



GeoG2 Solutions Inc.

Technology for improved land productivity

Kevin Spry
kespry@gmail.com
805-748-7153

Agenda

The Imagery Toolbox

GIS

Remote Sensing Imagery

Data Collection

Image Analysis - Image Enhancement/NDVI

Resolution

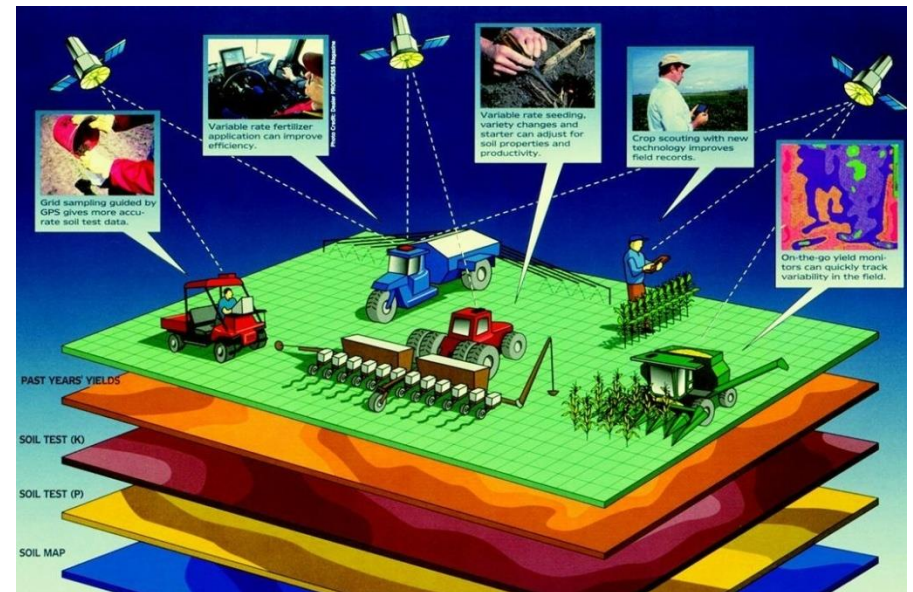
Post Harvest Analysis

Image Examples

GIS – Geographic Information System

The Foundation of Precision Farming

What it is
Where it is
What it is next to



A Relational data base
GPS - Global Positioning System

Remote Sensing Imagery

False color IR imagery



Blue



Green



Red



Near IR

True Color

False Color IR



Data Collection

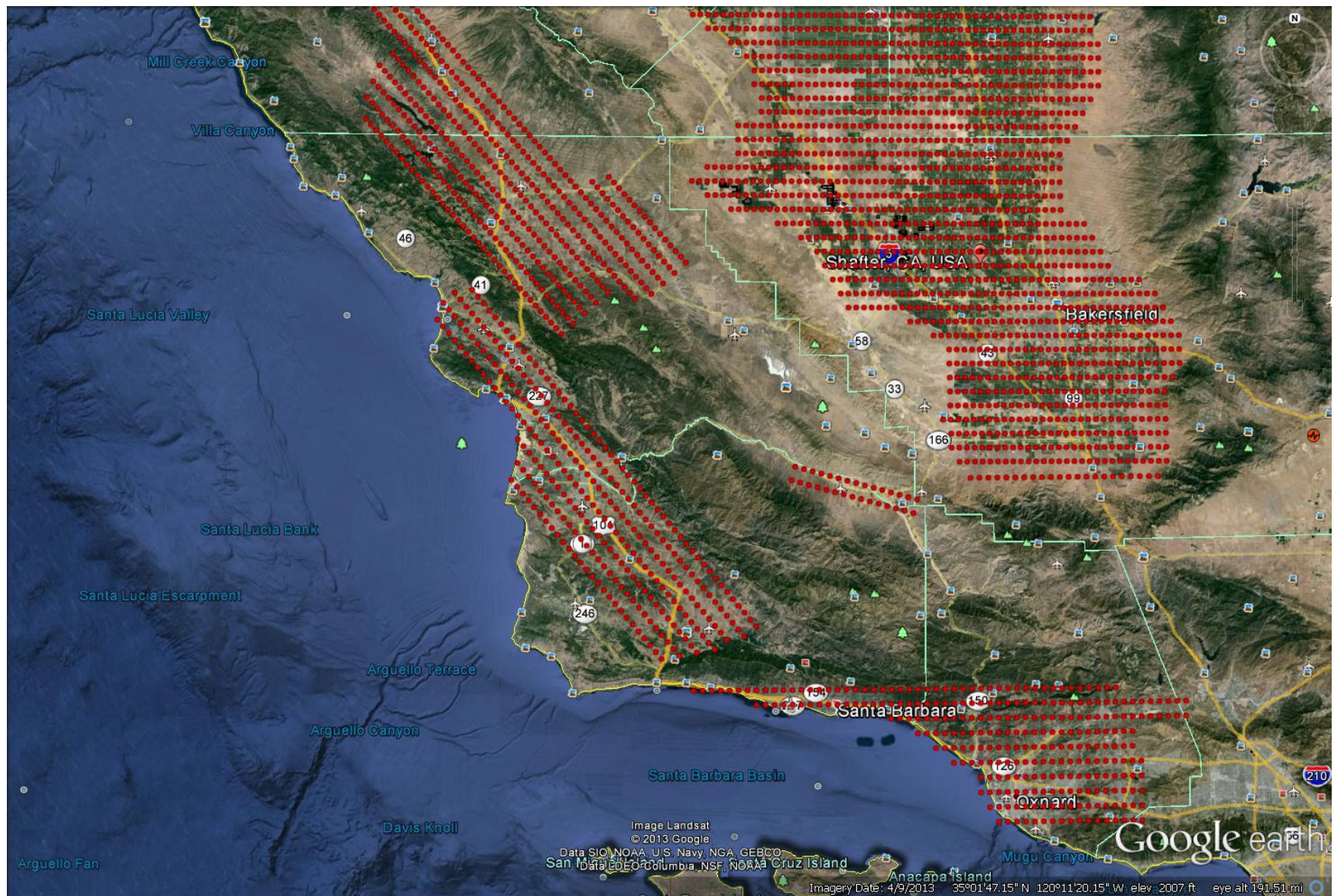
**Aircraft: Cessna Conquest II
Operating at 28,000' AGL**



**Four 7,218 X 5,412 CCD
39 Mp Cameras**

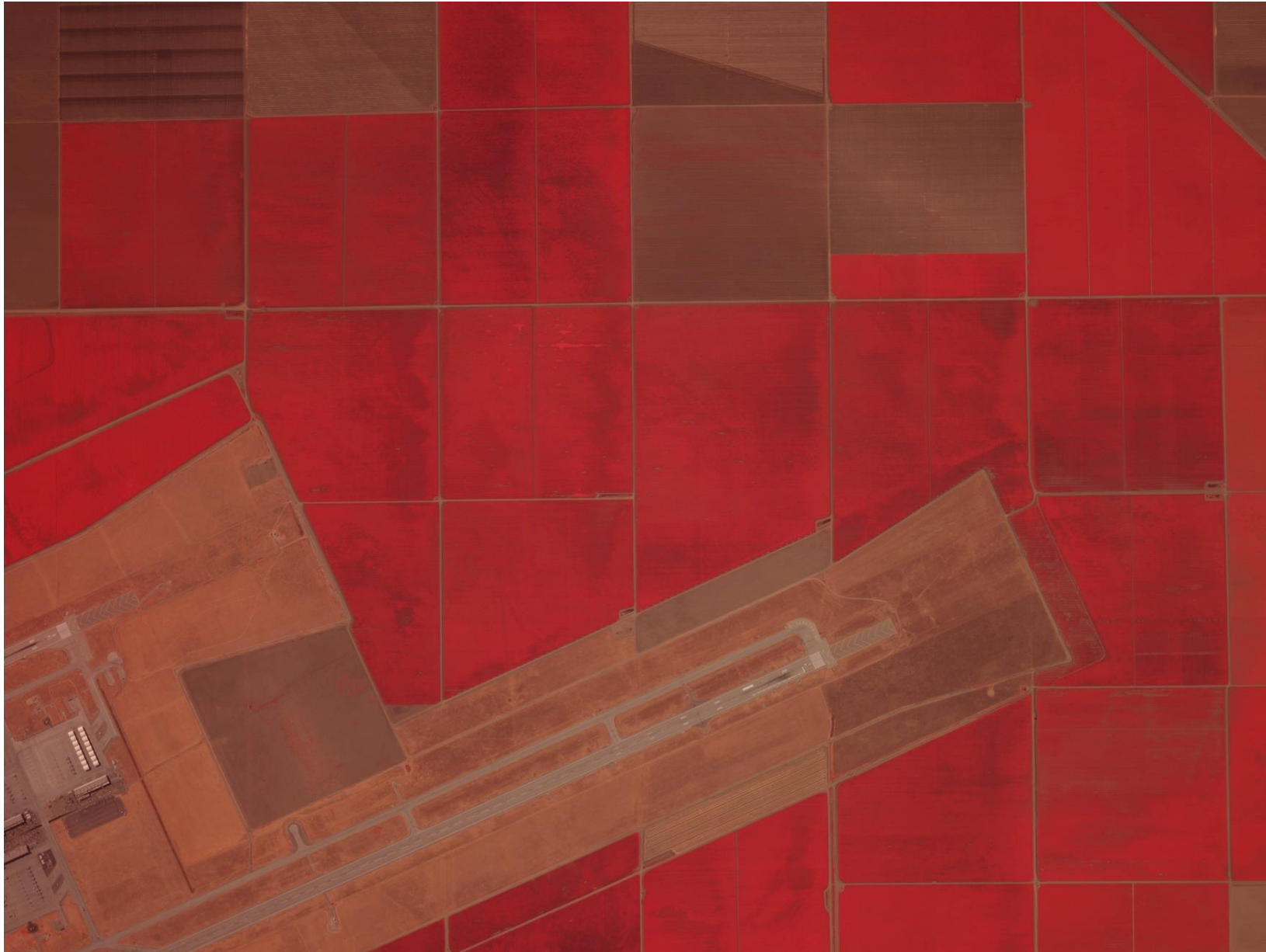


GeoG2 Flight Lines Central Coast

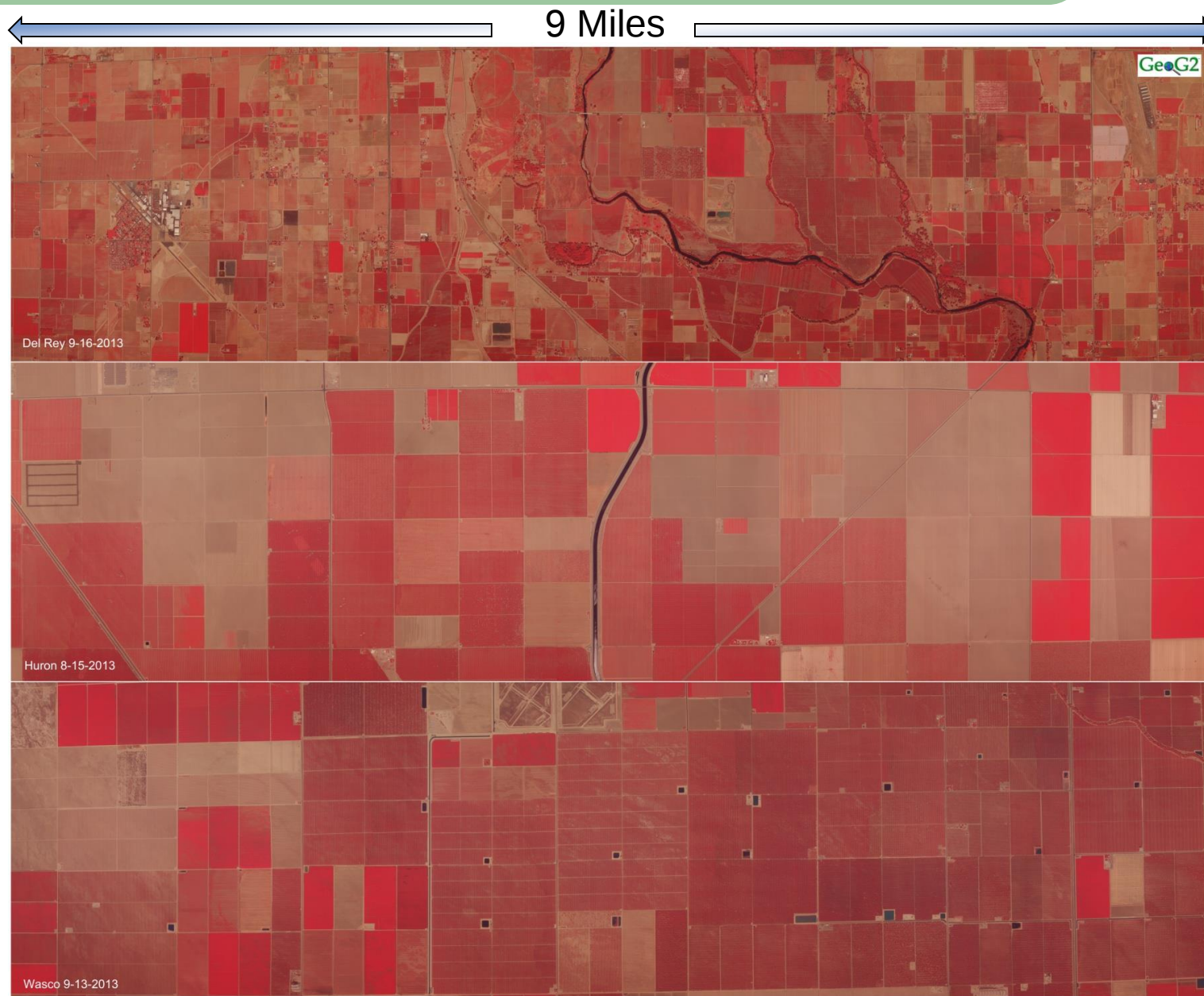


GeoG2 Full Scene Image (3.2 miles X 2.4 miles)

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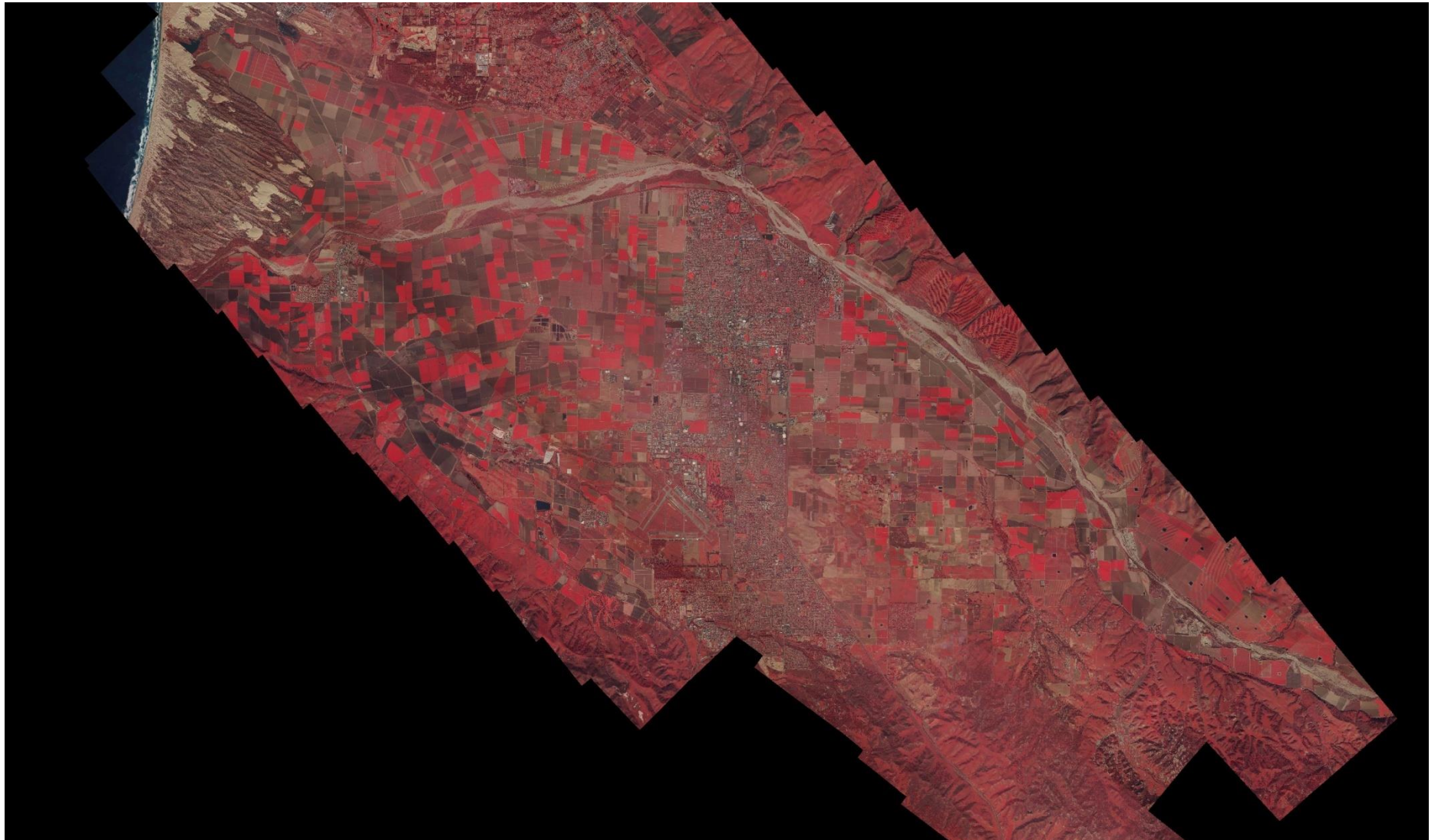


Data Collection (2 min for each line)



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GeoG2 Image Geo Referenced and Mosaiced



Santa Maria 2009

Image Analysis Tools

Image enhancement (PhotoShop)

