

METRIC ET data for ESPAM

Progress Report

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ESHMC Meeting, Boise, ID
January 31, 2014

Completed

1996

2000

2002

2006

2008

2009

Working

1986

1992

2010

2011

Next

2013

2013 METRIC Contract

Stage 1

Standard procedures

Stage 2

Develop procedures for applying the Spatial and Temporal Adaptive Reflectance Fusion Model (STAR-FM) or similar model using Landsat and MODIS or VIIRS to help fill in gaps in time caused by cloudy Landsat images

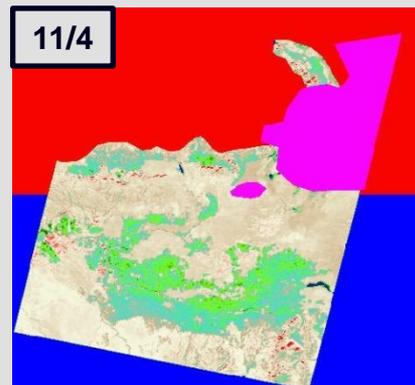
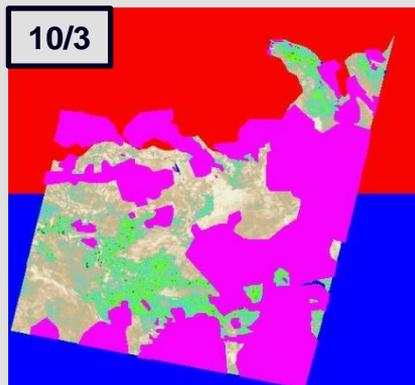
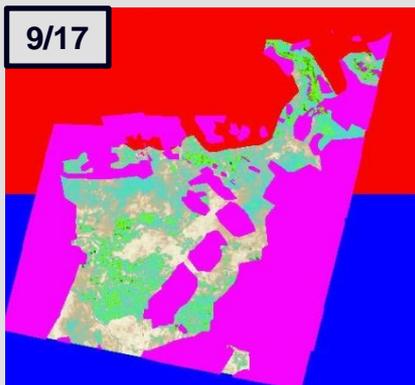
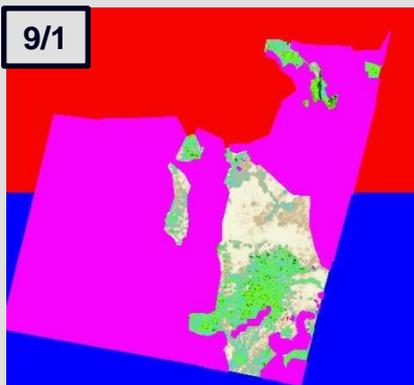
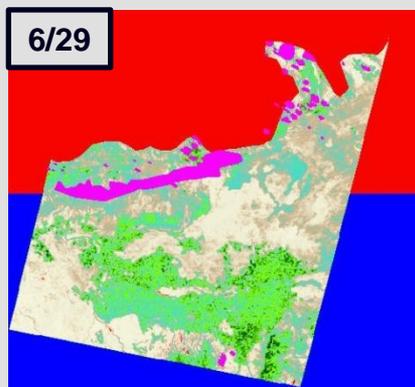
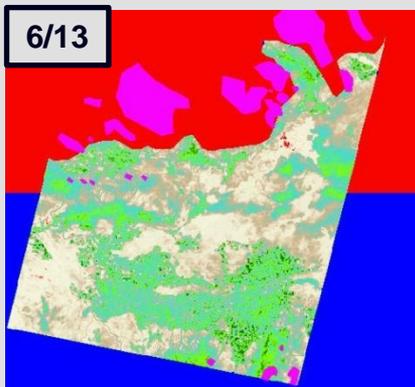
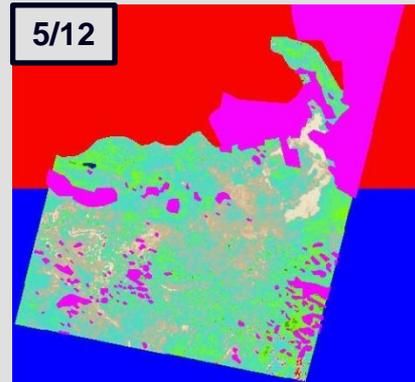
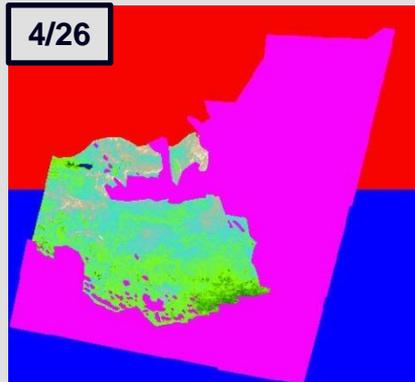
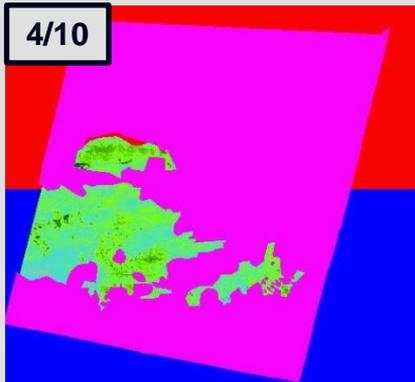
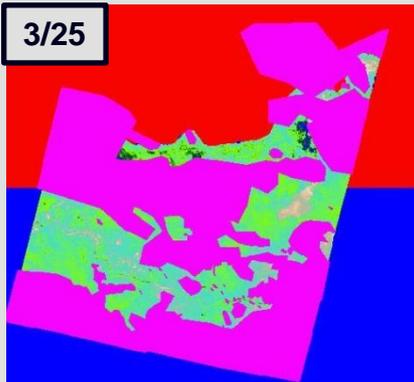
Also update ET Idaho through 2013

