Geo Spatial Analysis for Imagery Program Management

Kent Williams
USDA Farm Service Agency
Objectives of Analysis

   - Image collection out-of-season
     - Identify percent out-of-season by unit area
     - Identify areas that are difficult to collect

2. Identify causes for out-of-season image acquisition
   - Opportunities to improve
NAIP Imagery
Supporting USDA Farm Service Agency Mission Objectives

**FSA Mission Objective**

- Assess/Validate current year crop/and use practices
  - Commodity/Conservation program “compliance”

- Maintain farm records for
  - Common Land Unit -CLU
  - (farm field boundaries)

**Metric**

- Image acquisition within crop growing season

- Percentage of annual coverage of CONUS
  - Goal was annual coverage
NAIP Imagery Acquisition

Season Start Dates

• “Best Value” contracts
  • Specify product, not method
  • Acquisition windows defined by local (state) FSA program specialists
  • Two 5-Year IDIQ contracts

• Highly experienced contractors
  • Bid on task awards for coverage of States
  • Well aware of factors impacting collection with seasons

• Performance over 10 years of the contract is good indicator of difficulty of collection with seasons
Acquisition Season Windows

Season Start Dates

- April
- May
- June
- July
- August
- September

Map showing the acquisition season windows for different months across the United States.
Acquisition Season Windows

Season Length

- April
- May
- June
- July
- August
- September

Map showing the season length across different regions of the United States.
Acquisition out of Season

Percent Out of Season by Unit

Percent Out

- 1% - 5%
- 15% - 24%
- 25% - 36%
- 37% - 48%
- 56% - 73%
Acquisition out of Season
Different Start Dates

Percent Out-of-Season

- 1% - 5%
- 15% - 24%
- 25% - 36%
- 37% - 48%
- 56% - 73%

April 15
June 25
Acquisition out of Season

Areas that are difficult to acquire - NAIP 2007-2016

Years
Out-of-Season

- 3 Years
- 4 Years
Geospatial Analysis

Workflow

Data Prep
- Normalize data

Spatial Selection
- Select by location
- Union

Table/DB
- Add field to table
- Calculate % Out

Visualize
- Mash up with other layers in 3D
- Symbolize on map
Performance Trends
Annual Collection within Season and Coverage of CONUS

- Annual Coverage
- Collection In-Season
Contributing Factors
Acquisition out-of-season

**Things we can’t control**

• Climatic
  • Snow cover
  • Cloud cover
  • Smoke cover
  • Standing water/floods

• Air Space
  • Proximity to airports

• Industry Trends

**Things we can control**

• Late starts
  • Due to funding delays

• Flying Seasons
  • Length
  • Start
Geospatial Analysis/Visualization

Acquisition Out-of-Season

Climatic/Terrain

4 Years Out

NW Wyoming
Geospatial Analysis/Visualization

Acquisition Out-of-Season

Land Ownership

- Cropland
- USFS
- BLM
- NPS
- 4 Years Out

NW Wyoming
Geospatial Analysis/Visualization

Acquisition Out-of-Season

Airspace

- 25 Busiest Airports
- 50 Mile Buffer
- 3 Years Out
- 4 Years Out
Geospatial Analysis/Visualization

Acquisition Out-of-Season

Southern Nevada

Airspace

- Restricted
- McCarran AP
- 4 Year Out
Geospatial Analysis/Visualization

Acquisition Out-of-Season

Southern Nevada
Industry Trends
Increasing Spatial Resolution

![Graph showing increasing spatial resolution over years]

- **Spatial Resolution**
- **Collection In-Season**
Actions Indicated
Review FSA Program Requirements for 2018 and Out Years

In-season still Important

• Incentive AOIs within states
  • Specific to FSA user needs

• Supplemental/Alternative image collection platforms

In-season not important

• Adjust seasons
  • Longer seasons
  • Earlier starts