Examining Recovery of Soil Properties after Harvest and Culture Intensity

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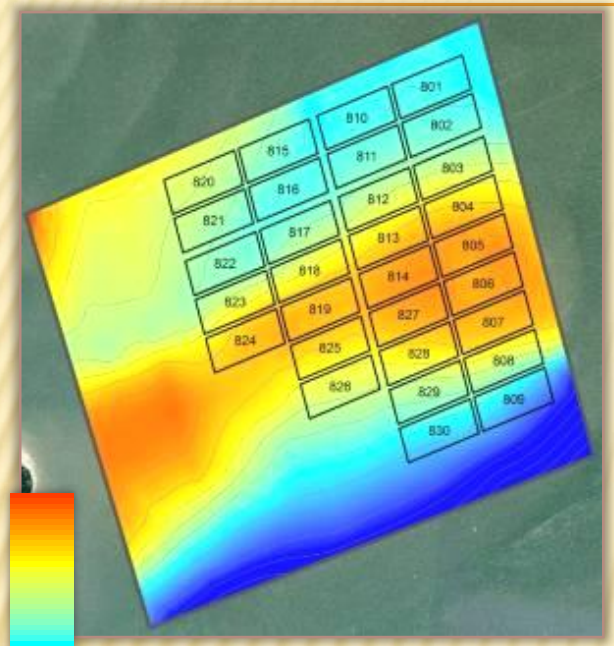
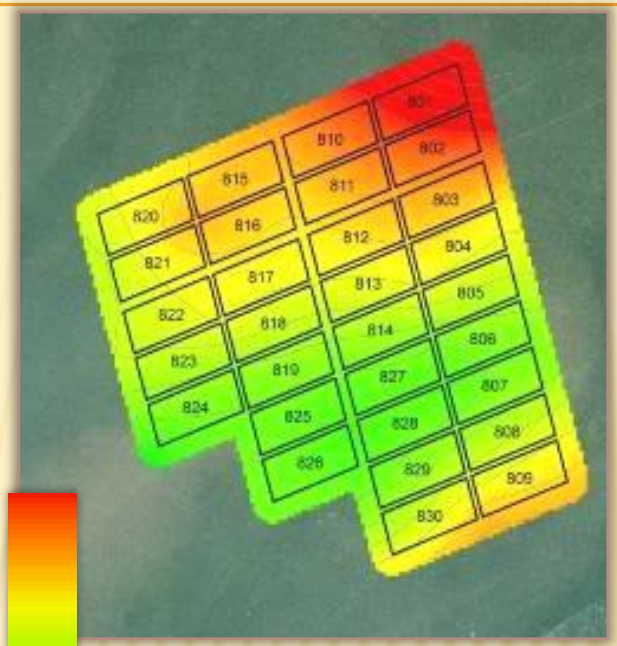
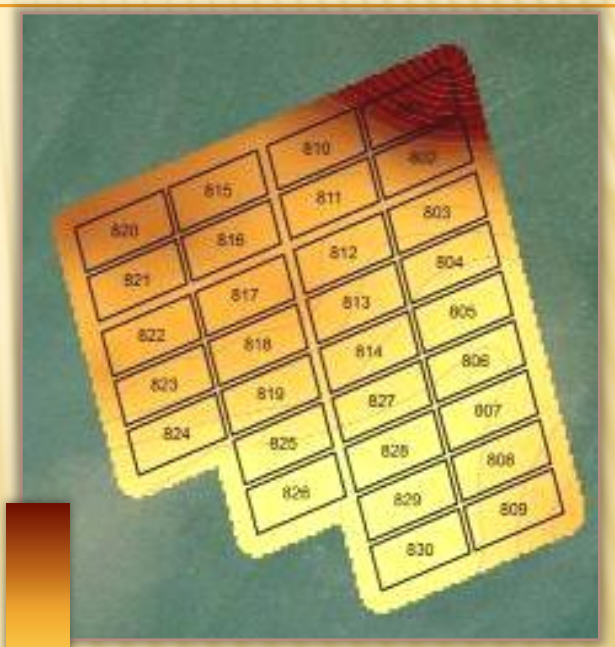
Dog Island HDLA Soil Characterization Study, 2009-10



Soil Elevation
Low (-6.5) to High (+1.5”)



Organic Matter
Low (0.5%) to High (4%)



Clay Content
Low (1%) to High (5%)

- Information collected was used to produce bathymetric and soil property maps of Dog Island HDLA.
- Spatial relationships and lease specific trends were evident.

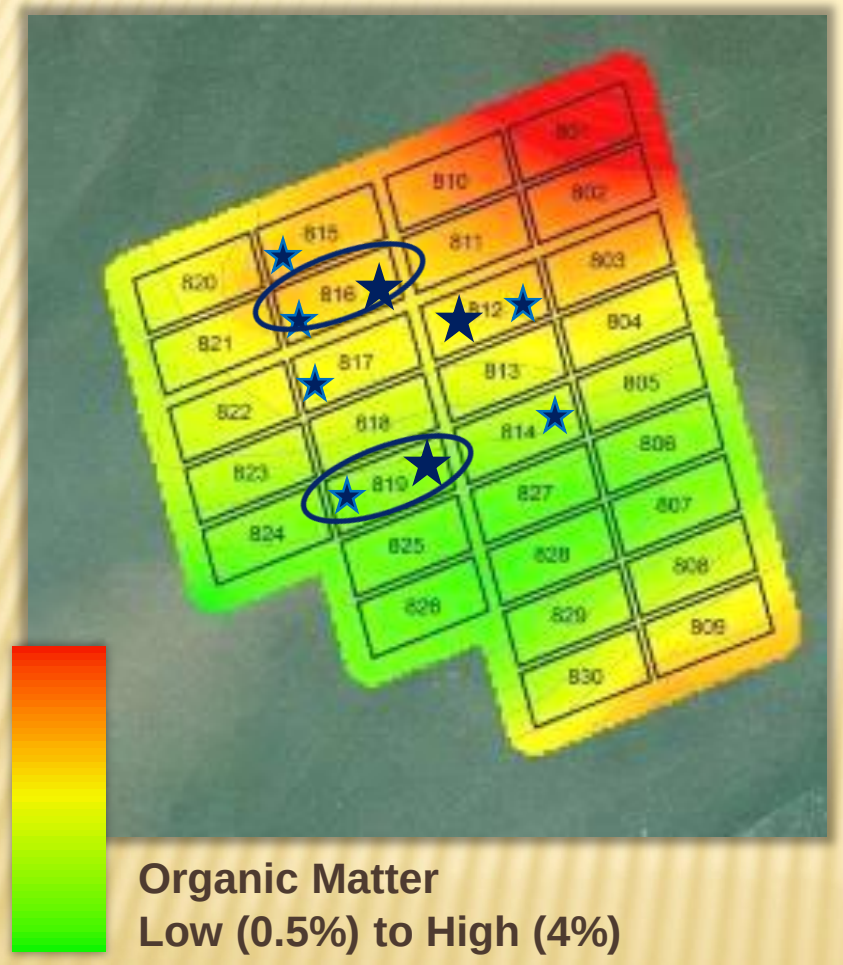
Soils-Based Approach to Shellfish Aquaculture

- Findings from soil characterizations at Dog Island HDLA led to the following questions:
  - Do soil properties differ in areas of intensively farmed leases versus adjacent unfarmed areas (e.g., easements, navigational corridors)?
  - Do relationships exist between hard clam aquaculture harvesting methods and soil properties? If so, what is the recovery time of the soils?

Dog Island HDLA Farming Intensity Study

- **Objective**
  - Determine if soil properties differ between farmed leases and adjacent easements
- **Methodology**
  - Evenly spaced, paired soil cores taken within 6 leases and easements at Dog Island HDLA during the summer 2011 and within 3 leases and easements in winter 2012.
  - Particle size distribution (sand, silt, and clay) and organic matter (OM) content determined