Cloud Cover Problems 1986

Landsat 1986 path 40

with cloud mask

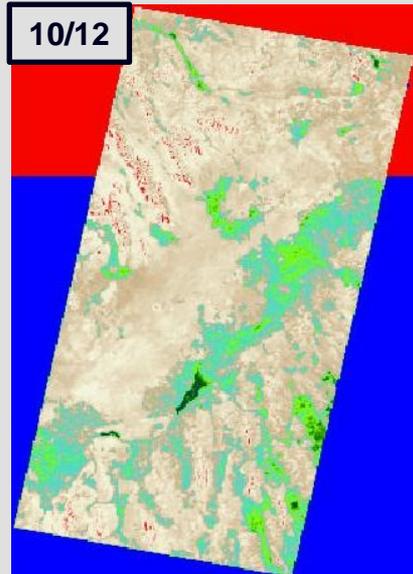
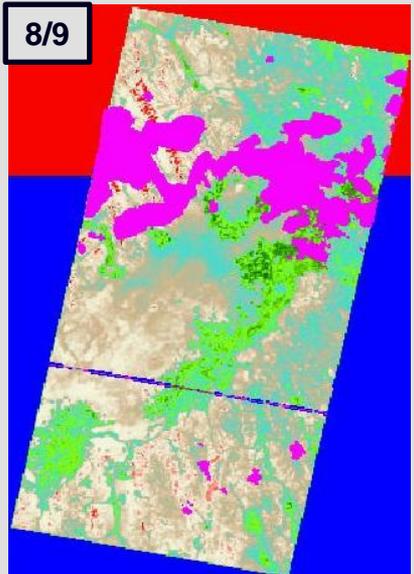
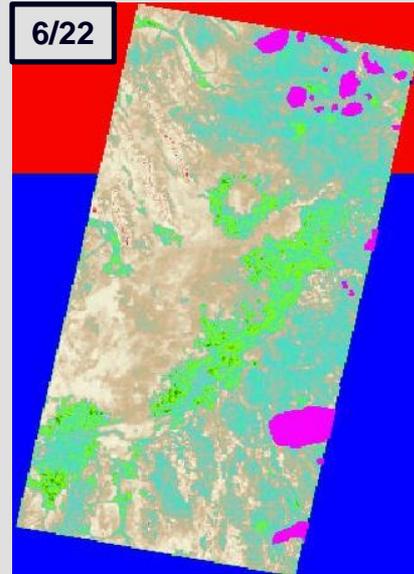
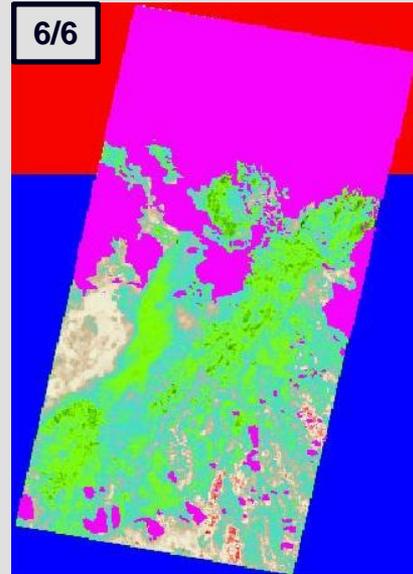
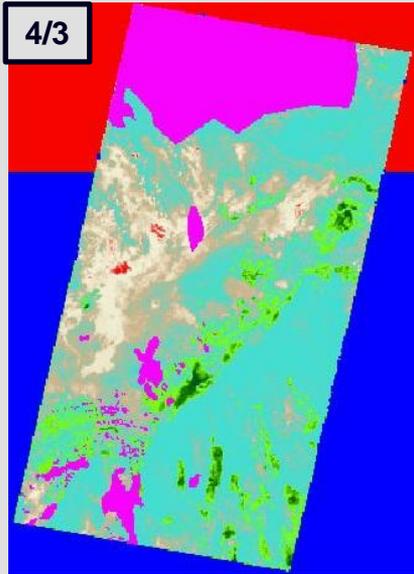
100% cloudy:
7/15, 8/16,
10/19.



Landsat 1986 path 39

with cloud mask

100% cloudy:
5/5, 5/21, 7/8,
7/24, 8/25, 9/26,
10/28.

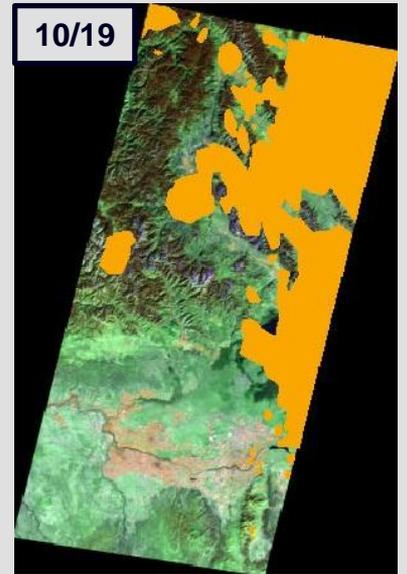
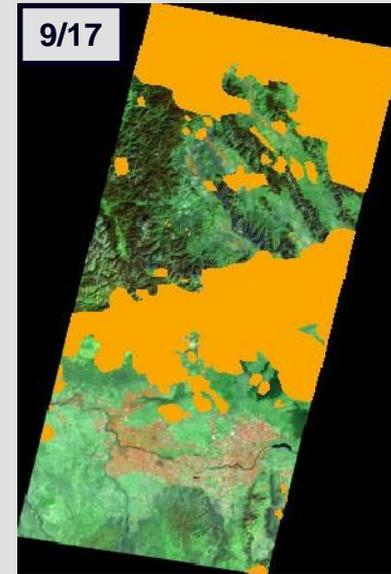
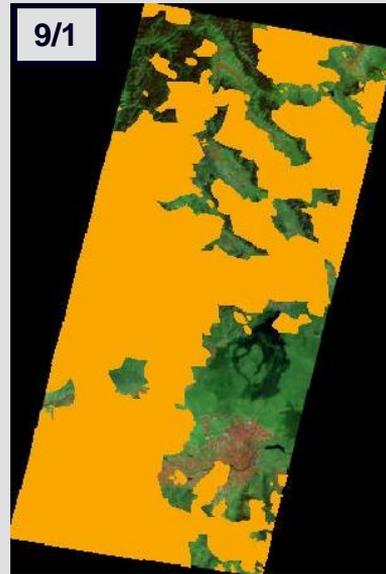
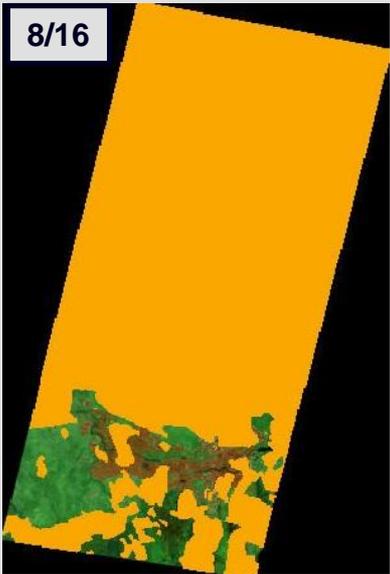
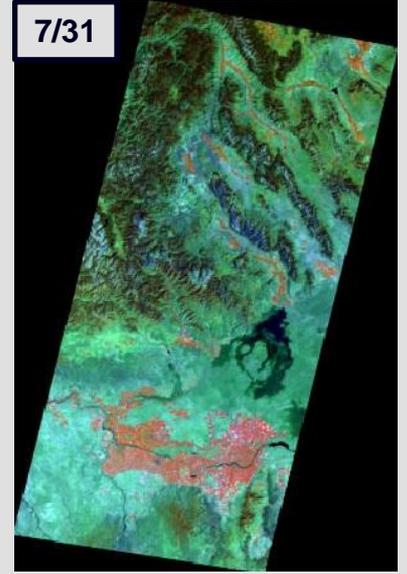
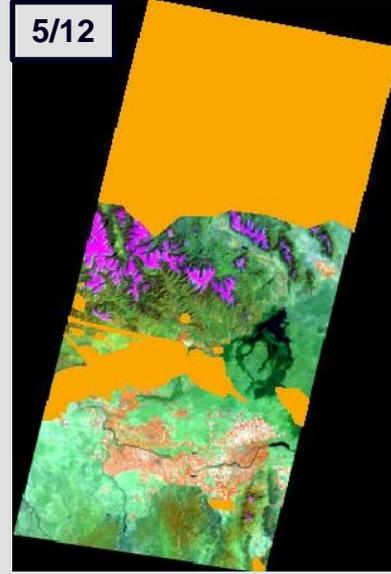
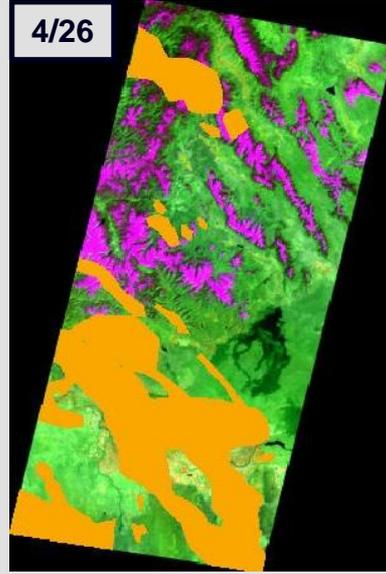
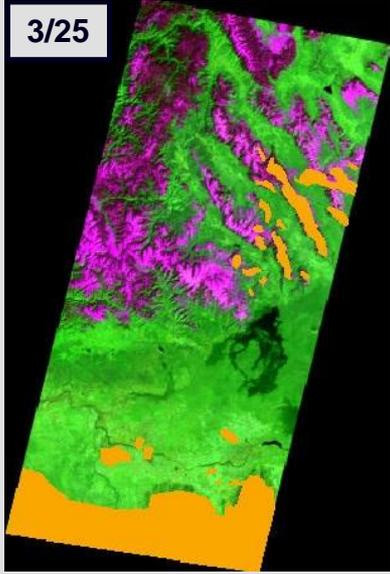


