

# Steve DeGloria lightning...

Professor of Resource Inventory & Analysis

Director, IRIS

Department of Crop and Soil Sciences

- Teaching (70%):

- CSS 4110 Environmental Information Science
- CSS 4200 Geographic Information Systems
- CSS 4650 Global Positioning System
- CSS 6200 Spatial Modeling & Analysis

- Research (30%):

- Reflectance spectroscopy for estimating soil properties for soil survey (Neafsey)
- Spatial modeling of invasive species establishment (McNally)
- Emergency Response Management System (Popowitch)
- Dilmun Hill Cornell Student Farm: Arsenic/Lead field plot positioning
- Spatial Modeling (Zambia): terrain derivatives for conservation agriculture
- Spatial Modeling (Kenya): Soil biogeochemistry watershed maps
- FLNF plot inventory data to USFS NRIS

# CSS 4110 Project: Land Cover Change Assessment

**Project Planning:**

**Specification**

**Data Accession**

**Coordinate Systems**

**Classification**

**L1 – L2**

**Map and Image Processing:**

**L3 – L6**

**LUNR  
(Apr 1968)**

**Inventory  
&  
Classification**

**Map Scanning  
&  
Georeferencing**

**Softcopy  
Digitizing**

**Digital  
Map Editing**

**1968  
Digital Map  
Production**

**Digital  
Orthophoto  
(Apr 2007)**

**Interpretation  
Aids**

**Land Cover  
Interpretation**

**Softcopy  
Digitizing**

**Digital  
Map Editing**

**2007  
Digital Map  
Production**

**Aerial  
Photo  
(Jun 1938)**

**Interpretation  
Aids**

**Land Cover  
Interpretation**

**Geo-referencing  
&  
Softcopy Digitizing**

**Digital  
Map Editing**

**1938  
Digital Map  
Production**

**Satellite  
Image  
(May 2002)**

**Geometric  
Correction**

**Radiometric  
Normalization**

**Image  
Enhancement**

**Image  
Analysis**

**2002  
Digital Map  
Production**

**Geospatial Analysis:**

**L7 – L8**

**Accuracy  
Assessment**

**Field Survey  
&  
Observations**

**Error  
Matrices**

**LC Change  
Analysis**

**Cross-tabulation  
&  
Summary Statistics**

**Inventory  
Comparison**

**Visualization & Presentation:**

**L9 – L10**

**Visual Display  
&  
Enhancement**

**Digital  
Cartography**

**Map Production  
&  
Report Preparation**

**Project Presentation**

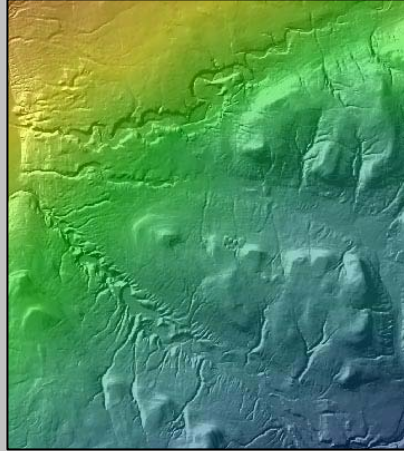
**CSS 4200:  
Agro-Ecological Zoning and Site Suitability Assessment  
for Biofuel Crop Production**