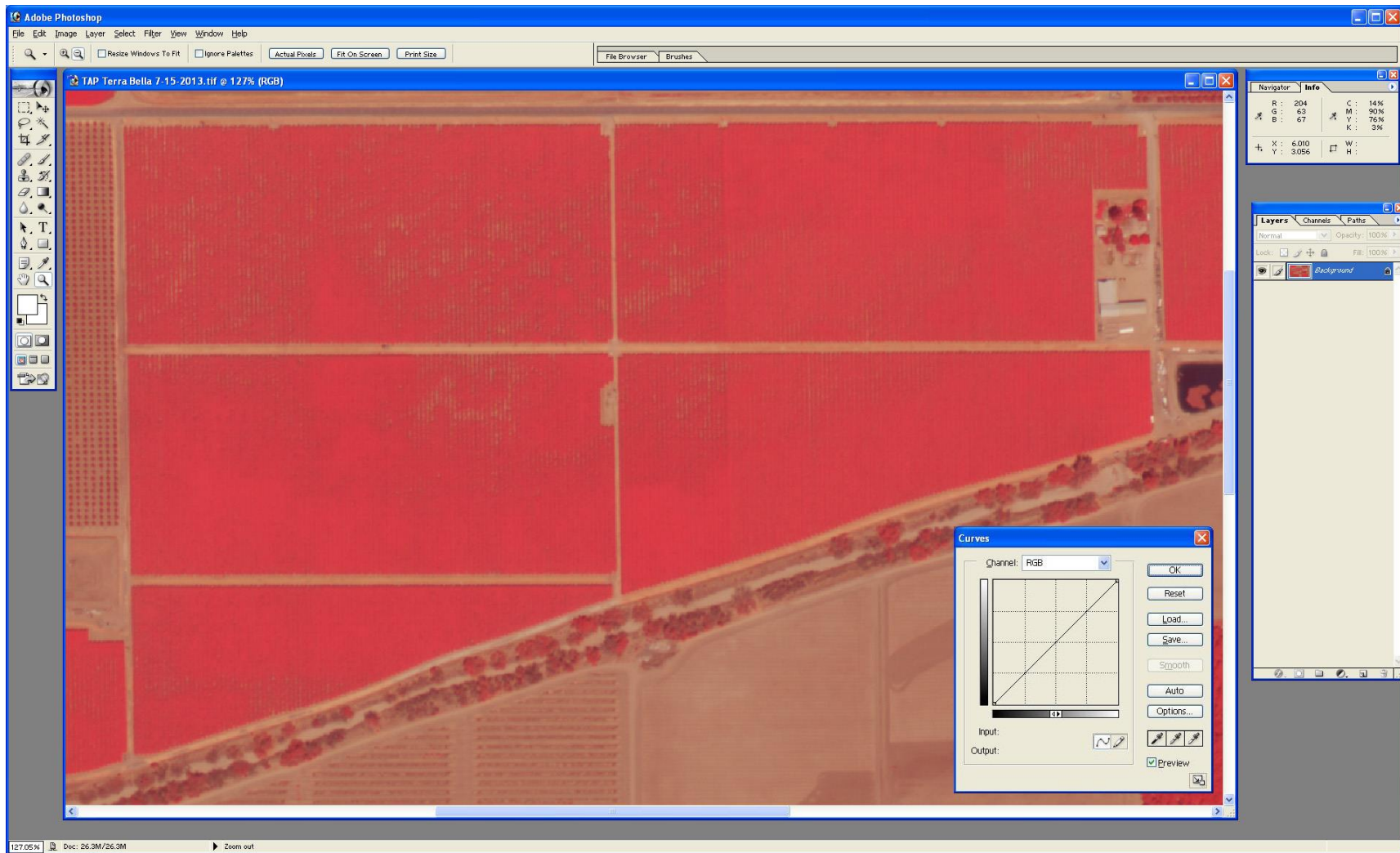
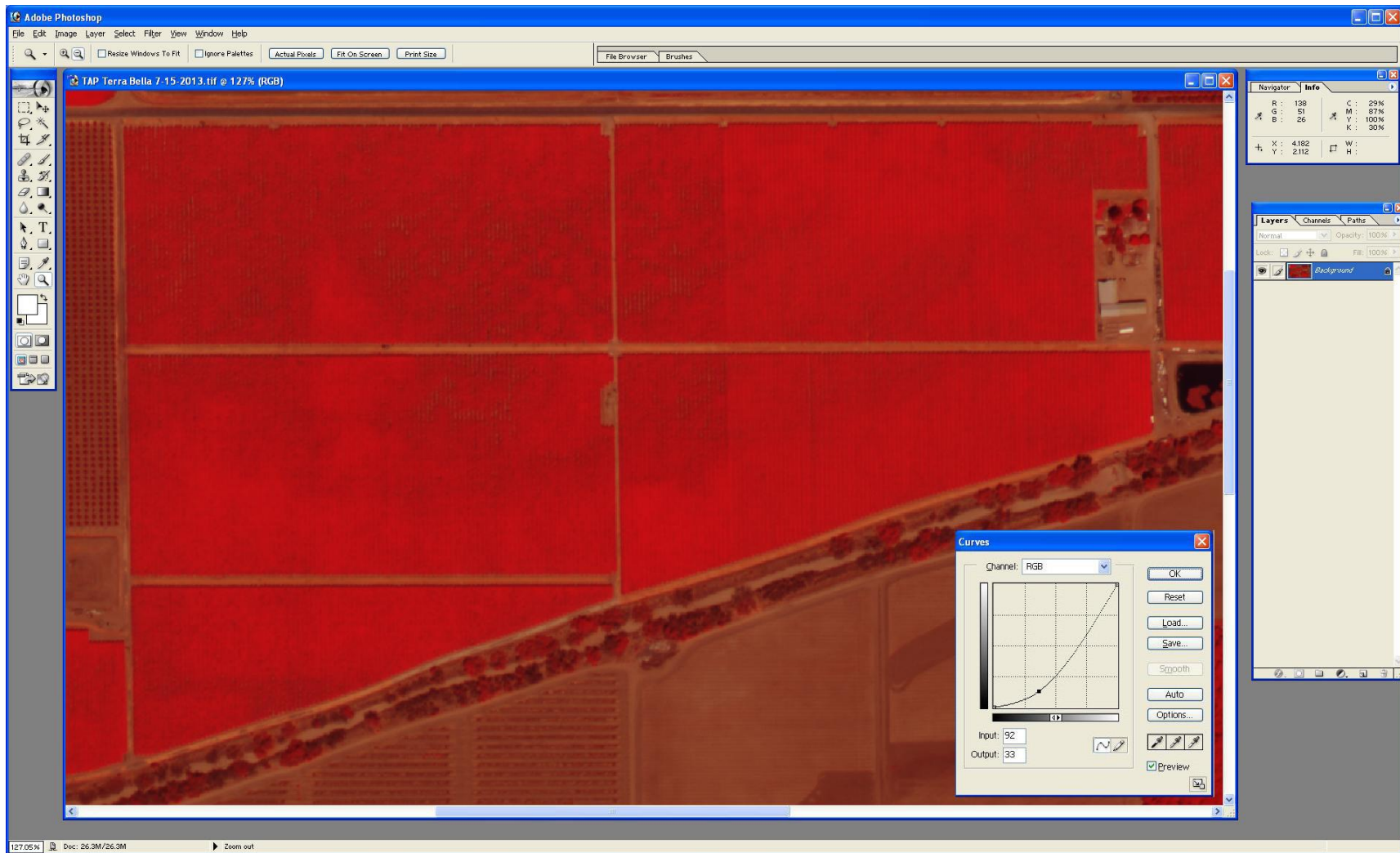


Image Analysis Tools

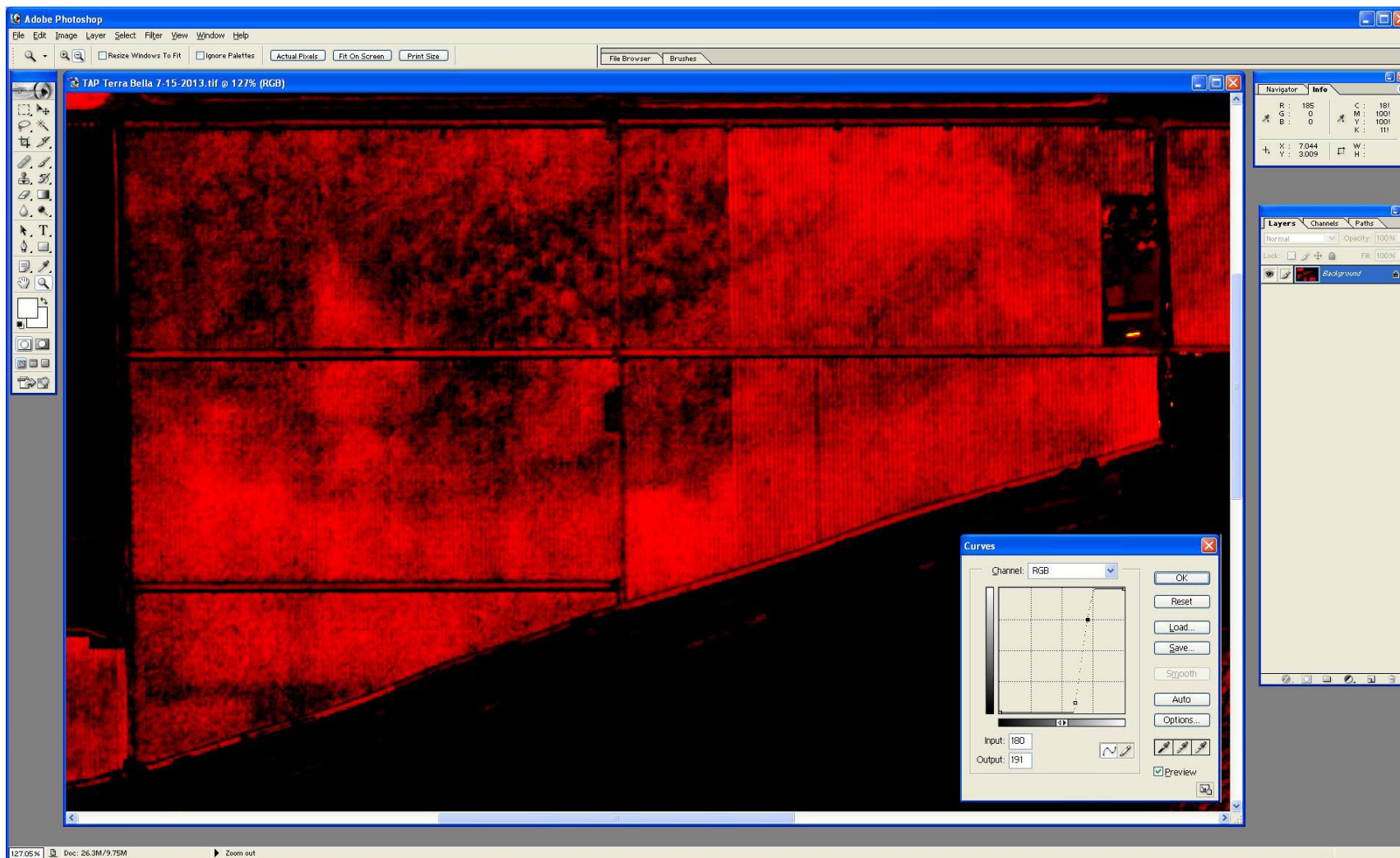
Image enhancement



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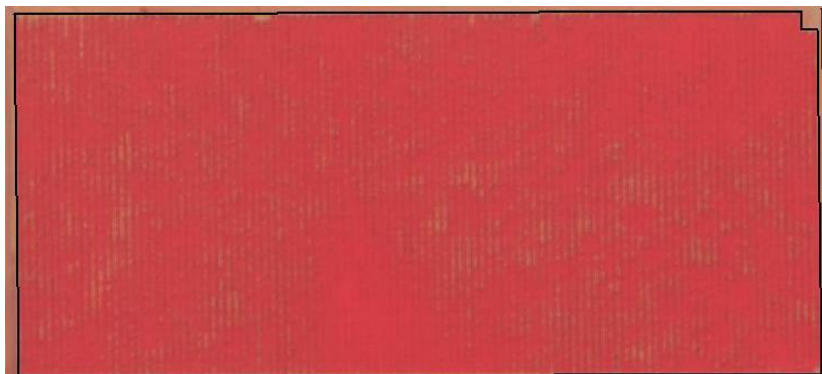
Image Analysis Tools

Image enhancement

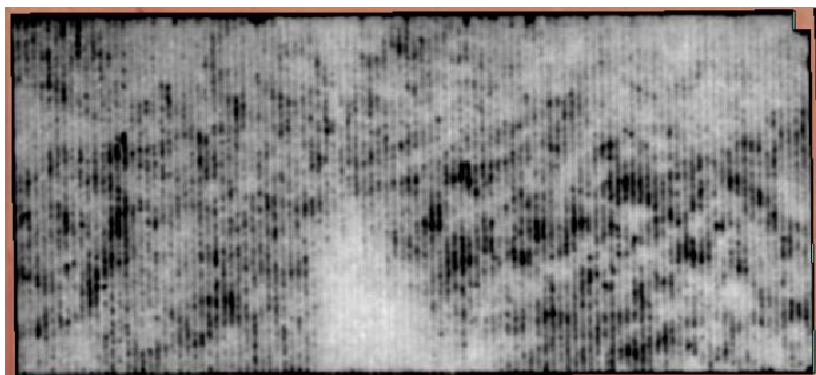


NDVI - Vegetative Index

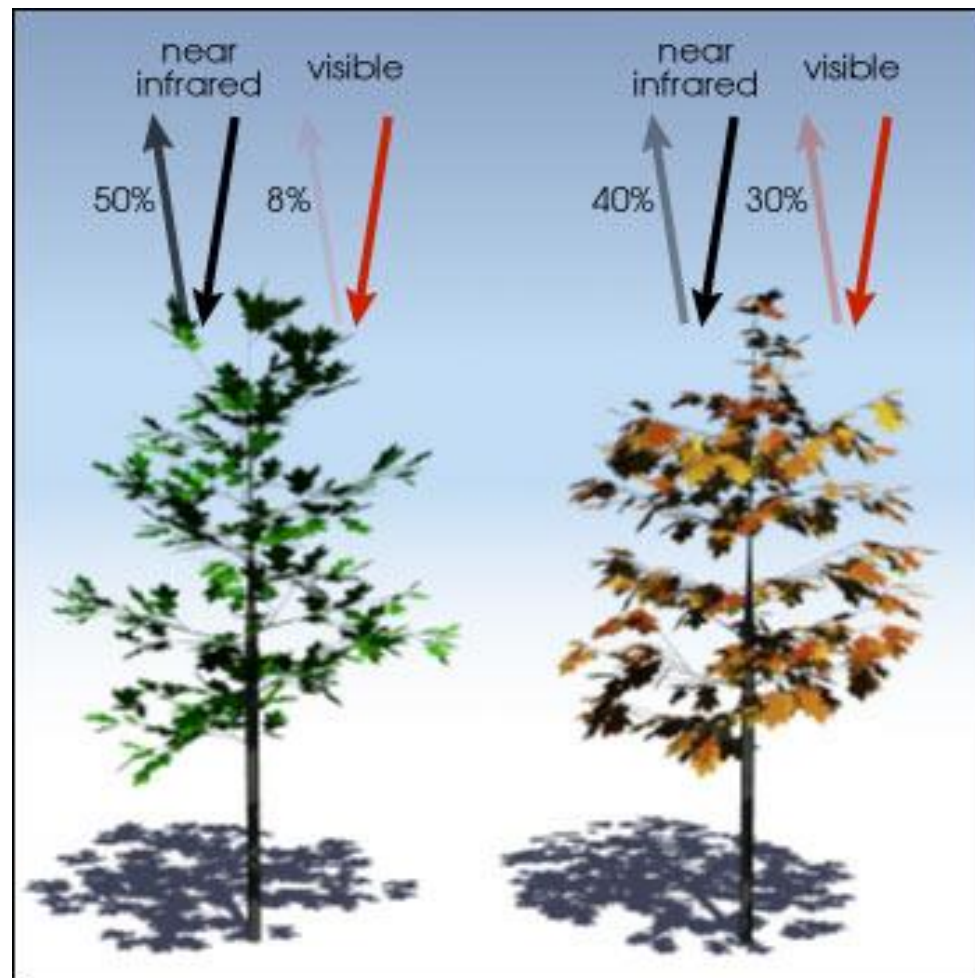
$$\text{NDVI} = \frac{(\text{NIR} - \text{Red})}{(\text{NIR} + \text{Red})}$$



