Drought and a Golf Course

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GEOG 342
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Summary and Purpose

- Recent CA drought spanned more than 5 years through 2017.
  - In 2015, a statewide mandate required a 25% reduction in water consumption
- Using NAIP imagery and through NDVI analysis, I wanted to measure the impact of the drought on a local golf course

Source Data

- National Agricultural Imagery Program (NAIP) aerial imagery
  - 2010 – 1 meter, 4Band(RGB, NIR)
  - 2012 – 1 meter, 4Band (RGB,NIR)
  - 2014 – 1 meter, 4Band (RGB,NIR)
  - 2016 –.6 meter, 4Band (RGB,NIR)

- California Fish and Game image services
  - https://map.dfg.ca.gov/arcgis/rest/services/Base_Remote_Sensing

NAIP statewide dataset

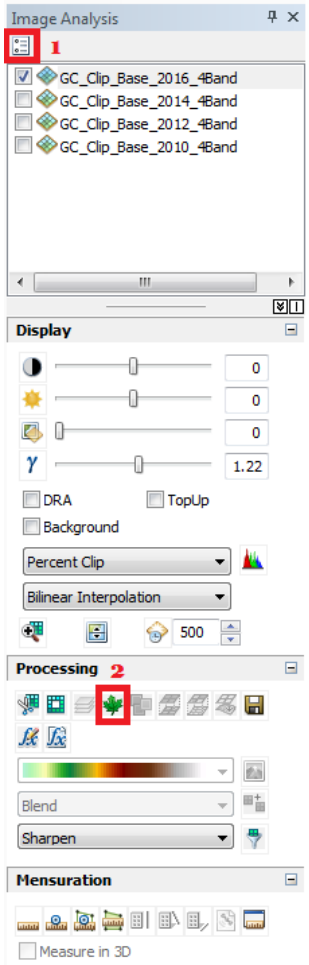
Project Area_Clipped (2016)

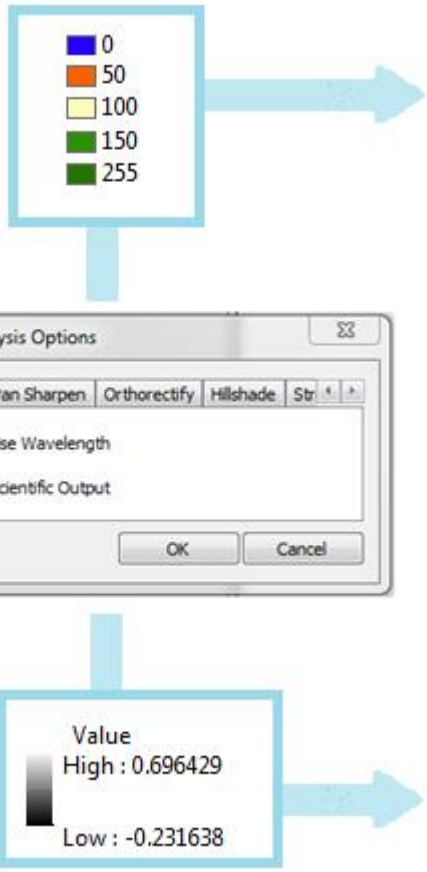
Imagery Prep

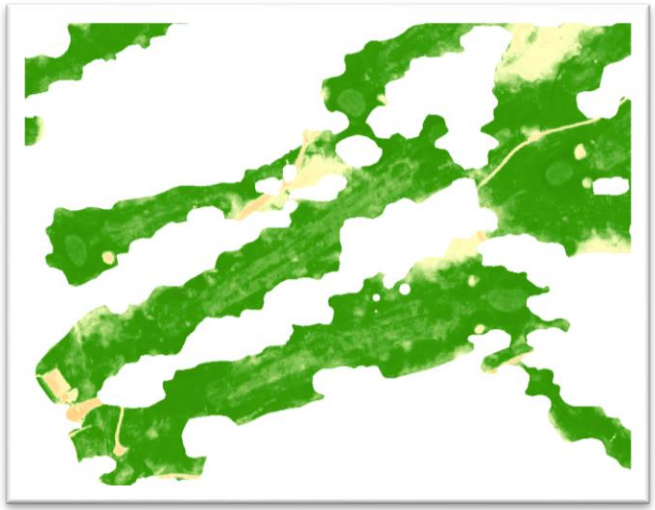
Clip Polygon Overlay

Resulting Grass Area_2016

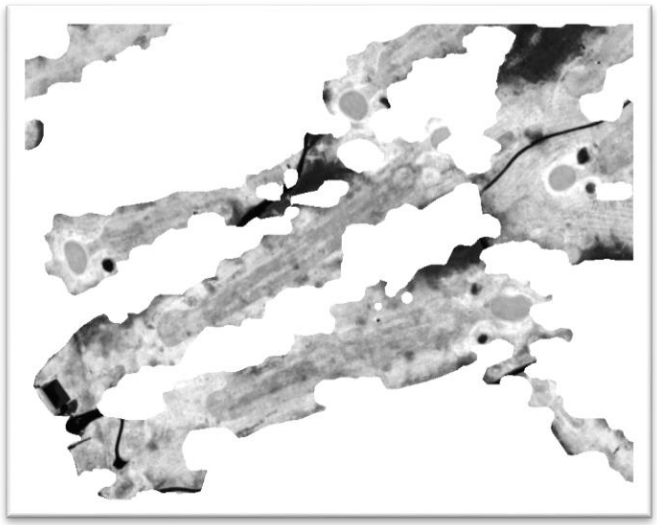
NDVI Analysis







Use Wavelength Output_2016



Scientific Output_2016

Determine Healthy Vegetation

- Wavelength

Con("Wave_2016_RC" >= 136, 1)
This formula will assign all values above 135 a value of 1

