GIS 390 Geographic Information Systems in Natural Resources

Agricultural Assessment: Pecan Orchard Feasibility Study

Presented By:
Brad Henley
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)
Agricultural Assessment: Pecan Orchard Feasibility Study
Disclaimer: The author does not warrant the data or map shown herein and therefore the author is not responsible for its accuracy. Rather, the author considers this information to its best knowledge.

Legend

- River, Creek, or Stream
- City Limits Boundary
- 4,000 Acre Study Area
- Existing Pecan Orchard

Soil Types

- Rdb
- Rg
- Kd
- Pt

Map Created By: Shaila Henri
Date: November 24, 2014

Coordinate Systems: NAD 1983 (USS Zone 11A)
Orthoimagery: NAP712 NC, Houston 320
Feature Layer: USDA-NRCS Soil Survey - NAD83 Quadrangle
Existing Pecan Orchard Acreage: 109 Acres

Sources:

- Texas Tech
- USDA
- USGS

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What soil types do The Hickory Creek Study Area and the existing pecan orchard have in common?

► **Using tabular analysis:**

   - **Existing Pecan Orchard:** 9 Total Acres in Common
   - **Hickory Creek Study Area:** 480 Total Acres in Common
   - **Ratio:** 1:53

► **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
Which Hickory Creek non-forested lands are currently available?

1,351.81 acres
Overlying 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
250.18 acres

Parcel Selection.
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