRCS designation of prime farmland may ultimately be a more accurate representation of local agricultural conditions.

Land Uses and Land Covers Incompatible with Agriculture

Although the preceding maps display the soil characteristics of the land, they do not account for existing land cover or land uses. This next map highlights areas with land uses and land covers that are incompatible with agricultural production to provide a more comprehensive view of the potential of agriculture in the county. This map uses information available from the Department of Natural Resource's Minnesota Land Cover Classification System (MLCCS) and the Metropolitan Council's land use data to identify land covers and uses that either negate the potential for agriculture (including water, parks, golf courses, and developed areas) or would require significant alteration to convert to croplands (forest and woodland, grassland tree complex, wetlands). Also included in this analysis is the Scott County Conservation Corridor, which represents natural areas that the county has prioritized for open space preservation.

The MLCCS is a land classification system that categorizes spatial areas by vegetation rather than land use (Minnesota Department of Natural Resources, 2004). This tool is particularly useful when analyzing potentially prime agricultural lands because it is

possible to identify and exclude land covers that are inappropriate for agricultural uses.

The MLCCS provides the data needed to remove forested areas, impervious surfaces, semi-wooded grasslands, water bodies, and wetlands from agricultural consideration.

MLCCS and Metropolitan Council data provide both the location of farmsteads and land covers associated with farmsteads that would otherwise be incompatible with agricultural use. Although it would technically be unlikely that semi-impervious areas associated with outbuildings and farmstead designated lands could be utilized for agriculture production, these areas are nevertheless assumed to be compatible with agriculture because they are a necessary component of a normal agricultural operation.

Land Uses and Land Covers Incompatible with Agriculture—Composite

This map is a composite showing the land uses and land covers that are incompatible with agriculture as a single layer. This composite layer was used as an overlay to remove from consideration areas that are not compatible with agriculture regardless of soil type, prime designation, or any other characteristic that would otherwise indicate prime agricultural land.

Prime Farmland and Incompatible Land Uses and Land Covers

Although the map of NRCS-designated prime farmland shows prime agricultural soils within Scott County, this map is more specific in that incompatible land uses and land covers are excluded from consideration. There are some notable differences in prime agricultural composition between this depiction and the NRCS-designated prime farmland. The swaths of prime farmland in the cities of Belle Plain and New Prague, for example, are

covered by incompatible land uses or land cover, as are some other areas within Belle Plain and Sand Creek Townships that originally appeared to be rife with prime farmland. As with previous maps, it still appears that the larger areas of lands designated “all areas are prime” or “prime farmland if drained” are located in the southwestern townships of Blakely, Belle Plaine, and Helena, as well as Sand Creek Township.

Poorly Drained Soils

This map combines the soil types of Blue Earth, Comfrey, Dundas, Glencoe, Webster-Glencoe, and Webster-Le Sueur into one composite layer of poorly drained soils. These soil types are identified in the Scott County Soil Survey as poorly drained (USDA, 1959) and identified by the NRCS as “only drained areas are prime” or “only drained areas that are either protected from flooding or not frequently flooded during the growing season are prime.” Although these soil types could be considered prime, there are other considerations that should be included when judging these soils. First, it is unclear which soils are in fact drained. Spatial data of these soil types do not include information regarding current agricultural management practices. Such as drain tiling. Therefore, although these soils have the potential to be considered “prime,” more information is needed to determine the specific characteristics of individual land tracts.

Second, there are ecological considerations that need to be acknowledged regarding agricultural drainage. Surface drainage ditches that divert water from fields also have the potential to carry soil sediments, nitrates, and phosphorus runoff from agricultural fertilizers into streams and rivers. These chemicals degrade water quality for human recreation and consumption, negatively affect the health of aquatic wildlife, and impair

hydrological systems further downstream. The use of subsurface tiling systems may alleviate some level of sedimentation and phosphorus, but do not adequately filter nitrates from surface waters (Busman and Sands, 2002). Many subsurface tile intake lines, however, can become sediment and chemical sinks as croplands drain directly into streams, further diminishing water quality (Busman and Sands, 2002). Carrie Jennings of the Minnesota Geological Survey stated that excessive tiling in Scott County has degraded surface water by increasing turbidity and diminishing the ability of waters to support aquatic life (Jennings, 2009).

