GIS 390 Geographic Information Systems in Natural Resources

Agricultural Assessment:
Pecan Orchard Feasibility Study

Presented By:
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2,000 acre Houston county property purchased by almond farmer.
Question:

Does land in East Texas host desirable soil types for developing large acreage into nut-bearing orchards?
What is the most common factor resulting in mortality among pecan tree orchards?

Poor Soil
Objective:
Determine if a pecan orchard is suitable for the study area in regards to soil type, water resources, and road infrastructure. Narrow the selection.
Plan:

Perform two levels of GIS analysis

► Comparison of existing pecan orchard soil types.

► Recommendations by the USDA Natural Resources Conservation Service Soil Survey for Houston County, Texas.
There is an existing pecan orchard in the vicinity!

- Distance from the study area: 3.4 miles southeast of study area
- Size of existing pecan orchard: 106 planted acres
- Age of existing pecan orchard: < 10 years (unknown)
Desired Qualities in Soil Types:

- Deep well-drained sandy soils along water channels:
  - Loamy sands
  - Sandy loams
  - Silt loams

- Water table should remain six feet below the soil surface during wet periods

- Terrain should be level or gently sloping

- No areas prone to frequent or long-term flooding
Maps.
Pecan Orchard Feasibility Study

Map 2. Digital Ortho-Quarter Quadrangle (DOQQ)

This map represents the geographic limits of the pecan orchard feasibility study and research area in the vicinity of Nacogdoches, Texas. The map was generated using geographic information system (GIS) technology and is subject to error. The map was created by the Texas Natural Resources Information System and was captured during 2014.

Legend
- 4,000 Acre Study Area
- River, Creek, or Stream

Map Created By: billedm@tncel.net
Date: November 20, 2014

Coordinate System: NAD 1983 UTM Zone 16N
Imagery: NAIP12_KC_Houston_2013

Disclaimer: The author does not warrant the data or map shown herein and therefore the author is not responsible for its accuracy. Neither the author nor any person contributing to this information is responsible for any loss or damage resulting from any use of the data or map shown herein.
What soil types do The Hickory Creek Study Area and the existing pecan orchard have in common?

Using tabular analysis:

<table>
<thead>
<tr>
<th>Orchard</th>
<th>Acres in Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Pecan Orchard</td>
<td>9</td>
</tr>
<tr>
<td>Hickory Creek Study Area</td>
<td>480</td>
</tr>
<tr>
<td><strong>Ratio</strong></td>
<td><strong>1:53</strong></td>
</tr>
</tbody>
</table>

Soil Types:

- BaB – Bernaldo fine sandy loam
- HaA – Hainesville fine sand
- KuB – Kurth fine sandy loam
Soil types in common with existing pecan orchard.

480.33 acres
Soil types shared with the Hickory Creek study area.

9.08 acres
1,351.81 acres

Which Hickory Creek non-forested lands are currently available?
Overlaying non-forested lands with the common soil types.

Execute the Intersect tool.
Desirable soil types and non-forested land.

177.38 acres
USDA Recommended Soil Types in Hickory Creek Study Area

- AtB – Attoyac fine sandy loam
- AuD – Austonio fine sandy loam
- BwB – Bowie fine sandy loam
- KfC – Kirvin fine sandy loam
- LtC – Lilbert loamy fine sand
- TaE – Teneha loamy fine sand
- WnB – Woden fine sandy loam
USDA recommended soil types overlaying non-forested lands.

1,086 acres

Execute the Intersect tool.
Desirable USDA recommended soil types and non-forested land.

261.31 acres
Merge.

USDA recommendations with the existing pecan orchard soils and non-forested land.

438.69 acres
Parcel Selection.

250.18 acres
Goal met!

Identified 250.18 acres of privately owned suitable agricultural land for the Hickory Creek Pecan Orchard.
End of Presentation

AGRICULTURAL ASSESSMENT: PECAN ORCHARD FEASIBILITY STUDY

Hickory Creek Orchard
Davy Crockett National Forest