Cloud Cover Problems 1992

Landsat 1992 path 40

with cloud mask

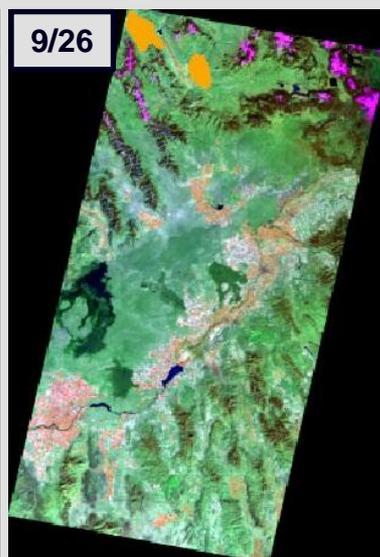
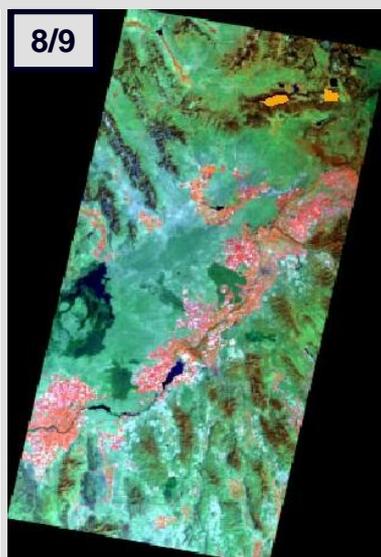
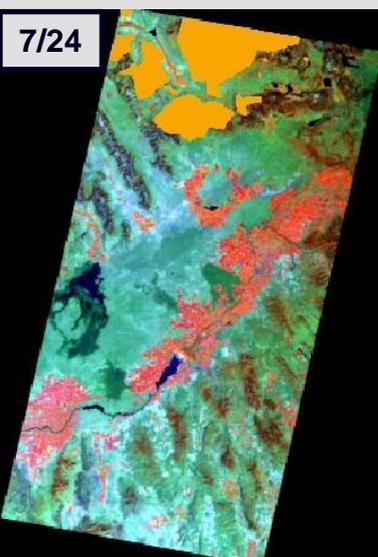
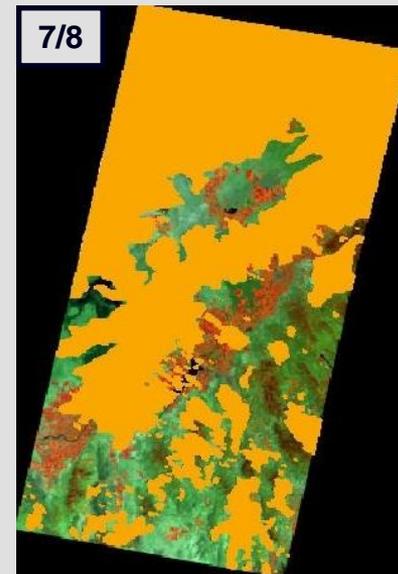
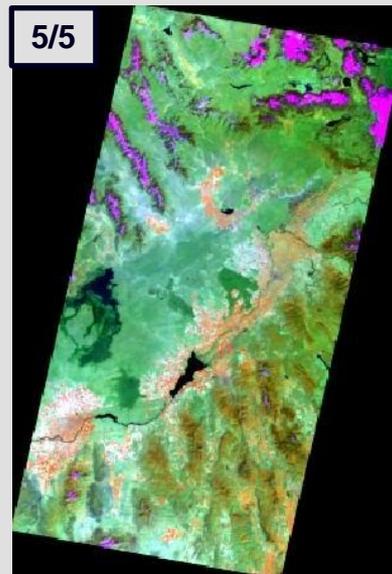
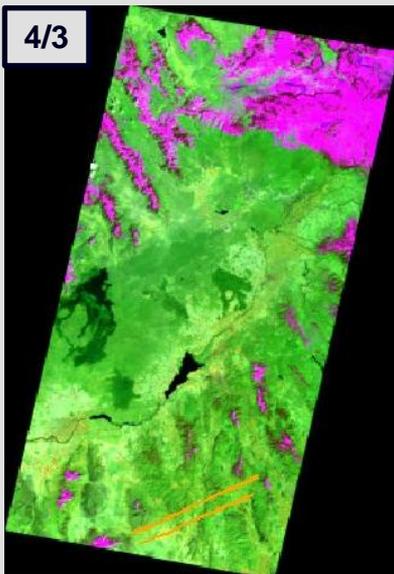
100% cloudy:
4/10, 5/28, 6/13,
6/29, 7/15, 10/3,
11/4.