False color IR image



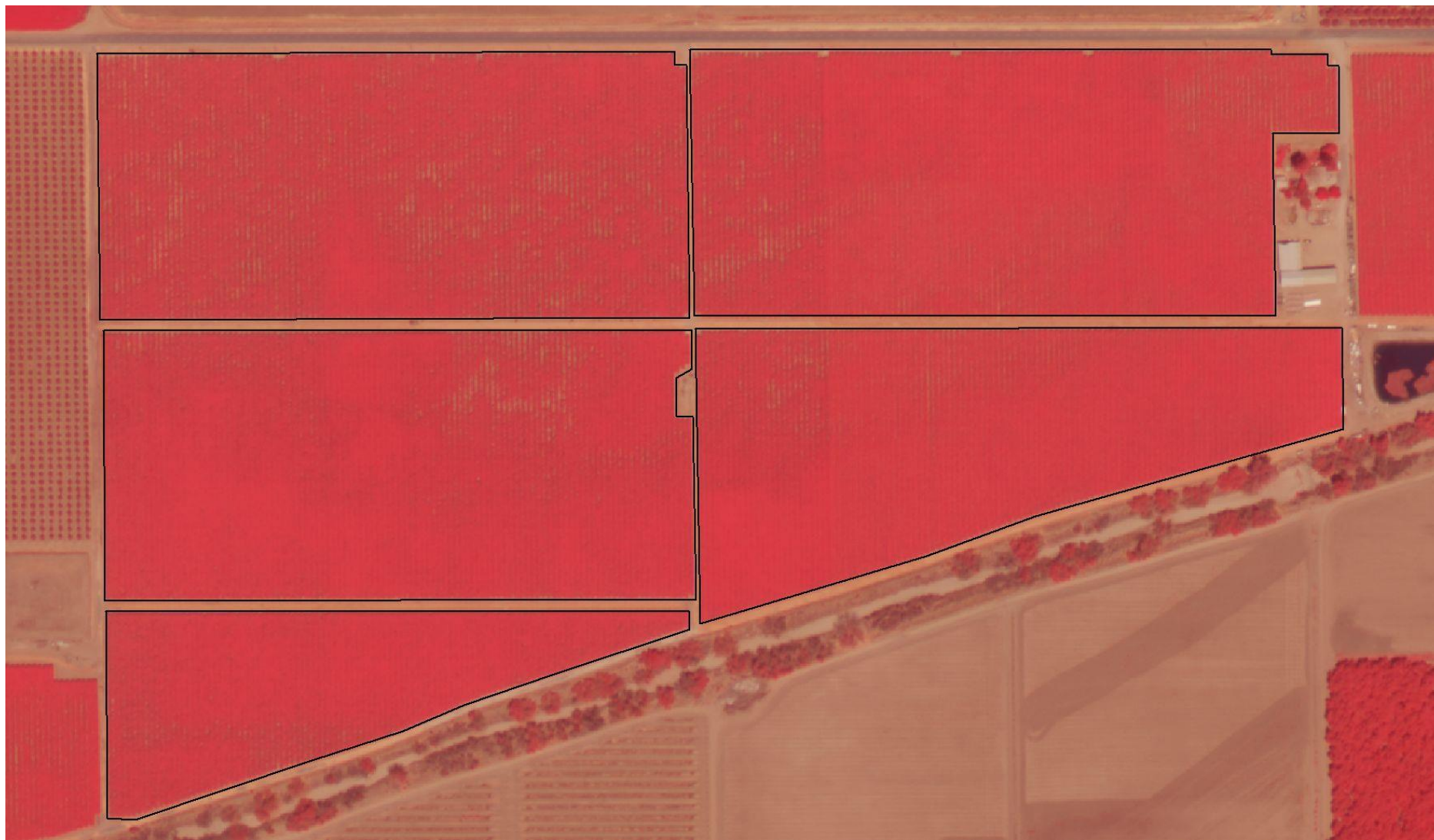
NDVI Gray Scale Image



$$\frac{(0.50 - 0.08)}{(0.50 + 0.08)} = 0.72$$

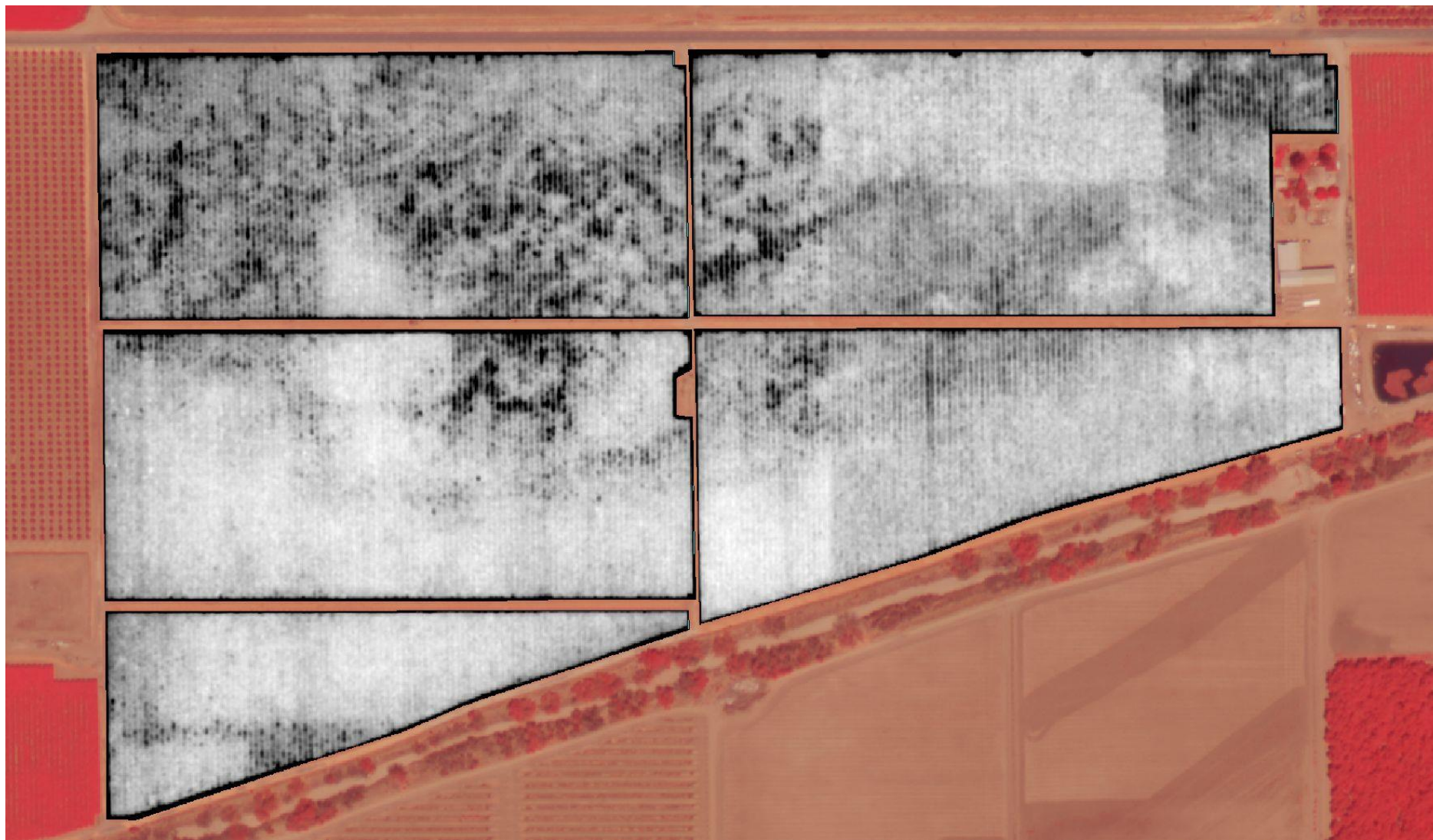
$$\frac{(0.4 - 0.30)}{(0.4 + 0.30)} = 0.14$$

NDVI - Vegetative Index



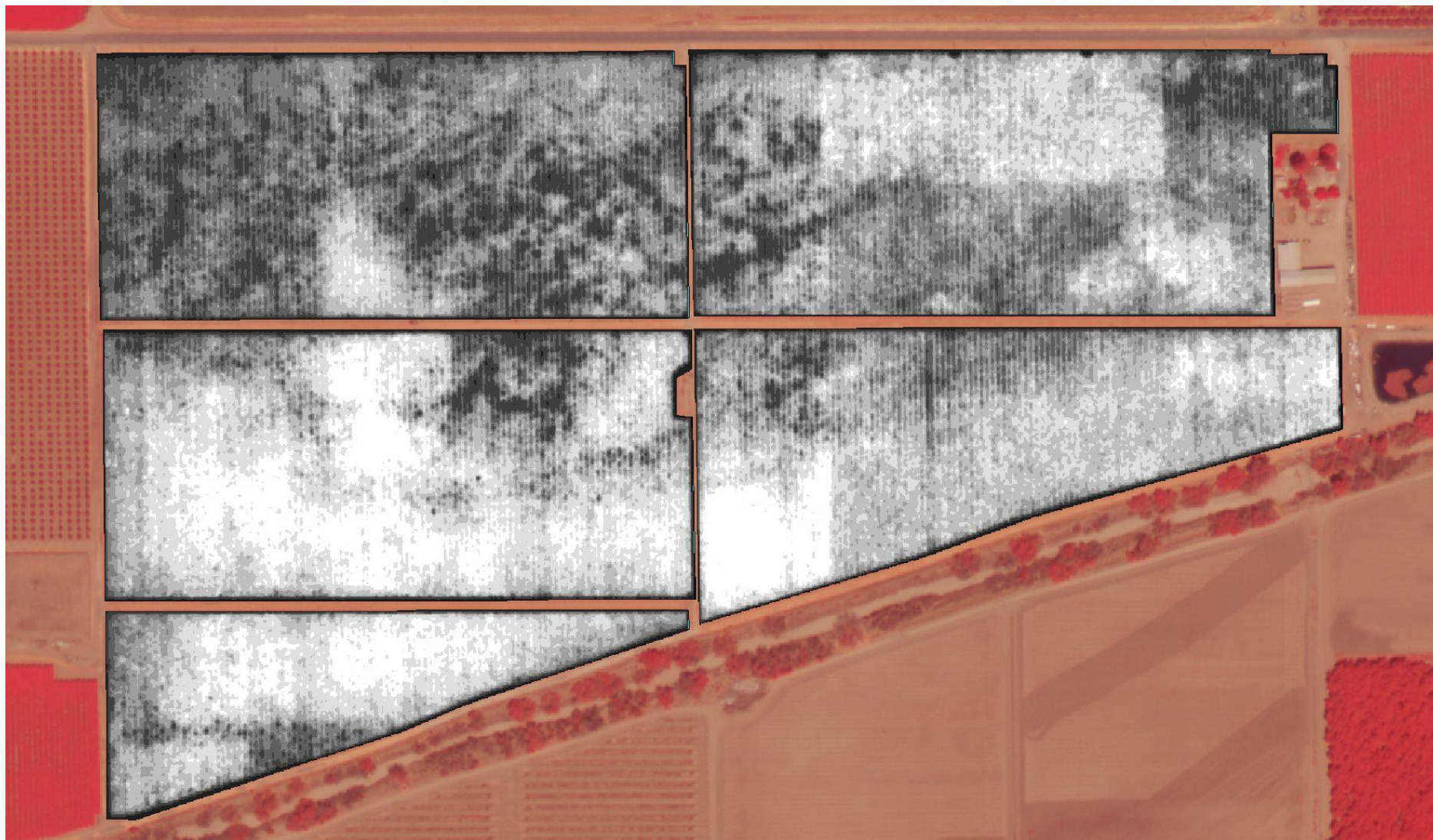
False Color IR Image

NDVI - Vegetative Index



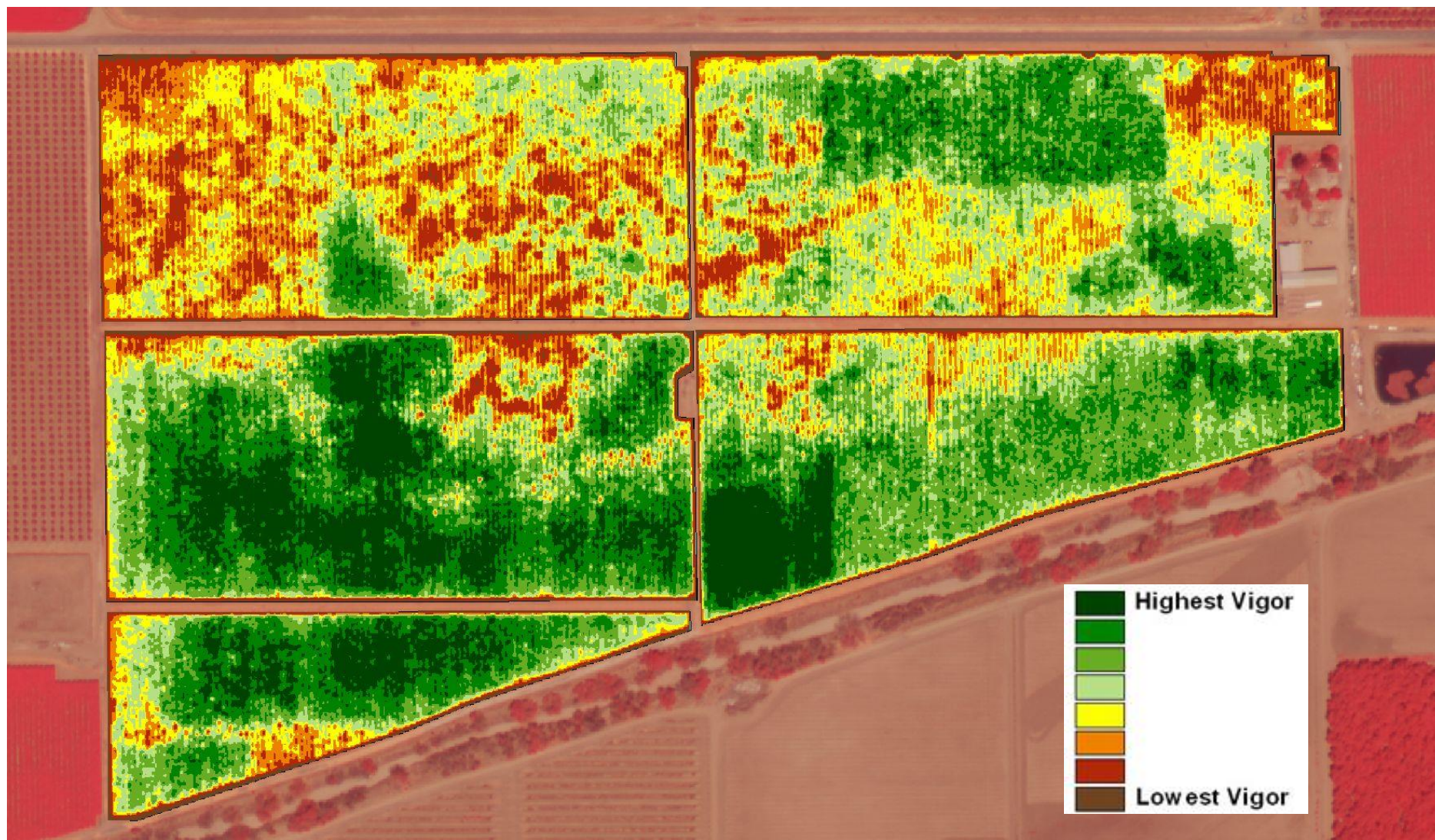
Gray Scale NDVI (256 shades)

NDVI - Vegetative Index



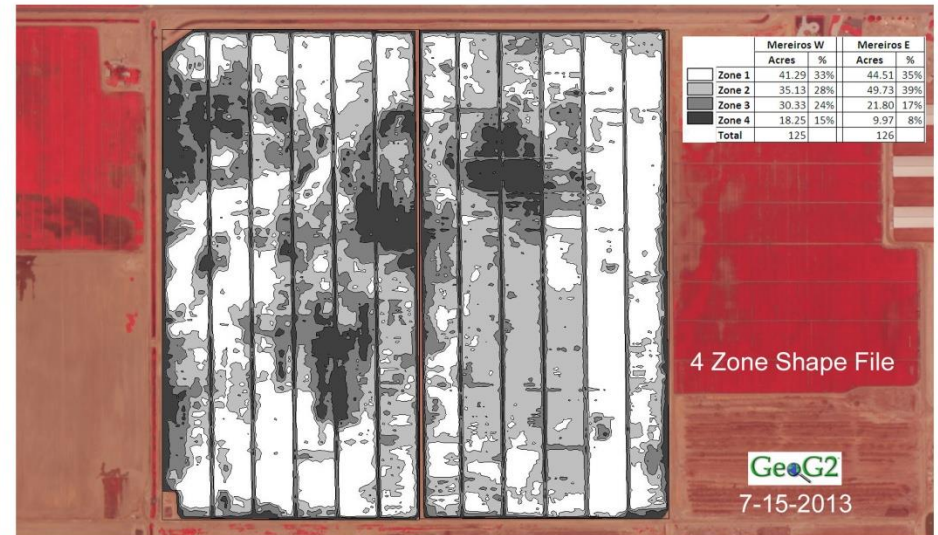
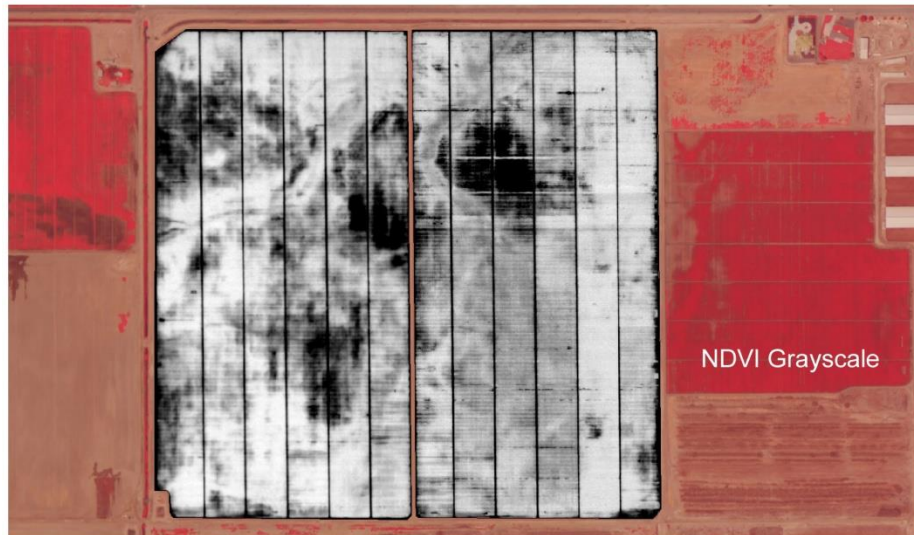
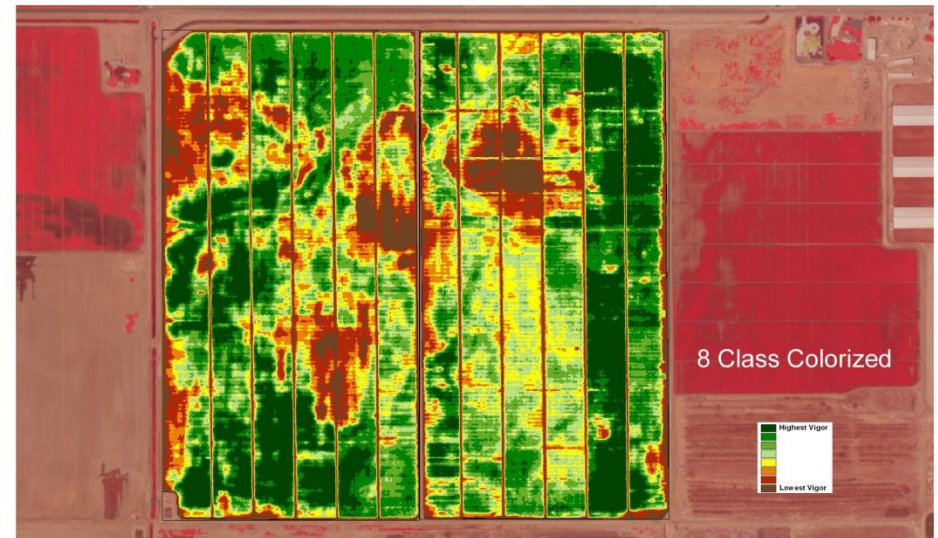
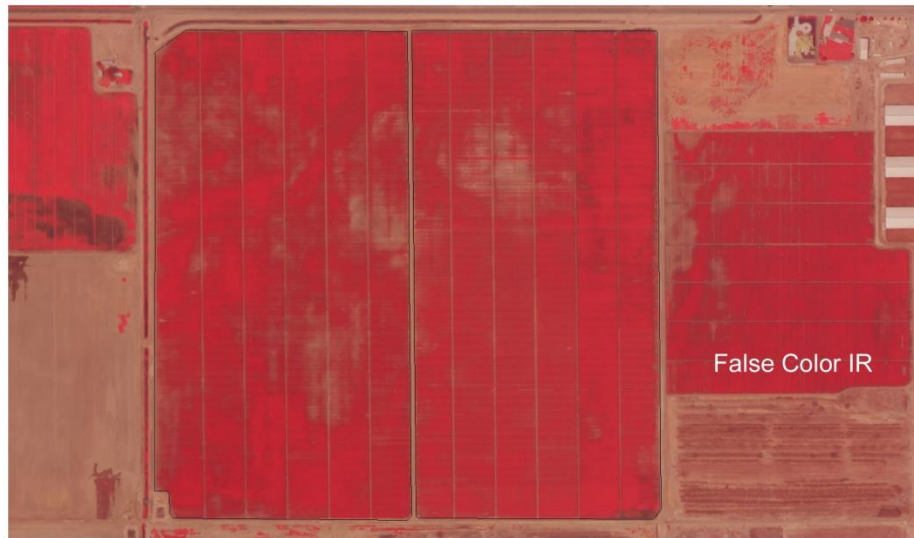
NDVI 8 Class Gray Scale