There has been some concern that agricultural tiling systems increase peak flows and can cause periodic flooding of agricultural fields on farms further downstream of the tilled fields. Busman and Sands (2002), however, cite various research studies indicating that locally specific soil types determine whether tiling increases or decreases peak or base flows. Specific localized research is therefore needed to determine how agricultural drainage might affect local hydrology.

As much as 30 percent of agricultural lands in the Upper Midwest require artificial drainage to create viable farmland (Busman and Sands, 2002). With proper management, environmental problems associated with drained agricultural land can be reduced. Drained agricultural lands can be very productive and poorly drained soils should not be assumed to be poor agricultural land.

Soils Designated as “All Areas Are Prime Farmland” with Incompatible Land Uses and Land Covers

This map shows areas within Scott County that are designed as ‘all areas are prime’ by the NRCS, overlaid with incompatible land uses and land covers.

Crop Productivity Index and Incompatible Land Uses and Land Covers

Although the “all areas are prime” map shows a splotchy pattern of prime farmland throughout much of Scott County, the Crop Production Index and Incompatible Land Use and Land Cover map displays a more consistent pattern of productive soils, with high productivity ratings predominating in the southwestern and central townships.

Ecological Considerations of Farmland

Standard agricultural practices can have deleterious effects on ecological functions.

Chemical fertilizers and pesticides can make their way into ground and surface waters; intensive monocropping can lead to topsoil depletion and diminished biodiversity; soil erosion caused by wind, water, or mechanical practices can lead to diminished soil fertility and sedimentation of surface waters. Additionally, agricultural drainage practices can diminish water quality and increase the potential for flooding.

The Ecological Considerations of Farmland map identifies areas that are particularly vulnerable to ecological impacts from conventional agricultural practices. Moderate and severely eroded soils are provided in the NRCS soil type data. The USDA (1994) recommends a buffer zone width of 150 feet for activities adjacent to a perennial stream or

water body, and a 170-foot buffer zone for activities adjacent to water bodies where there is a severe erosion hazard with 30 percent slopes. These recommendations were used to identify areas where erosion might threaten water quality because moderate and severe erosion near water bodies can cause ecological damage. In addition, severe erosion hazards in Scott County have the potential to occur on steep slopes.

It appears that erosion that threatens water quality is most likely to occur in the eastern portion of the county, where there are greater occurrences of urbanization and incompatible land uses and land covers. This is also a function of the greater abundance of surface water in that portion of the county. In the western portion of the county where there are rivers and water bodies, there are also many areas at risk for moderate erosion. Taken together, the spatial representation of eroded soils, erosion near water bodies, and poorly drained soils demonstrate that agricultural practices in Scott County have the potential to affect the health of the county's natural ecosystem.

Alternative Farming Possibilities

This map depicts options for alternative farming practices that are responsive to ecological considerations and to the unique character of Scott County's soils. This map could serve as a guide for farmers who seek to diversify their production or take advantage of the unique characteristics of their land. This map is not intended to suggest that conventional row cropping systems would necessarily be inappropriate or unproductive on these lands.

Biofuel production in Scott County could provide farmers with agricultural revenues on lands that are of relatively poor quality and degraded through erosion or loss of fertility. Terry Bovee (2009), source water protection planner for the Minnesota Department of

Health, suggests that lands on steep slopes or eroded soils are suitable for carefully managed pasture or biofuel production using perennial grasses. Such practices could potentially restore degraded farmlands and soils. Tillman, Hill, and Lehman (2006) found that mixed native grassland perennials produce substantially higher yields of biomass energy than corn-based ethanol or soy-based biodiesel. Prairie plantings in Scott County for biofuel production could provide benefits for both farmers and the ecosystem by providing an additional revenue source, offering a suitable use for degraded lands and eroded slopes, and restoring ecosystem function by improving soil fertility and reintroducing deep-rooted perennial cover that reduces the risk of soil erosion.