- Scientific

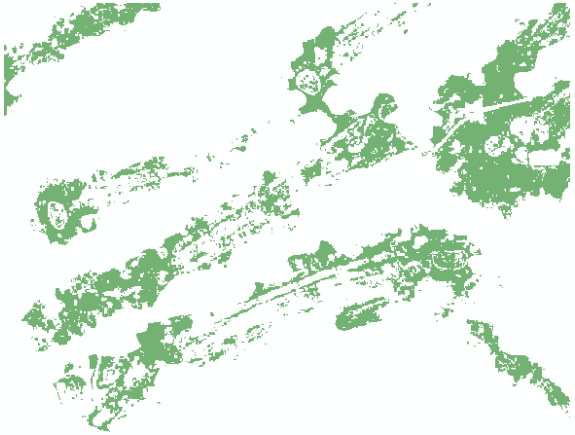
Con("Scientific_2016_RC" >= .2, 1)
This formula will assign all values above 0.19 a value of 1

Wavelength Results

2010

2012

2014

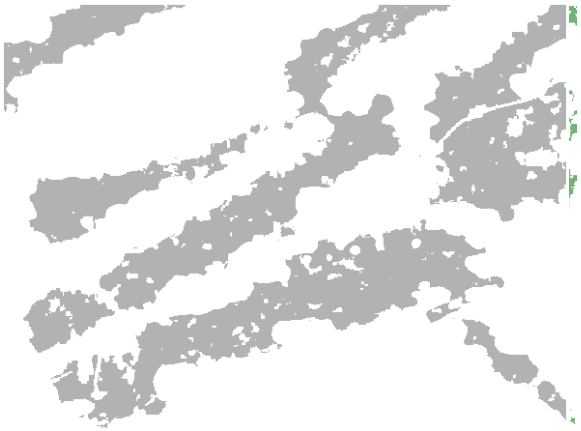


2016

Scientific Output Results

2010

2012



2014

2016

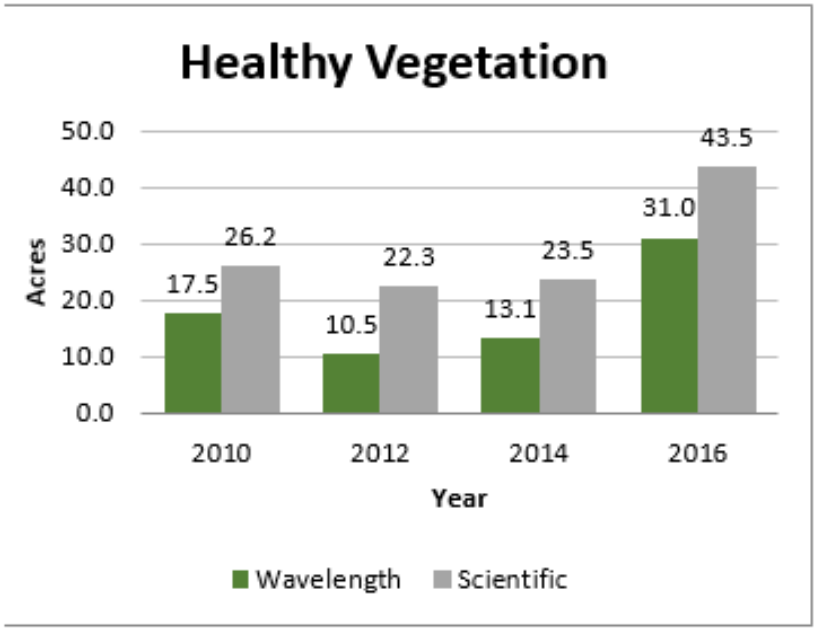
Results

Wavelength

Year	Count	Acres	% Change
2010	70958	17.53	Base Year
2012	42614	10.53	-40%
2014	52992	13.09	-25%
2016	209108	31.00	77%

Scientific Output

Year	Count	Acres	% Change
2010	105829	26.15	Base Year
2012	90344	22.32	-15%
2014	95118	23.5	-10%
2016	293608	43.5	66%



Note

2010, 2012, 2014 are measured in a cell size of 1 meter

1 m = .000247105 acre

2016 is measured in a cell size of .6 meter

.6 m = .000148263 acre

Summary

- Acreage between the two methods were different, but still resulted in similar patterns
- The drought certainly had an impact on the healthy vegetation
  - Most severe between 2012 and 2014 datasets
- Further project analysis
  - More dramatic data could be gathered if I reduced the calculated area to fairways and greens, excluding the “rough”

Challenges

- Clipping the project area is time consuming
  - Trees and shadows change each year
- Determining healthy vegetation threshold for the Wavelength data