NDVI - Vegetative Index



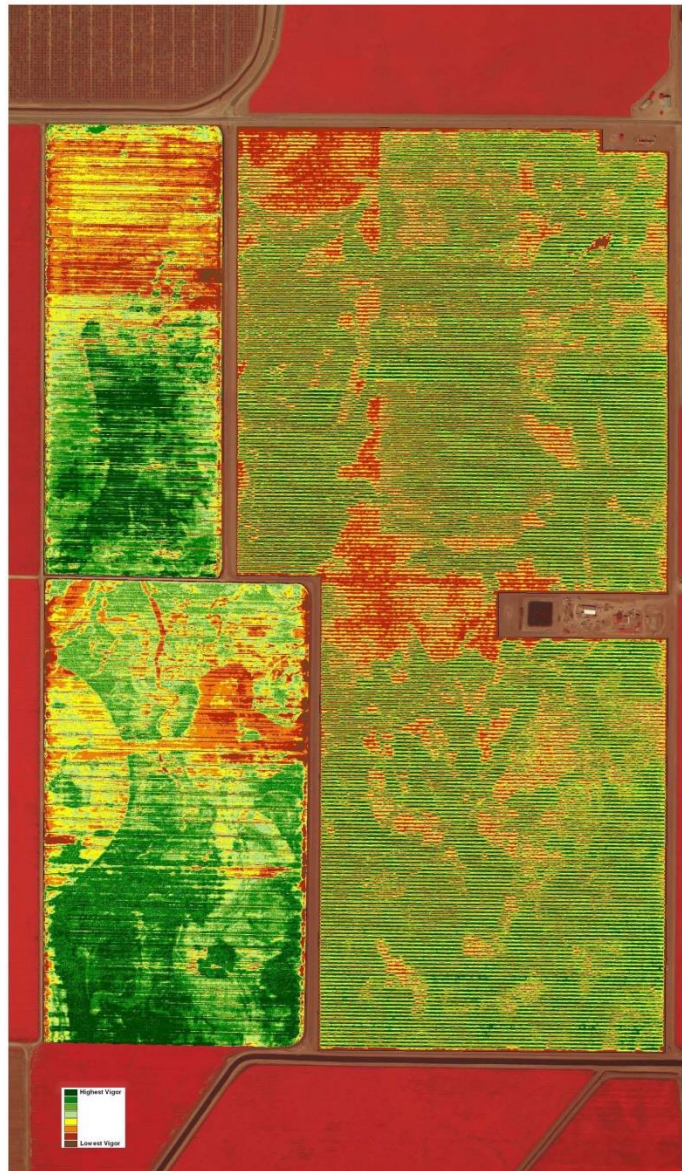
NDVI 8 Class Colorized

FCIR > NDVI > 8Class > 4Class Shape Map

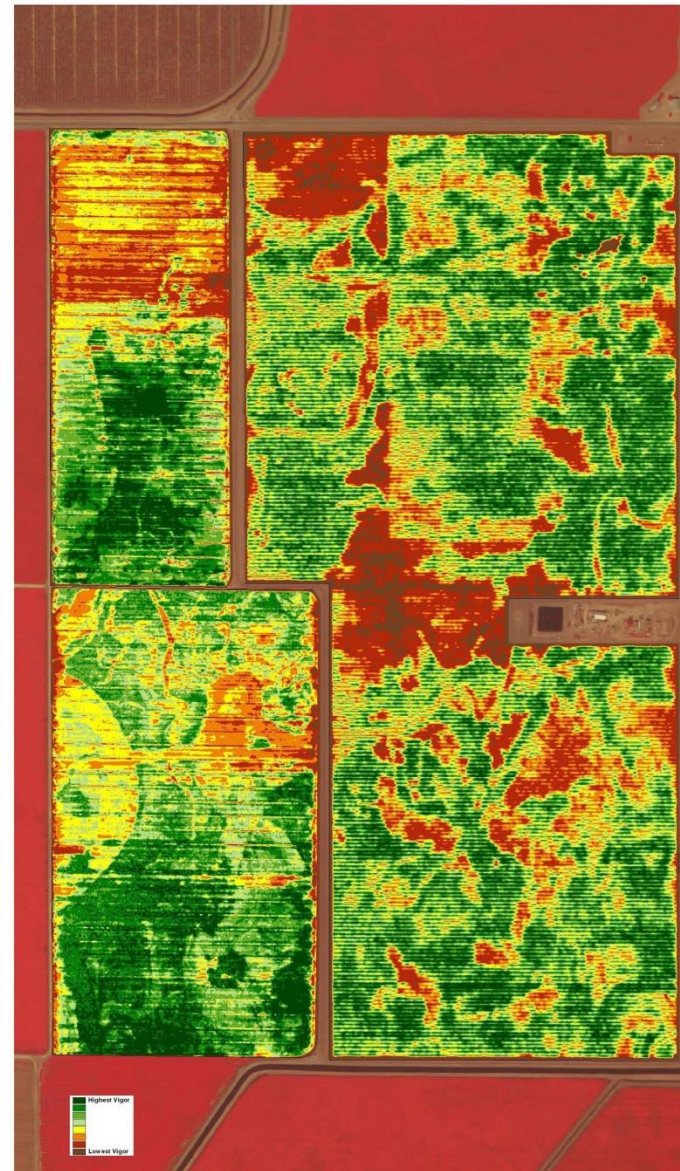


Resolution, Resolution, Resolution to a Point!

12 in. Resolution

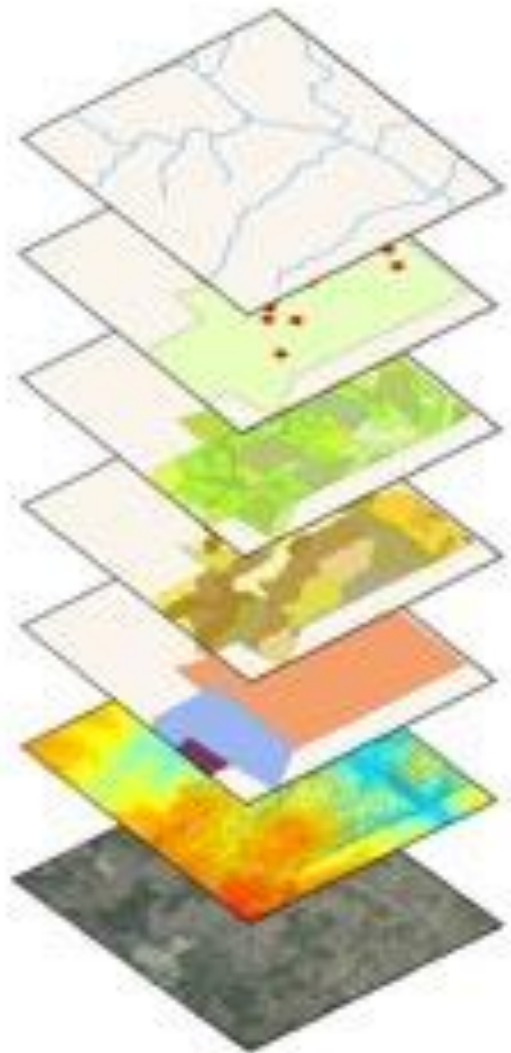


30 in. Resolution



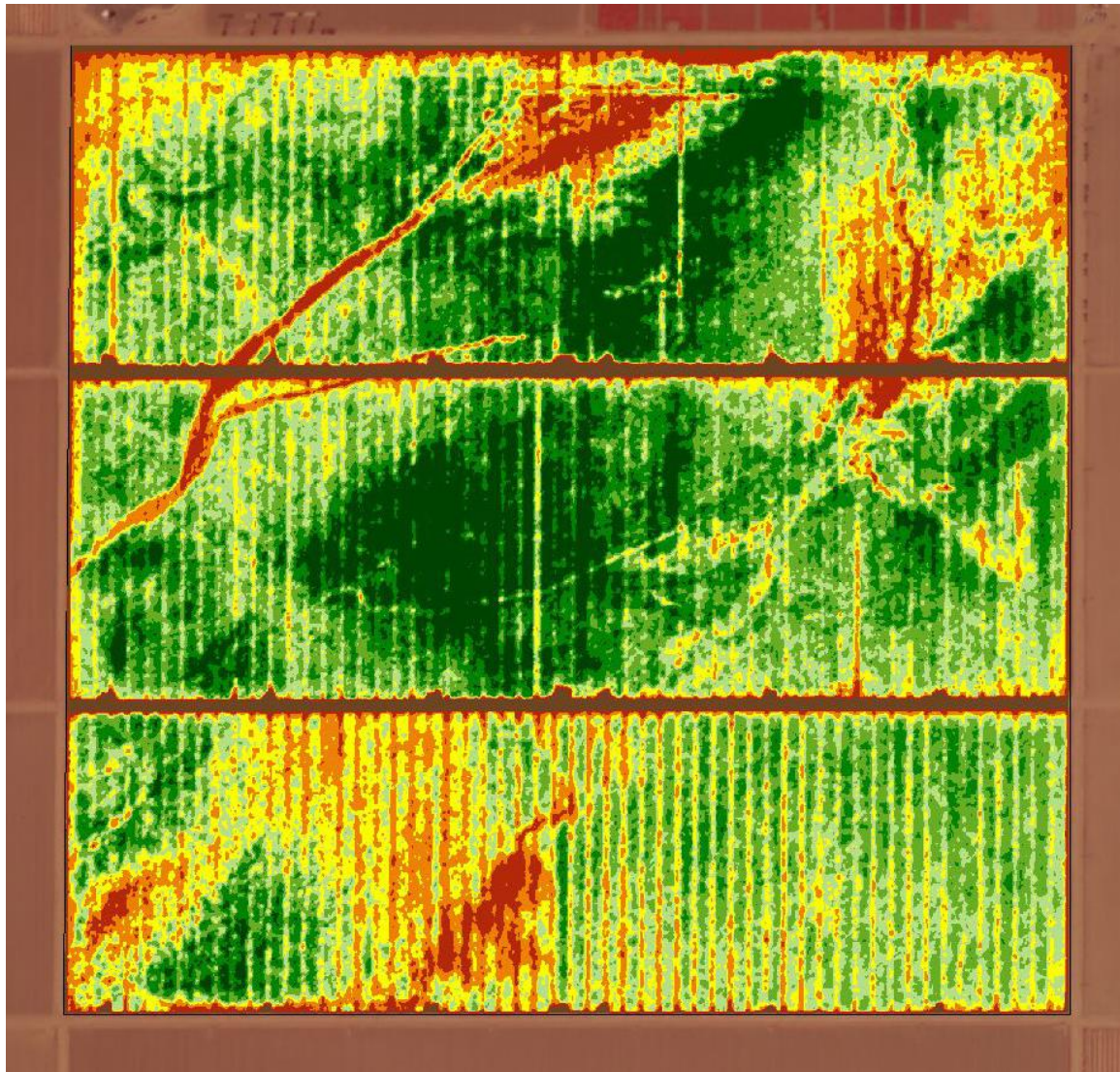
Post Harvest Analysis

Back to the GIS Relational Data Base:



Base Map
Soils
Planting Data
Imagery
Irrigation
Application
Scouting
Yield.....

GeoG2 Image Example: Cotton in the SJV

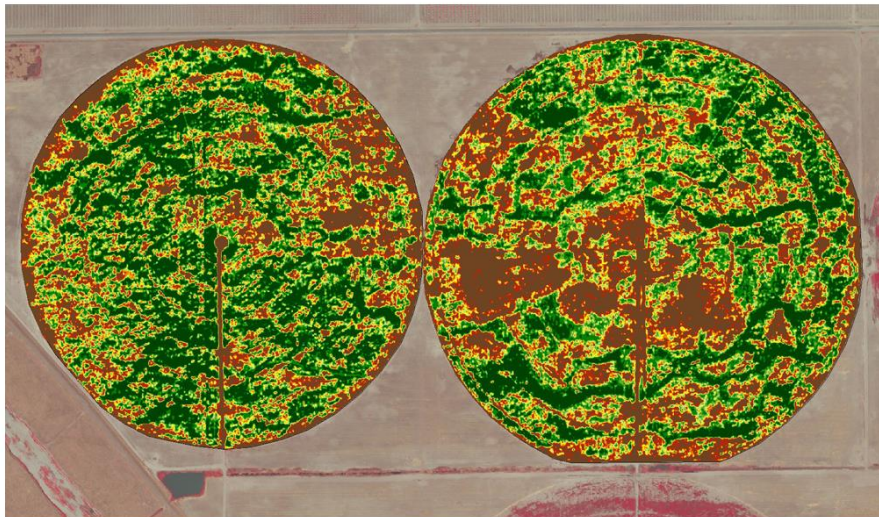
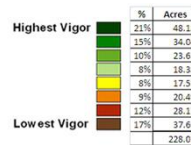


- Only problem areas need treatment
 - Less cost for treatment
 - less environmental impact

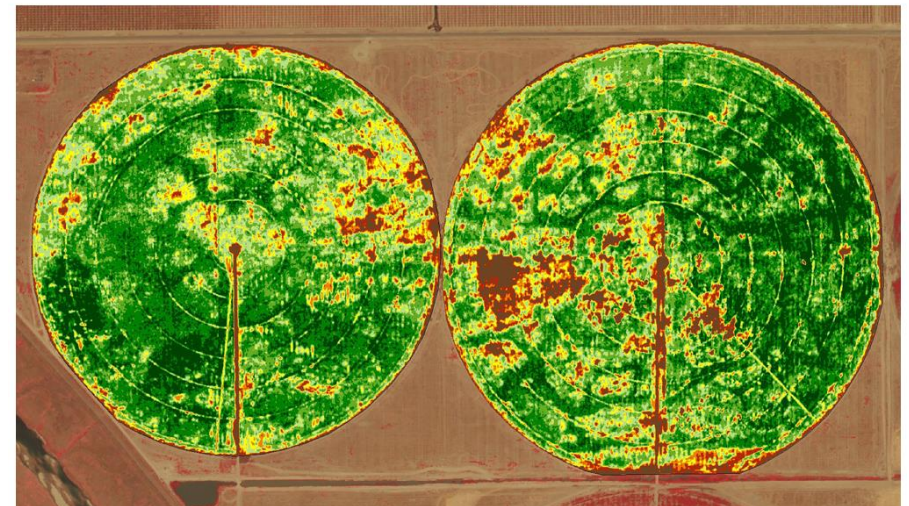
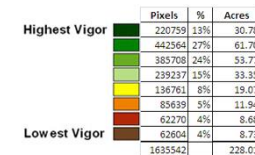
8 Class Colorized NDVI

Application of Technology

A&E Farming
Field: P6-P7
Date: 8-8-2010



A&E Farming
Fields: P-6 P-7
Date: 8-16-2011



Problem (Left Image): In 2010, GeoG2 imagery was used to identify significant problems in these two corn fields.

Treatment: The grower, A&E Farming, in conjunction with their chemicals supplier, Helena, used the imagery to direct soil sampling and prescribe a variable rate application treatment.

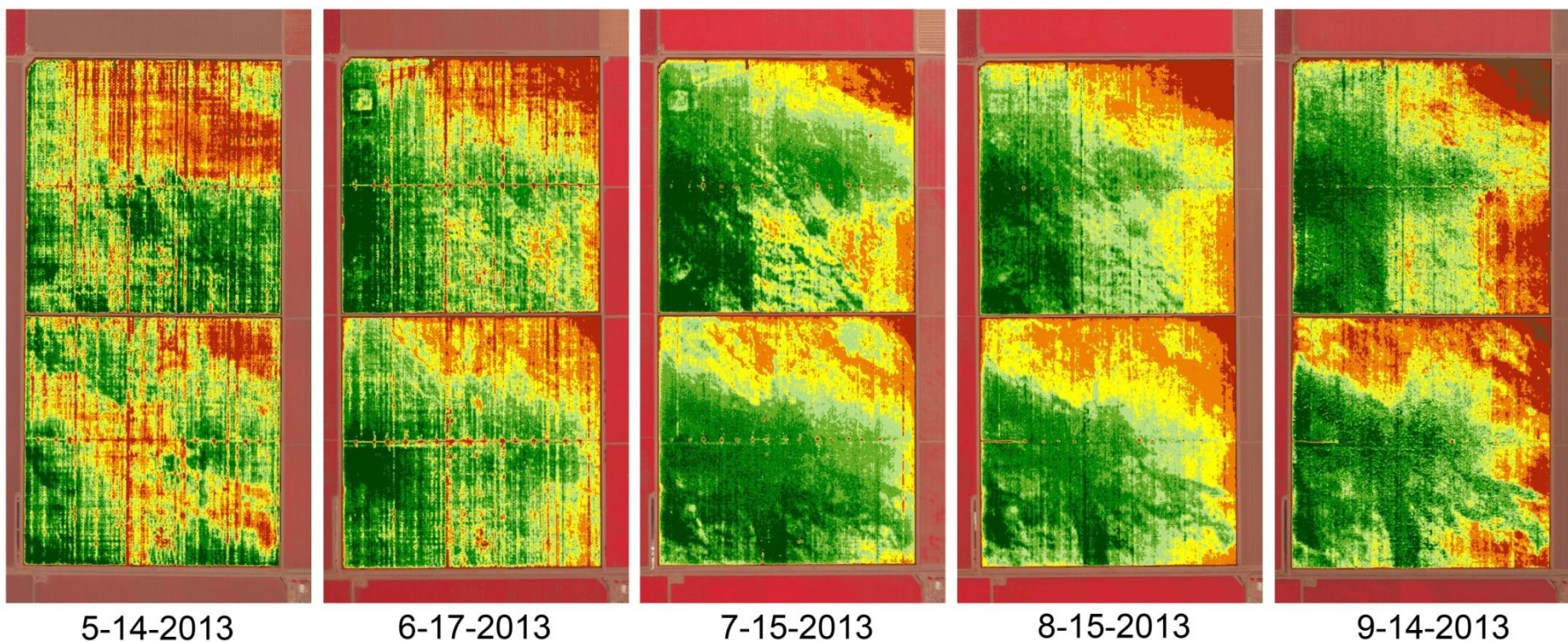
Results (Right Image): 2011 GeoG2 imagery of improved results.