Landsat 1992 path 39

with cloud mask

100% cloudy:
5/21, 6/6, 6/14,
6/30, 9/10,
10/28.



Other Satellites

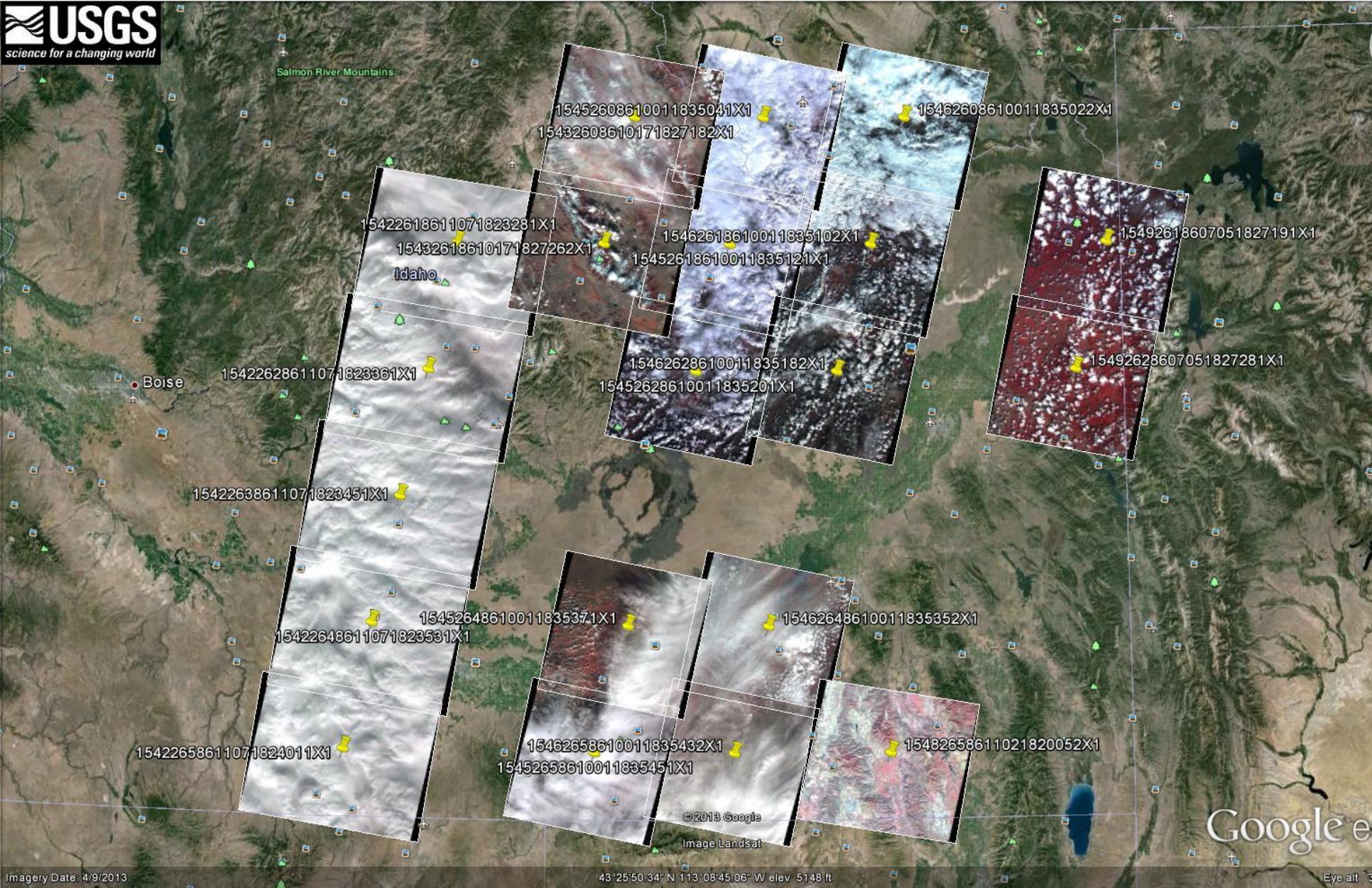
SPOT

- a) Incomplete coverage of ESPAM area
- b) 9 SPOT images cover 1 Landsat image

AVHRR

- a) Spatial resolution is 1.1 Km to 6.7 Km
- b) High cloud cover in 1986

SPOT 1986



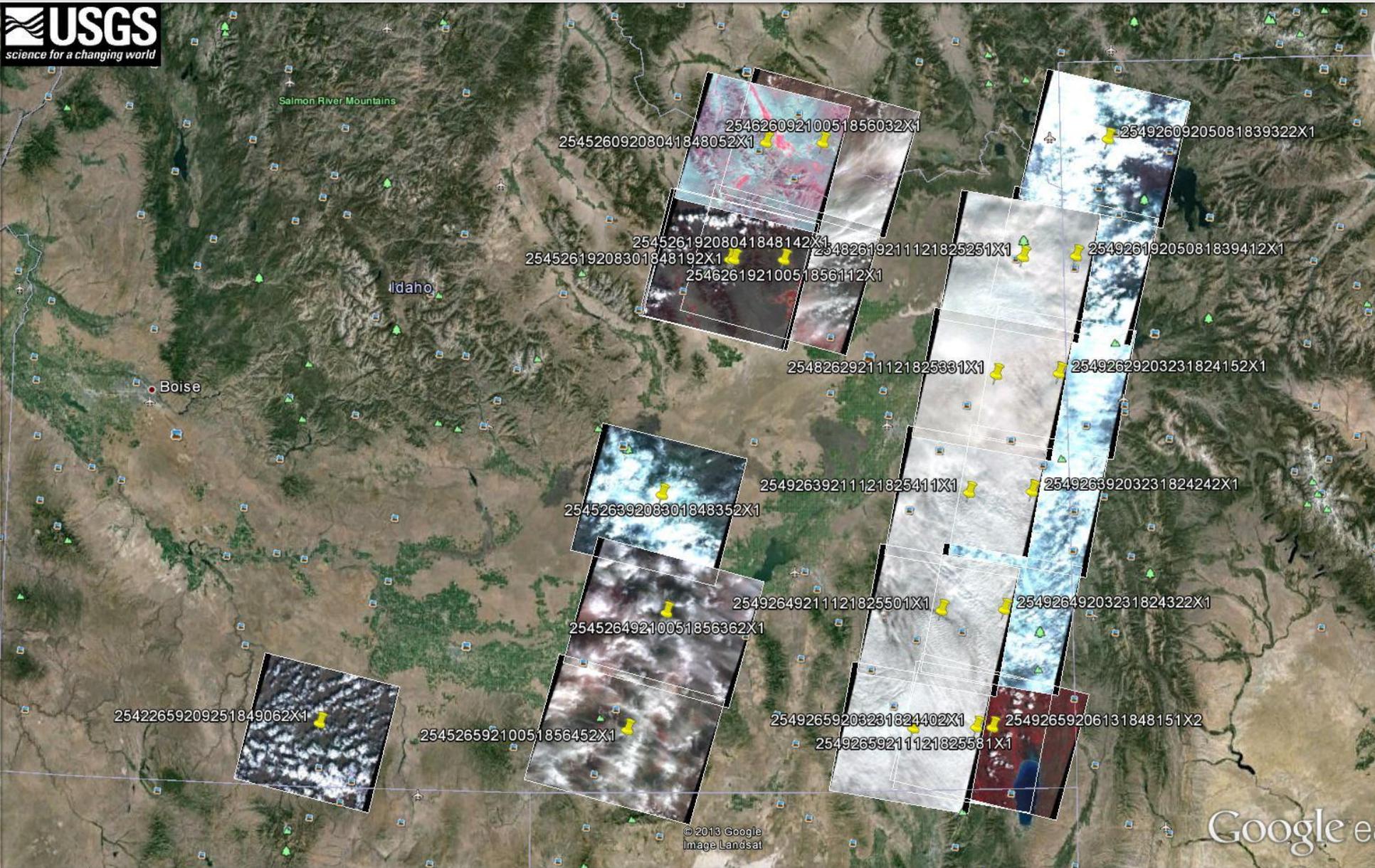
Salmon River Mountains

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- 15432608610171827182X1
- 15462608610011835022X1
- 15422618611071823231X1