**Global Properties:**



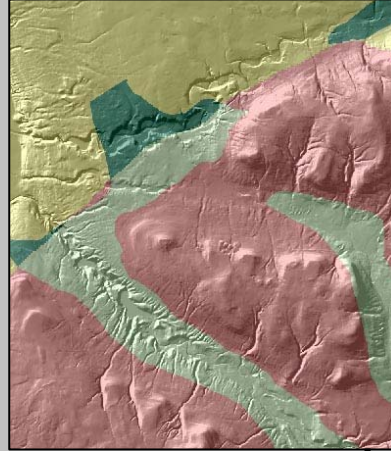
**Soil Drainage**

+



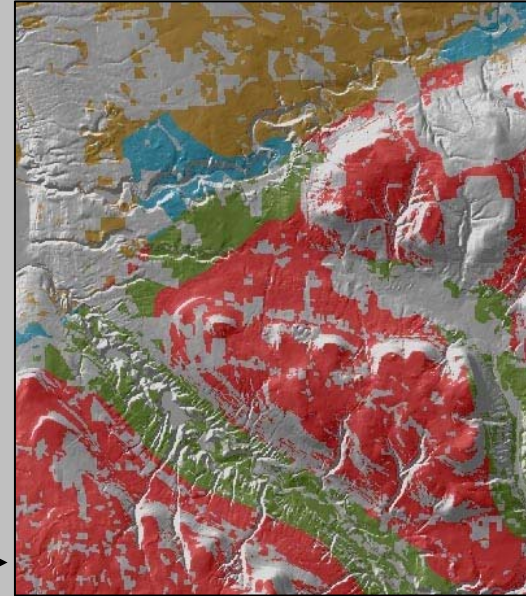
**GDD**

→



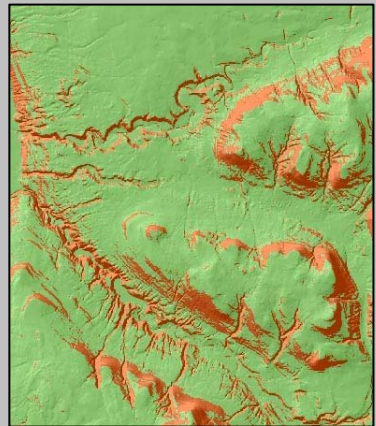
**= AEZ**

→



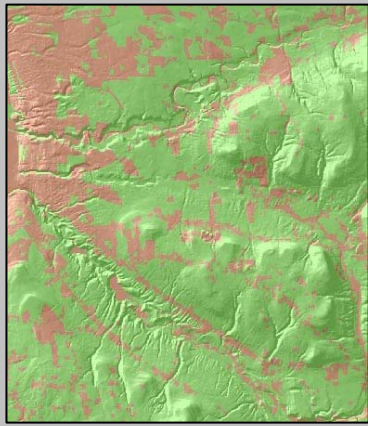
**AEZ Biosuitability**

**Local Constraints:**



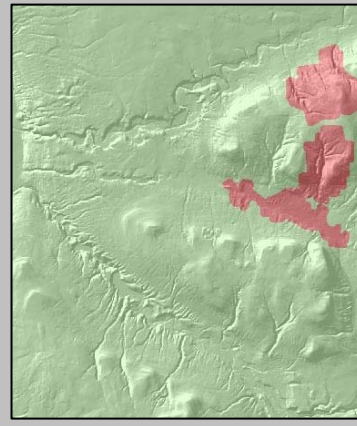
**Slope Gradient**

+



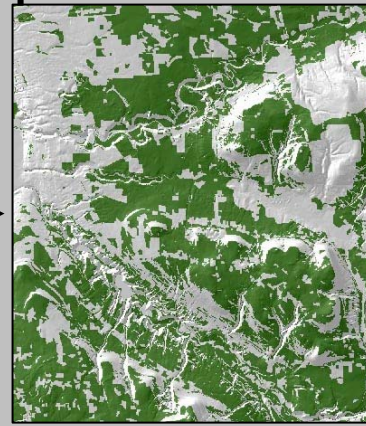