Dog Island HDLA Farming Intensity: Sampling Sites



Organic Matter
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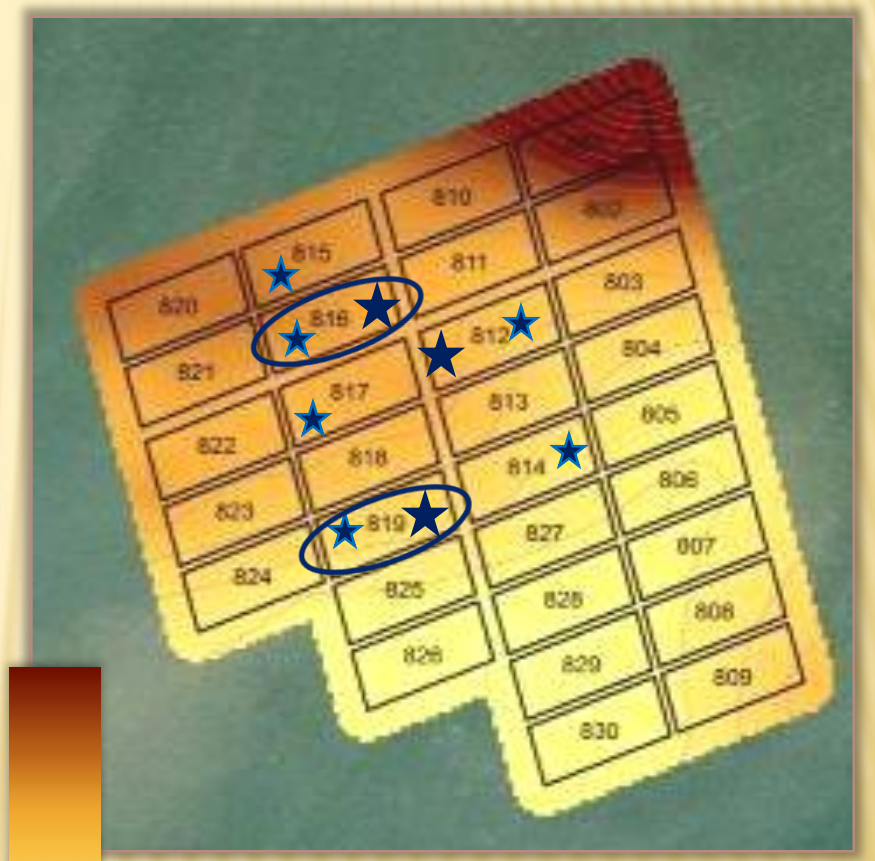
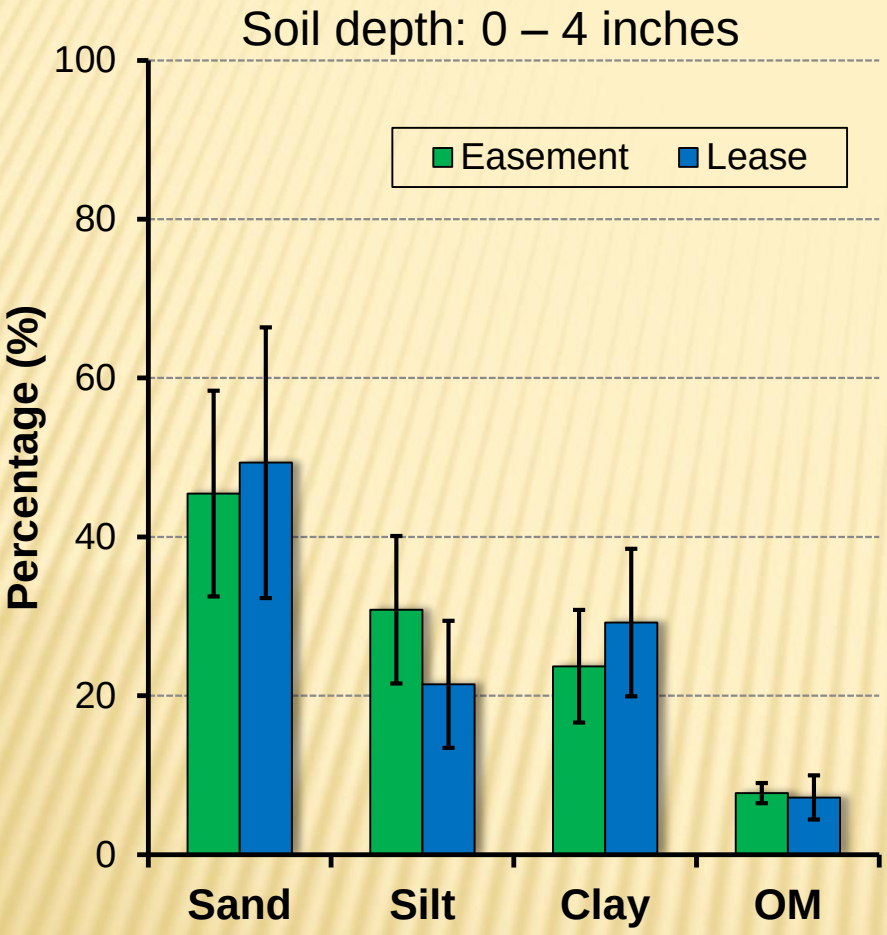
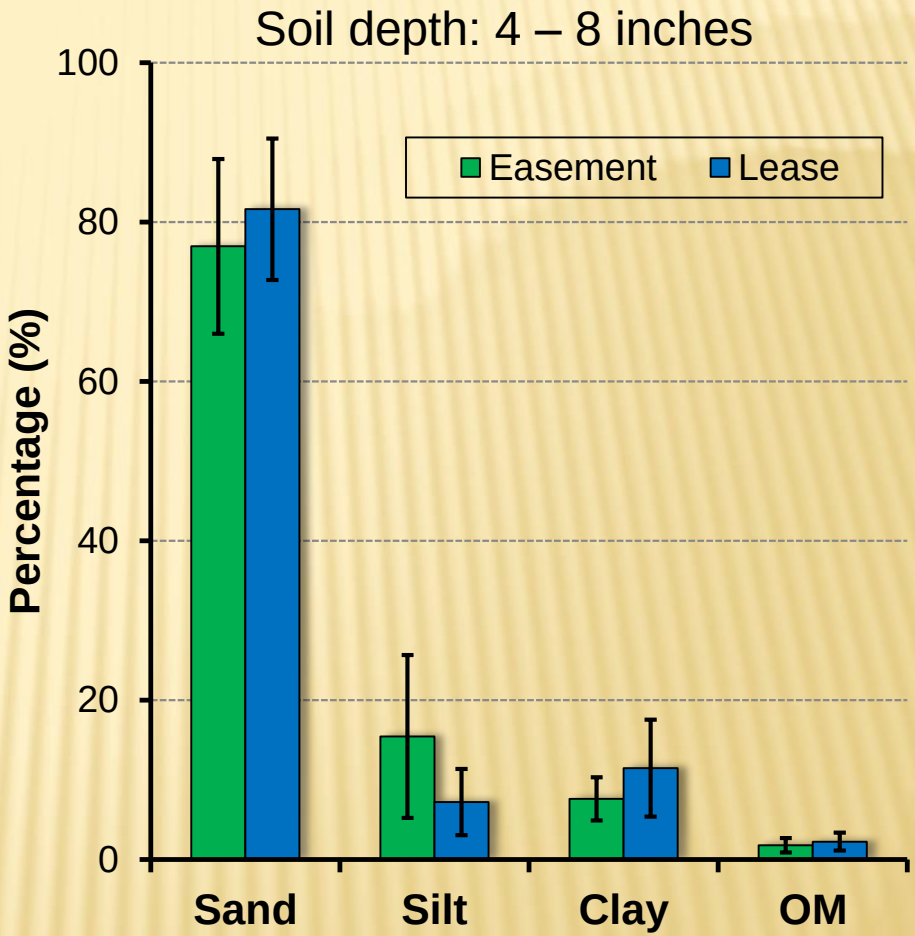


Clay Content
Low (1%) to High (5%)

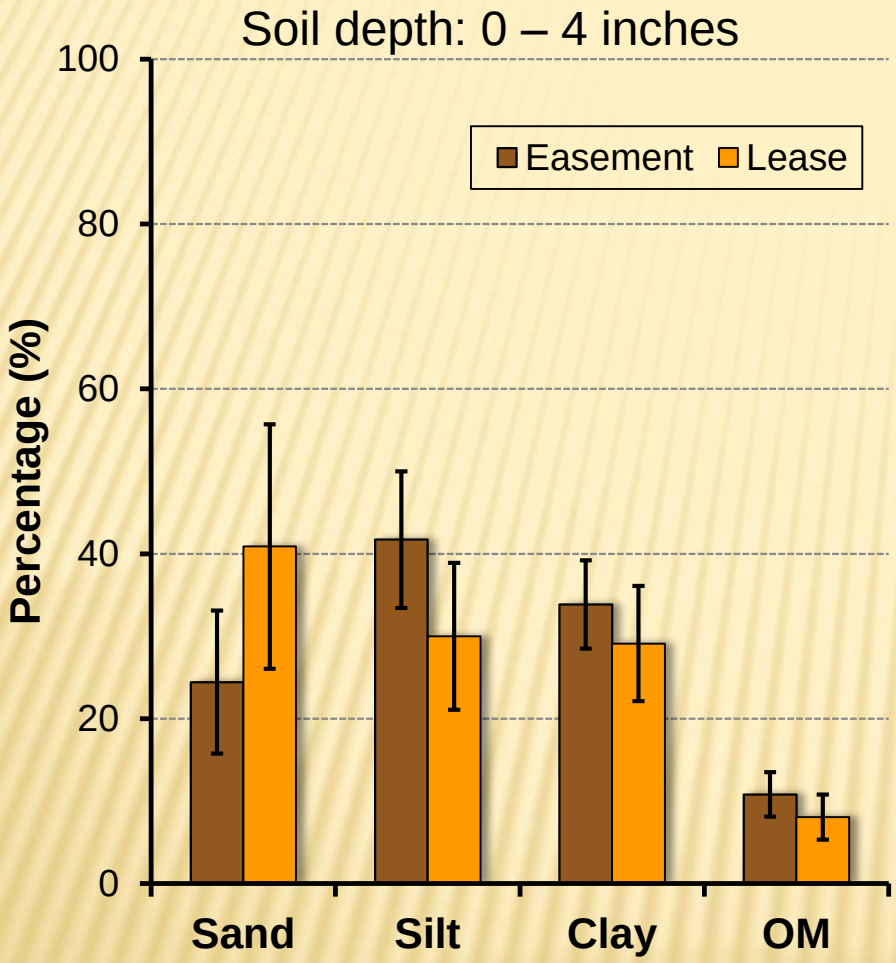
Soil Properties - Dog Island HDLA Lease Parcel 816 – Summer 2011

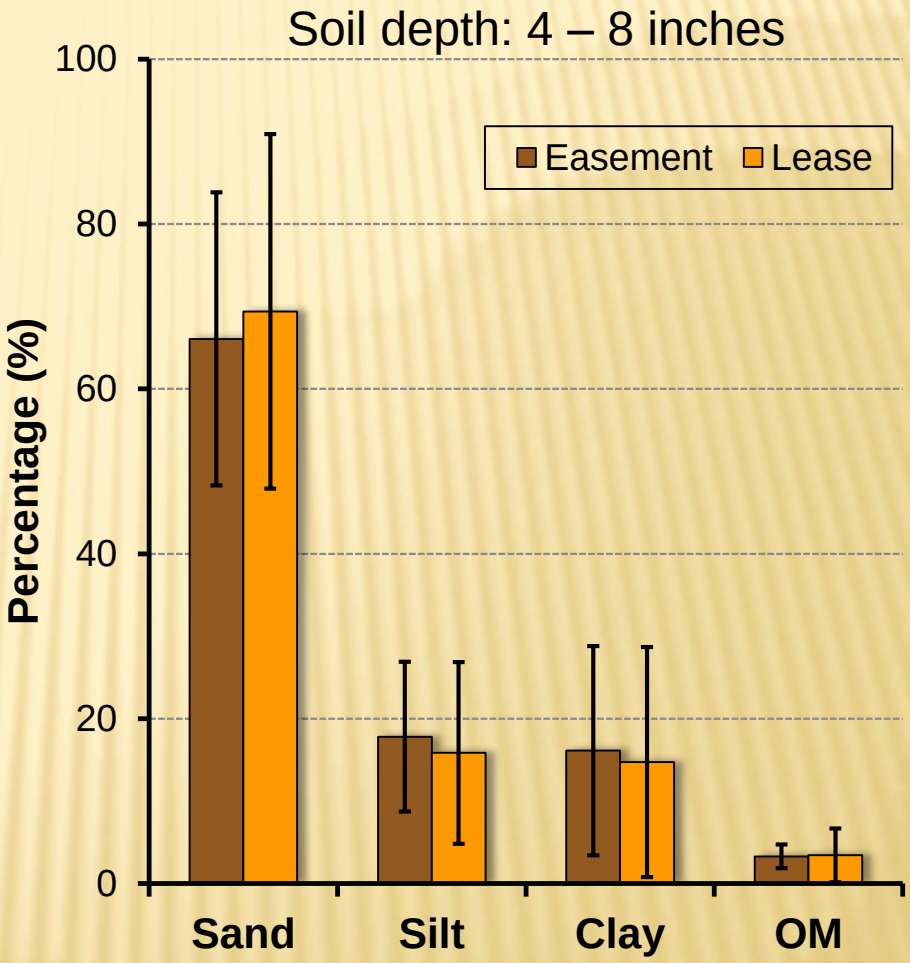




Note: T-tests were performed using Microsoft Excel 2007. Treatment means were considered significantly different when $p \leq 0.05$.