- 15432618610171827262X1
- 15462618610011835102X1
- 15452618610011835121X1
- 15492618607051827191X1
- Idaho
- 15422628611071823361X1
- 15462628610011835182X1
- 15452628610011835201X1
- 15492628607051827281X1
- Boise
- 15422638611071823451X1
- 15452648610011835371X1
- 15462648610011835352X1
- 15422648611071823531X1
- 15422658611071824011X1
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Image Landsat

Google e

SPOT 1992

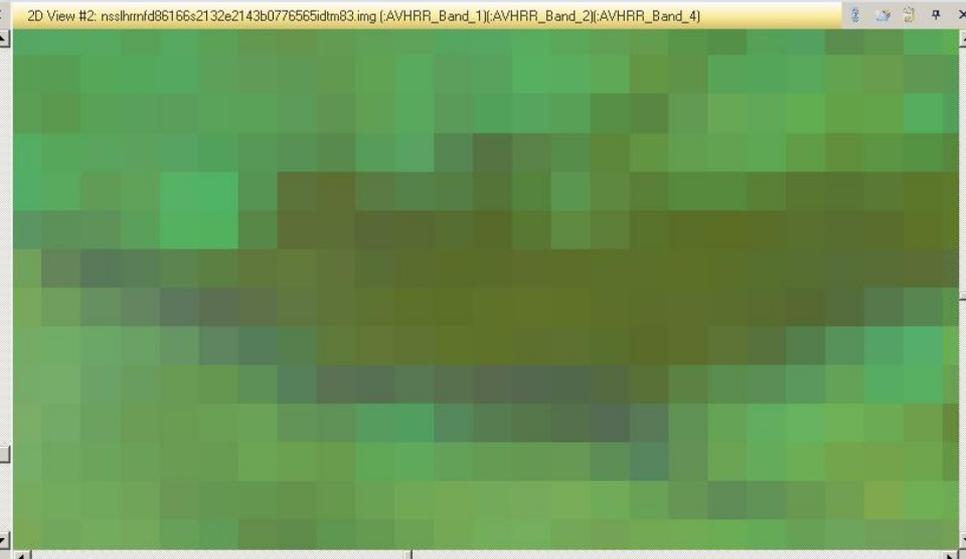
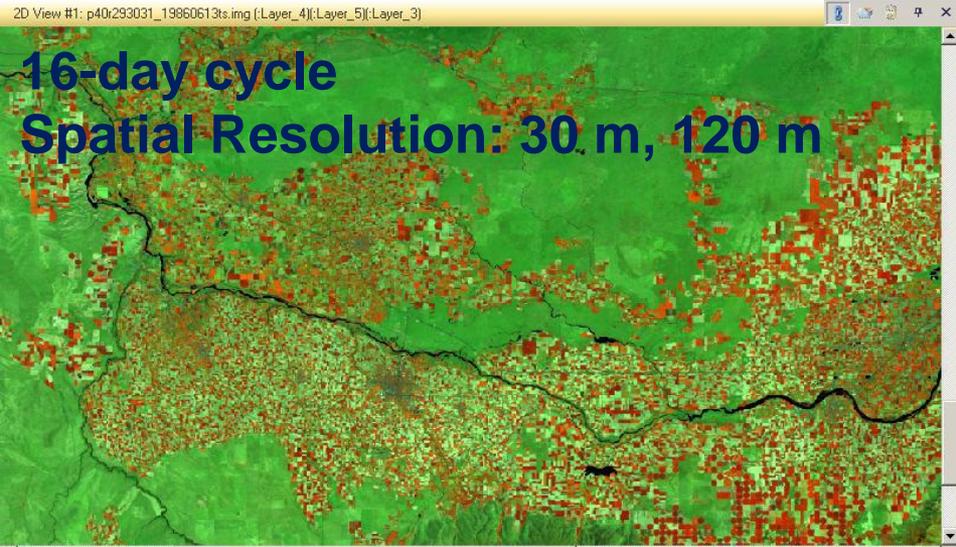