**Land Cover**

+



**Unique Natural Areas**

→



**= Biosuitability**



# CSS 4650 (GPS): Mapping Dilmun Hill Cornell Student Farm

Area ~ 2.7 ha  
Area ~ 6.7 ac  
Perimeter ~ 870 m



wp 8

wp 9

wp 10

wp 1, 11

wp 2

Block 1  
DO NOT  
TRAVERSE

wp 7

wp 6

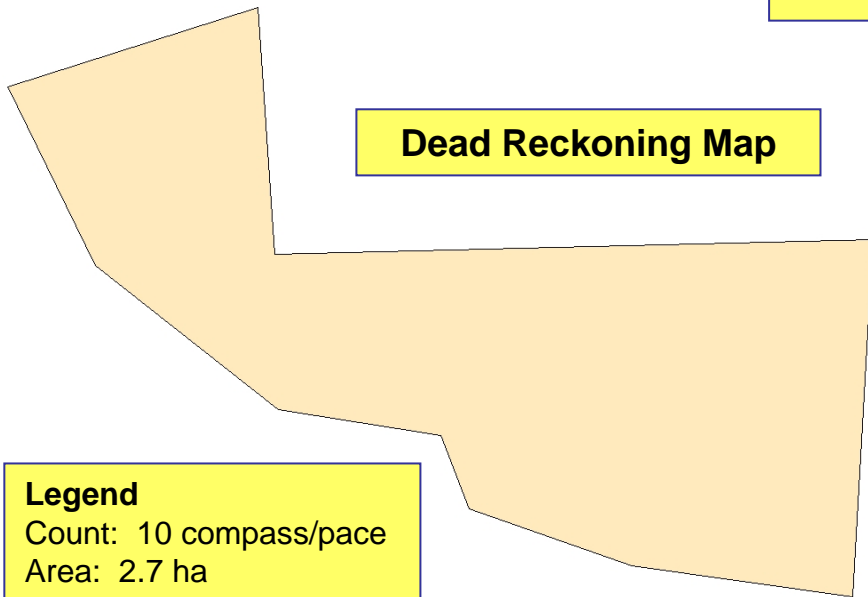
wp 5

wp 4

wp 3

# Final Maps

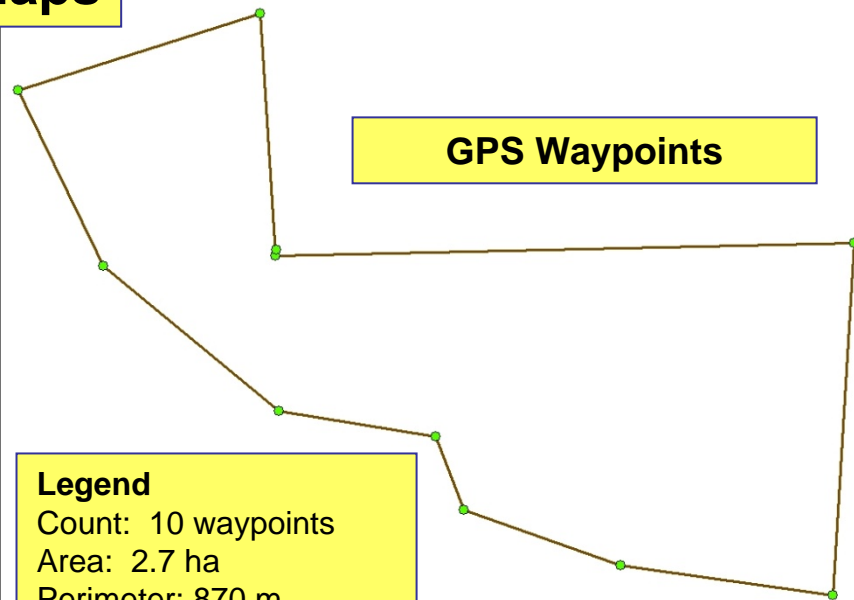