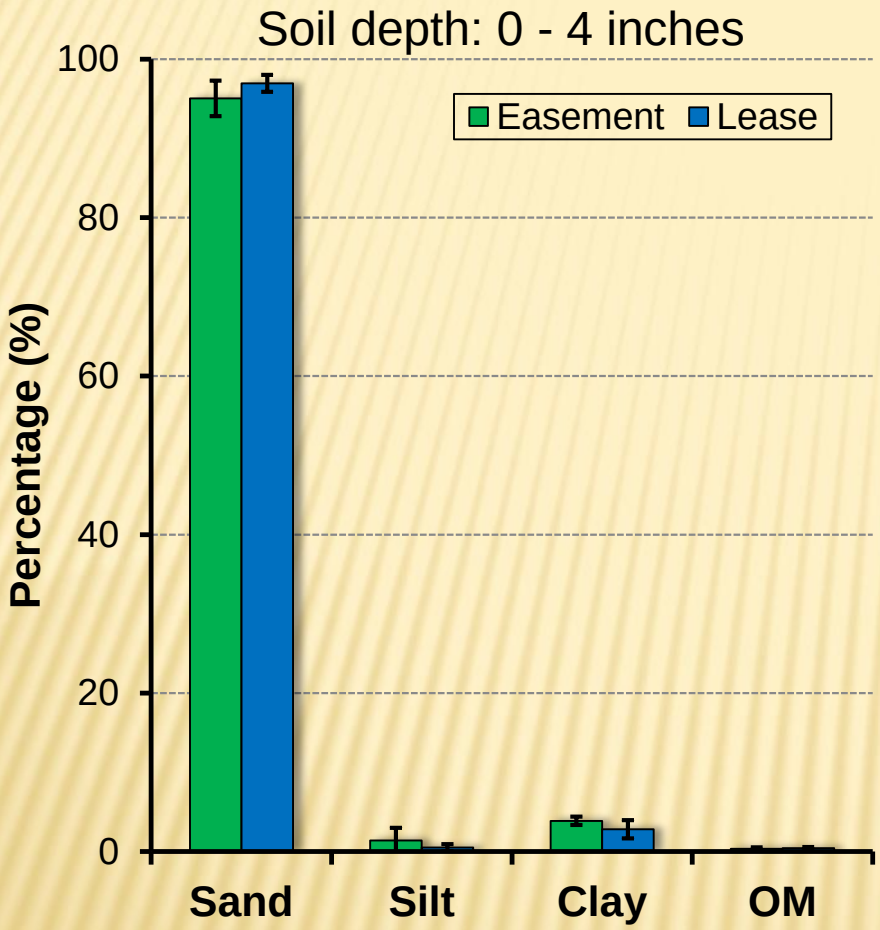
Soil Properties - Dog Island HDLA Lease Parcel 816 – Winter 2012

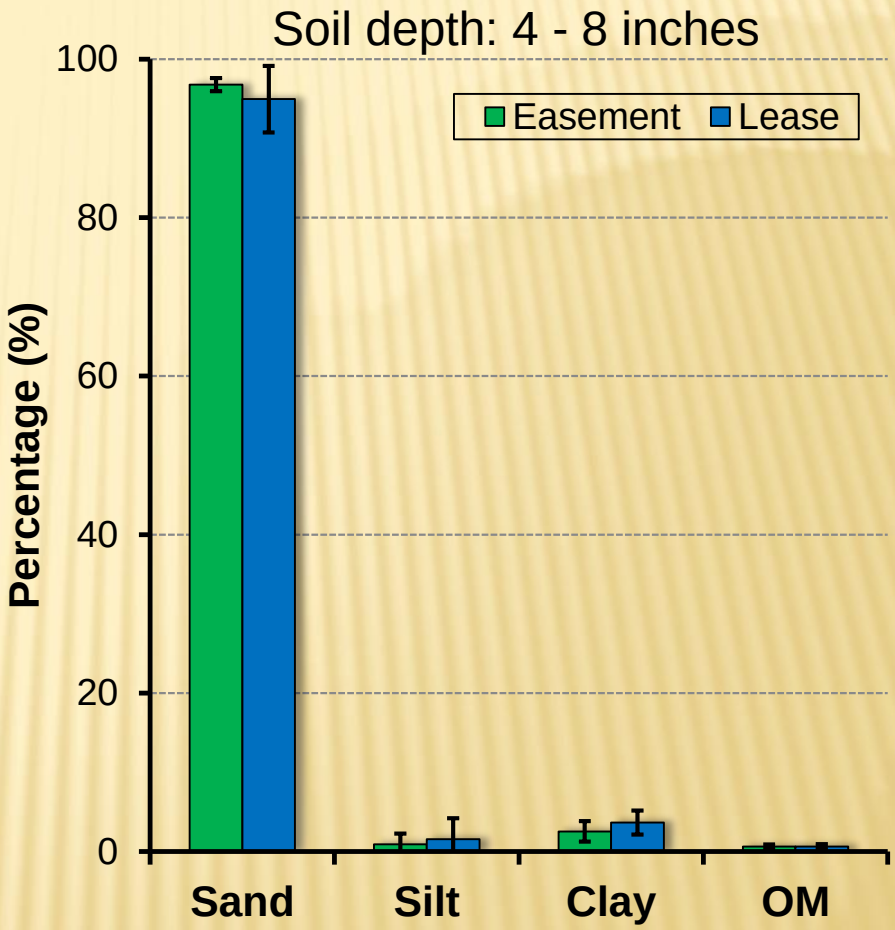




Note: T-tests were performed using Microsoft Excel 2007. Treatment means were considered significantly different when $p \leq 0.05$.

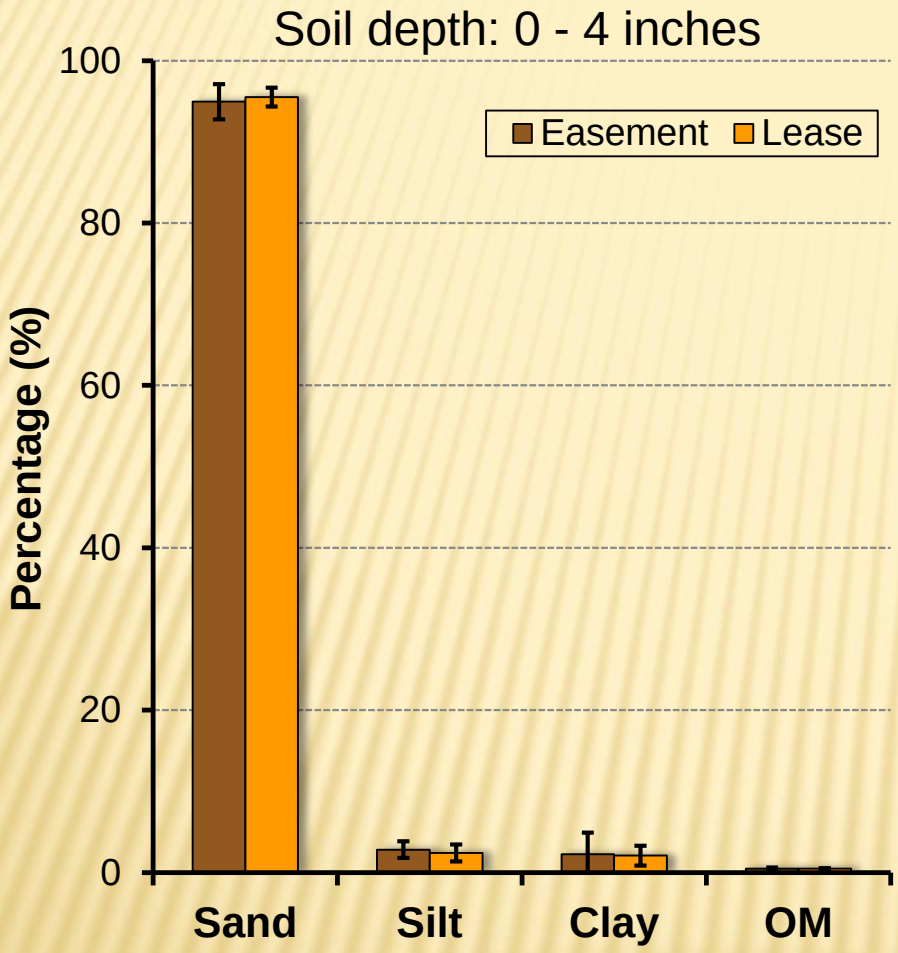
Soil Properties - Dog Island HDLA Lease Parcel 819 – Summer 2012

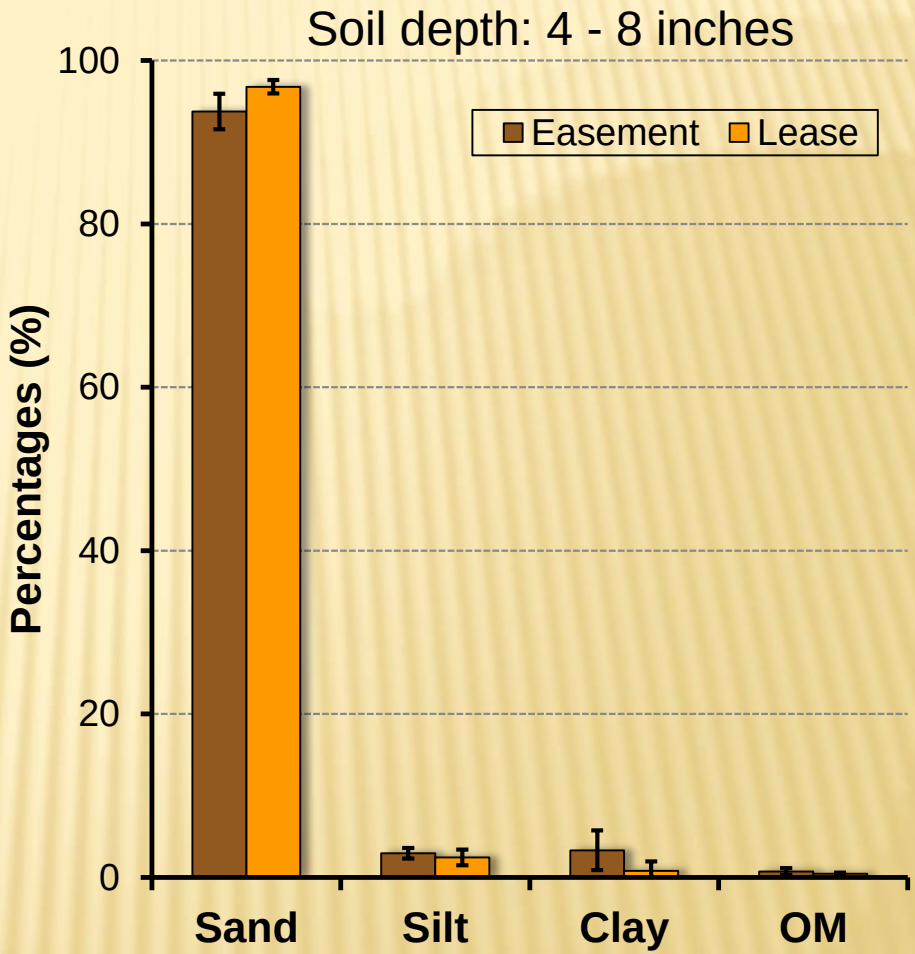




Note: T-tests were performed using Microsoft Excel 2007. Treatment means were considered significantly different when $p \leq 0.05$.