Poorly drained soils that are identified as “only drained areas are prime” by the NRCS might be suitable for grazing should agricultural production become diminished due to old or failing drainage systems. Terry Bovee (2009) also identified these areas as potential sites for wetland restoration, further increasing the potential for some biofuel production as an alternative to extensive investment in drainage tiling.

David Rhodes (2008) of the Purdue University Department of Horticulture and Landscape Architecture has described muck soils as important vegetable growing soils that are heavy in organic matter and which are often reserved for growing the crops of highest value. Houghton Muck (which is very common in Scott County) is commonly used to grow onions, lettuce, potatoes, celery, radishes, carrots, mint, and some corn (National Cooperative Soil Survey, 2007). These soils are not considered prime by the NRCS and are difficult soils on which to grow row crops due to their poor drainage and high organic matter, which causes problems with weed control and herbicide receptivity. However, such

areas could be well-suited to organic market-vegetable production that uses alternative methods of weed control rather than chemical herbicides.

Similarly, sandy soils provide qualities that are favorable for crops of the cucurbit family. These crops (cucumbers, melons, and squashes) prefer sandy soils and warm weather (USDA, 2000). Although excessively sandy soils may lack nutrients necessary for successful growth, the addition of organic materials or compost can boost the production potential of sandy soils. The sand banks of northern Scott County, although not typically considered prime or productive for agriculture, might provide opportunities for high-value specialty crop production.

Alternative Farming Possibilities and Prime Farmland

When areas suitable for alternative farming practices are combined with the “all areas are prime” layer, the vast agricultural opportunities in Scott County become apparent. Prime agricultural lands as designated by the NRCS are included with other soil types that may be suitable for the alternative forms of agriculture of vegetable production, biofuel production, or ecologically oriented managed grazing or wetland restoration. The result is a densely layered mosaic of agricultural potential. Very few undeveloped areas in the county are unsuitable for agricultural production of some type.

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Appendix: GIS Mapping Methods Used for the Scott County Prime Farmland Mapping Project

NRCS Designated Prime Farmland

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: NRCS Soil Types and Production Classes

Source: NRCS

Process:

1. soil_mn139 (Scott County) downloaded from: <http://soildatamart.nrcs.usda.gov/>
2. shp joined with mapunit.txt to provide soil type names.
3. shp joined with crop productivity index and farmland class data obtained from the USDA NRCS.
4. removed areas where the attribute farmland class (farmlndcl) is labeled 'not prime farmland.'

Crop Productivity Index

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: Crop Productivity Index

Source: NRCS

Process:

1. soil_mn139 (Scott County) downloaded from: <http://soildatamart.nrcs.usda.gov/>
2. shp joined with mapunit.txt to provide soil type names.
3. shp joined with crop productivity index and farmland class data obtained from the USDA NRCS.

Land Uses and Land Covers Incompatible with Agriculture

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layers: Water, Wetlands, Bottomland forest and woodland, Upland forest and woodland, grassland tree complex.

Source: DNR MLCCS

Process: The Minnesota Land Cover Classification System serves as the primary database for many of the layers associated with Land Uses and Land Covers Incompatible with Agriculture map. The MLCCS shapefile was obtained from <ftp.dnr.state.mn.us/pub/gisftp/barichar/MLCCS/>. This dataset was manipulated before creating separate shape files.

1. An attribute field was added and named 'SimpLndCvr' (simple land cover).
2. Land covers were dissolved into a broader classification class based on recommendations provided by Dr. David Pitt (Department of Landscape Architecture, University of Minnesota), as shown in Table 1.

Table 1. Equivalencies of C_NUM values in MLCCS data with LandCovCls and SimpLndCvr Class Values

