Importance of soil characterization data to nutrient management planning

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Soil Tables for NMP
SnapPlus nutrient management planning software

By County: Map Unit: Major Component: 9754 rows

Crop nutrient recommendations
Soil group
Soil yield potential

Restrictions on manure or fertilizer applications
Fall nitrogen application restrictions for soils with leaching risk (590)
Soils where manure application may be prohibited for CAFOs (NR243)
NMP Models Using Soil Data
SnapPlus nutrient management planning software

**RUSLE2 Erosion:**
- Average Tons per acre per year
- Manure or fertilizer can not be applied if field soil loss > Tolerable soil loss (T)

**Phosphorus runoff to surface water (P Index):**
- Average lb per acre per yr
- Manure can not be applied if P Index > 6
SnapMaps: Draw fields
SnapMaps: ID restrictions
SnapMaps: ID soils

\[ ES = \frac{K \times LS}{T} \]

<table>
<thead>
<tr>
<th>Subfarm Name</th>
<th>County</th>
<th>Field Name</th>
<th>Map Symbol</th>
<th>Slope</th>
<th>Slope Length</th>
<th>% of field</th>
<th>Soil Group</th>
<th>Yield Potential</th>
<th>K</th>
<th>T</th>
<th>ES</th>
<th>Fall N Restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dane</td>
<td>Example field</td>
<td>EfB</td>
<td>2.5</td>
<td>200</td>
<td>64.8</td>
<td>L</td>
<td>H</td>
<td>0.37</td>
<td>5</td>
<td></td>
<td>0.022</td>
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<tr>
<td>Dane</td>
<td>Example field</td>
<td>PnA</td>
<td>1</td>
<td>250</td>
<td>12.6</td>
<td>L</td>
<td>H</td>
<td>0.37</td>
<td>5</td>
<td></td>
<td>0.013</td>
<td></td>
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<tr>
<td>Dane</td>
<td>Example field</td>
<td>Ot</td>
<td>1</td>
<td>250</td>
<td>11.8</td>
<td>L</td>
<td>M</td>
<td>0.37</td>
<td>5</td>
<td></td>
<td>0.013</td>
<td>W</td>
</tr>
<tr>
<td>Dane</td>
<td>Example field</td>
<td>PnB</td>
<td>4</td>
<td>200</td>
<td>6.9</td>
<td>L</td>
<td>H</td>
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<td>5</td>
<td></td>
<td>0.039</td>
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<tr>
<td>Dane</td>
<td>Example field</td>
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<td>200</td>
<td>4.0</td>
<td>L</td>
<td>H</td>
<td>0.32</td>
<td>5</td>
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<td>0.034</td>
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</table>

<table>
<thead>
<tr>
<th>Field County</th>
<th>Field Acres</th>
<th>Soil Map Symbol (critical)</th>
<th>Soil Map Symbol (predominant)</th>
<th>Slope</th>
<th>Slope Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dane</td>
<td>53.15</td>
<td>EfB</td>
<td>EfB</td>
<td>2.5</td>
<td>200</td>
</tr>
</tbody>
</table>
Soils make a difference in NMP models

Dane County silt loams, 4% slope, 200 ft slope length
Corn and soybean rotation with fall chisel plowing and manure
Soil test P = 50 ppm, OM% = 3

- **SmB Seaton**
  - Silt loam
  - Soil Loss = 4.7
  - T = 5
  - P Index = 6

- **AsB Ashdale**
  - Silt loam
  - Silty clay loam
  - Clay
  - Bedrock
  - Soil Loss = 3.4
  - T = 3
  - P Index = 5

- **EfB Elburn**
  - Silt loam
  - Water table
  - Silty clay loam
  - Loam
  - Soil Loss = 3.4
  - T = 5
  - P Index = 5
Soils make a difference in meeting soil loss criteria

Soil Losses:

- SmB Seaton: K=0.49, T=5, Soil Loss = 4.7
- AsB Ashdale: K=0.37, T=3, Soil Loss = 3.4
- EfB Elburn: K=0.37, T=5, Soil Loss = 3.4
Soils make a difference in P Index

SmB Seaton
Silt loam
Silt loam
Silt loam
P Index  = 6

AsB Ashdale
Silt loam
Silty clay loam
Clay
Bedrock
P Index  = 5

EfB Elburn
Silt loam
water table
Silty clay loam
Loam
P Index  = 5

Particulate P = 5.9
Dissolved P = 0.4
P Index  = 6

Particulate P = 4.3
Dissolved P = 0.4
P Index  = 5

Particulate P = 4.2
Dissolved P = 0.5
P Index  = 5
Soils make a difference in P Index

- **Highest erosion rate**
  - SmB Seaton
    - Silt loam
      - Silt loam
      - Silt loam
      - P Index = 6
      - Particulate P = 5.9
  - AsB Ashdale
    - Silt loam
      - Silty clay loam
      - Clay
      - Bedrock
      - P Index = 5
      - Particulate P = 4.3
  - EfB Elburn
    - Silt loam
      - Water table
      - Silty clay loam
      - Loam
      - P Index = 5
      - Particulate P = 4.2

- **Same erosion rate, small differences in texture and aggregation**
Soils make a difference in P Index

Hydrologic soil group influences estimated runoff

**B-moderately low**

- SmB Seaton
  - Silt loam
    - Silt loam
      - Silt loam

  P Index = 6

- AsB Ashdale
  - Silt loam
    - Silty clay loam
      - Clay
        - Bedrock

  P Index = 5

- EfB Elburn
  - Silt loam
    - Water table
      - Silty clay loam
        - Loam

  P Index = 5

**B-moderately low**

**C-moderately high**

Dissolved P = 0.4  Dissolved P = 0.4  Dissolved P = 0.5
Soil survey characterization helps farmers protect water quality and maintain profitability.