Soil Properties - Dog Island HDLA Lease Parcel 819 – Winter 2012





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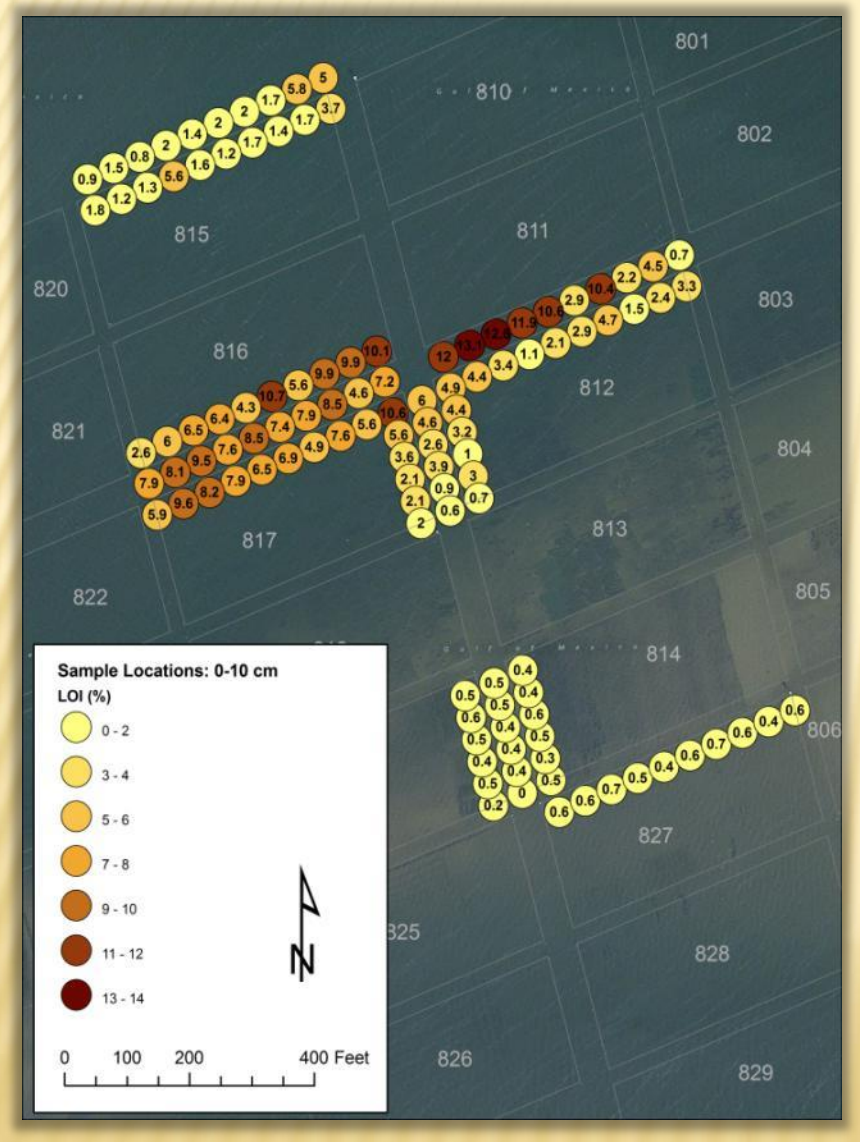
Dog Island HDLA Farming Intensity Study: Summary



- No differences between paired easements and lease samples

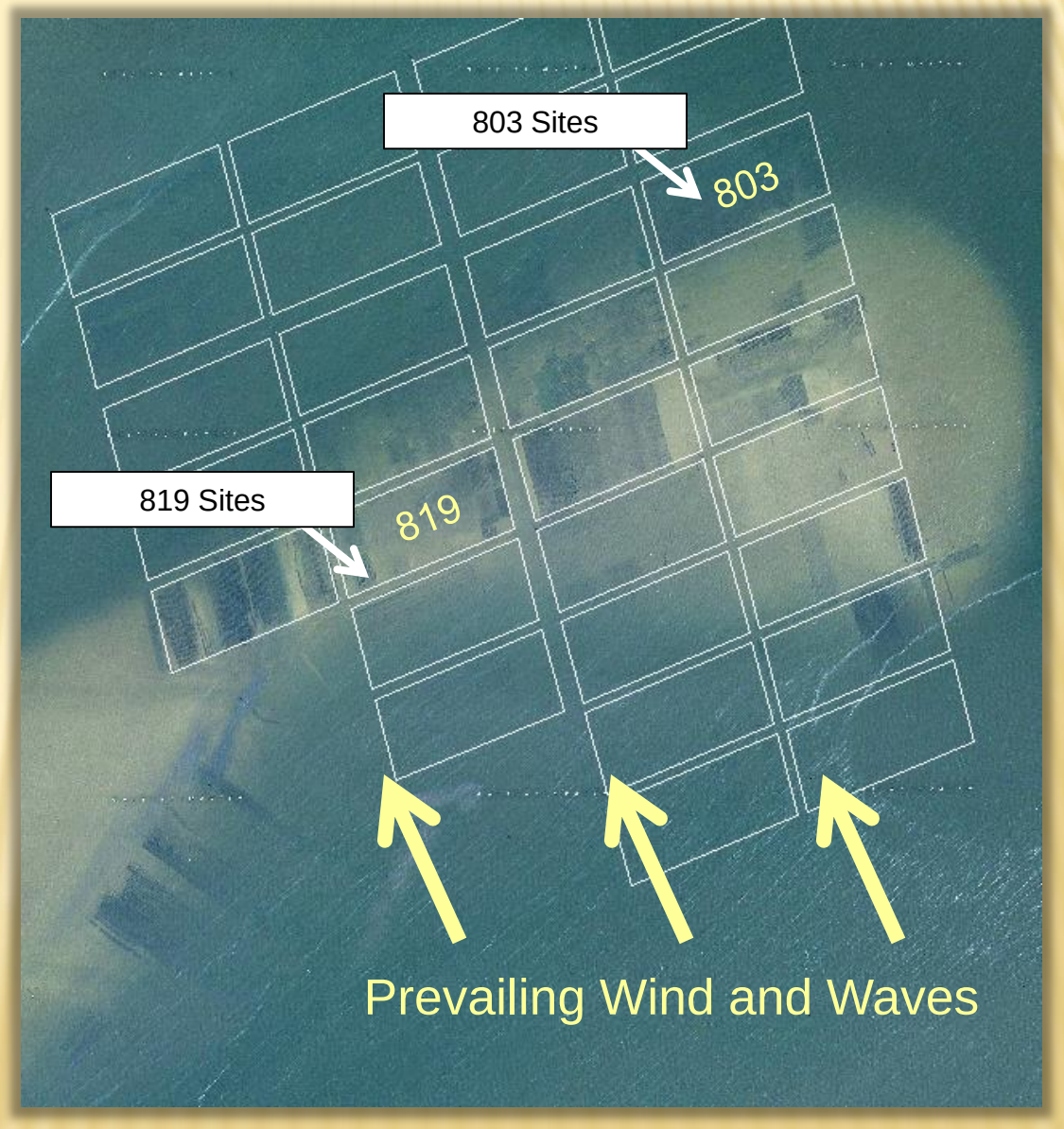
Harvesting Studies

- **Objectives**
  - Determine trends in soil properties during a fallow period following hard clam bottom bag harvesting

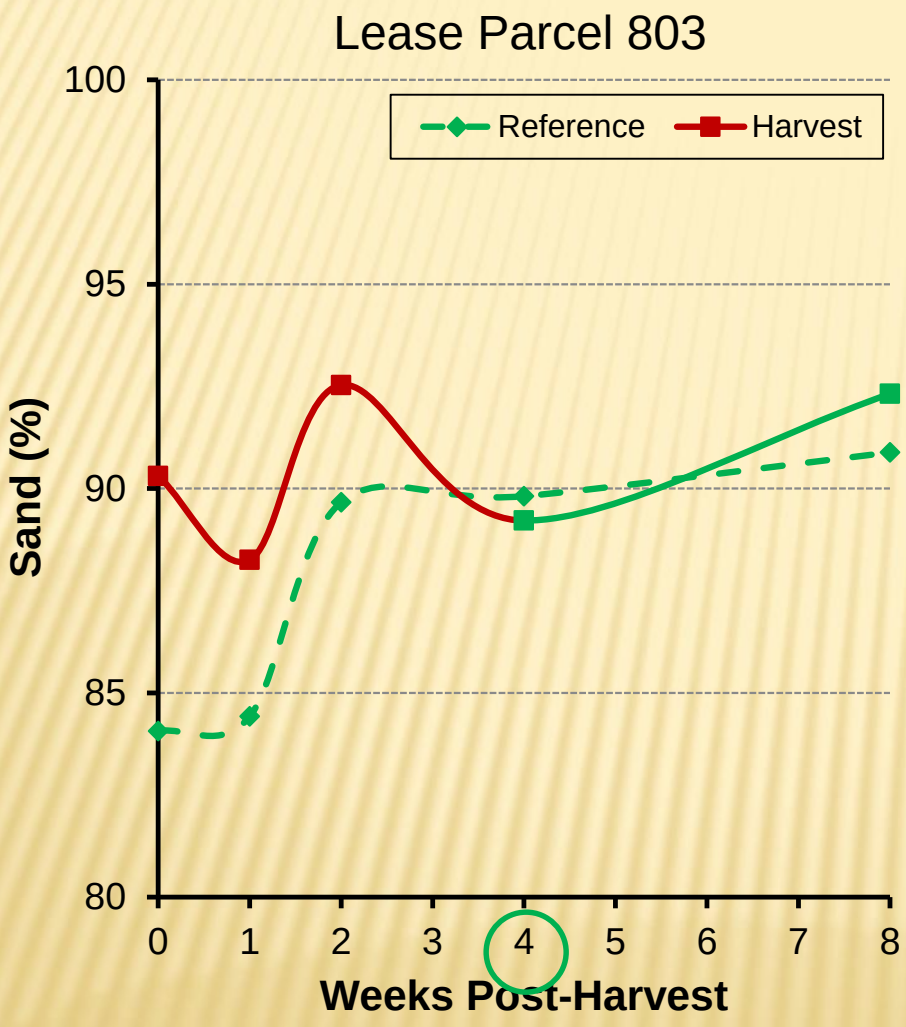
- **Methodology**
  - Sampled soils (0-4 in, 4-8 in)
    - 0, 1, 2, 4 and 8 weeks post harvest
  - Clam bag harvest sites and adjacent, less-disturbed reference sites were sampled
  - Analyze soils for particle size (sand, silt, and clay) and OM