## Dead Reckoning Map



### Legend

Count: 10 compass/pace  
Area: 2.7 ha  
Perimeter: 882 m

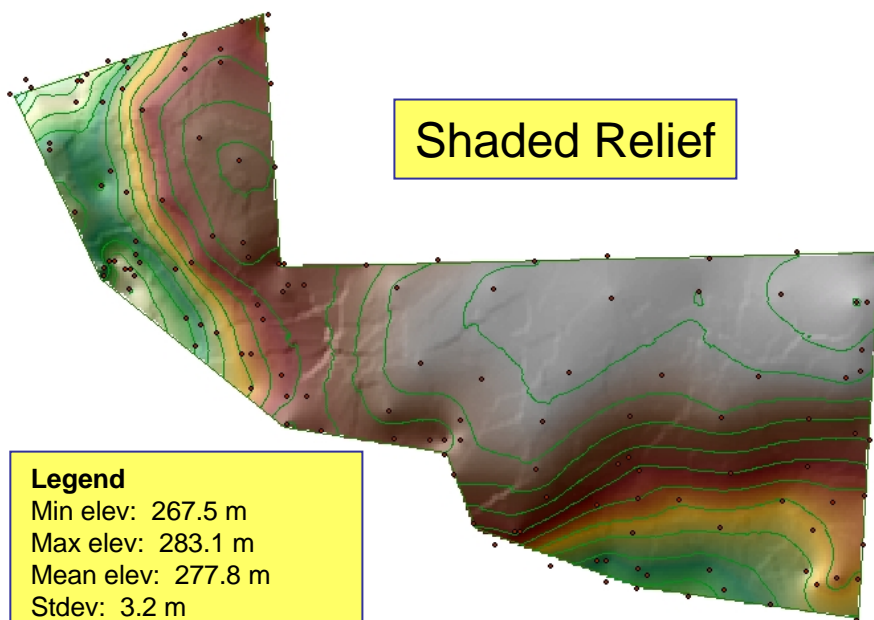
## GPS Waypoints



### Legend

Count: 10 waypoints  
Area: 2.7 ha  
Perimeter: 870 m

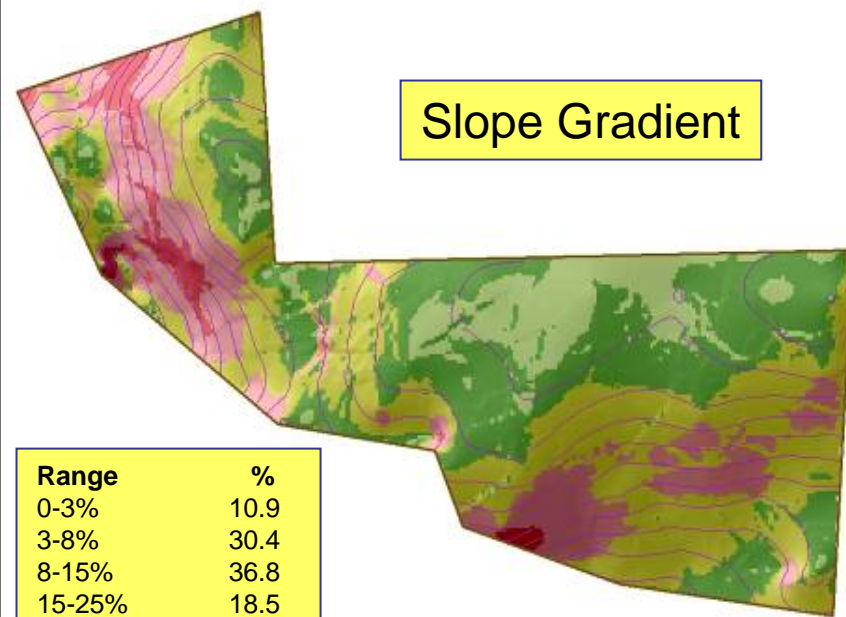
## Shaded Relief



### Legend

Min elev: 267.5 m  
Max elev: 283.1 m  
Mean elev: 277.8 m  
Stdev: 3.2 m  
Contour interval: 1 m