C_NUM Values	LandCovCls	SimpLndCvr	Mapped Color
10000-14999	Artificial surfaces & associated areas	Artificial surfaces & associated areas	Red
21000-22999	Maintained trees, shrubs and vines	Maintained trees, shrubs and vines	Dark yellow green
23000-23999	Maintained grasses	Maintained Grasses	Grass green
24000-24999	Cropland	Cropland	Light green
31100-31199	Upland coniferous forest	Upland forest and woodland	Dark grass green
31200-31299	Bottomland coniferous forest	Bottomland forest and woodland	Blue-green
32100-32199	Upland deciduous forest	Upland forest and woodland	Dark grass green
32200-32499	Bottomland deciduous forest	Bottomland forest and woodland	Blue-green
41100-41199	Upland coniferous woodland	Upland forest and woodland	Dark grass green
42100-42199	Upland deciduous woodland	Upland forest and woodland	Dark grass green
42200-42499	Bottomland deciduous woodland	Bottomland forest and woodland	Blue-green
43100-43199	Upland mixed woodland	Upland forest and woodland	Dark grass green
52100-52199	Upland shrubland	Shrubland	Light orange
52200-52999	Bottomland shrubland	Shrubland	Light orange
61100-61299	Dry/mesic grassland	Grassland and forbs	Yellow
61300-61410	Wet grassland	Grassland and forbs	Yellow
61420-61899	Wetland	Wetland	Magenta
62110-62130	Oak/aspens savannah/openings	Oak/aspens savannah/ openings	Dark orange
62140	Grassland deciduous tree complex	Grassland tree complex	Medium yellow green
62200-62220	Upland grassland mixed tree complex	Grassland tree complex	Medium yellow green
62310-62510	Bottomland grassland mixed tree complex	Grassland tree complex	Medium yellow green
63100	Upland forbs	Grassland and forbs	Yellow
91100	Slow moving stream	Water	Blue
83212	Riverine sandbars	Sandbars	Grey
92100	Deep lake environment	Water	Blue
92200-92500	Shallow lake environment	Water	Blue
93100-93300	Wetland open water	Water	Blue

3. Of these categories from SimpLndCvr water, wetlands, bottomland forest and woodlands, upland forest and woodland, and grassland tree complex were isolated. Shape files of each of these were created.

Layer: Developed areas excluding farmsteads

Source: DNR MLCCS, Metropolitan Council

Process: The 'Developed areas excluding farmsteads' was created by removing 'farmstead' features from the Metropolitan Council's Generalized Land Use 2005 data set from 'artificial surfaces & associated areas' from the MLCCS.

1. Separate shape files were created for 'Farmstead' and 'artificial surfaces & associated areas' which were isolated from their respective datasets.
2. A union between 'Farmsteads' and 'artificial surfaces' was created.
3. Any area containing the attribute 'farmstead' was deleted and saved as the shape file 'Developed_Areas_WO_Farmsteads.'

Layers: Parks, Golf courses

Source: Metropolitan Council

Process: 'Golf course' and 'park' attributes were isolated from the Metropolitan Council's Generalized Land Use 2005 data set and a shape file of each was created.

Layer: Scott County Conservation Corridor

Source: Scott County

Process: A shape file of the Scott County Conservation Corridor was obtained directly from Scott County.

Land Uses and Land Covers Incompatible with Agriculture Composite

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: Incompatible land uses and land covers

Source: DNR MLCCS, Metropolitan Council, Scott County

Process:

1. All of the shape files that were created for the Land Uses and Land Covers Incompatible With Agriculture map (water, wetlands, artificial surfaces excluding farmsteads, bottomland forest and woodlands, upland forest and woodlands, grassland tree complex, parks, golf courses, and Scott County conservation corridor) were unioned together to create one composite layer.

2. The incompatible land use and land cover composite layer was dissolved to the Incompatible Land Uses and Land Covers shape file.

Prime Farmland and Incompatible Land Uses and Land Covers

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: NRCS Soil Types and Production Classes

Source: NRCS

Process:

1. soil_mn139 (Scott County) downloaded from: <http://soildatamart.nrcs.usda.gov/>
2. shp joined with mapunit.txt to provide soil type names.
3. shp joined with crop productivity index and farmland class data obtained from the USDA NRCS.
4. removed areas where the attribute farmland class (farmlndcl) is labeled 'not prime farmland.'

Layer: Incompatible land uses and land covers

Source: DNR MLCCS, Metropolitan Council, Scott County

Process:

1. All of the shape files that were created for the Land Uses and Land Covers Incompatible With Agriculture map (water, wetlands, artificial surfaces excluding farmsteads, bottomland forest and woodlands, upland forest and woodlands, grassland tree complex, parks, golf courses, and Scott County conservation corridor) were unioned together to create one composite layer.
2. The incompatible land use and land cover composite layer was dissolved to the Incompatible Land Uses and Land Covers shape file.