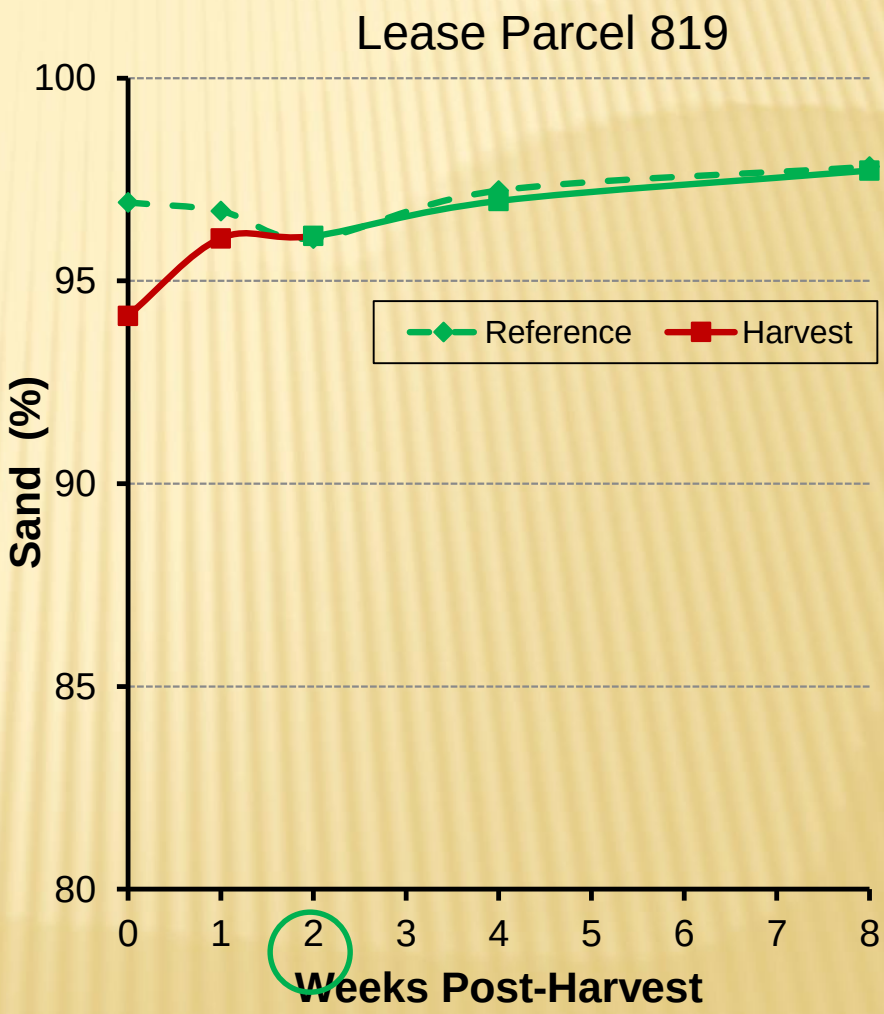
Dog Island HDLA Harvesting Study: Site Selection

- **Lease 803**
  - Deeper bottom
  - Slough area
  - Protected from waves
  - Loamier soils
- **Lease 819**
  - Sand bar
  - Shallow
  - Frequent wave action
  - Sandier soils

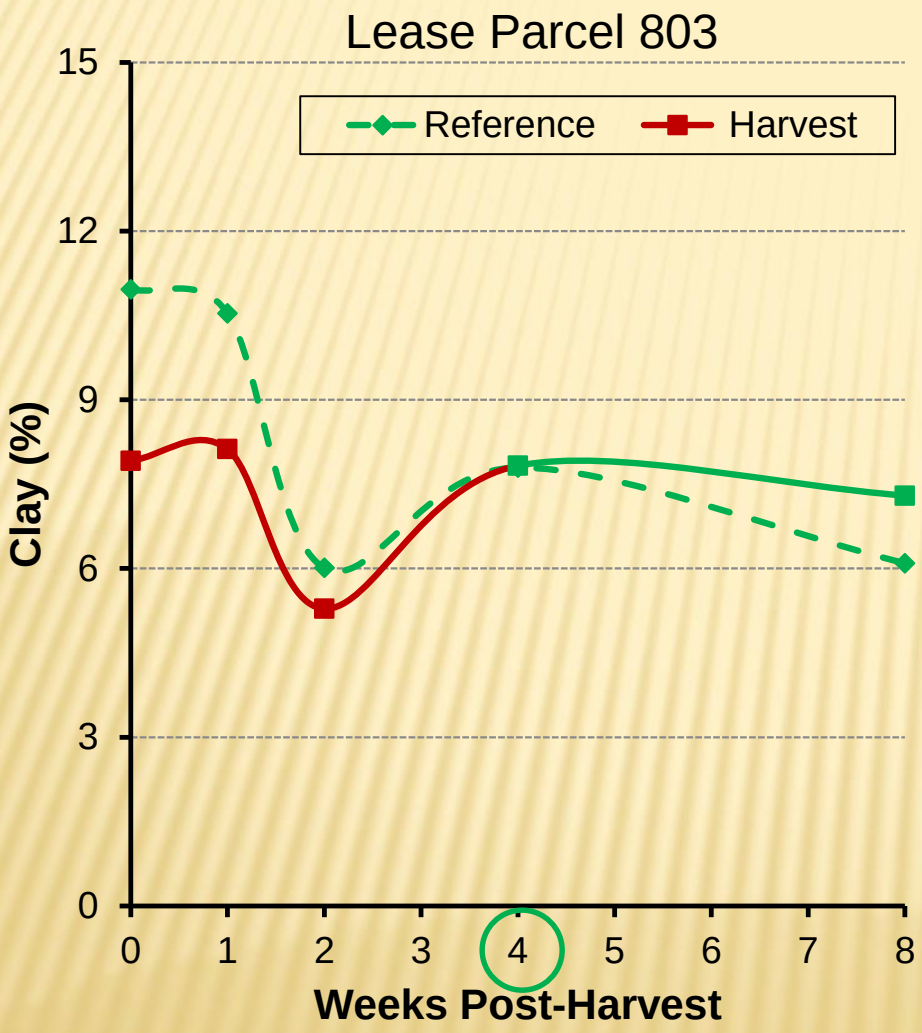


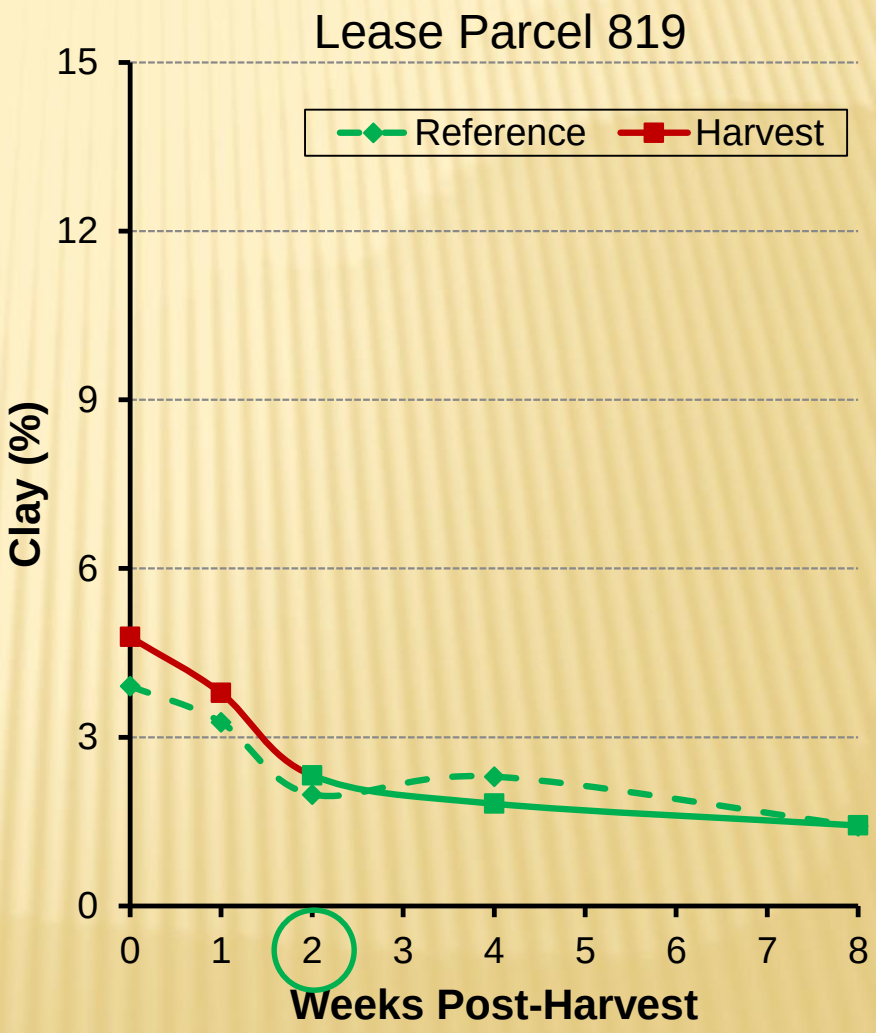
Dog Island HDLA Harvesting Study: Sand (%) Content