Landsat

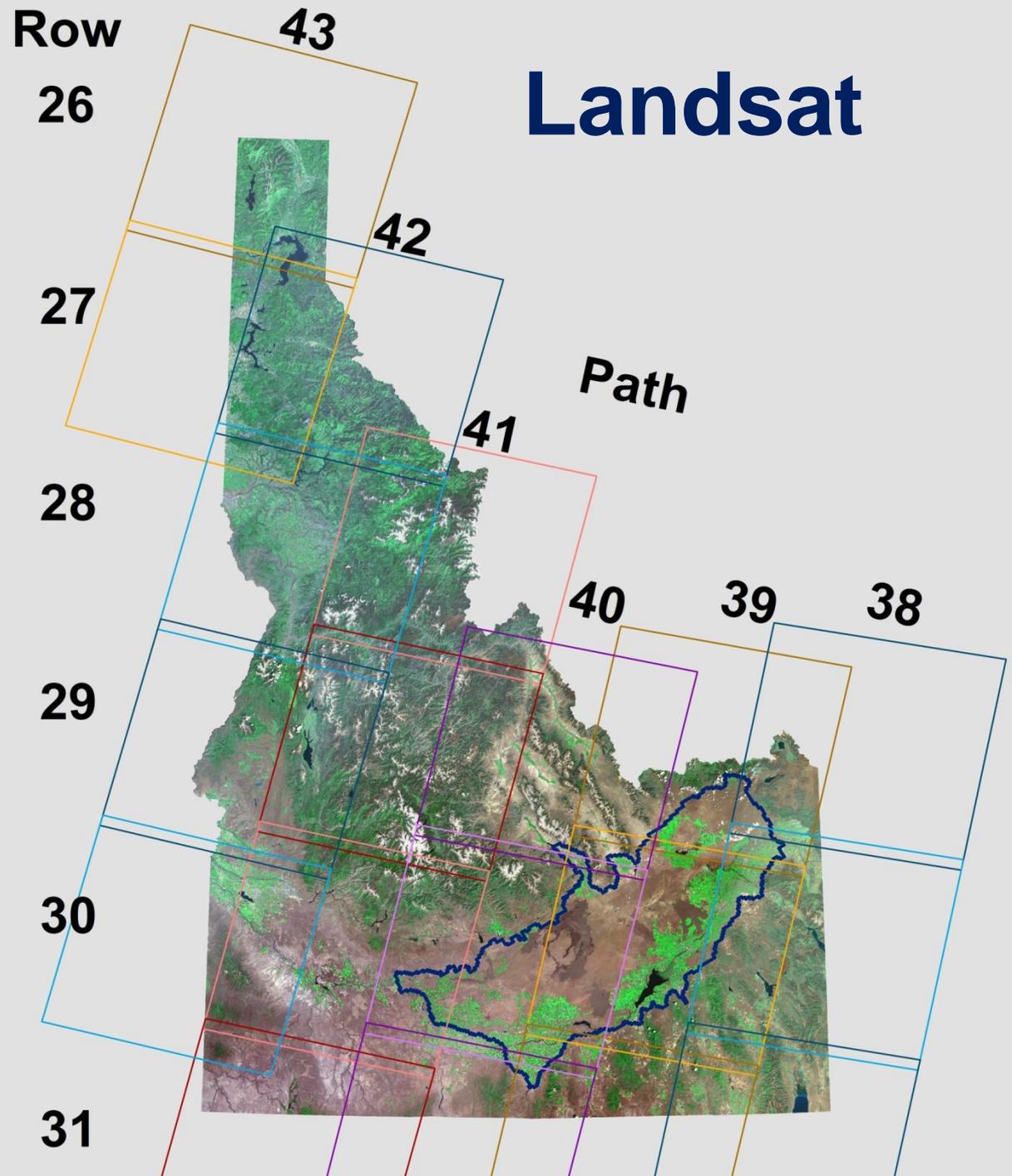
June 13, 1986

AVHRR

June 15, 1986



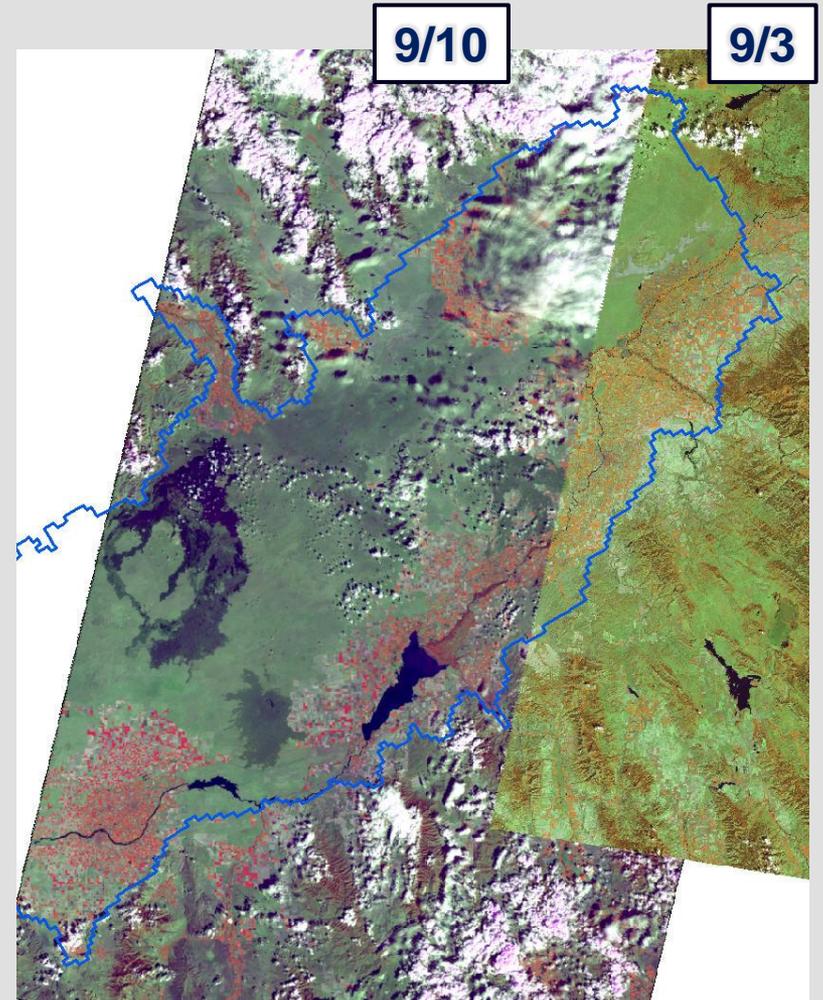
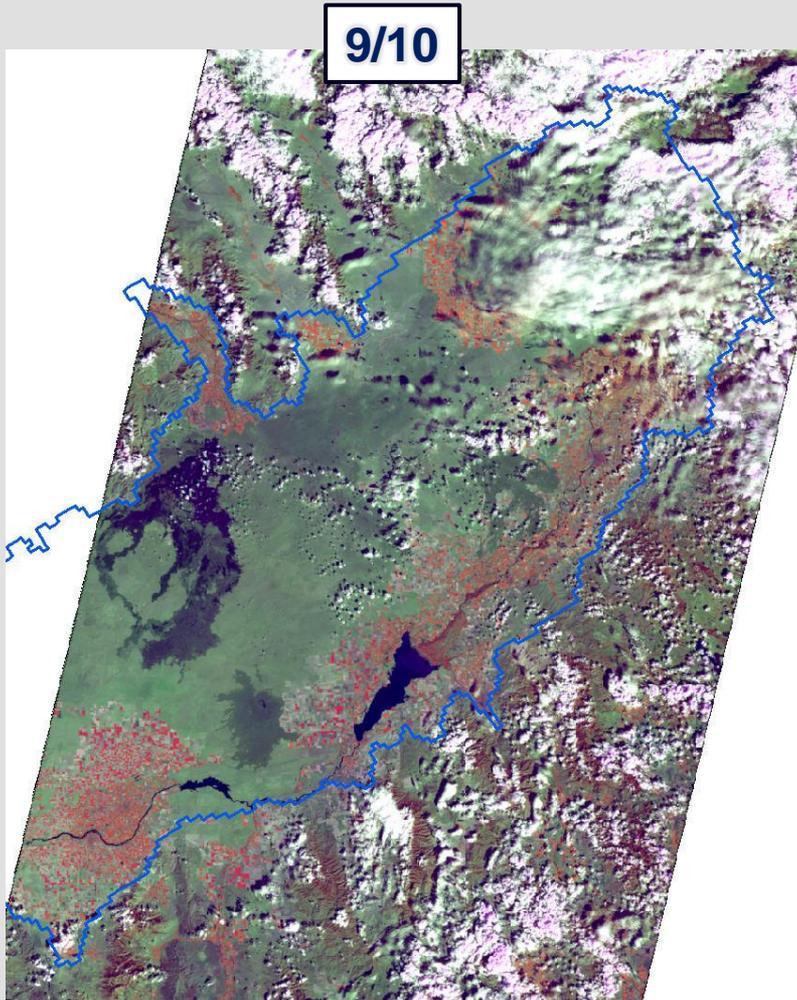
Landsat