Poorly Drained Soils

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: Poorly Drained Soils

Source: NRCS Soil Types and Production Classes

Process: 'Prime farmland if drained' and 'Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season' from the NRCS Soil Types and Production Class shape file are displayed.

Soils Designated as 'All Areas are Prime Farmland' with Incompatible Land Uses and Land Covers

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: NRCS Soil Types and Production Classes

Source: NRCS

Process:

1. soil_mn139 (Scott County) downloaded from: <http://soildatamart.nrcs.usda.gov/>
2. shp joined with mapunit.txt to provide soil type names.
3. shp joined with crop productivity index and farmland class data obtained from the USDA NRCS.
4. removed areas where the attribute farmland class (farmlndcl) is labeled 'not prime farmland.'
5. only 'All areas are prime farmland' displayed

Layer: Incompatible land uses and land covers

Source: DNR MLCCS, Metropolitan Council, Scott County

Process:

1. All of the shape files that were created for the Land Uses and Land Covers Incompatible With Agriculture map (water, wetlands, artificial surfaces excluding farmsteads, bottomland forest and woodlands, upland forest and woodlands, grassland tree complex, parks, golf courses, and Scott County conservation corridor) were unioned together to create one composite layer.
2. The incompatible land use and land cover composite layer was dissolved to the Incompatible Land Uses and Land Covers shape file.

Crop Productivity Index and Incompatible Land Uses and Land Covers

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: Crop Productivity Index

Source: NRCS

Process:

1. soil_mn139 (Scott County) downloaded from: <http://soildatamart.nrcs.usda.gov/>
2. shp joined with mapunit.txt to provide soil type names.
3. shp joined with crop productivity index and farmland class data obtained from the USDA NRCS.

Layer: Incompatible land uses and land covers

Source: DNR MLCCS, Metropolitan Council, Scott County

Process:

1. All of the shape files that were created for the Land Uses and Land Covers Incompatible With Agriculture map (water, wetlands, artificial surfaces excluding farmsteads, bottomland forest and woodlands, upland forest and woodlands, grassland tree complex, parks, golf courses, and Scott County conservation corridor) were unioned together to create one composite layer.
2. The incompatible land use and land cover composite layer was dissolved to the Incompatible Land Uses and Land Covers shape file.

Ecological Considerations of Farmland

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: Streams

Source: Metropolitan Council, DNR, Mn/DOT

Process: Drawn on graduated symbols based on the STRAHLER attribute.

Layers: Wetlands and Water

Source: DNR MLCCS

Process: Water and Wetland land covers isolated from MLCCS into individual shape files.

Layers: Eroded Soils

Source: NRCS

Process:

1. Field added to the NRCS Soil Types and Production Classes data set and named 'erosion.' Soil types defined as 'moderately eroded' or 'severely eroded' selected from Soil_Typ attribute field.
2. Moderately eroded soils labeled 'moderate' in erosion field. Severely eroded soils labeled 'severe' in erosion field.
3. Field added and named 'ero_near_w' (erosion near water).
4. Moderately eroded soils selected that are within a distance of 150 feet from water, wetlands, or streams. This selection named 'moderate erosion 150 feet from water, wetland, or stream' in ero_near_w field.
5. Severely eroded soils that are within 170 feet from water, wetland, or stream selected. This selection named 'severe erosion 170 feet from water, wetland, or stream' in ero_near_w field.

Layer: Poorly Drained Soils

Source: NRCS

Process: 'Prime farmland if drained' and 'Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season' from the NRCS Soil Types and Production Class shape file are displayed.

Alternative Farming Possibilities

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: Incompatible land uses and land covers

Source: DNR MLCCS, Metropolitan Council, Scott County

Process:

1. All of the shape files that were created for the Land Uses and Land Covers Incompatible With Agriculture map (water, wetlands, artificial surfaces excluding farmsteads, bottomland forest and woodlands, upland forest and woodlands, grassland tree complex, parks, golf courses, and Scott County conservation corridor) were unioned together to create one composite layer.