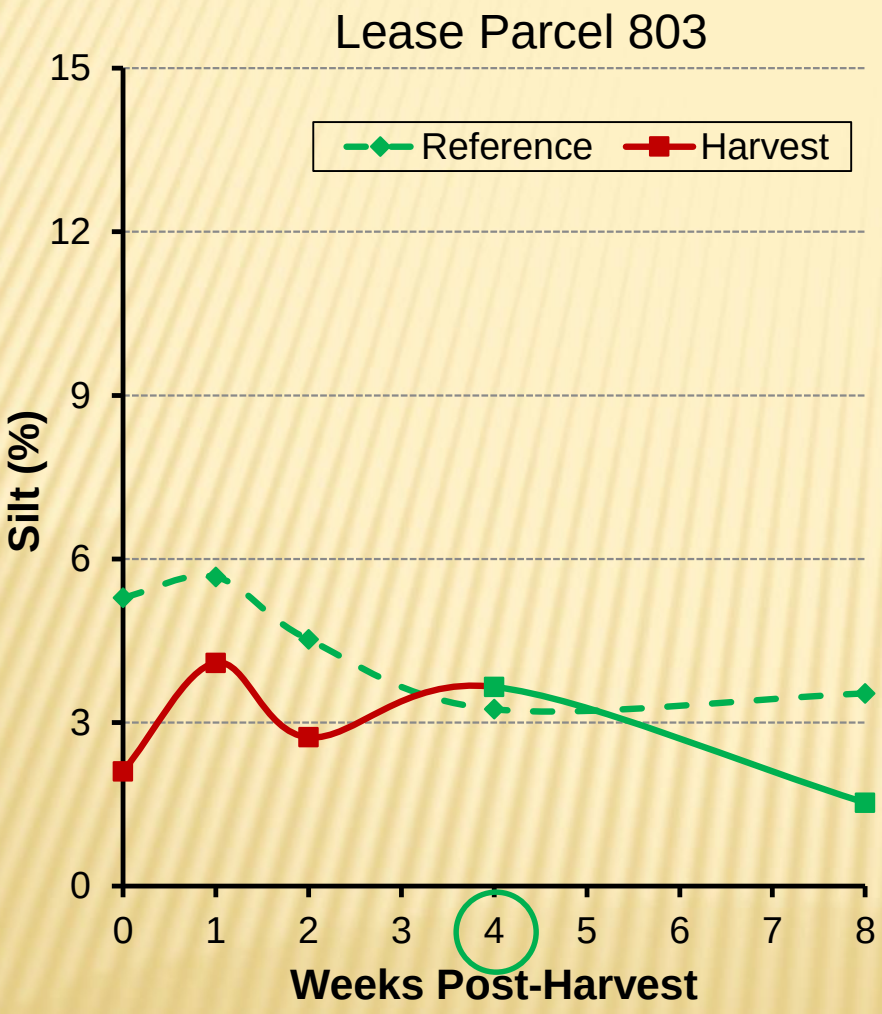


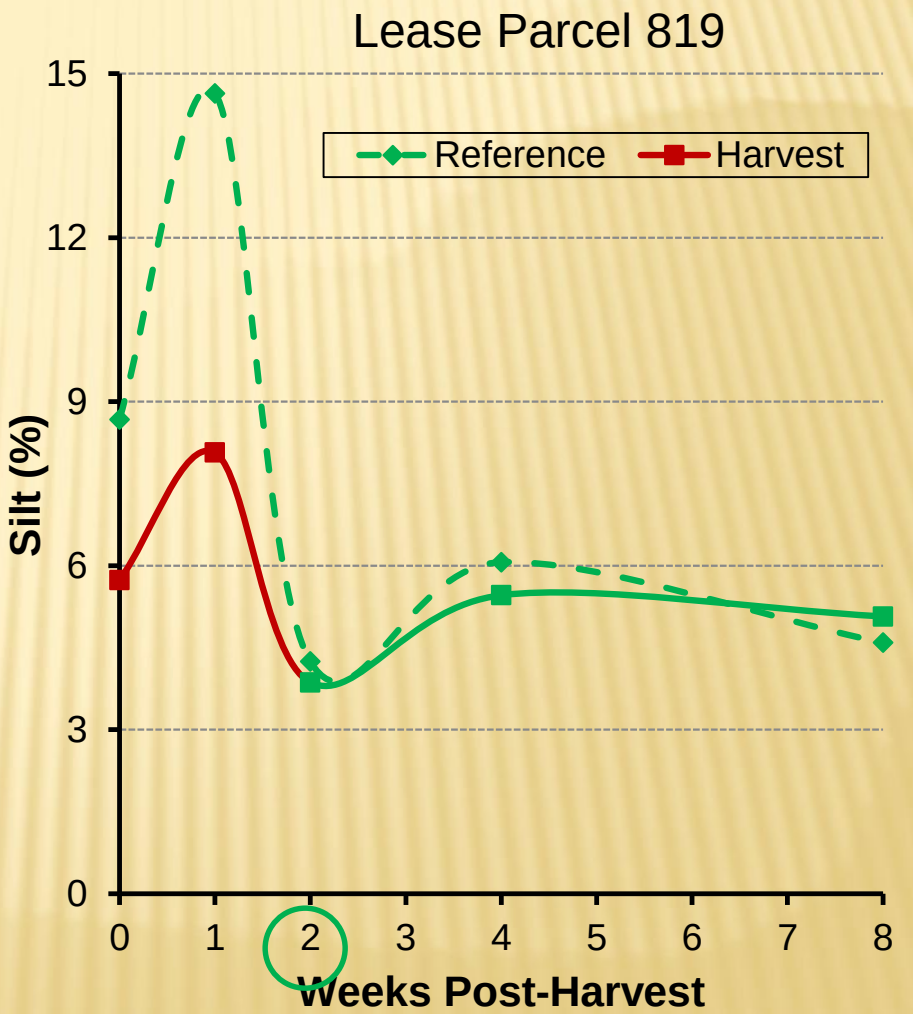
Dog Island HDLA Harvesting Study: Clay (%) Content



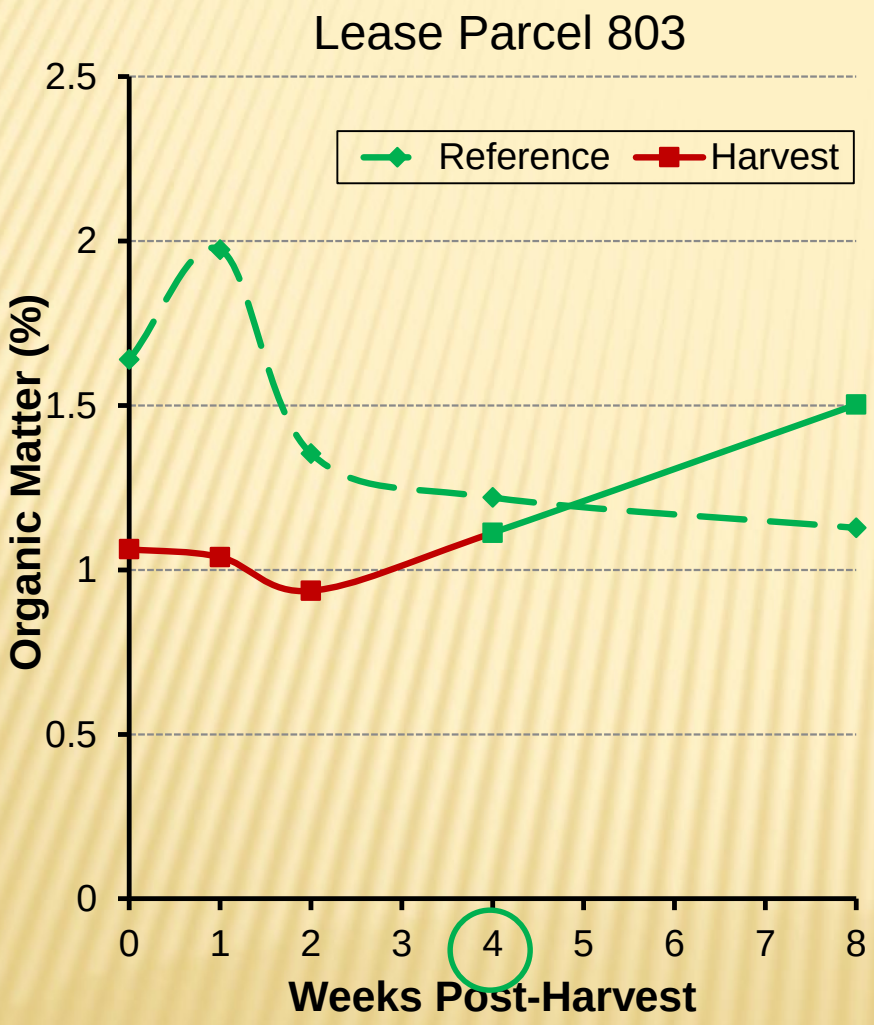


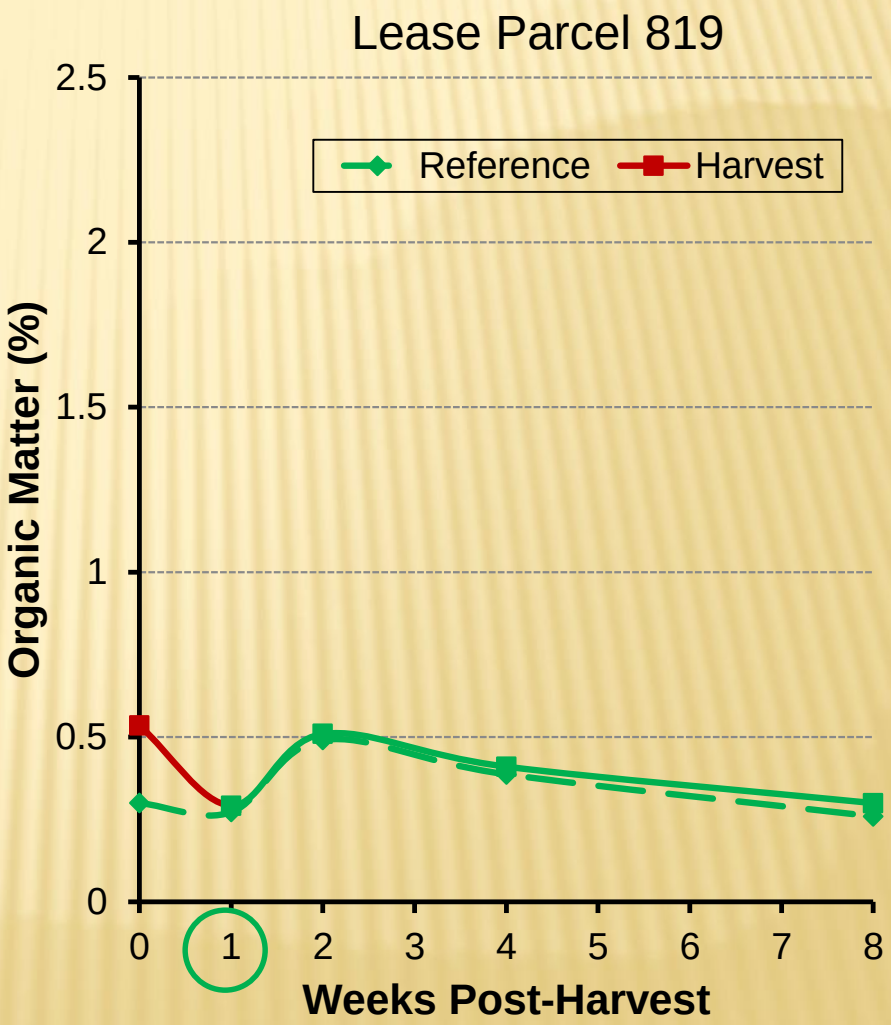
Dog Island HDLA Harvesting Study: Silt (%) Content