Cotton Growth Cycle

Cotton Growth Cycle 8Class Colorized NDVI 2013



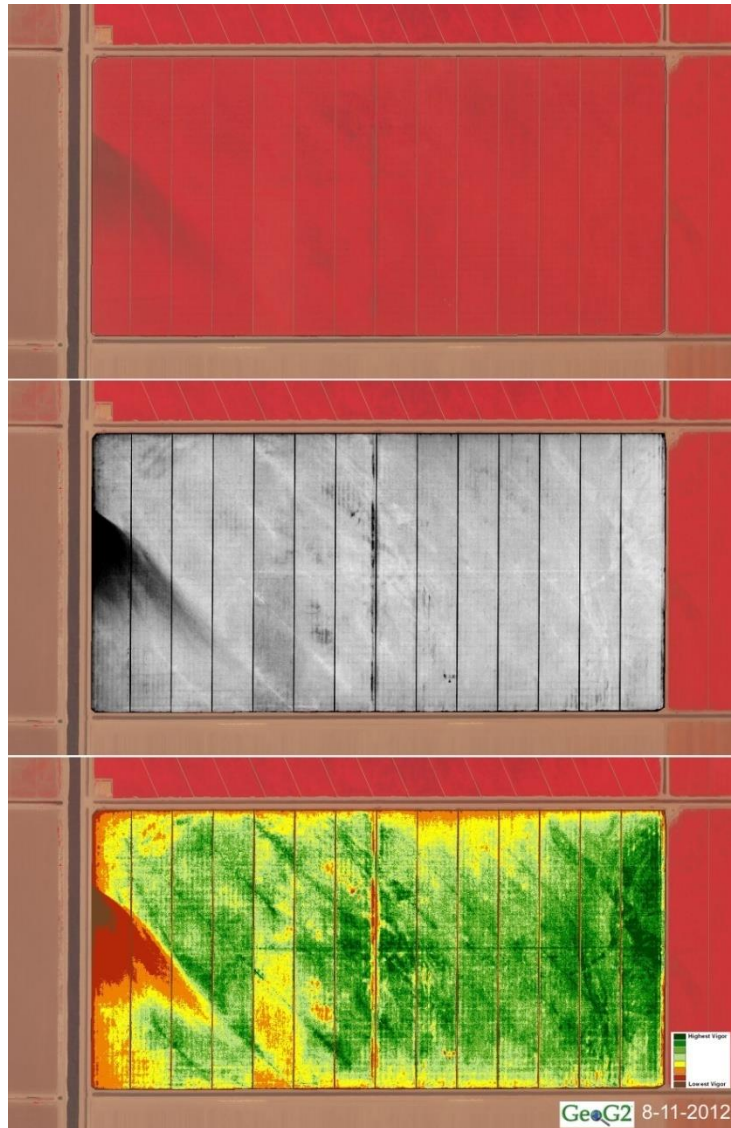
GeoG2™



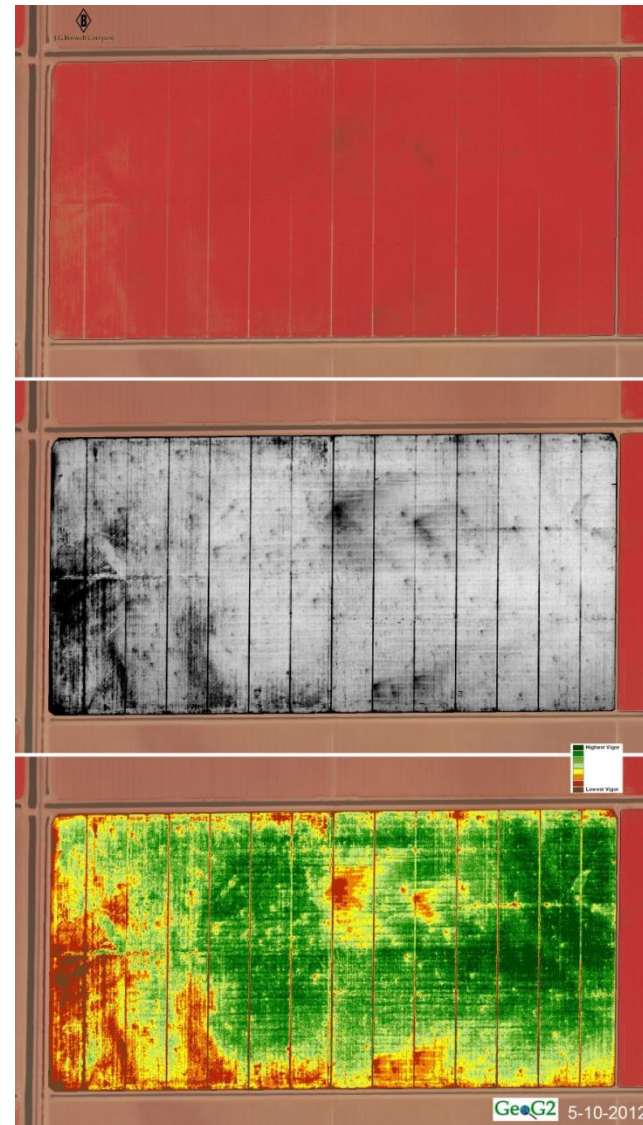
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Example (Drift and Disease)

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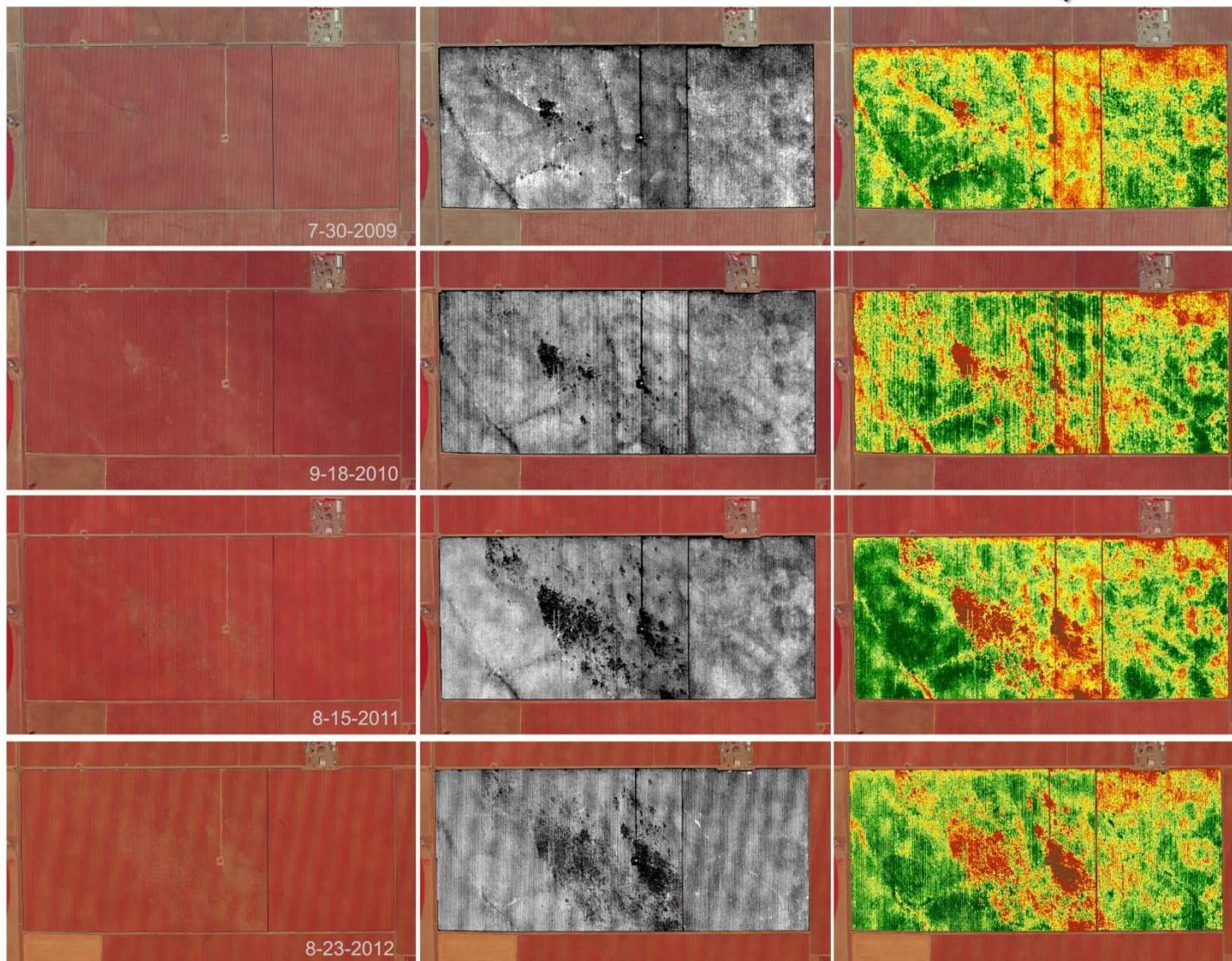
Chemical Drift



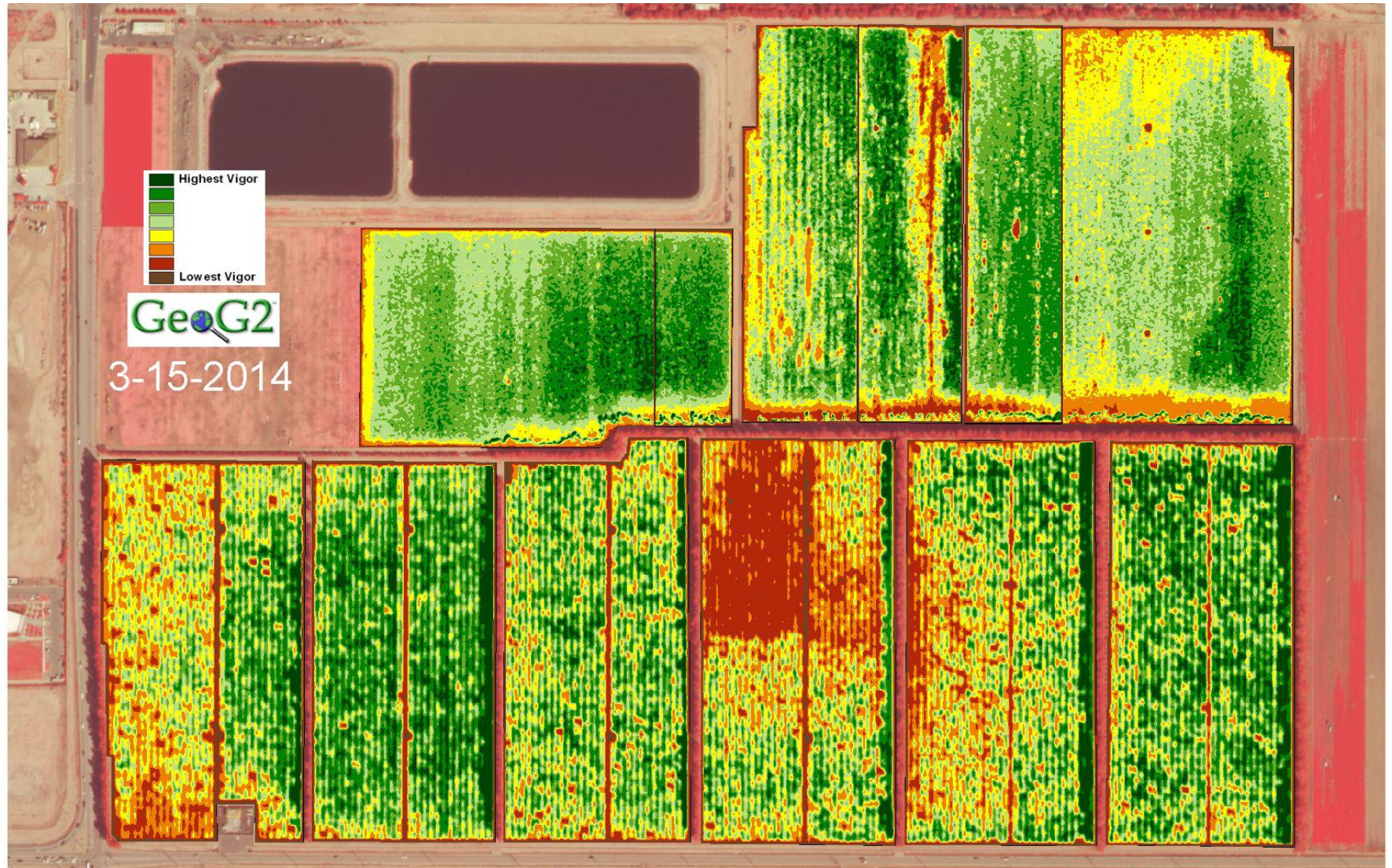
Rust in Wheat

Example 4 Year Comparison

Vineyard Comparison 2009-2012

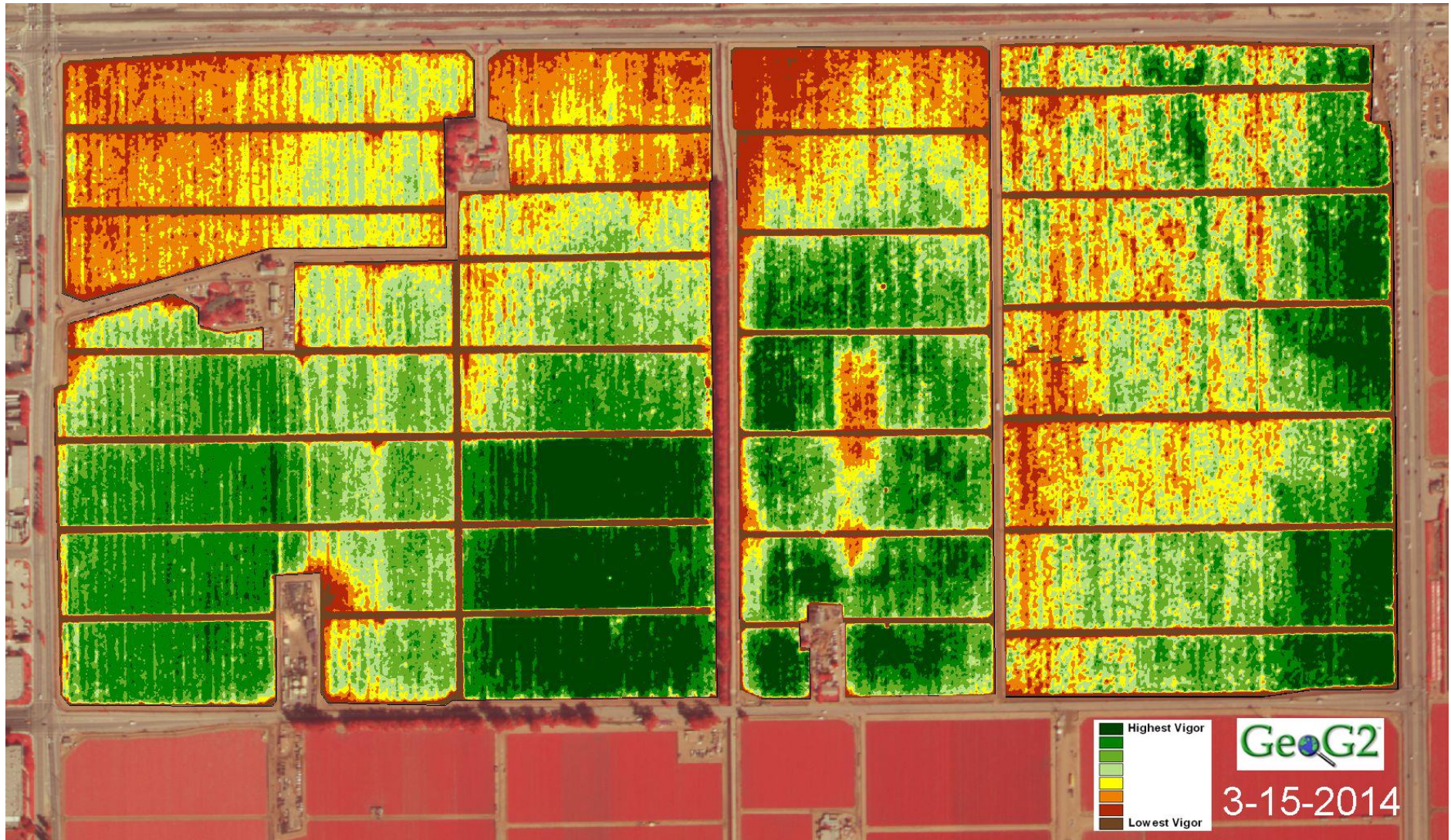


Example: Lemons & Row Crops Oxnard



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Example: Strawberries Oxnard