2. The incompatible land use and land cover composite layer was dissolved to the Incompatible Land Uses and Land Covers shape file.

Layer: Slopes greater than 12 percent

Source: NRCS

Process:

1. Soil types including slope percentages greater than 12 percent selected from NRCS Soil Types and Production Classes shape file.
2. Shape file 'slopes_greater_than_12' created.
3. Field added and named Slopes. Field populated with descriptor of slope percentage from 'soil_typ' field.

Layer: Moderately and Severely Eroded Soils.

Source: NRCS

Process:

1. Field added to the NRCS Soil Types and Production Classes data set and named 'erosion.' Soil types defined as 'moderately eroded' or 'severely eroded' selected from Soil_Typ attribute field.
2. Moderately eroded soils labeled 'moderate' in erosion field. Severely eroded soils labeled 'severe' in erosion field.

Layer: Poorly Drained Soils

Source: NRCS

Process: 'Prime farmland if drained' and 'Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season' from the NRCS Soil Types and Production Class shape file are displayed.

Layer: Muck Soils

Source: NRCS

Process: The soil types 'Beach materials and muck,' 'Blue Earth mucky silty clay loam, 0 to 1 percent slopes,' 'Houghton muck, 0 to 2 percent slopes,' 'Houghton muck, sloping, 2 to 6 percent slopes,' 'Palms muck, 0 to 2 percent slopes,' and 'Palms muck, sloping, 2 to 12 percent slopes' selected from the NRCS Soil Types and Production Classes shape file and exported to the Muck_Soils shape file.

Layer: Sandy Soils

Source: NRCS

Process:

The soil types 'Dickman sandy loam, 0 to 2 percent slopes,' 'Dickman sandy loam, 2 to 6 percent slopes,' 'Dickman sandy loam, 2 to 6 percent slopes, moderately eroded,' 'Dickman sandy loam, 6 to 12 percent slopes, moderately eroded,' 'Duelm variant, fine sandy loam,'

'Estherville loam and sandy loam, 0 to 2 percent slopes,' 'Estherville loam and sandy loam, 2 to 6 percent slopes,' 'Estherville loam and sandy loam, 2 to 6 percent slopes, moderately eroded,' 'Estherville loam and sandy loam, 6 to 12 percent slopes,' 'Estherville loam and sandy loam, 6 to 12 percent slopes, moderately eroded,' 'Hayden sandy loam, 12 to 18 percent slopes,' 'Hayden sandy loam, 12 to 18 percent slopes, moderately eroded,' 'Hayden sandy loam, 18 to 25 percent slopes,' 'Hayden sandy loam, 25 to 35 percent slopes,' 'Hayden sandy loam, 6 to 12 percent slopes,' 'Hayden sandy loam, 6 to 12 percent slopes, moderately eroded,' 'Isanti fine sandy loam,' 'Isanti fine sandy loam,' 'Sartell fine sand, 0 to 2 percent slopes,' 'Sartell fine sand, 0 to 2 percent slopes, moderately eroded,' 'Sartell fine sand, 2 to 6 percent slopes,' 'Sartell fine sand, 2 to 6 percent slopes, moderately eroded,' 'Sartell fine sand, 6 to 12 percent slopes, moderately eroded,' 'Sparta fine sand, 0 to 2 percent slopes,' 'Sparta fine sand, 2 to 6 percent slopes,' 'Sparta fine sand, 6 to 12 percent slopes,' 'Sparta loamy fine sand, 0 to 2 percent slopes,' 'Sparta loamy fine sand, 2 to 6 percent slopes,' 'Sparta loamy fine sand, 6 to 12 percent slopes,' and 'Terrace escarpments' selected from the NRCS Soil Types and Production Classes shape file and exported to the Sandy_Soils_Not_Prime shape file.

Alternative Farming Possibilities and Prime Farmland

Layers: Cities, Township Boundaries

Source: Metropolitan Council

Process: cities and townships were clipped to the Scott County boundary.

