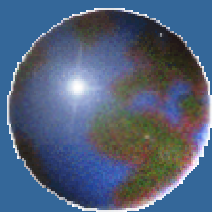


**USDA**



**Farm Service Agency**

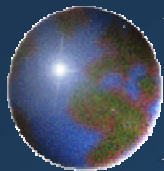


**NAIP 2004**  
***National Agriculture***  
***Imagery Program***

*January 31, 2004*

*MAPPS Winter Meeting, Phoenix, Arizona*

*W. Geoffrey Gabbott, Contracting Officer*  
*USDA, FSA, Aerial Photography Field Office*



# *USDA Service Centers:*



- Responsible for administering over 40 programs in farm commodity, credit, conservation, and emergency assistance.
- Transitioning from analog to digital imagery (GIS) in order to administer programs more effectively.
- Seeking imagery cost sharing partnerships under cooperative agreements.

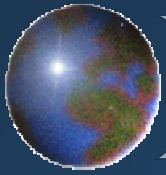


# Current Service Center: Enlarged and Scaled Aerial Photography



# Current Service Center: Measuring Field with Planimeter

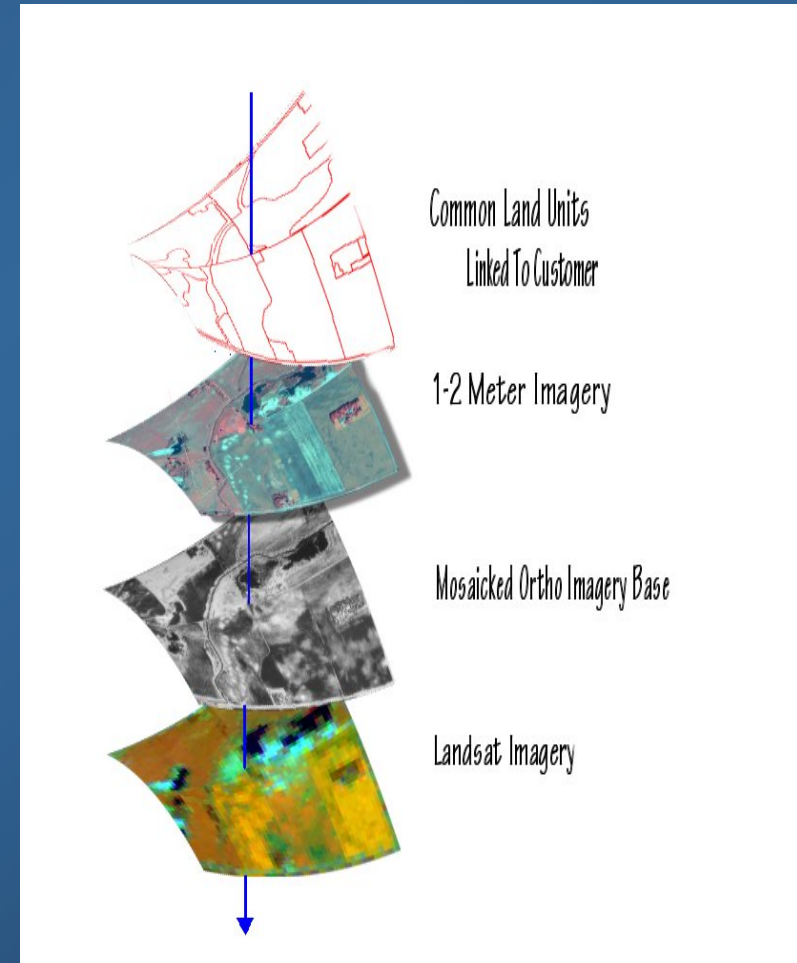




# *Farm Service Agency's GIS Initiative*



- Replace paper photomaps with digital orthophotos and GIS vector (line) data
- Replace pencils and pens with PCs and GIS software
- Replace wheel and chains with GPS units
- Replace 35mm compliance slides with NAIP digital imagery





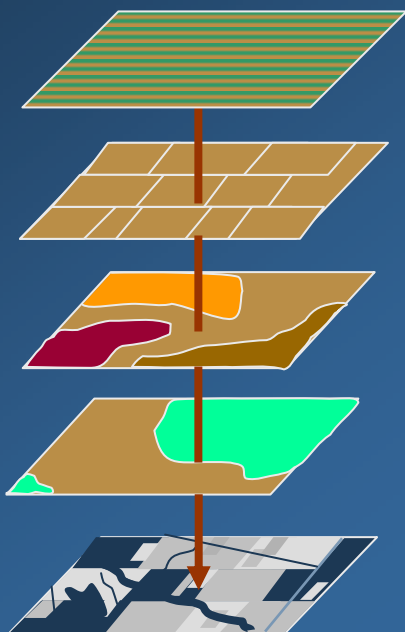
# *Program Purpose*



- **FSA Compliance Program:**
  - Two Meter Ortho-rectified Digital Imagery
  - Replaces 35mm Color Slide Program
- **GIS Orthoimagery Base Update:**
  - One Meter Ortho-rectified Digital Imagery
  - Also used for FSA Compliance Program
- **Aerial Photography Film Archive:**
  - Digital and Photographic products made from the Original Color or Color Infrared Film at APFO



# USDA Geospatial Data Themes



**NAIP Imagery**

**Common Land Unit  
(CLU)**

**Soils**

**Demographics**

**Orthoimagery  
(MDOQ)**

## FSA Focus for Other Themes:

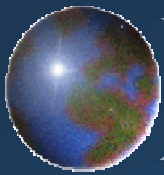
- CLU Based Themes
  - Land Use/ Land Cover
  - Owner/Operator Links
  - Easements
  - CRP
  - HEL
- Wet Lands Point Data
- Digital Photography
- Satellite Imagery
- Public Land Survey
- Daily Weather Data



## Lower Priority Themes:

- Digital Raster Graphics
- Geographic Names
- Government Units
- Elevation
- Watershed Boundaries
- Transportation