Example: Strawberries Oxnard



Example: Strawberries Oxnard

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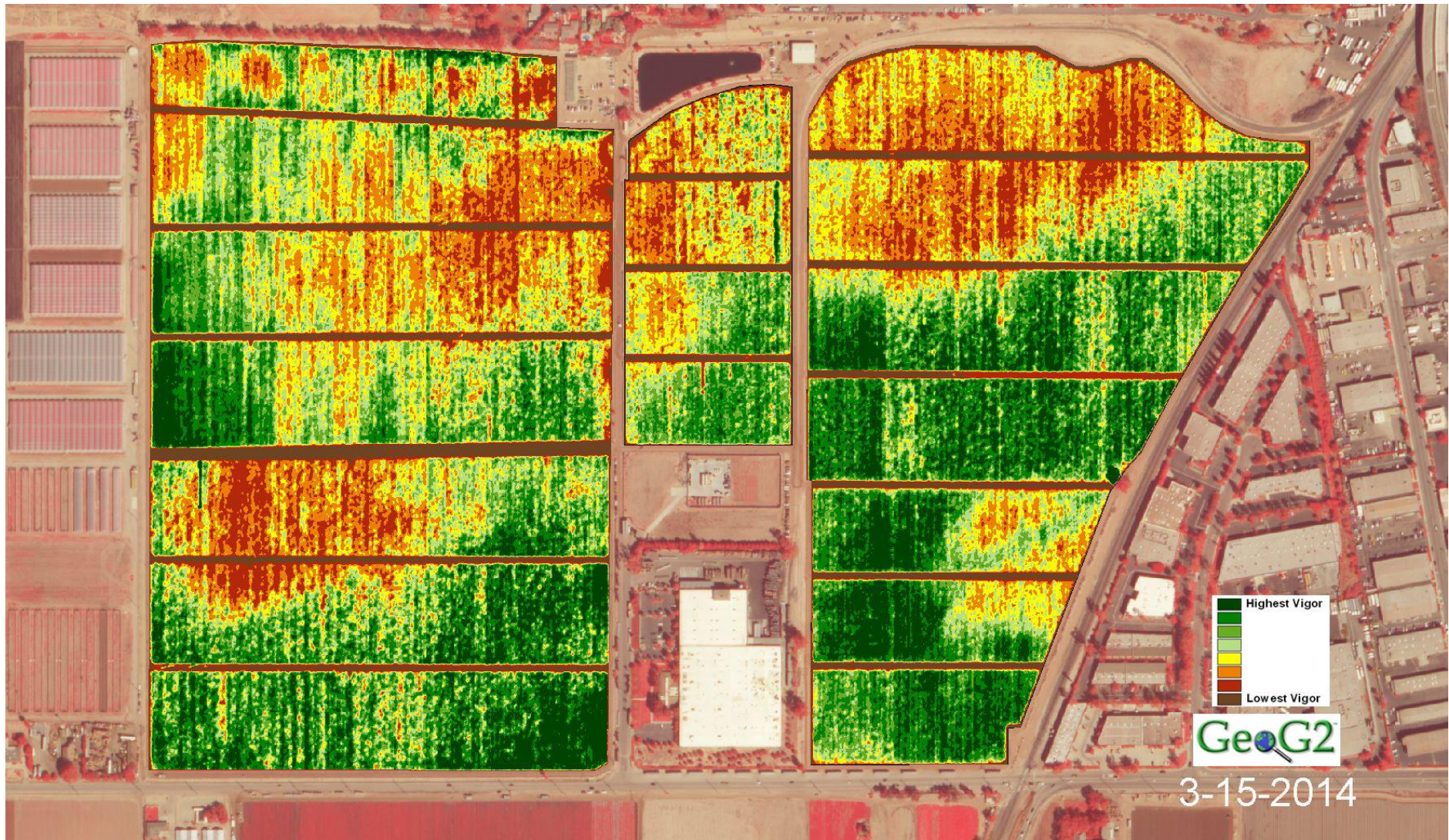
Example: Strawberries Oxnard



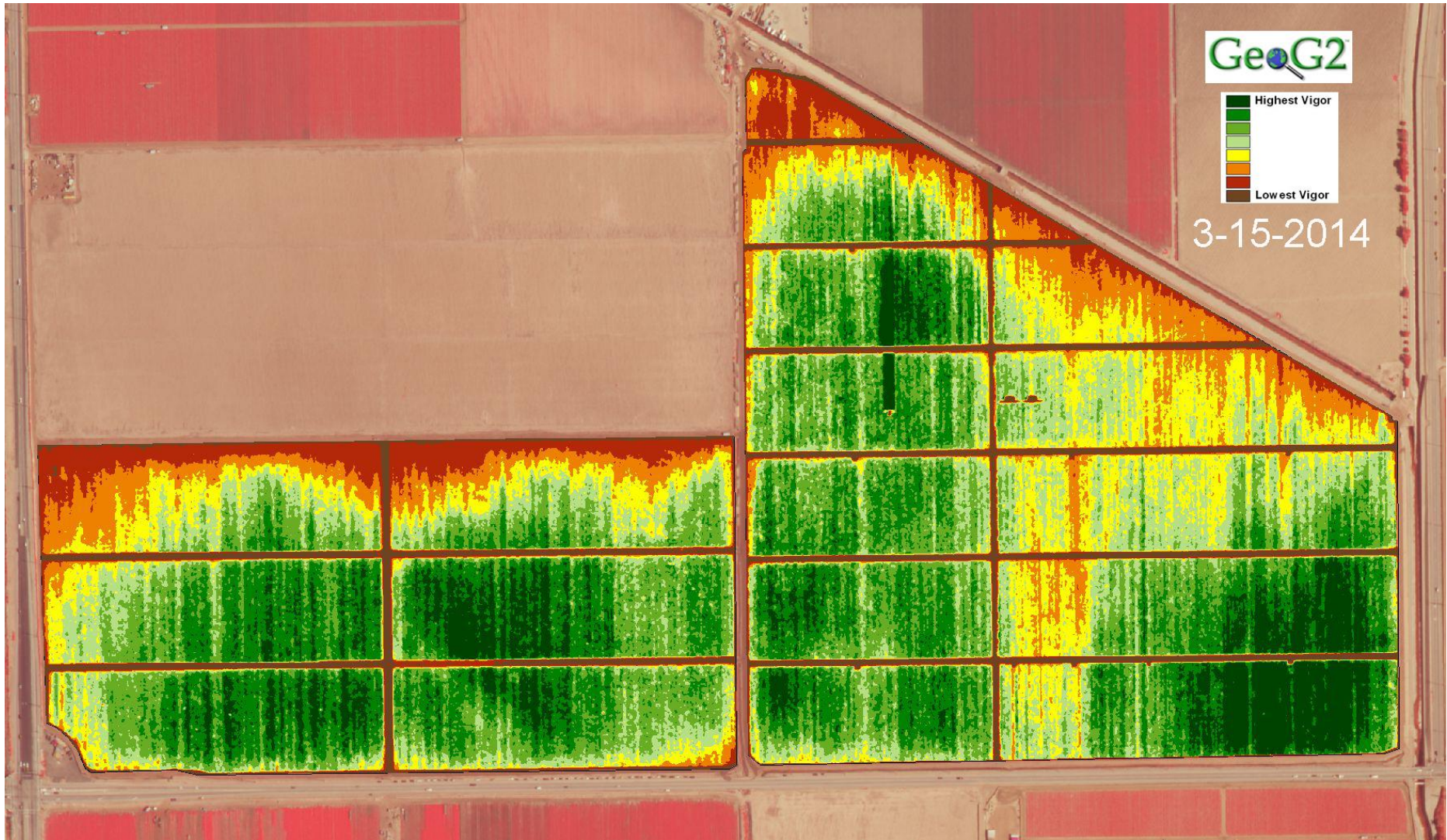
Example: Orchard & Strawberries Oxnard



Example: Strawberries Oxnard

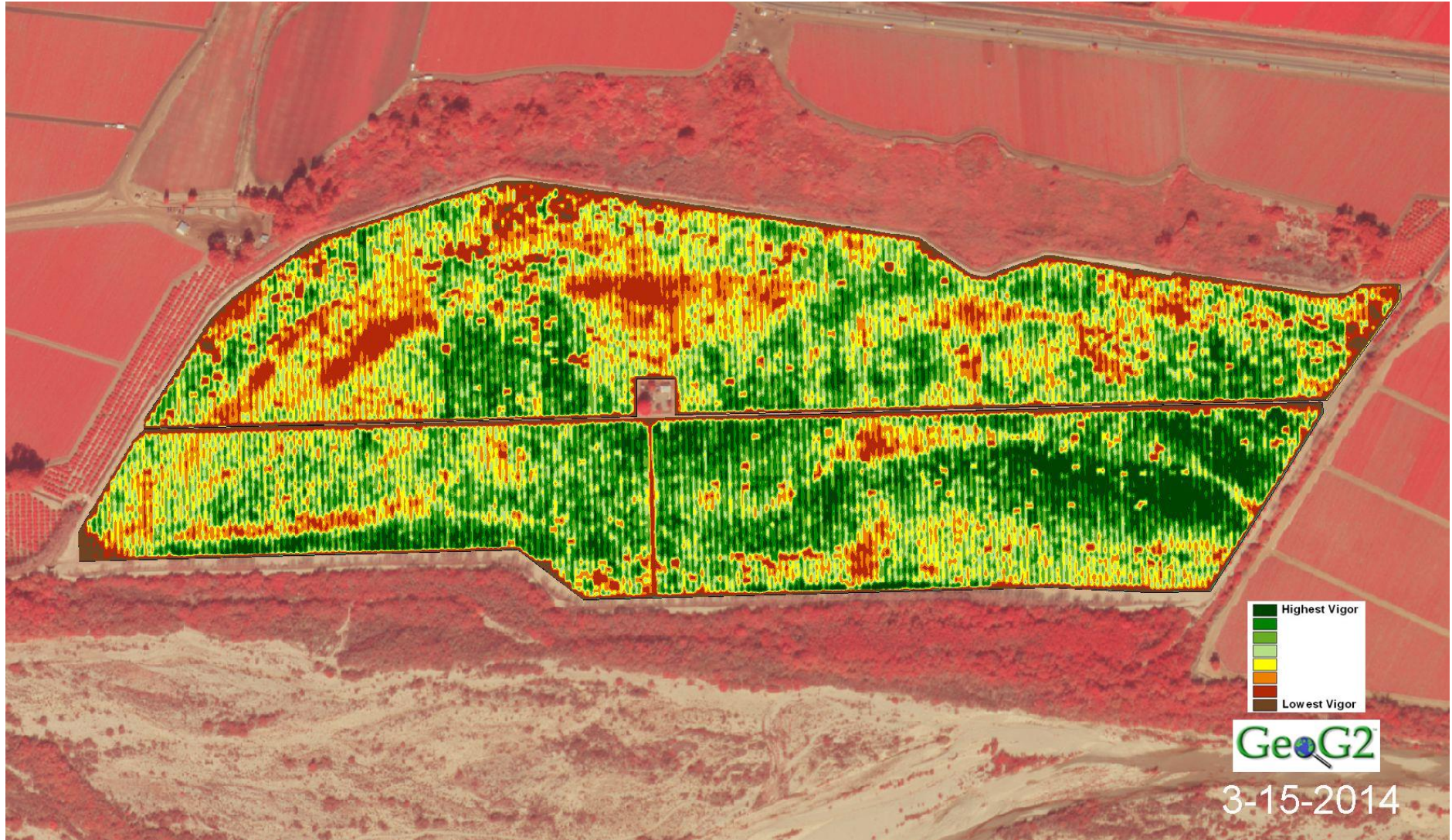


Example: Strawberries Oxnard

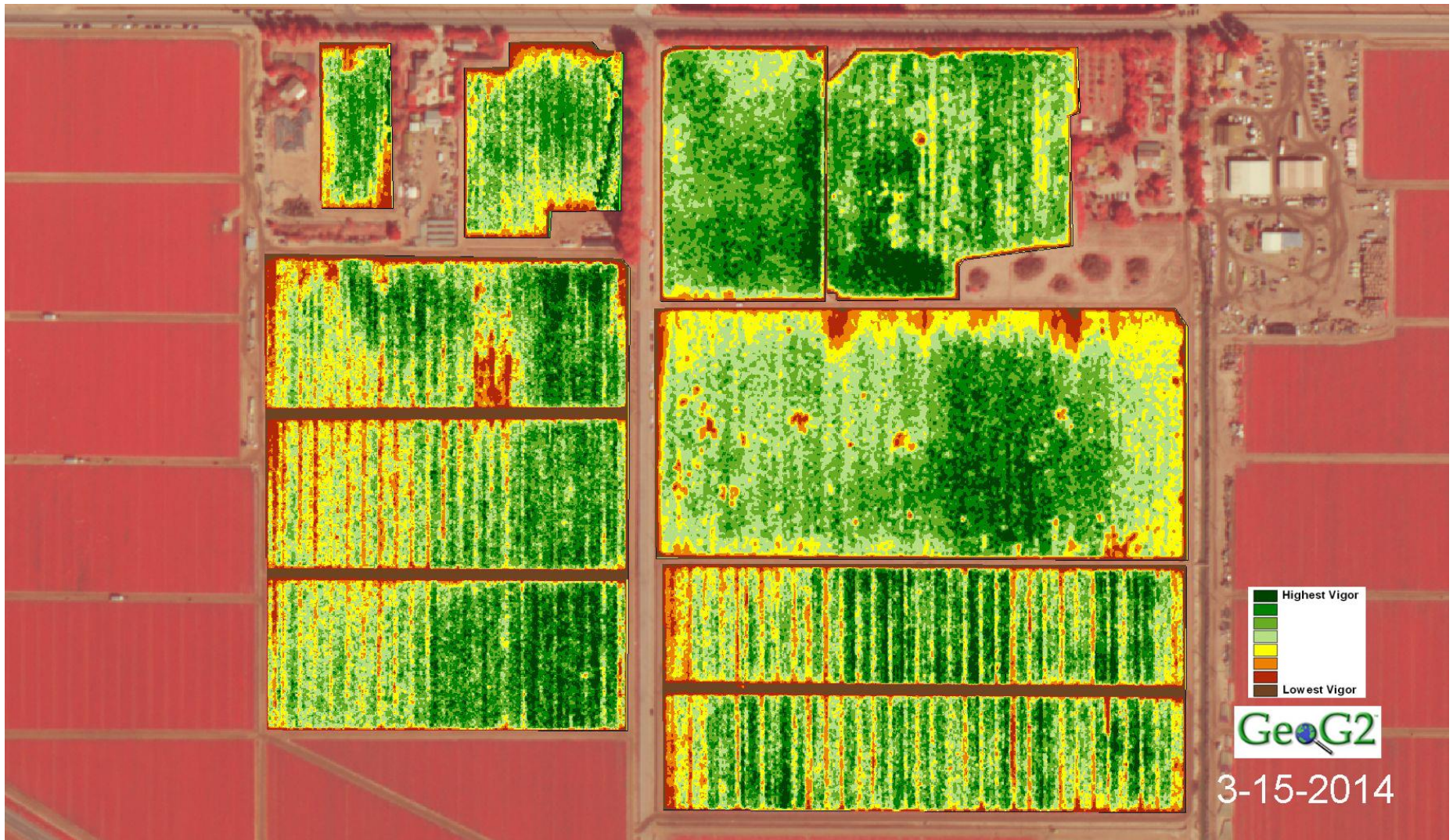


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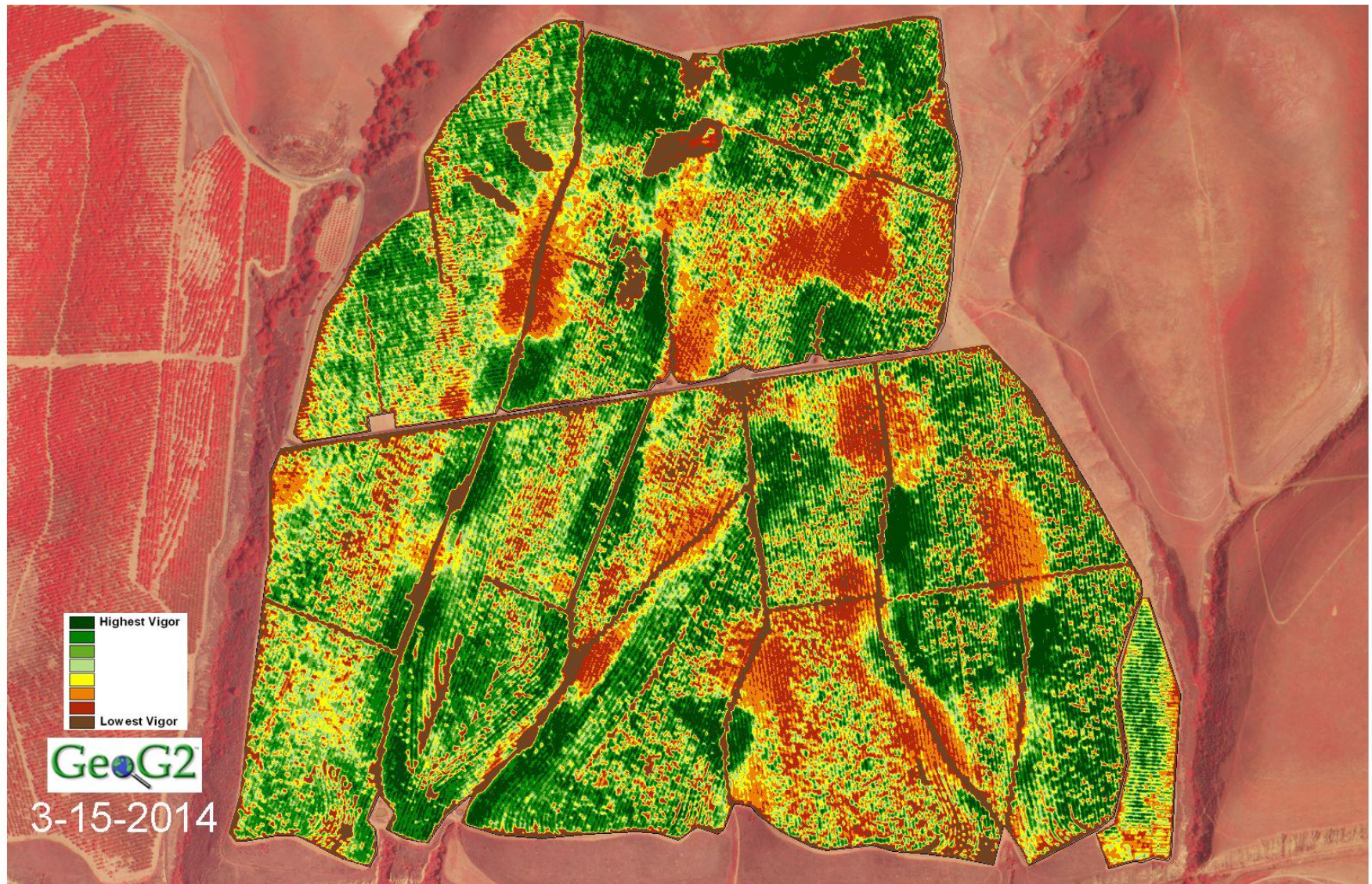
Example: Orchard Oxnard