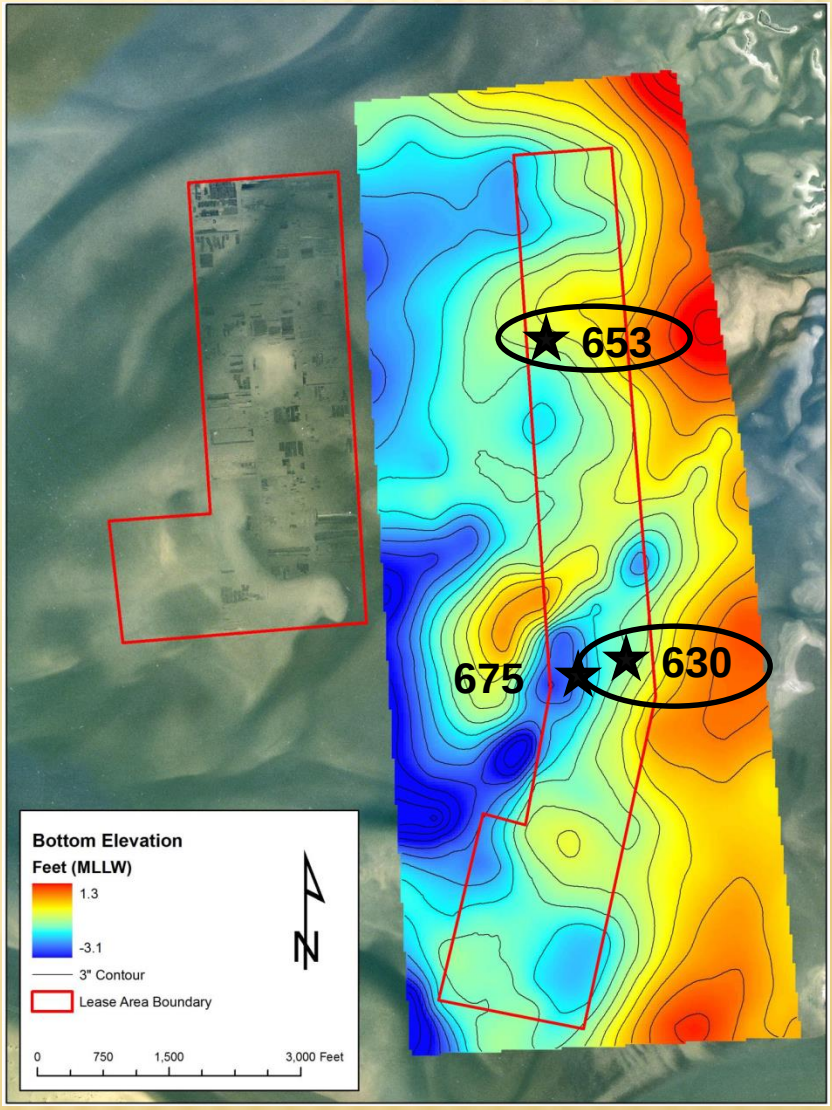
Dog Island HDLA Harvesting Study: Organic Matter (%) Content



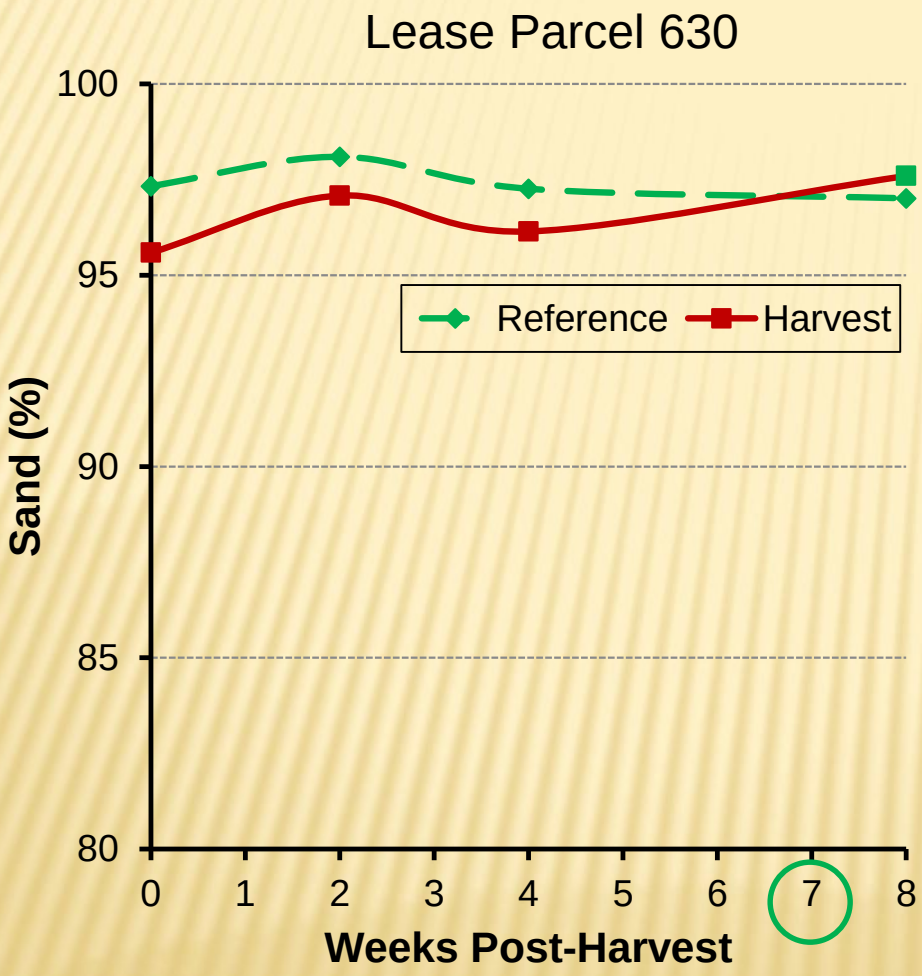


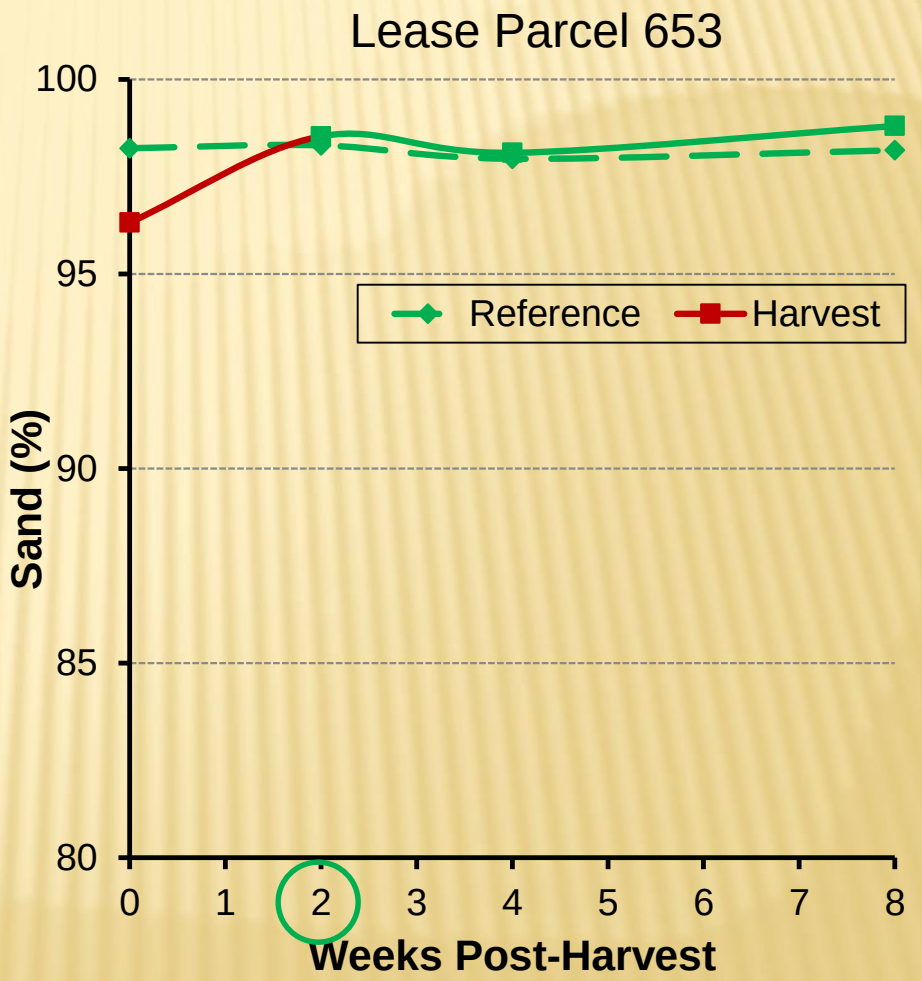
Gulf Jackson HDLA Harvesting Study: Site Selection

- Conducted in Summer 2012
- Selected three lease parcels:
  - 630
  - 653
  - 675
- Used same methodology as Dog Island HDLA Harvesting Study