# *GIS Orthoimagery Base Development*

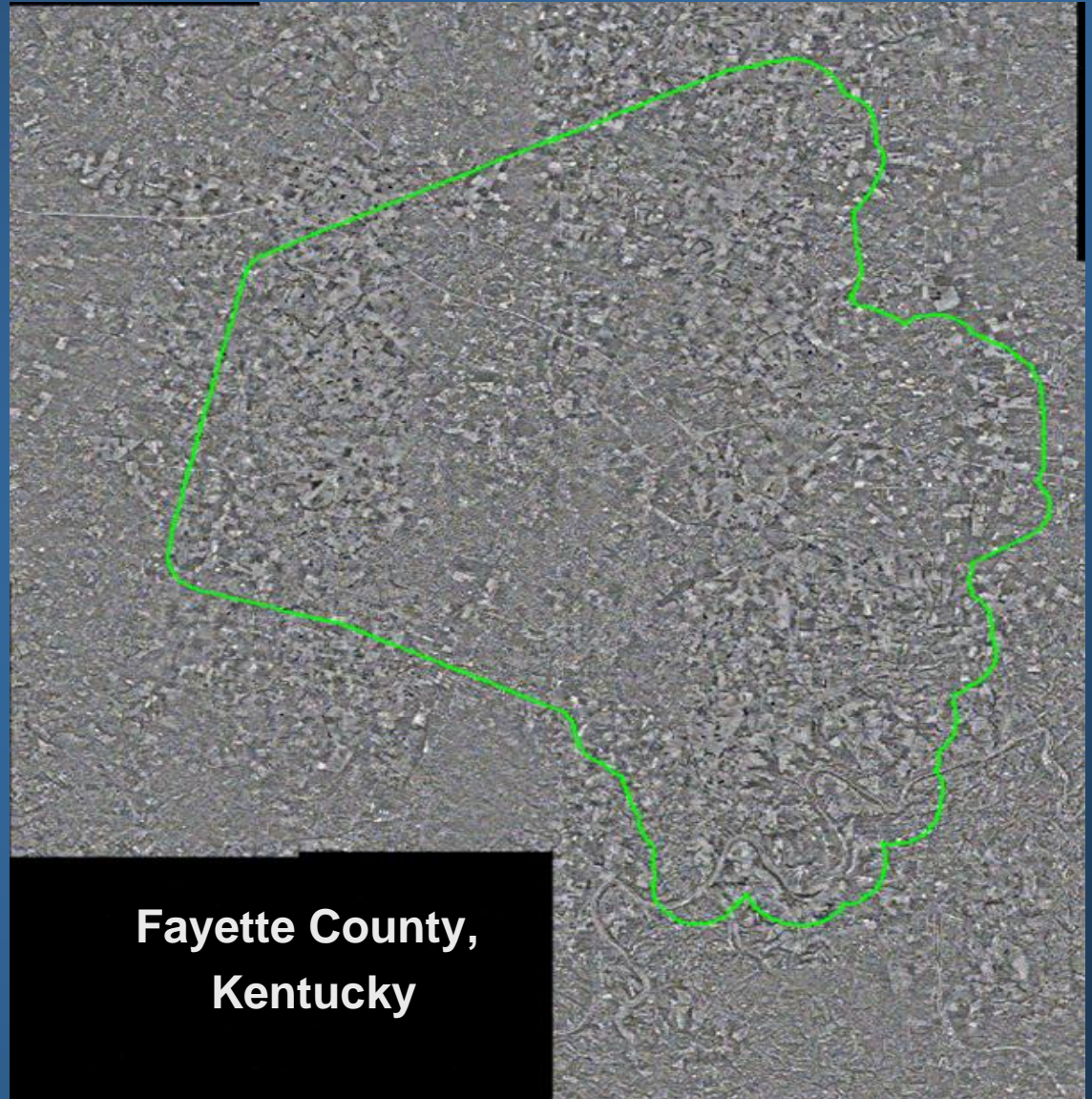


**Mosaicked Digital  
Ortho Quads  
(MDOQ)**

**USDA County  
GIS Base Imagery**

**One Meter  
Resolution**

**MrSID Compression**

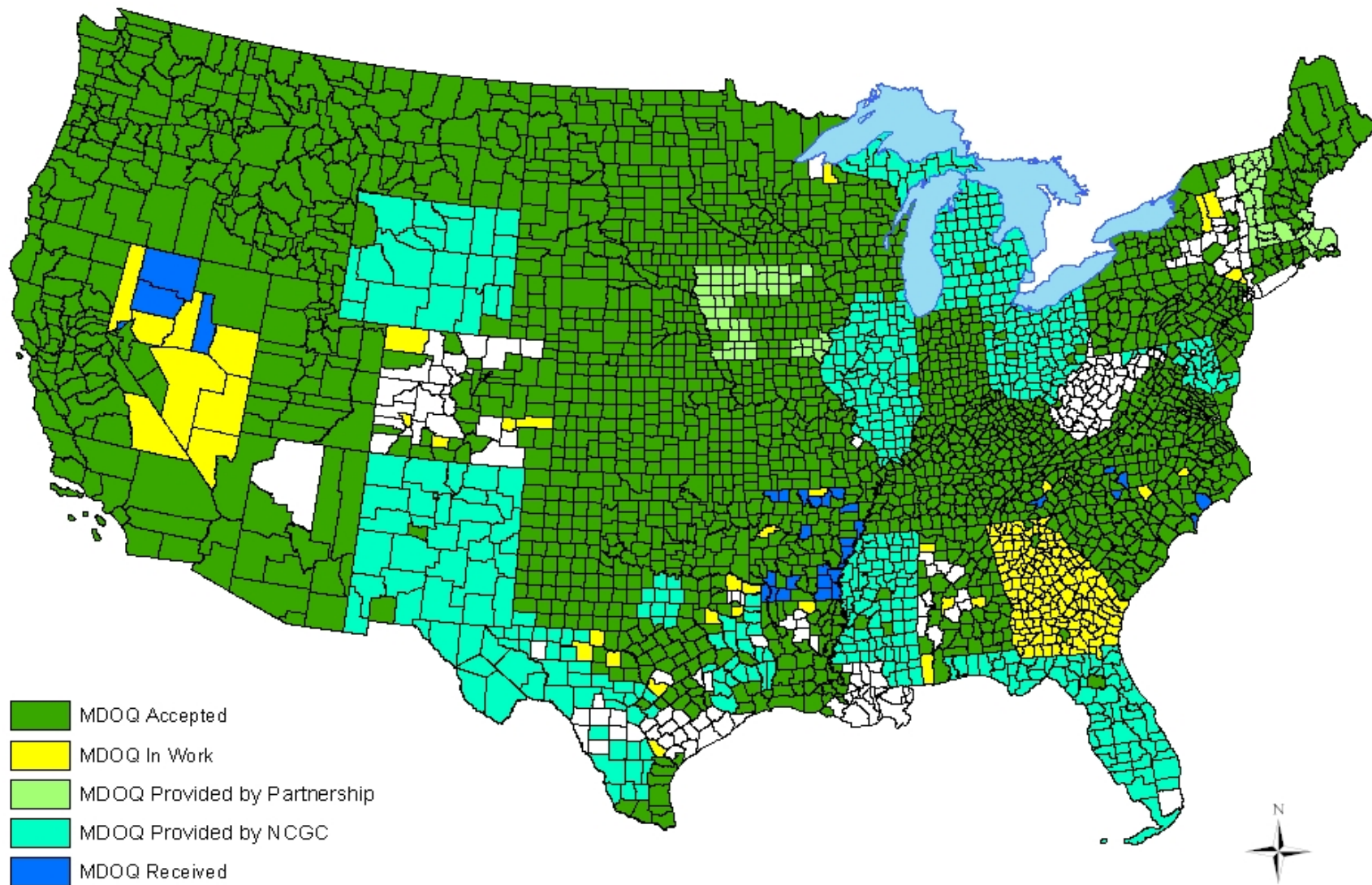


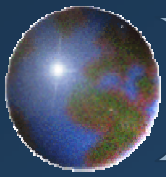
**Fayette County,  
Kentucky**



# MDOQ STATUS - ALL SOURCES

November 25, 2003





# *Common Land Unit (CLU) Digitization*



**Common Land  
Unit (CLU)**

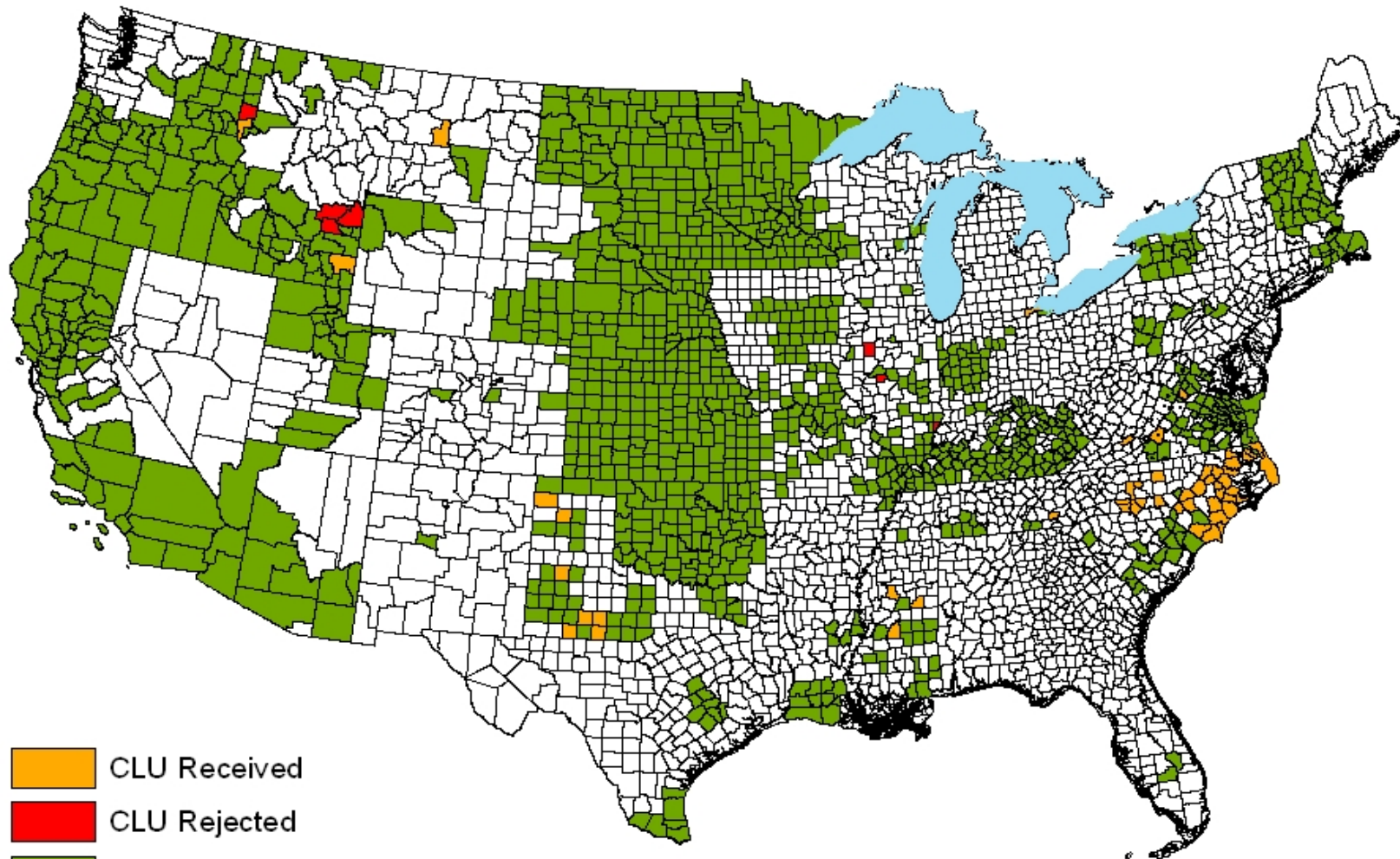
**Digitization  
Of County  
Tract and  
Farm Field  
Boundaries**




**FSA County  
GIS Data Layer**