1986 Solutions

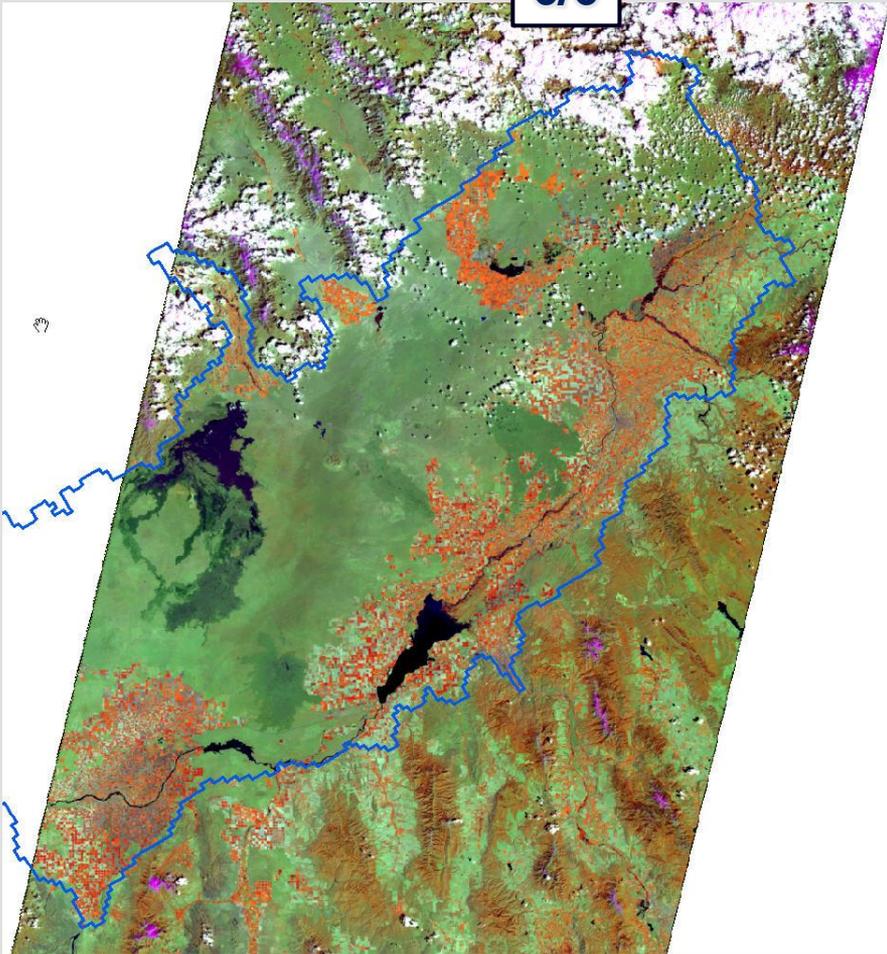
- 1. Use adjacent paths for cloud filling**
 - a) Use paths 41 and 38**
 - b) Overlap is about 1/3 along paths**
- 2. Adjust 6/6 image for soil moisture**
- 3. No Landsat MSS is available**