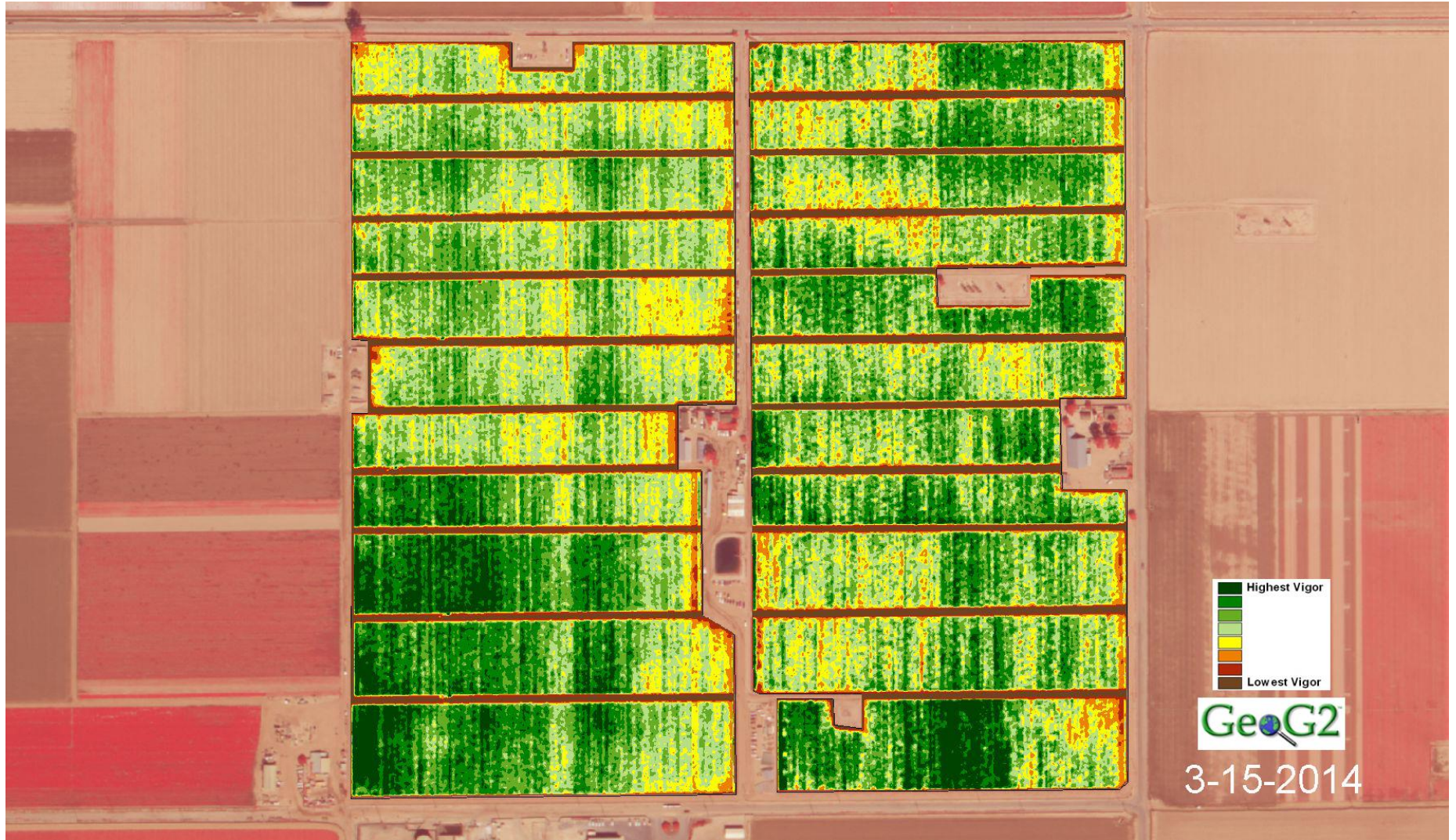
Example: Row Crops & Strawberries Oxnard