# CLU STATUS - ALL SOURCES

November 26, 2003



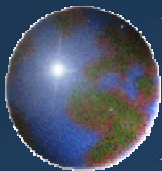
-  CLU Received
-  CLU Rejected
-  CLU Completed





## Previous Pilot Projects:

- Scanned 35mm Slides
- Direct Digital 35mm Cameras (small format)
- Satellite Imagery
- Aerial Mapping Cameras (1:40,000 QQC)
- Direct Digital Mapping Cameras (large format)



# Image Format Comparison

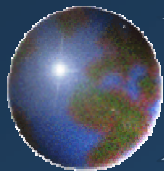


## Small Format

- 35mm Camera
- 3 sq. miles @ 8,000 feet
- Digital Camera
- 3 sq. miles @ 10,000 feet

## Large Format

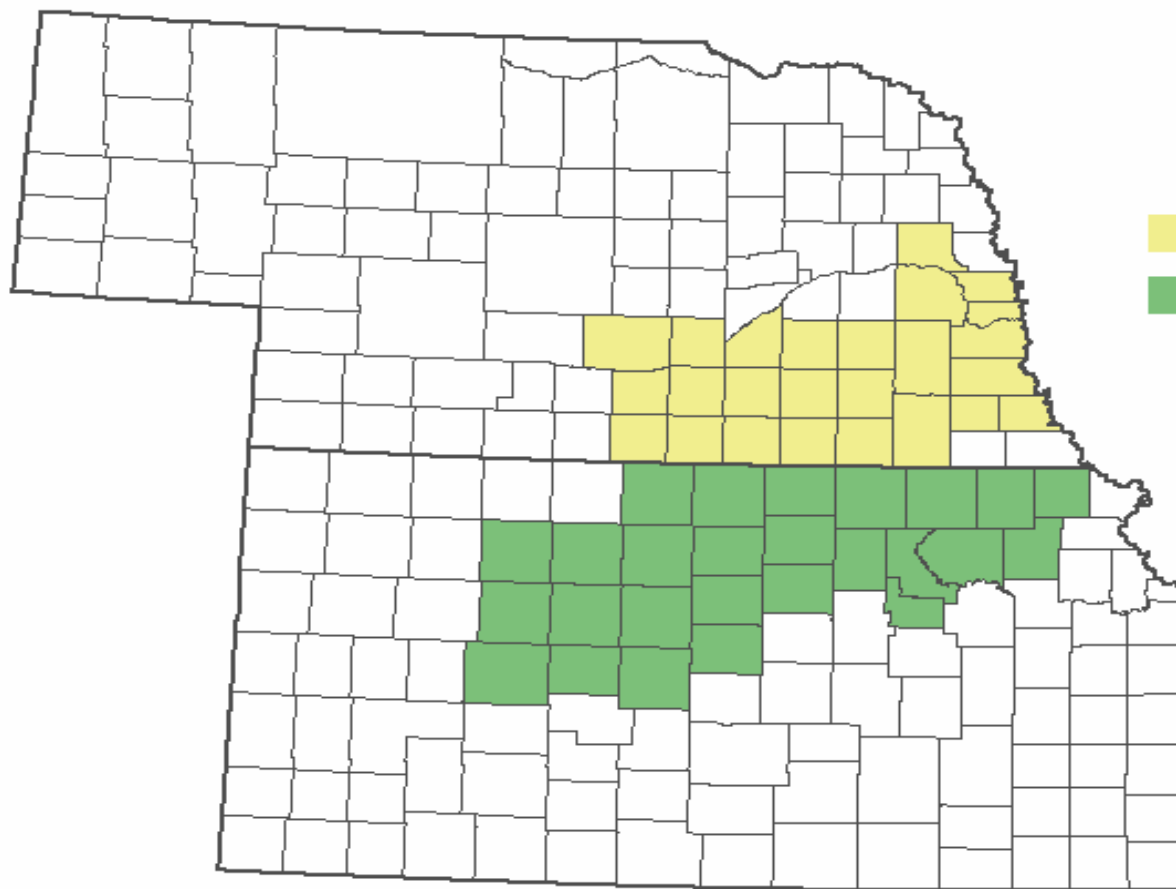
- Mapping Camera
- 9" x 9" film
- 25 sq. miles @ 20,000 ft.





