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.
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
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.