Layer: Incompatible land uses and land covers

Source: DNR MLCCS, Metropolitan Council, Scott County

Process:

1. All of the shape files that were created for the Land Uses and Land Covers Incompatible With Agriculture map (water, wetlands, artificial surfaces excluding farmsteads, bottomland forest and woodlands, upland forest and woodlands, grassland tree complex, parks, golf courses, and Scott County conservation corridor) were unioned together to create one composite layer.
2. The incompatible land use and land cover composite layer was dissolved to the Incompatible Land Uses and Land Covers shape file.

Layer: Slopes greater than 12 percent

Source: NRCS

Process:

1. Soil types including slope percentages greater than 12 percent selected from NRCS Soil Types and Production Classes shape file.
2. Shape file 'slopes_greater_than_12' created.

3. Field added and named Slopes. Field populated with descriptor of slope percentage from 'soil_typ' field.

Layer: Moderately and Severely Eroded Soils.

Source: NRCS

Process:

1. Field added to the NRCS Soil Types and Production Classes data set and named 'erosion.' Soil types defined as 'moderately eroded' or 'severely eroded' selected from Soil_Typ attribute field.
2. Moderately eroded soils labeled 'moderate' in erosion field. Severely eroded soils labeled 'severe' in erosion field.

Layer: NRCS Class 'All Areas are Prime'

Source: NRCS

Process: Only 'all areas are prime' is displayed from the farmlandcl field of the NRCS Soil Types and Production Class shape file.

Layer: Poorly Drained Soils

Source: NRCS

Process: 'Prime farmland if drained' and 'Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season' from the NRCS Soil Types and Production Class shape file are displayed.

Layer: Muck Soils

Source: NRCS

Process: The soil types 'Beach materials and muck,' 'Blue Earth mucky silty clay loam, 0 to 1 percent slopes,' 'Houghton muck, 0 to 2 percent slopes,' 'Houghton muck, sloping, 2 to 6 percent slopes,' 'Palms muck, 0 to 2 percent slopes,' and 'Palms muck, sloping, 2 to 12 percent slopes' selected from the NRCS Soil Types and Production Classes shape file and exported to the Muck_Soils shape file.

Layer: Sandy Soils

Source: NRCS

Process:

The soil types 'Dickman sandy loam, 0 to 2 percent slopes,' 'Dickman sandy loam, 2 to 6 percent slopes,' 'Dickman sandy loam, 2 to 6 percent slopes, moderately eroded,' 'Dickman sandy loam, 6 to 12 percent slopes, moderately eroded,' 'Duelm variant, fine sandy loam,' 'Estherville loam and sandy loam, 0 to 2 percent slopes,' 'Estherville loam and sandy loam, 2 to 6 percent slopes,' 'Estherville loam and sandy loam, 2 to 6 percent slopes, moderately eroded,' 'Estherville loam and sandy loam, 6 to 12 percent slopes,' 'Estherville loam and sandy loam, 6 to 12 percent slopes, moderately eroded,' 'Hayden sandy loam, 12 to 18 percent slopes,' 'Hayden sandy loam, 12 to 18 percent slopes, moderately eroded,' 'Hayden sandy loam, 18 to 25 percent slopes,' 'Hayden sandy loam, 25 to 35 percent slopes,'

'Hayden sandy loam, 6 to 12 percent slopes,' 'Hayden sandy loam, 6 to 12 percent slopes, moderately eroded,' 'Isanti fine sandy loam,' 'Isanti fine sandy loam,' 'Sartell fine sand, 0 to 2 percent slopes,' 'Sartell fine sand, 0 to 2 percent slopes, moderately eroded,' 'Sartell fine sand, 2 to 6 percent slopes,' 'Sartell fine sand, 2 to 6 percent slopes, moderately eroded,' 'Sartell fine sand, 6 to 12 percent slopes, moderately eroded,' 'Sparta fine sand, 0 to 2 percent slopes,' 'Sparta fine sand, 2 to 6 percent slopes,' 'Sparta fine sand, 6 to 12 percent slopes,' 'Sparta loamy fine sand, 0 to 2 percent slopes,' 'Sparta loamy fine sand, 2 to 6 percent slopes,' 'Sparta loamy fine sand, 6 to 12 percent slopes,' and 'Terrace escarpments' selected from the NRCS Soil Types and Production Classes shape file and exported to the Sandy_Soils_Not_Prime shape file.