# 2001 NAIP Contract

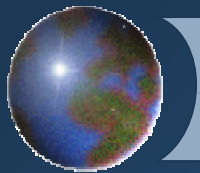


## Kansas and Nebraska Compliance Imagery



-  Nebraska - 26 counties
-  Kansas - 25 Counties

2 Meter Ortho-Rectified  
34,960 Square Miles  
Total Cost: \$418,207  
\$11.99 per Square Mile



# 2002 NAIP Contract



## FY2002 NAIP

Six States Contracted:

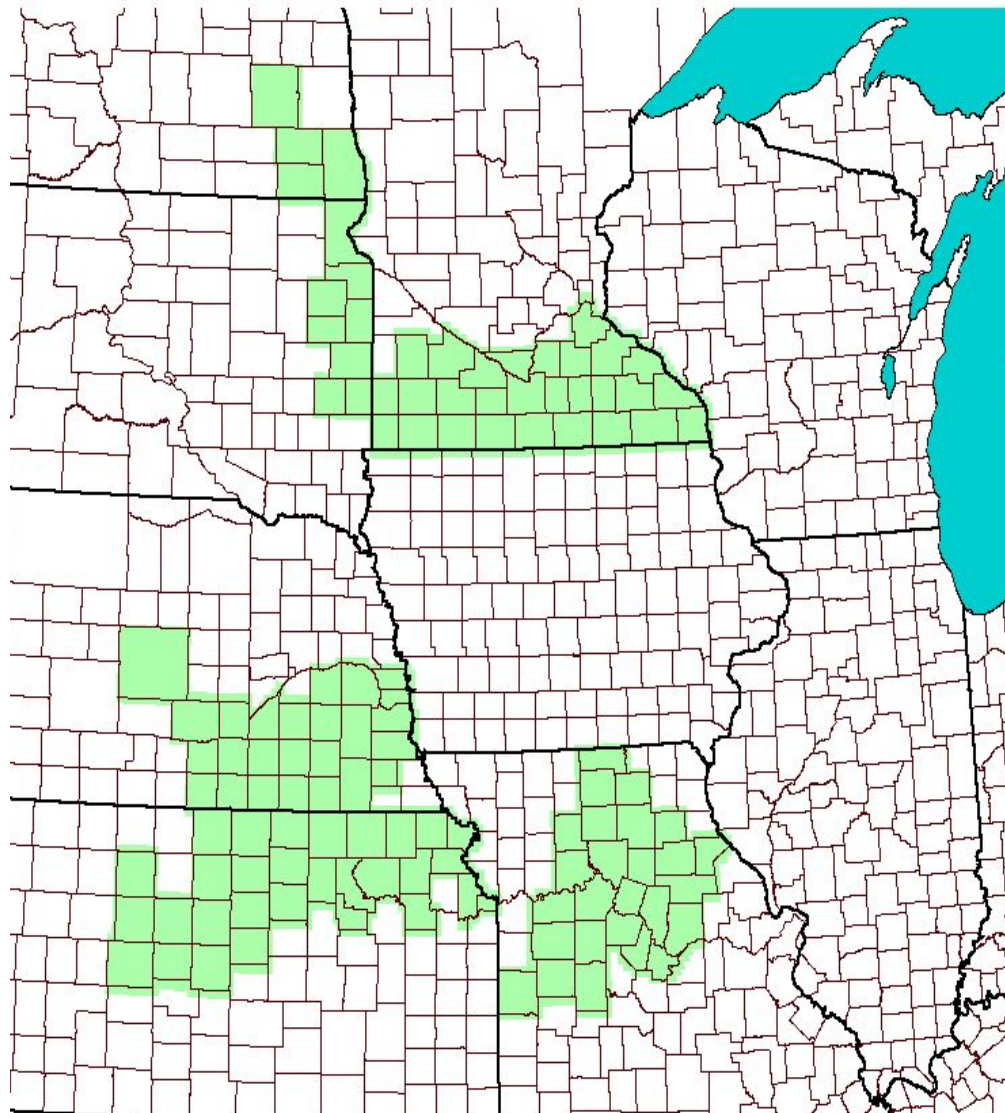
KS, NE, ND, SD, MO, & MN

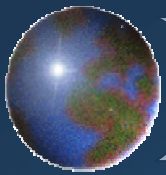
121 Counties Covered

82,727 Square Miles

28,932 Linear Miles of NAPP-  
Like Aerial Photography (Film  
archived at APFO)

Summer 2002 Flying Season





# 2002 NAIP Products and Cost



## 1m Ortho-Rectified

Digital Image  
(one meter GSD)

ABGPS  
& IMU  
Control

Control  
(MDOQ)

Elevation  
Model

**\$18.99 / Square Mile**

## 2m Geo-Rectified

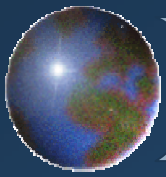
Digital Image  
(two meter GSD)

GPS  
Control

Control  
(MDOQ)

**\$6.94 / Square Mile**





# 2003 NAIP Delivery Products



1. Compressed county format orthoimagery on CD-Rom (one & two meter), delivered 30 days after acquisition for FSA Compliance Program.
2. Full resolution tile orthoimagery on DLT tape media (one & two meter), in quarter quadrangle tile format, delivered 90 days after acquisition.
3. FGDC compliant metadata for required documentation of imagery data.
4. Aerial photography film for photo reproduction, higher resolution scans, and archive.