1986 Adjacent paths for Cloud Filling



1986 Adjacent paths for Cloud Filling

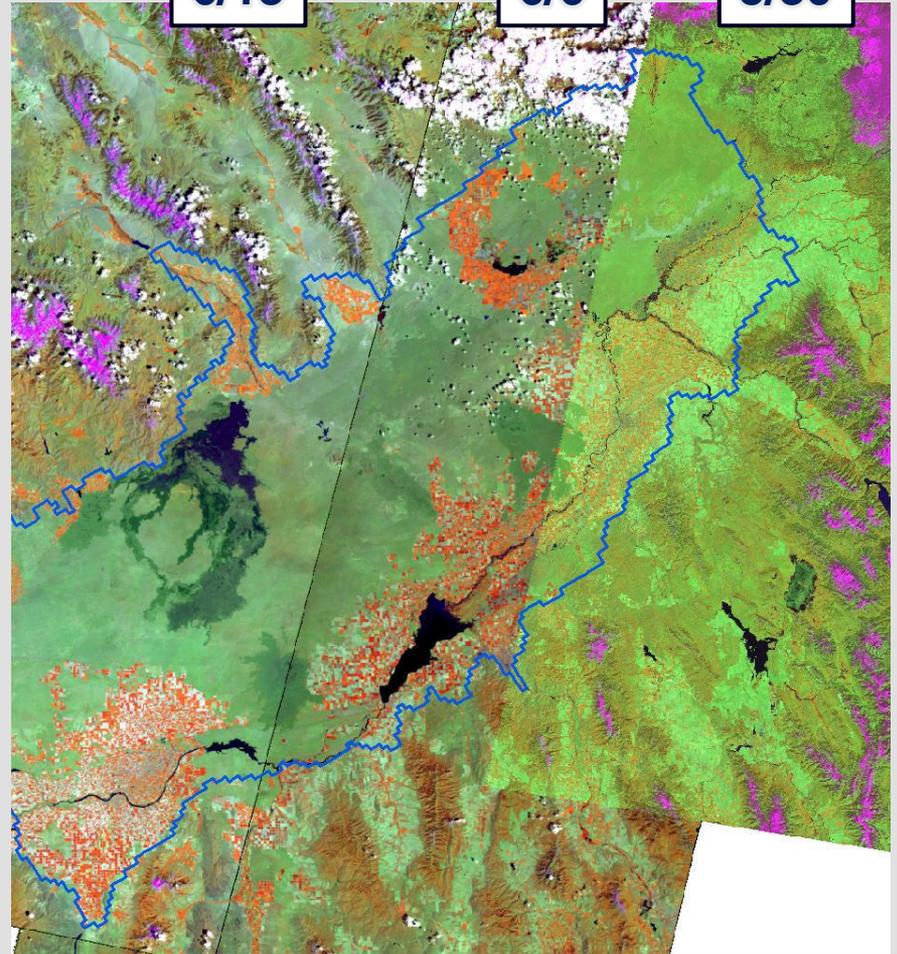
6/6



6/13

6/6

5/30

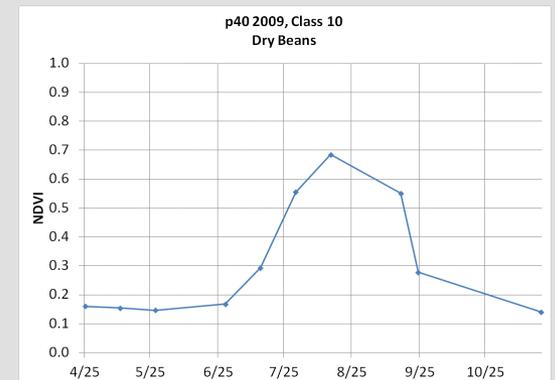
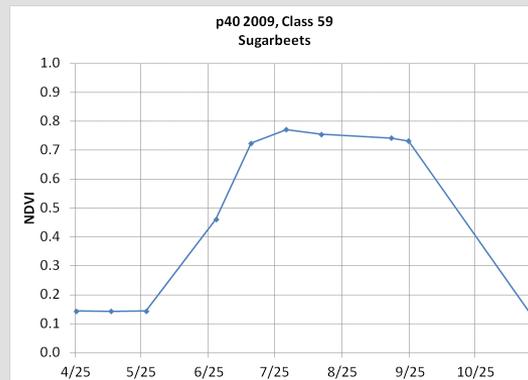
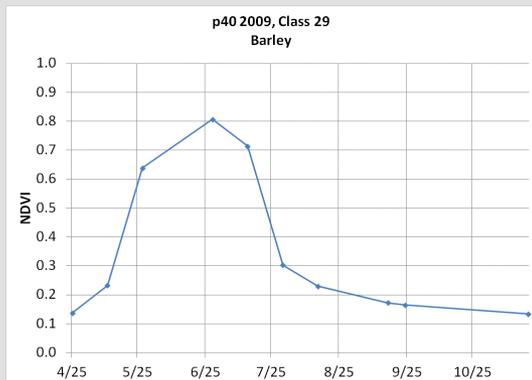
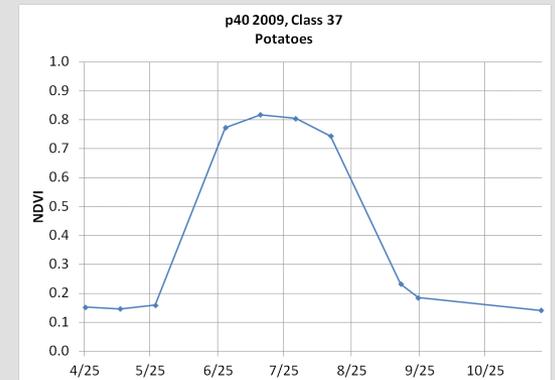
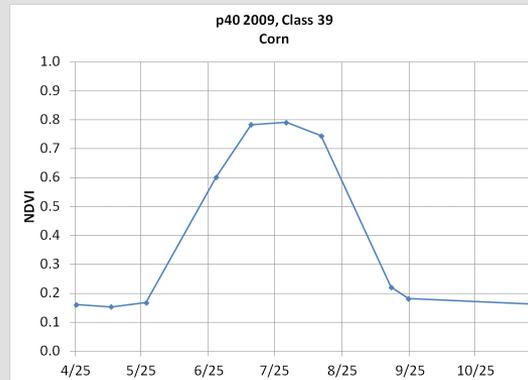
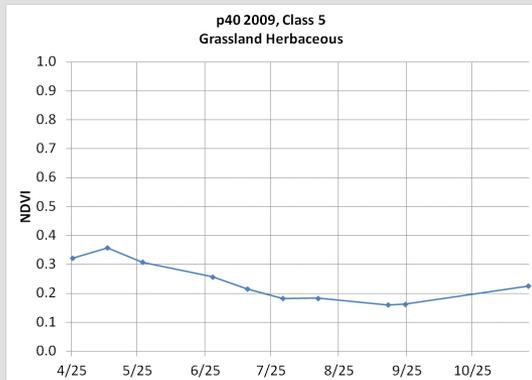
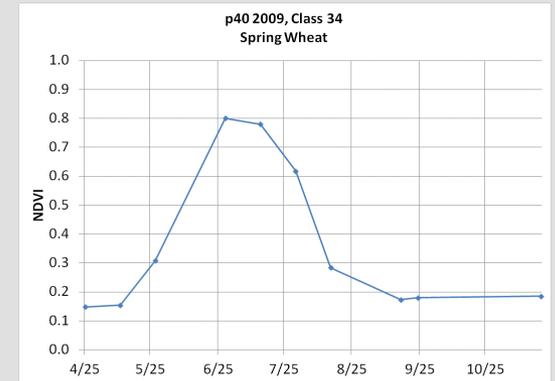
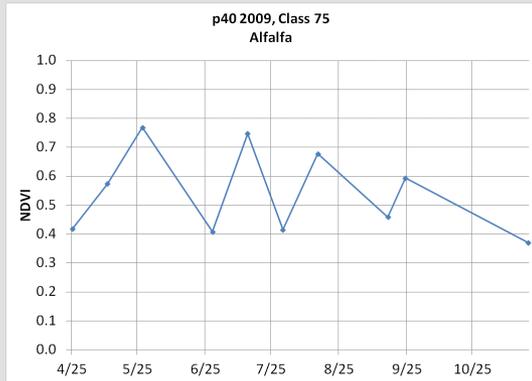


1986 Solutions (cont.)

4. Develop April 1 synthetic image based on ET Idaho and crop layer

- a) No crop layer or ground truth is available**
 - **USDA NASS Crop Data Layer started in 2005**
- b) Need crop layer of: winter wheat, alfalfa, other forages, and all other crops using NDVI**
- c) Developed 100 NDVI signatures using ArcGIS clustering algorithm and 2009 NDVI images**
- d) Labeled 2009 NDVI signatures using 2009 USDA NASS CDL**
- e) Will label 1986 NDVI crop signatures by comparing to 2009 signatures**

NDVI by 2009 USDA NASS CDL (9 of 100)



1992 Solutions

1. Use adjacent paths for cloud filling

- a) Use paths 41 and 38
- b) Overlap is about 1/3 along paths

2. Develop Nov. 1 synthetic image

- a) Use ET Idaho mulch

3. Some Landsat MSS is available

- a) 60m pixel size
- b) No thermal
- c) Develop NDVI ET
- d) Adjust MSS NDVI to TM NDVI