## Slope Gradient



Range	%
0-3%	10.9
3-8%	30.4
8-15%	36.8
15-25%	18.5
> 25%	3.4



# Sample Plot Positioning for Assessing Heavy Metals in Soils

## Dilmun Hill Cornell Student Farm





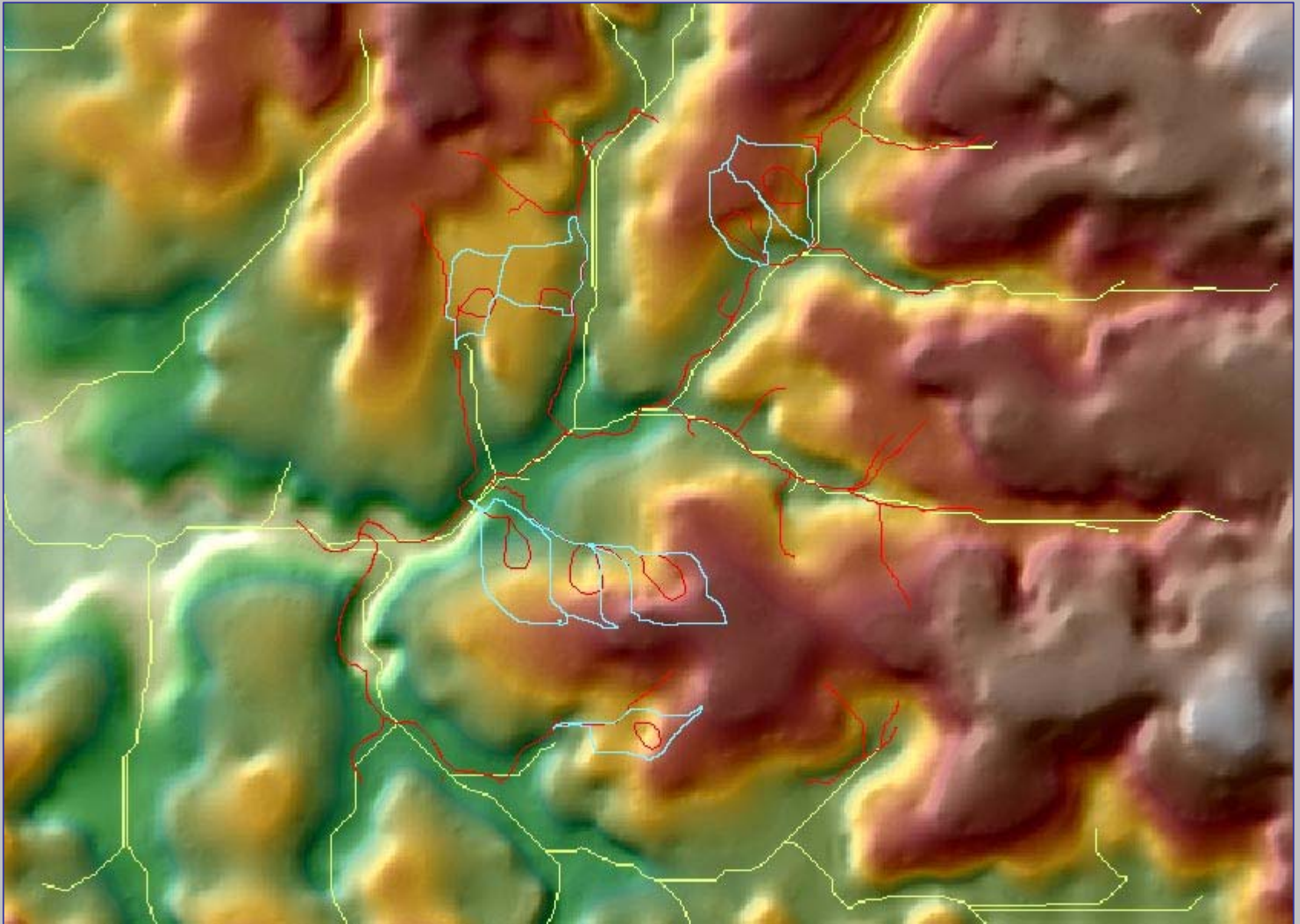
# Visible-Near Infrared Diffuse Reflectance Spectroscopy (VNIR DRS) for Soil Survey





# Estimating Watershed Areas in Western Kenya Using DEM Derivatives

(Spatial Analyst > Hydrology; TauDEM; ArcHydro)





# Spatial Modeling (Zambia): terrain derivatives for conservation agriculture