# *Compressed County Mosaic*



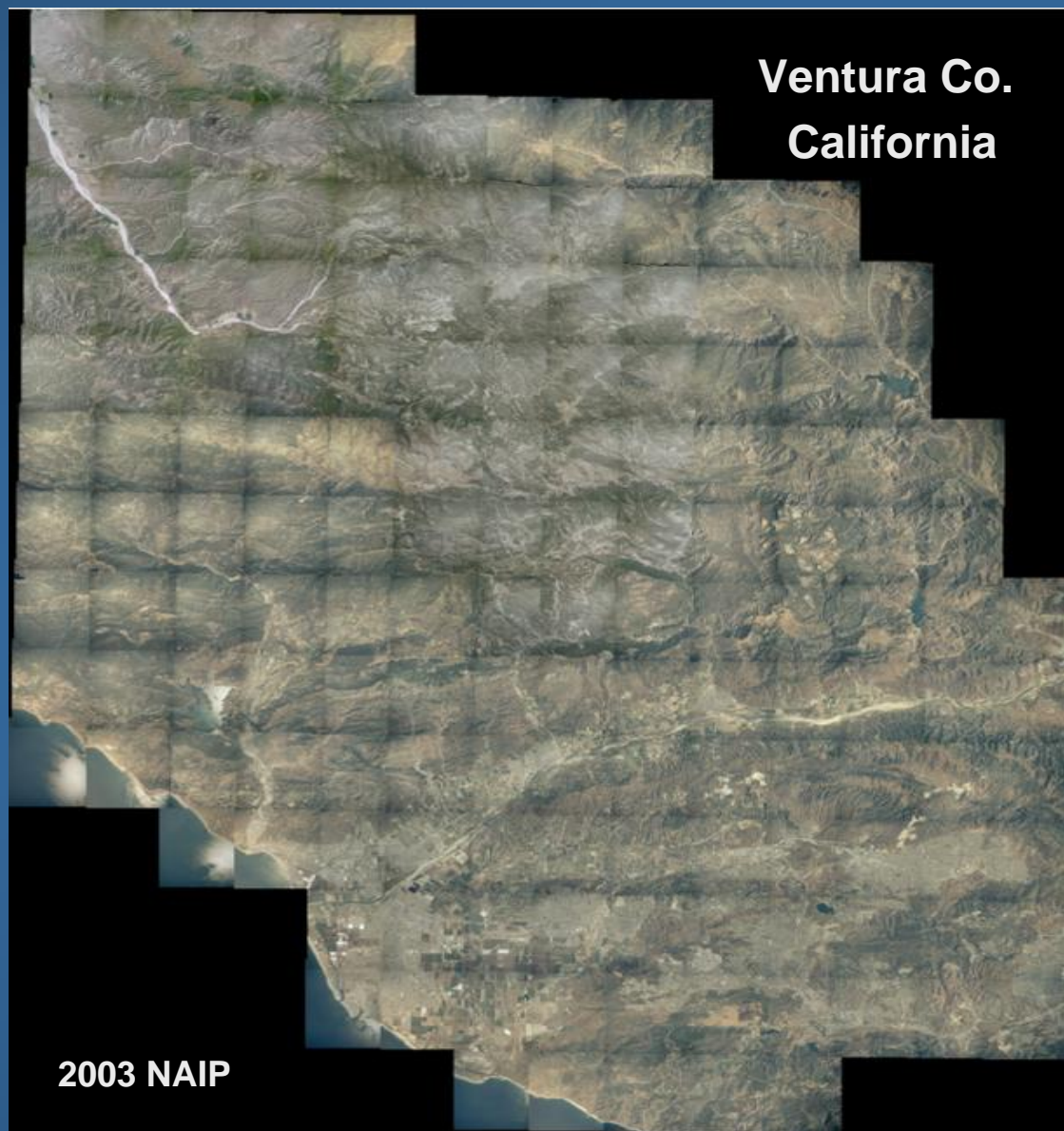
**Delivered on CD Rom**

**MrSid Compression**

**1:50 Compression  
For 1m Imagery**

**1:20 Compression  
For 2m Imagery**

**FGDC Metadata**

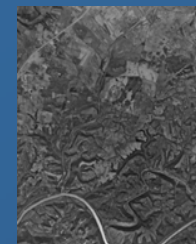
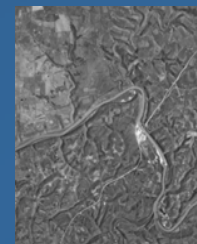
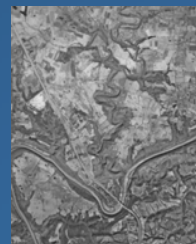




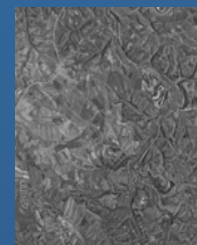
# *NAIP DOQQ Tile Imagery*



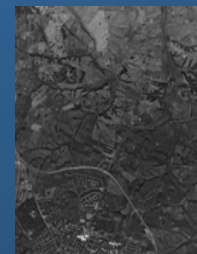
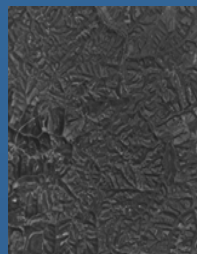
**Full Resolution  
DOQQ Tiles**



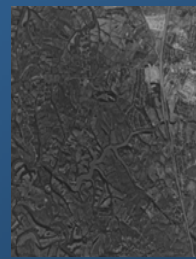
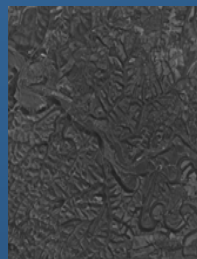
**Delivered on  
Tape Media**

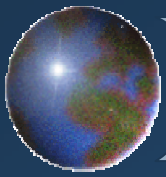


**Delivered by State  
or Project Area**



**FGDC Metadata**

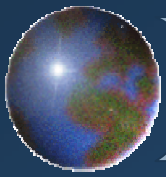




## APFO Aerial Film Repository

The Aerial Photography Field Office has a national film vault archiving more than 10 million aerial images dating from 1955 to the present.





# *Types of Partnership Opportunities*



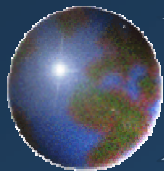
Federal, State, or  
County Cost Share  
with FSA for:

New Coverage  
Beyond FSA Counties

New Coverage  
Beyond Agricultural  
Areas of a County

Higher Resolution  
Image Upgrade





# 2003 NAIP Partners

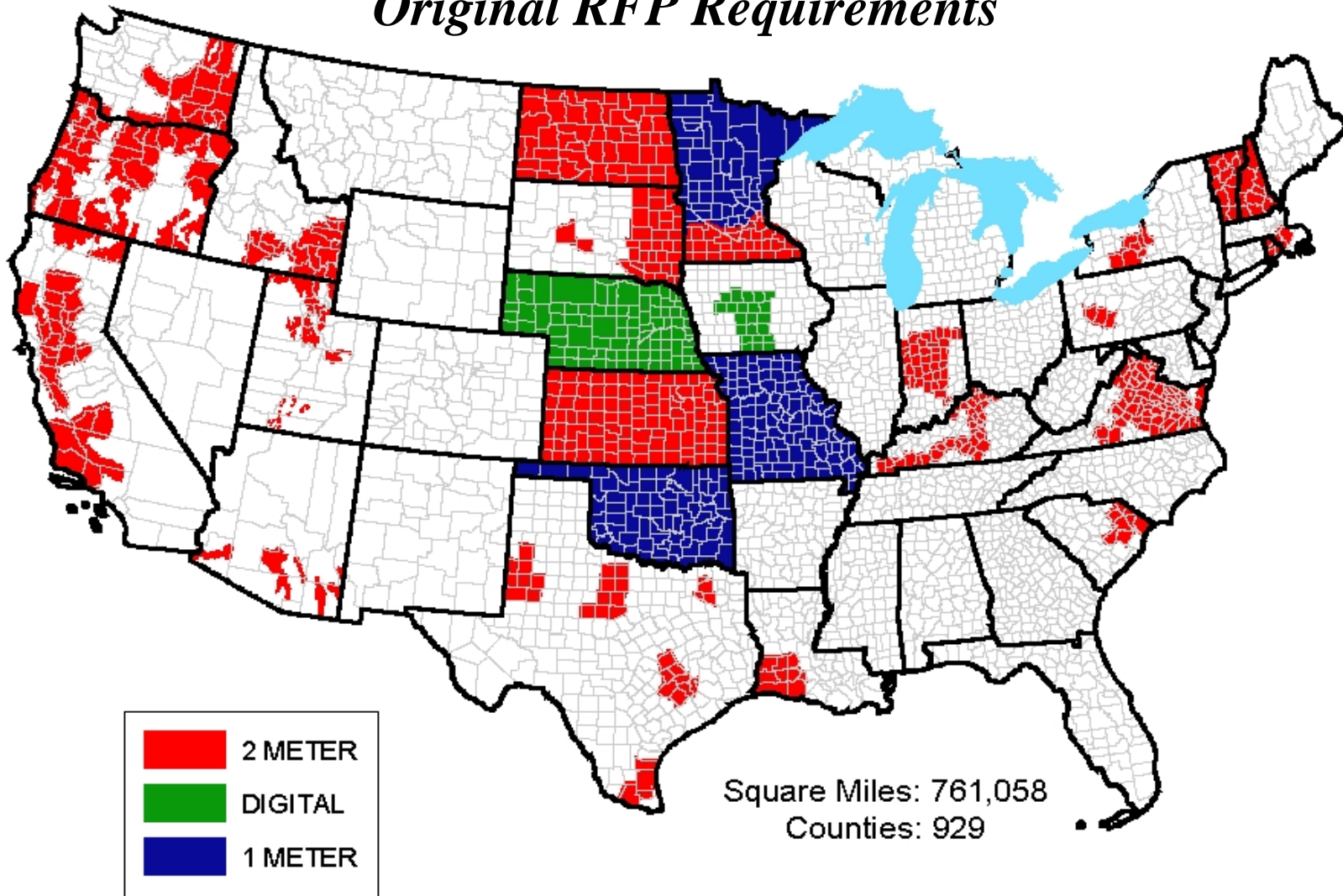


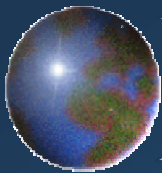
## PRE-AWARD COOPERATIVE AGREEMENTS

■ Minnesota:	State Agencies	\$250,000
	NRCS	\$300,000
■ Missouri:	State Agencies	\$220,000
	Forest Service	\$30,000
	NRCS	\$300,000
■ Oklahoma:	NRCS	<u>\$600,000</u>
Total 2003 Cost Shares:		\$1,700,000

# 2003 NAIP Coverage

## *Original RFP Requirements*

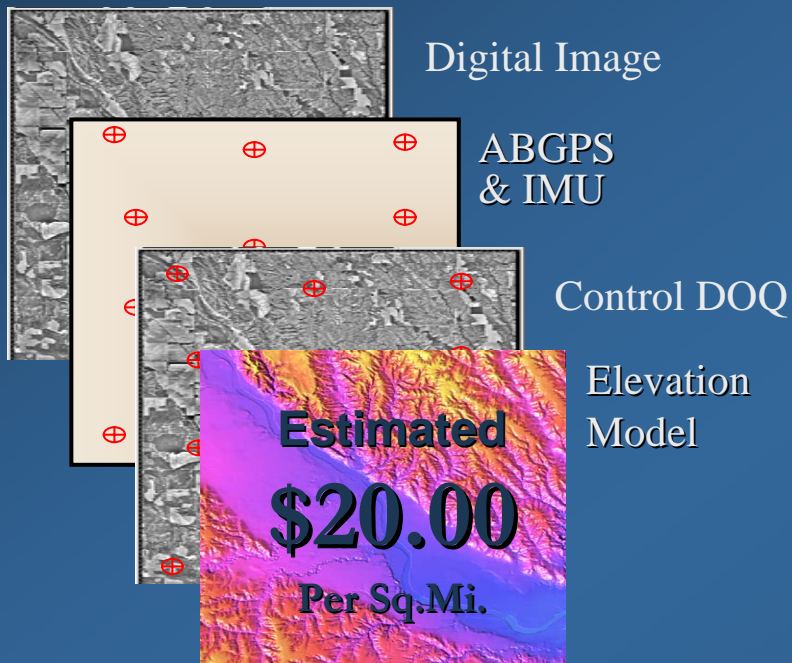




# 2003 Average Costs (Film)

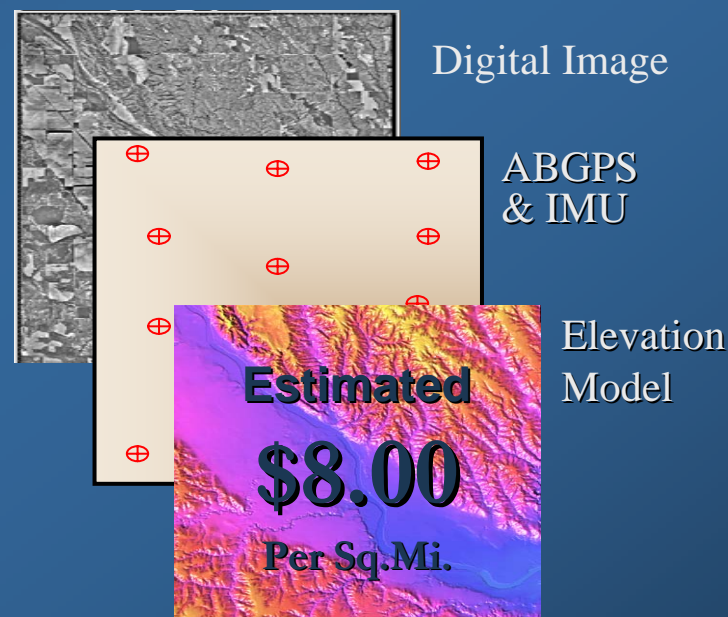


## 1m Ortho Rectified



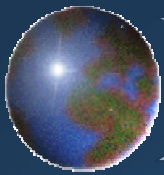
Actual Average Price Awarded  
**\$12.10 per Sq.Mi.**  
**\$157.27 per DOQQ**