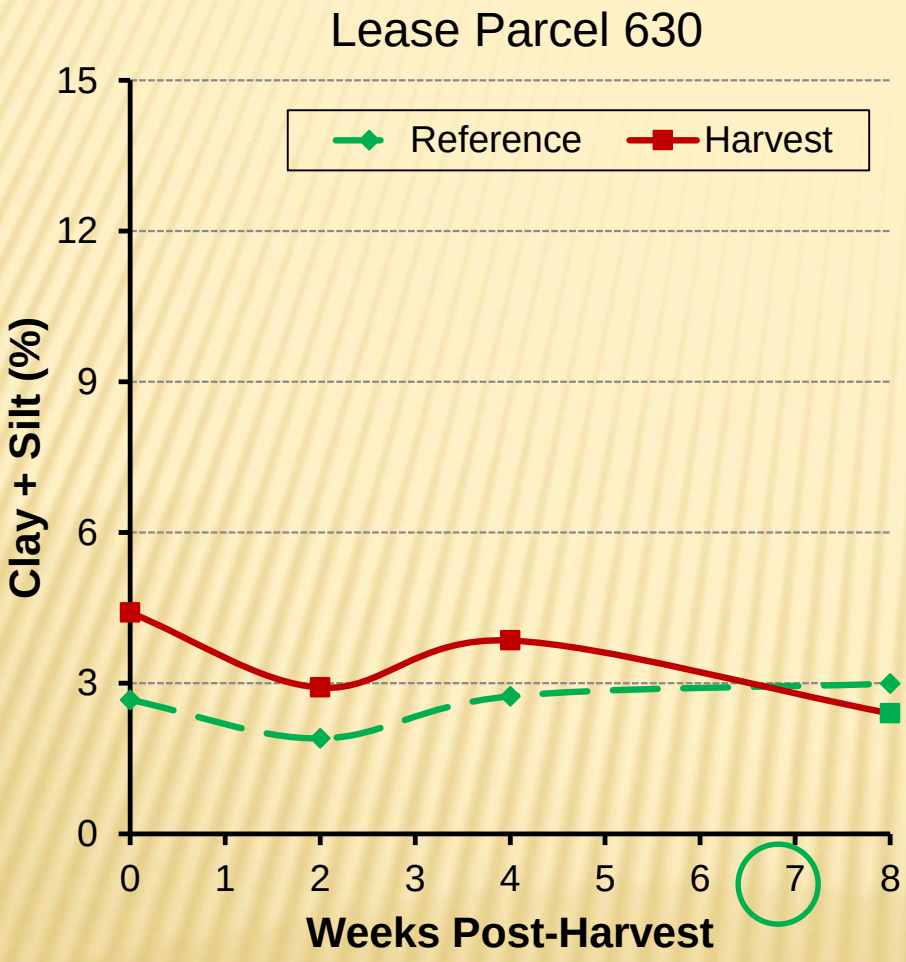


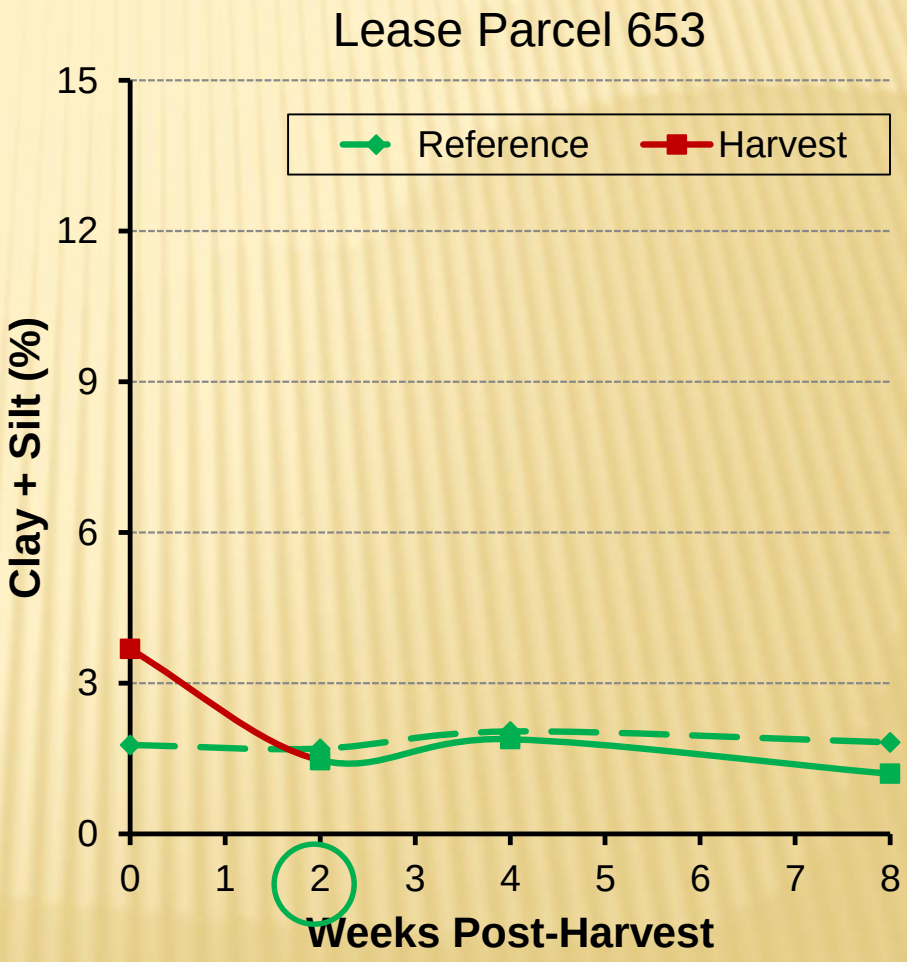
Gulf Jackson HDLA Harvesting Study: Sand (%) Content



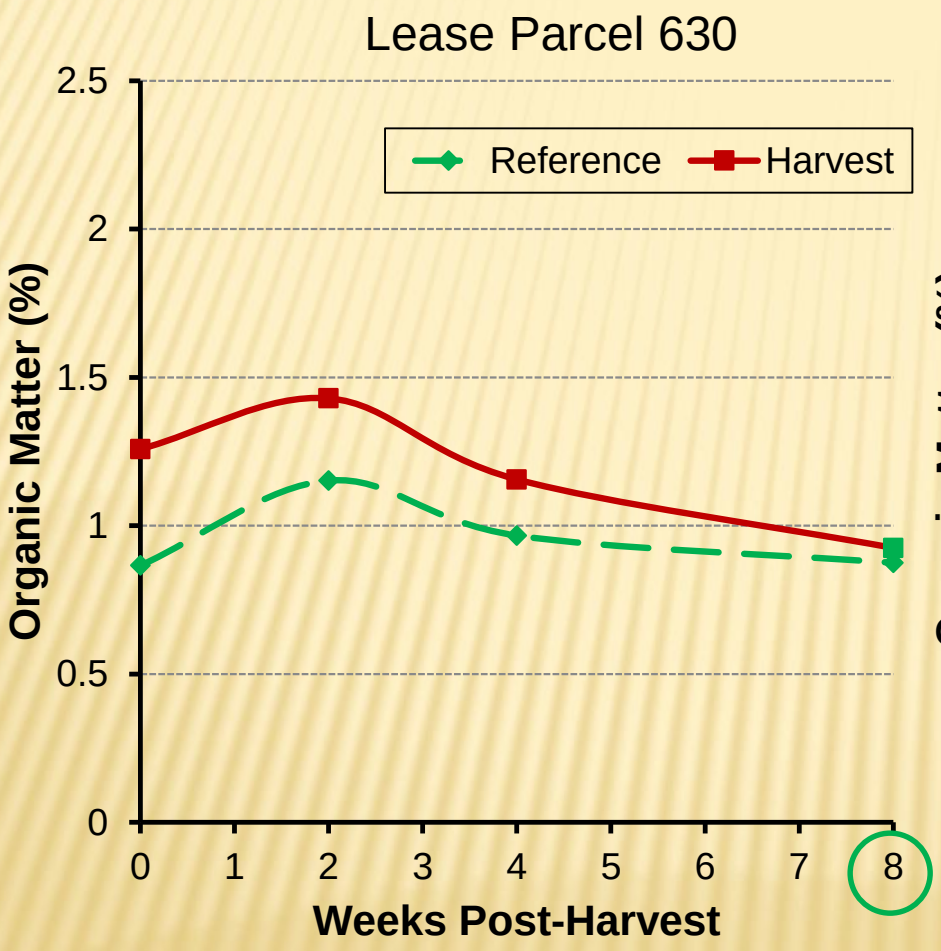


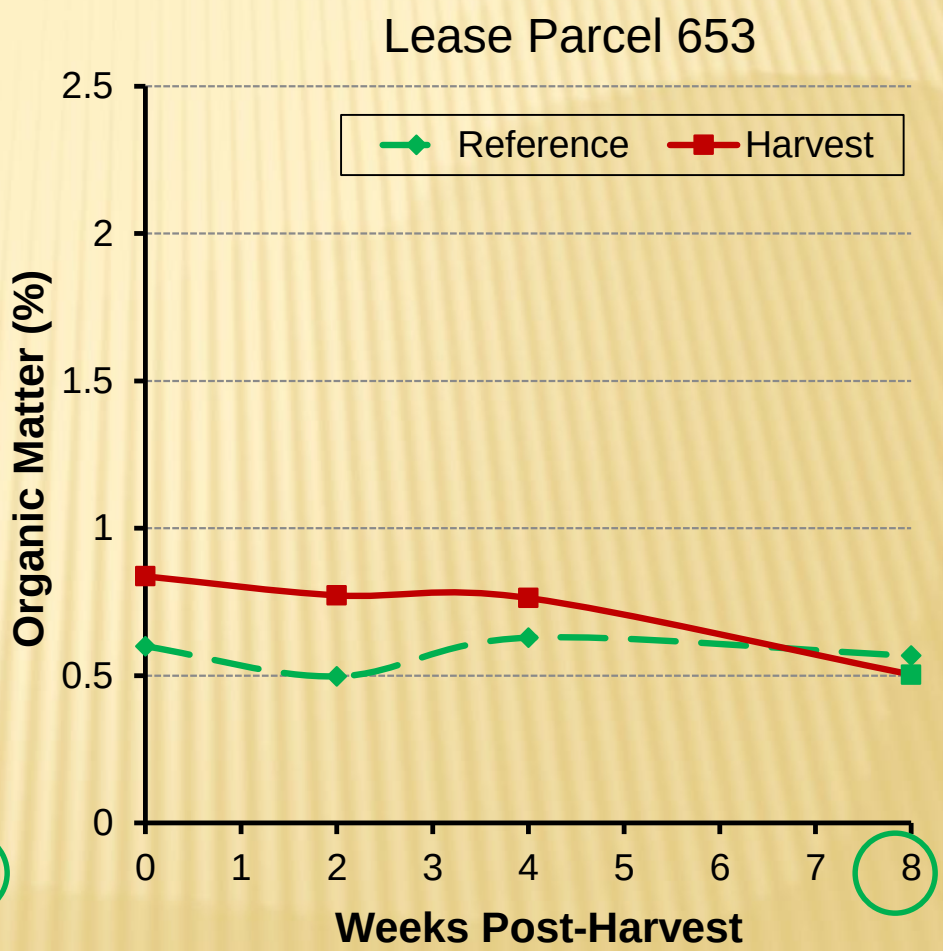
Gulf Jackson HDLA Harvesting Study: Clay + Silt (%) Content





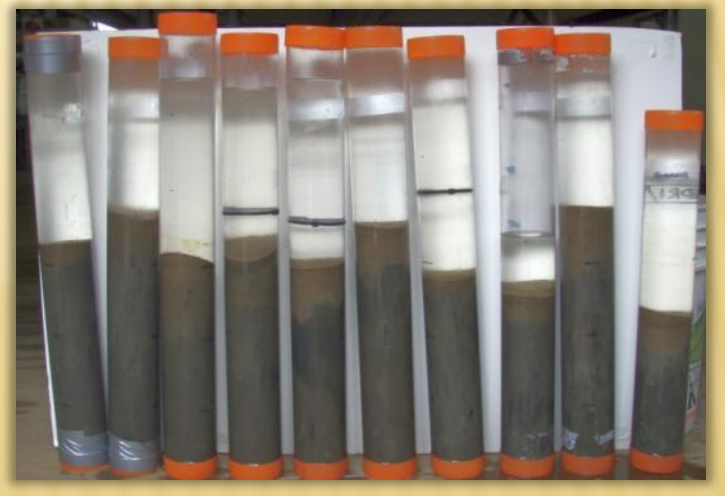
Gulf Jackson HDLA Harvesting Study: Organic Matter (%) Content





Summary

- Hard Clam Intensity Study
  - 0-4 inches vs. 4-8 inches
    - Lower sand and higher clay, silt, and OM contents in top 4 inches of soil than for soils at 4-8 inches.
  - Reference vs. Harvest
    - No difference
  - Ongoing at Gulf Jackson HDLA
- Hard Clam Harvesting Study
  - Spatial variation
    - Lease parcels with different soil attributes were chosen
  - Recovery of soil properties occurs within 2 to 8 weeks after harvest at leases examined.
- Information could drive management decisions similar to terrestrial farming



What's Next?

- Examining alternative methods of culture (bottom nets) and harvesting (mechanical – box harvester) effects on aqueous soil properties
- Funded by Florida Sea Grant, 2012-3

Bottom net planting of hard clams, Massachusetts

Box harvester used by Virginia clam growers

Acknowledgments

- UF Personnel
  - Reggie Markham, Barry Clayton, Matt Norton, Brenhan Street, Bryce Van Dam, Ben Loughran, Alexandra Rozin, Kendra Thomason, and Kayla Thomason
- Clam Farmers
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- Funding
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