Example: Orchard Santa Maria



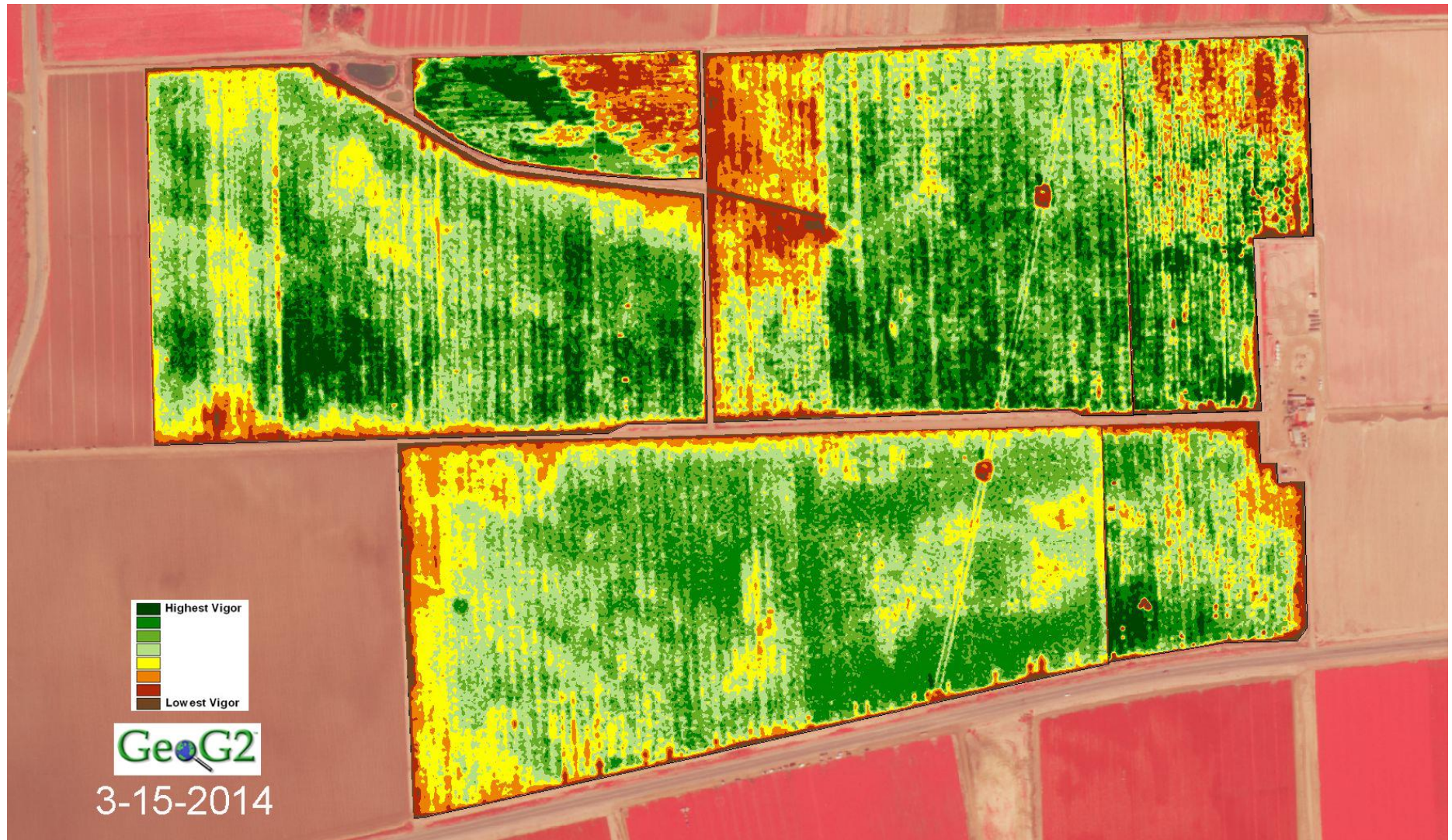
Example: Strawberries Santa Maria



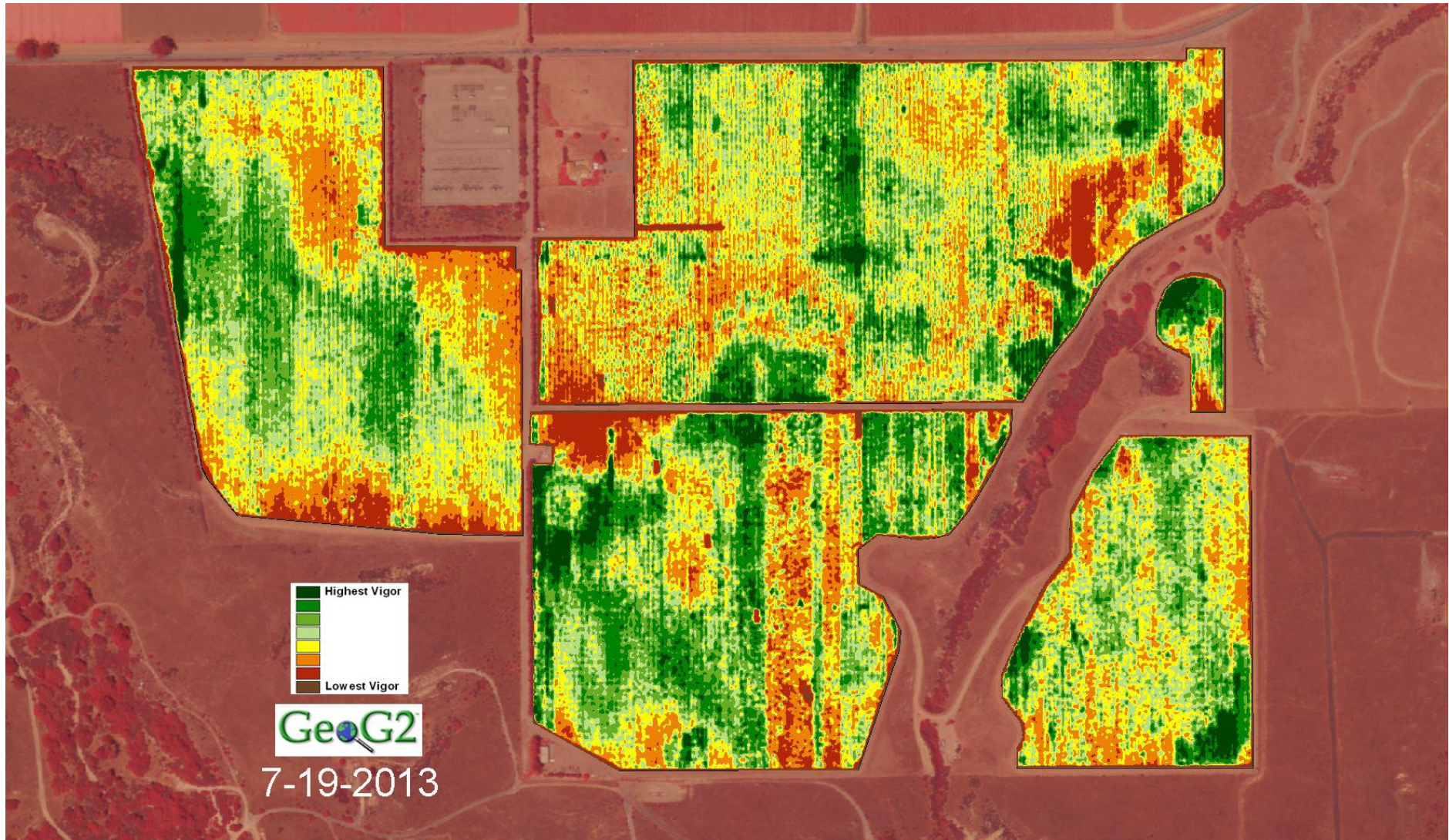
Example: Row Crops Santa Maria



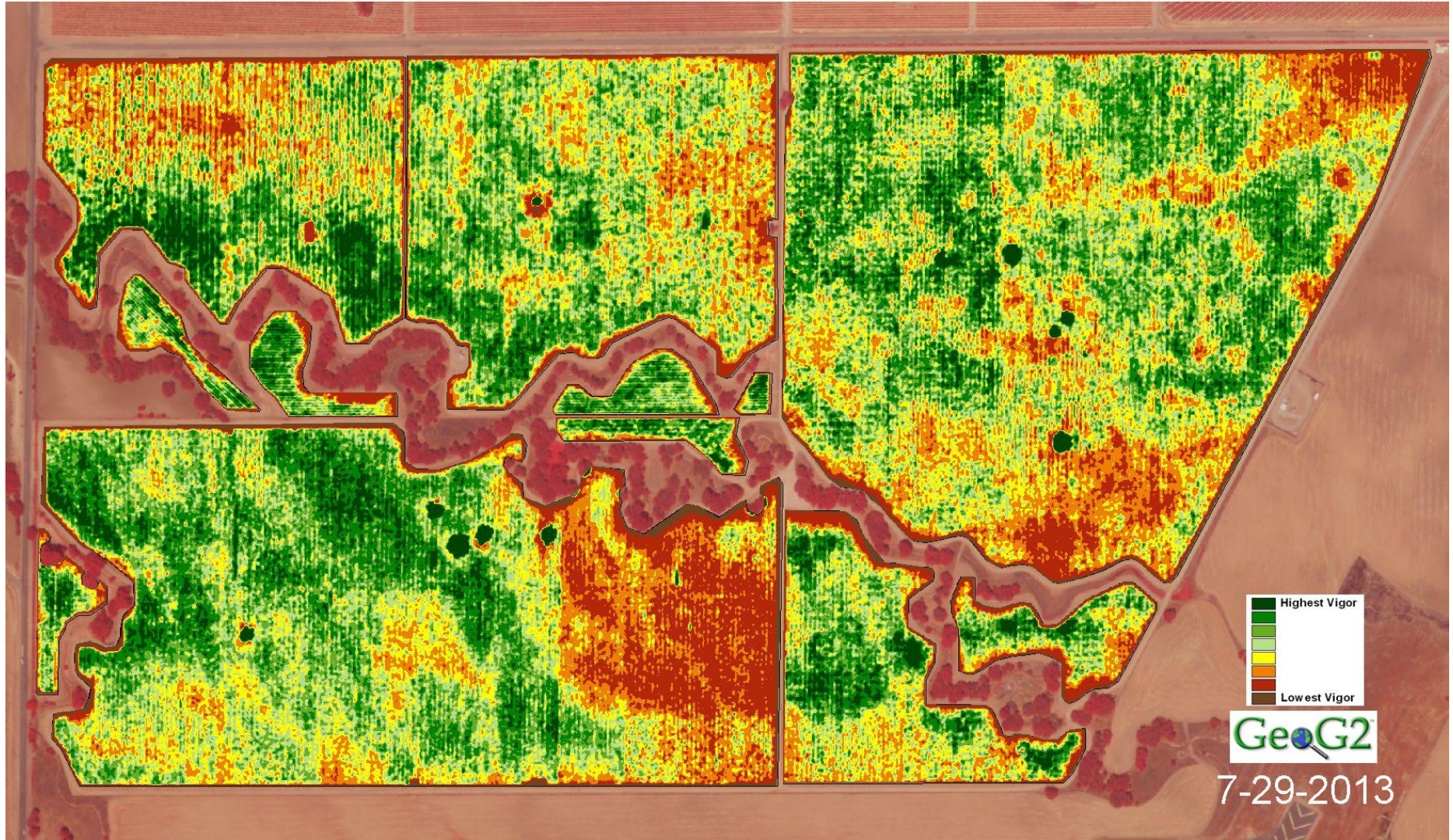
Example: Row Crops Santa Maria



Example: Vineyard Santa Maria

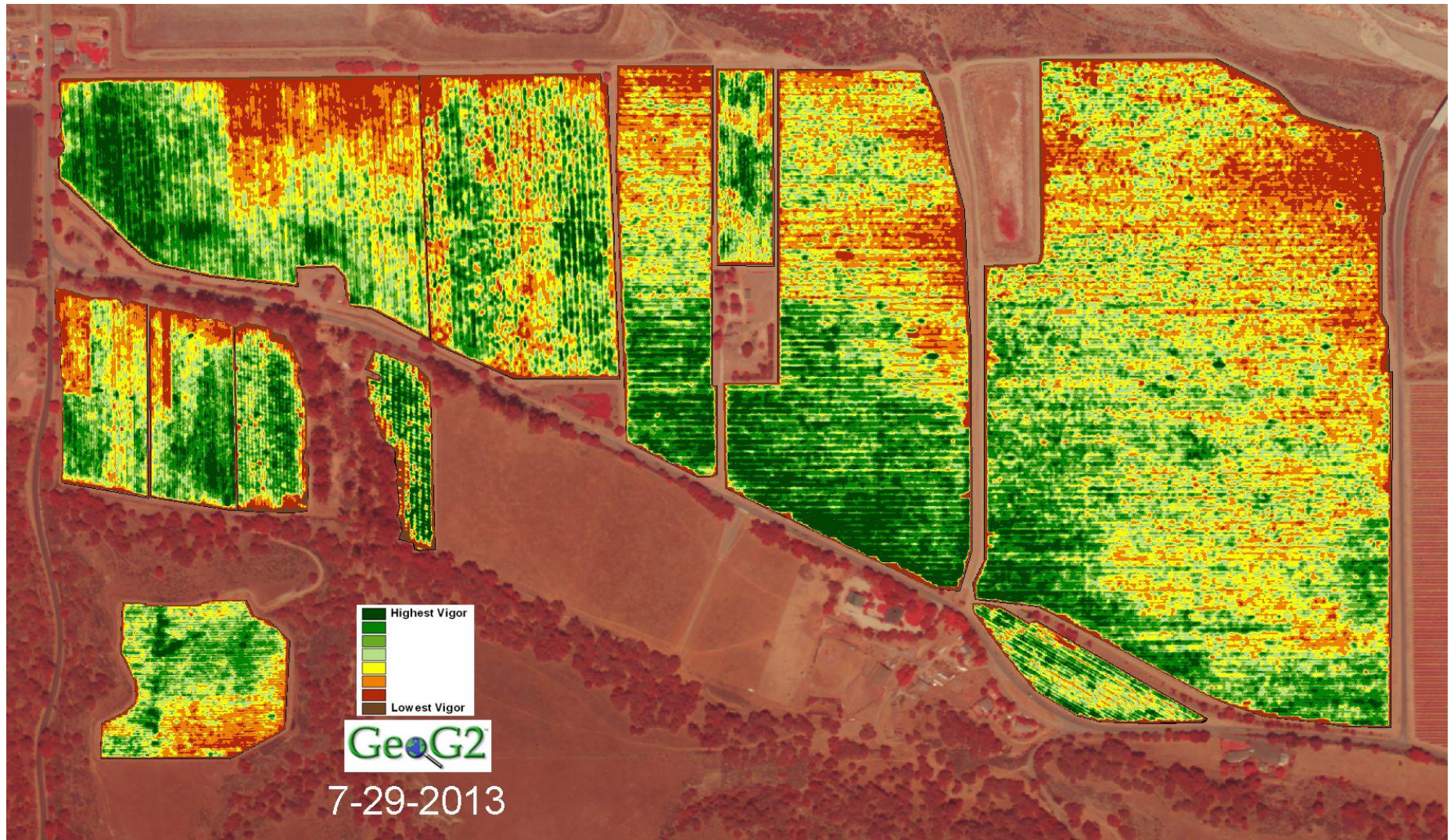


Example: Vineyard Paso Robles

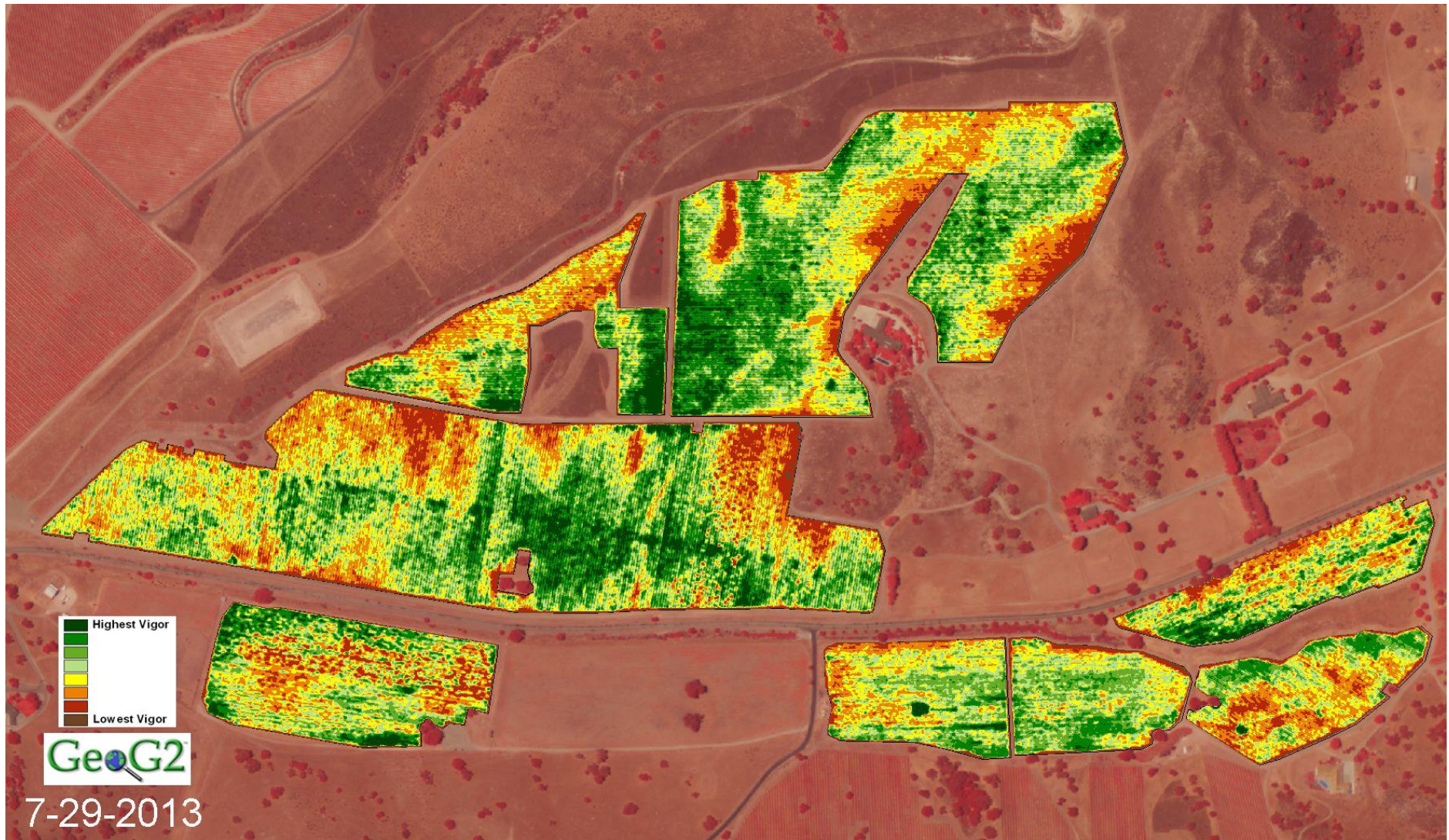


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Example: Vineyard Santa Maria



Example: Vineyard Los Alamos

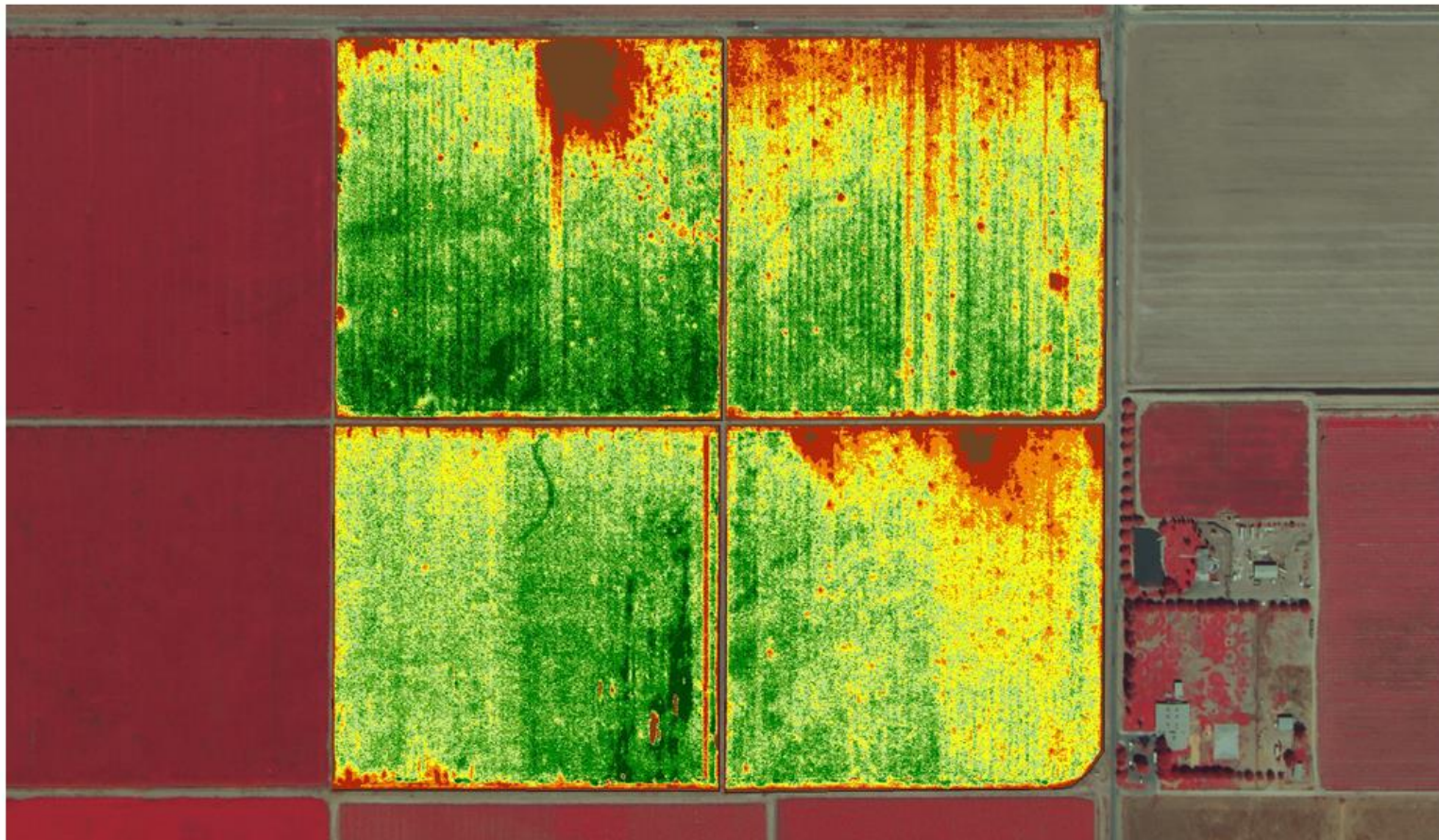


Example Field Corn Los Banos, CA

Los Banos (East)
SW Rd. 4 & Ave 21
9-21-2010

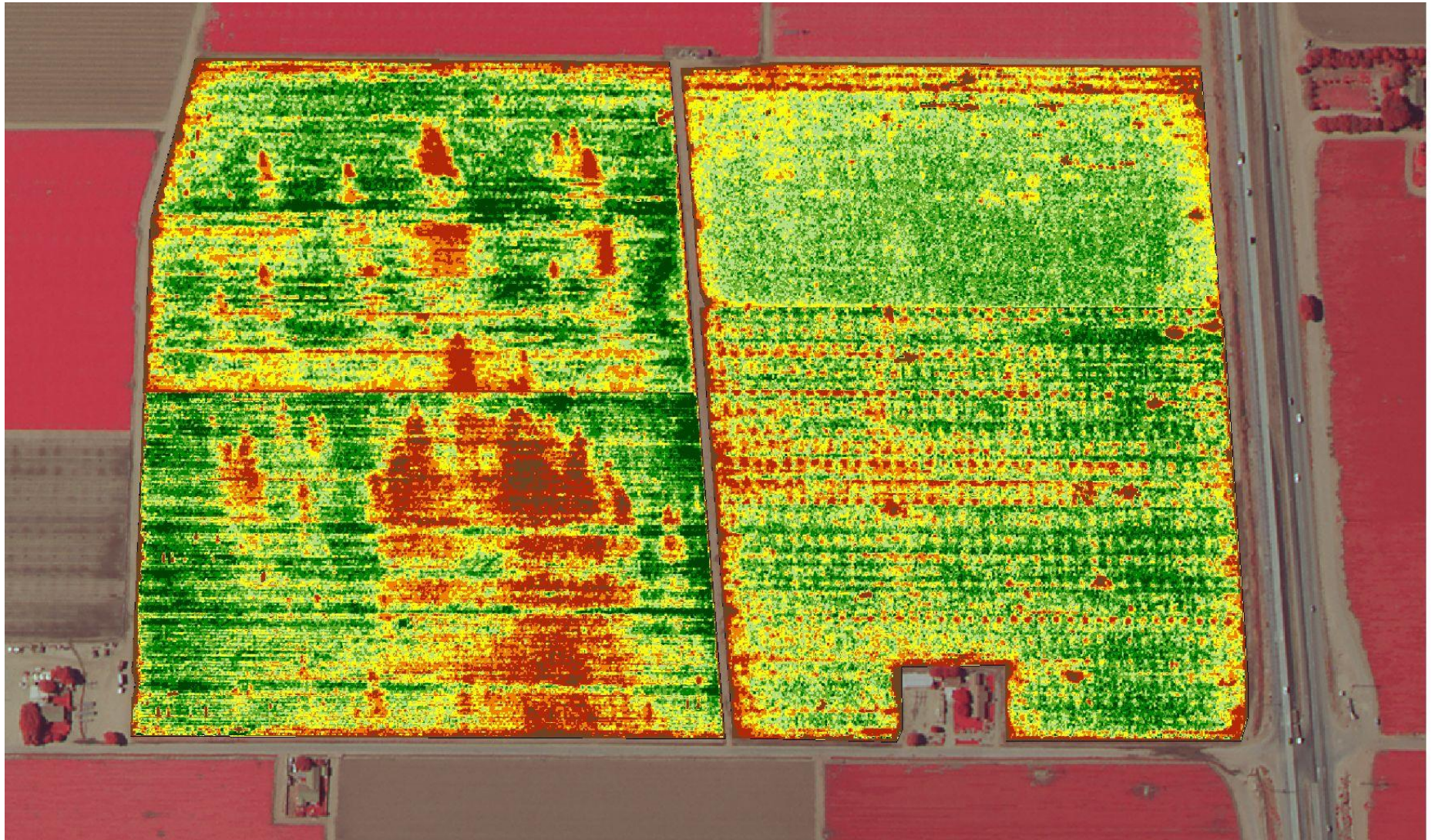


GeoG2



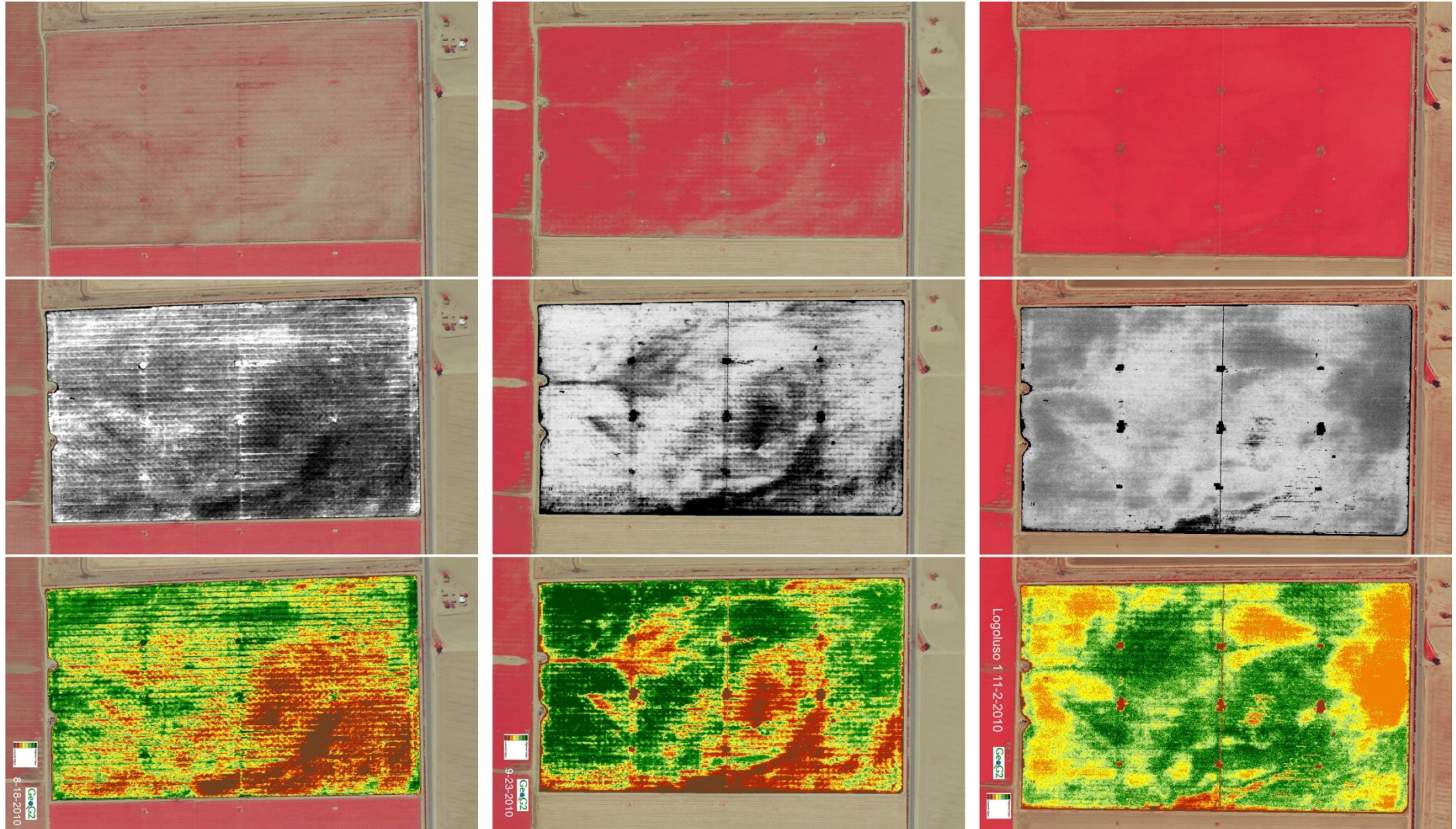
Field Corn

Example: Pepper and Broccoli Salinas, CA

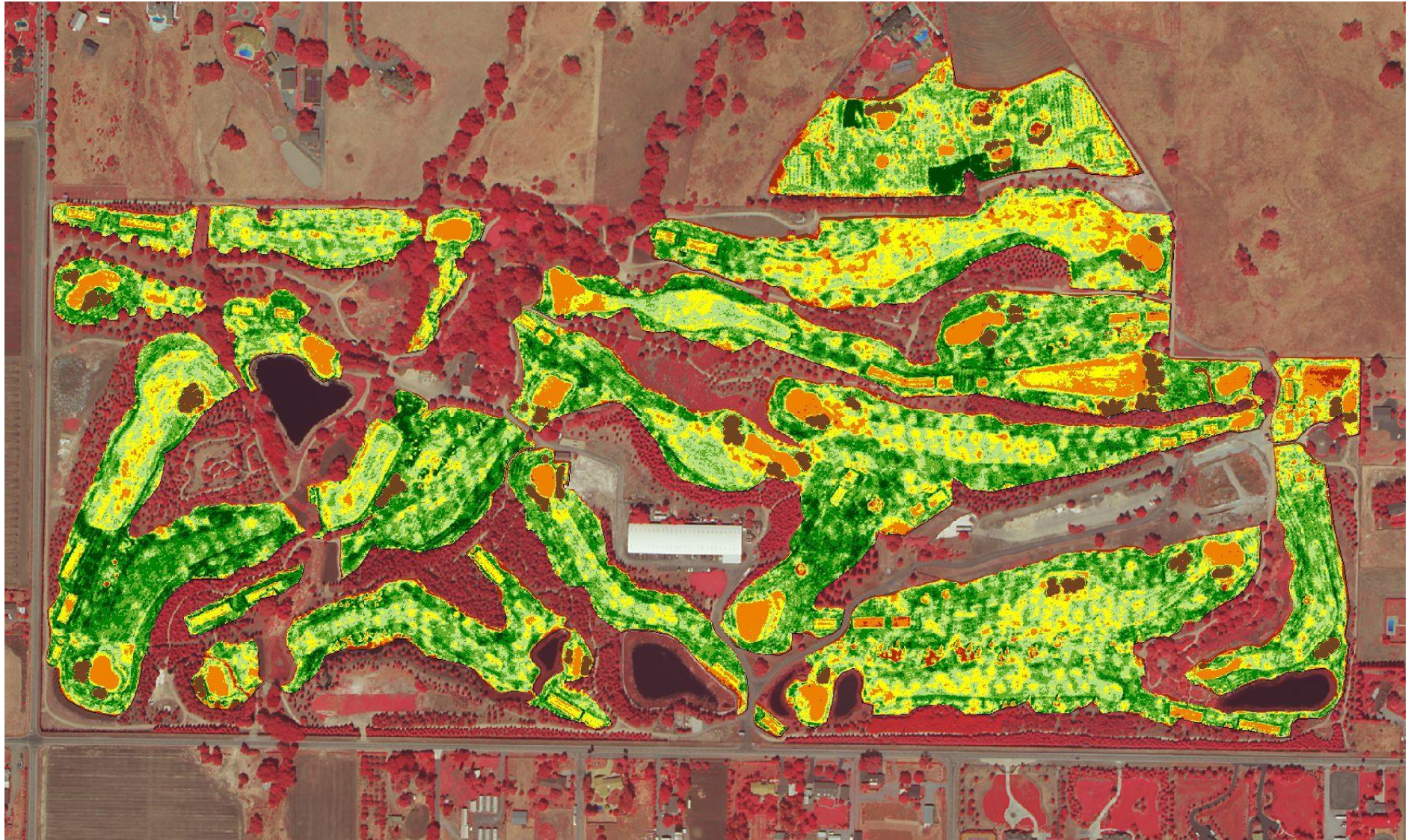


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Image Example: Growth Cycle in Carrots



Example: Golf Course San Martin, CA



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Example (Disaster Response)

San Bruno pipeline explosion taken 10:30 AM the following morning



Conclusion

Thank you
Questions?