## 2m Ortho Rectified



Actual Average Price Awarded  
**\$9.92 per Sq.Mi.**  
**\$120.36 per DOQQ**





# 2003 NAIP Funding Sources



NRCS - 12 States (50%) \$2,620,000

BLM - Idaho and Nevada \$111,220

Minnesota State Agencies \$250,000



Missouri State Agencies \$230,000

USFS Nat'l Forests - MN & MO \$98,000

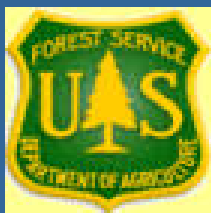
Oklahoma State Agencies \$180,000



Total 2003 Cost Shares \$3,489,220

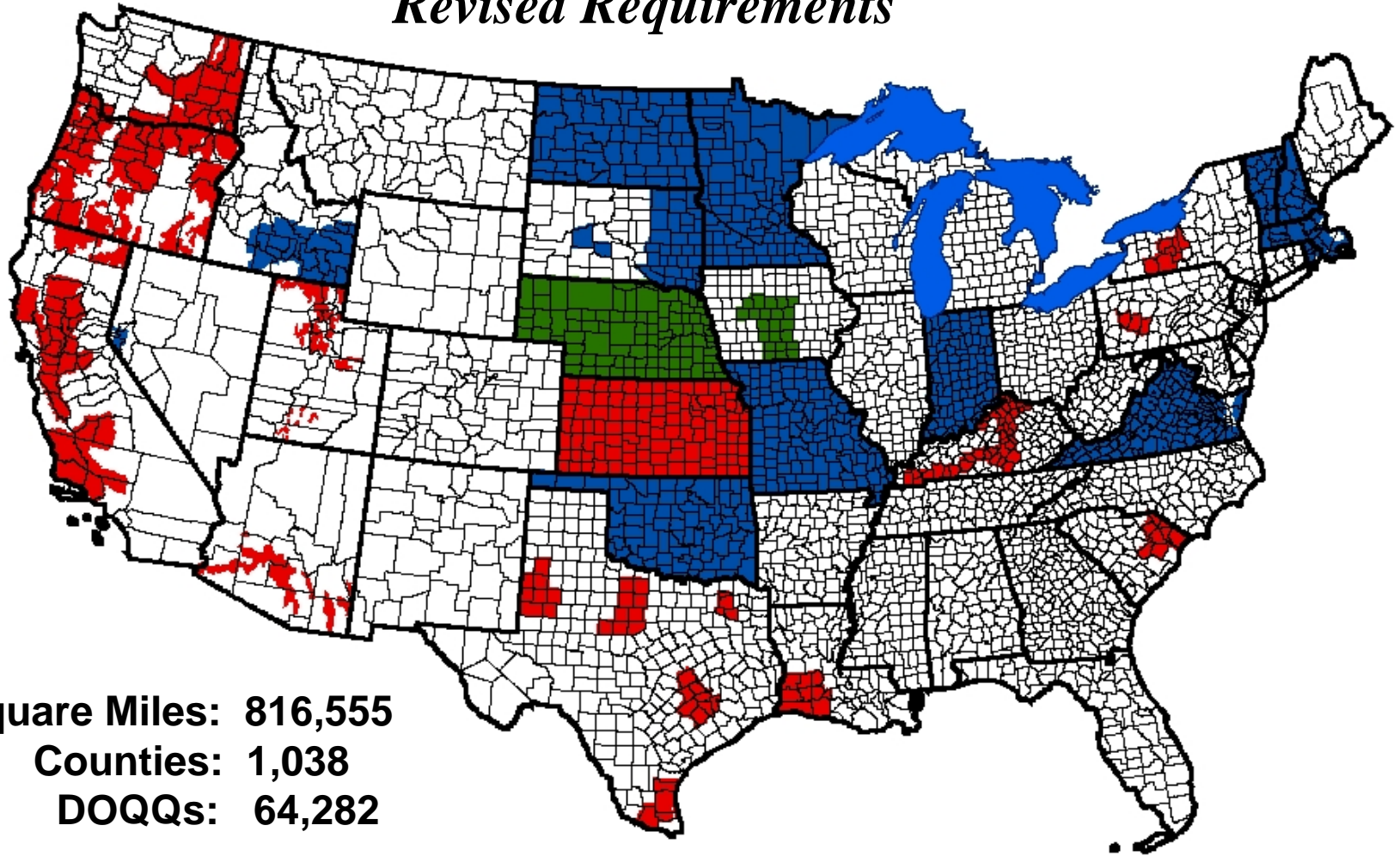
FSA Funding Amount \$6,000,658

**Total 2003 NAIP Investment \$9,489,878**



# NAIP 2003 CONTRACTS

## *Revised Requirements*



**Square Miles: 816,555**

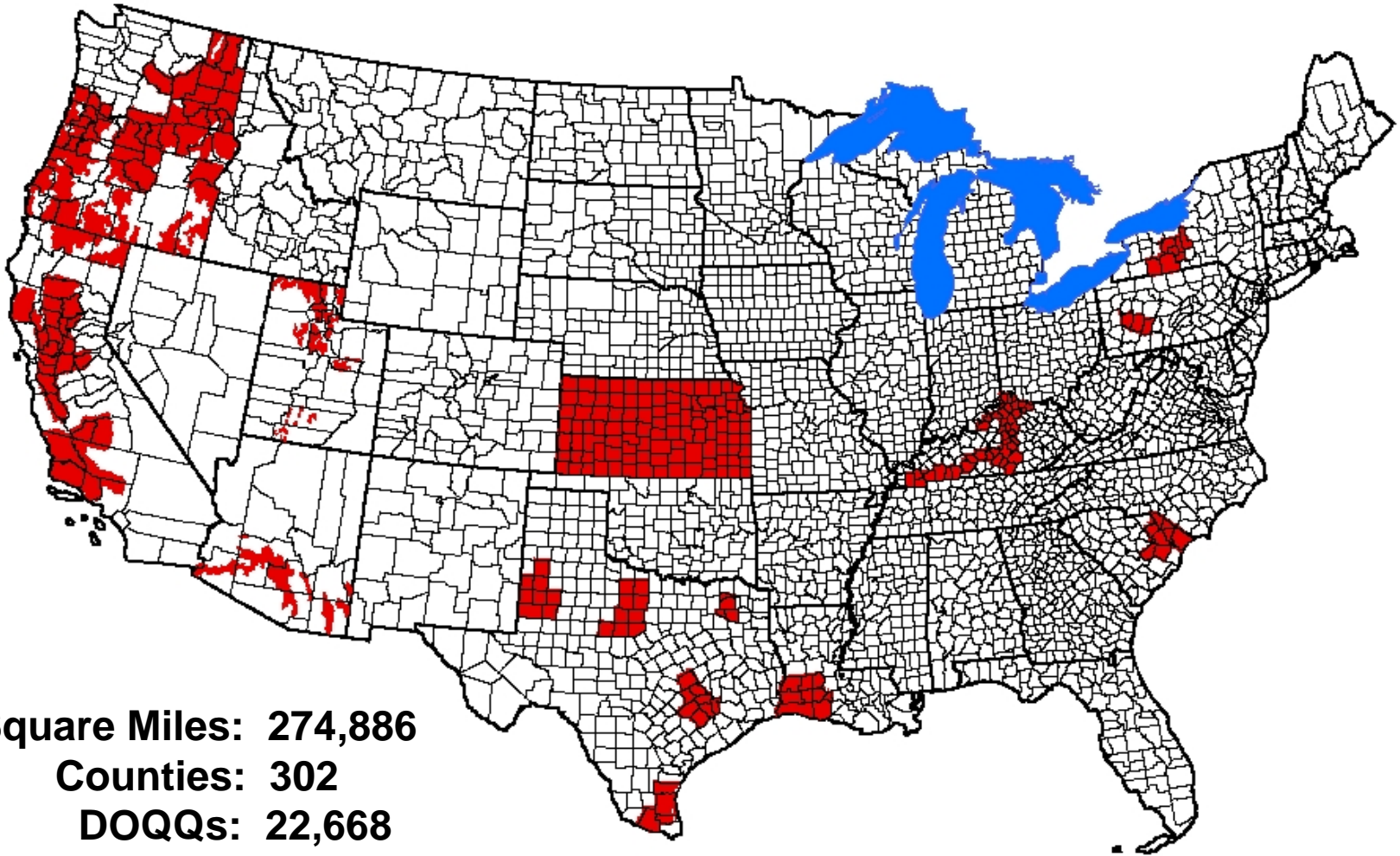
**Counties: 1,038**

**DOQQs: 64,282**

**1 METER 2 METER DIGITAL**



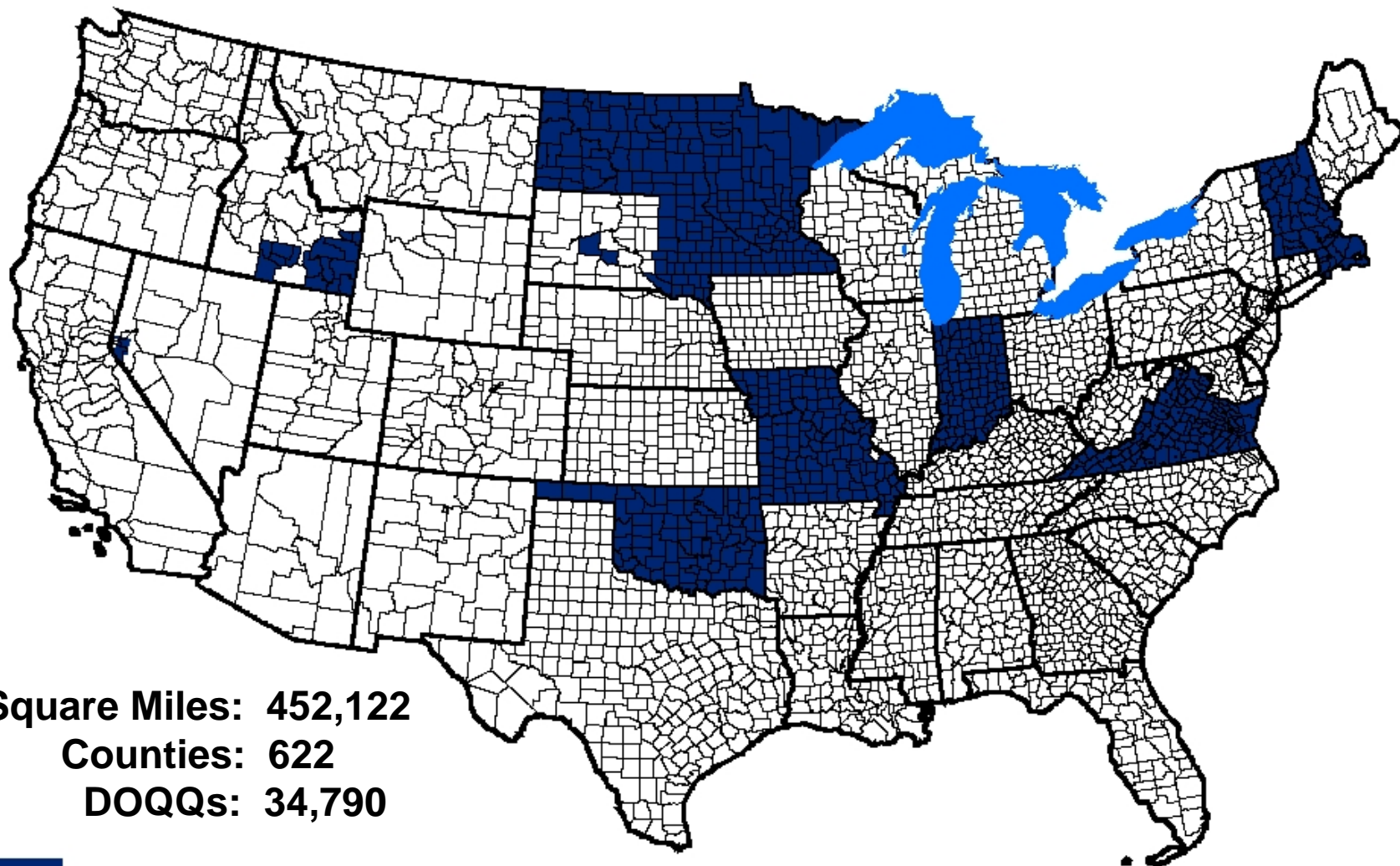
## 2 METER 2003 NAIP



**Square Miles: 274,886**  
**Counties: 302**  
**DOQQs: 22,668**

 2 METER

# 1 METER 2003 NAIP



**Square Miles: 452,122**

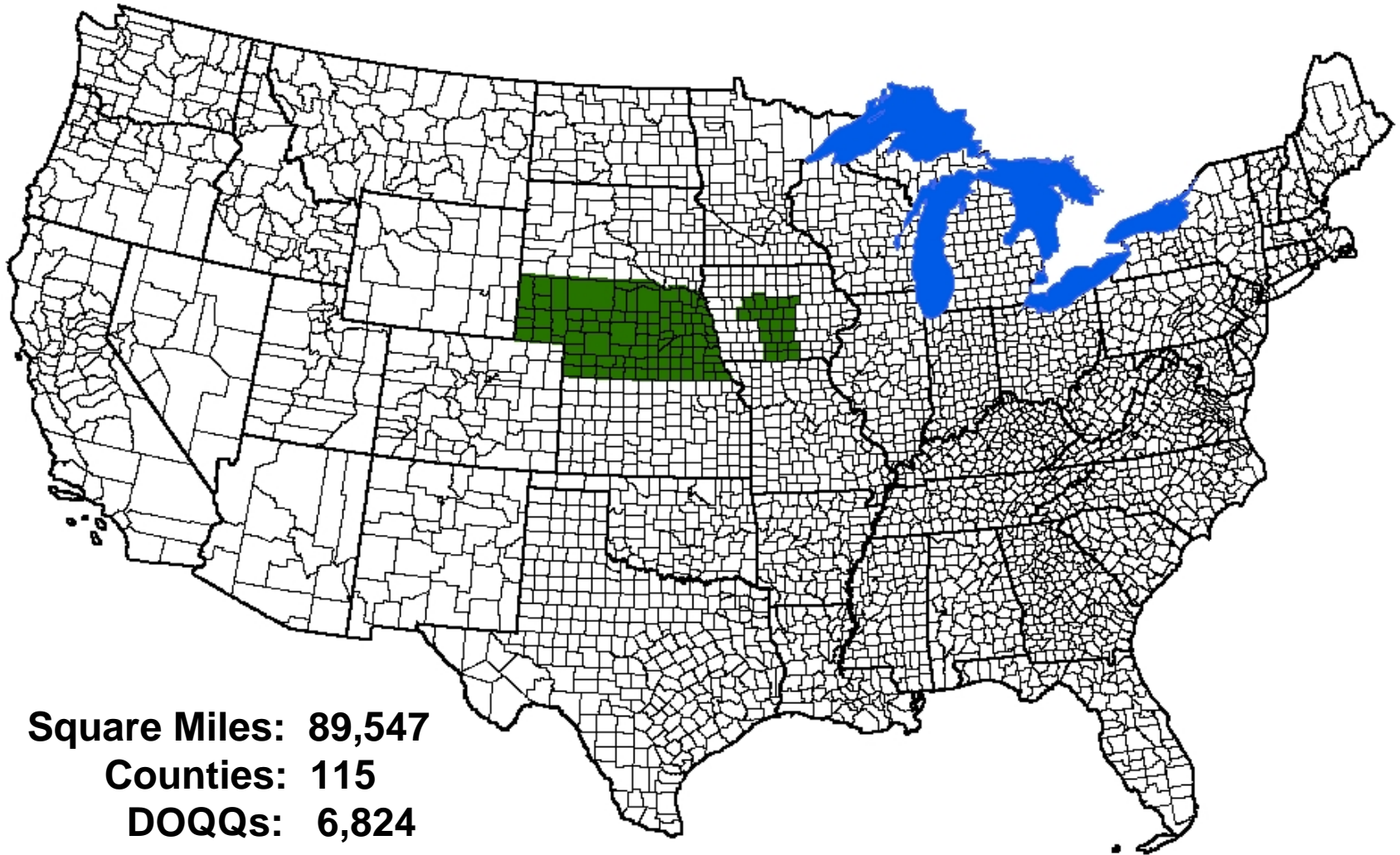
**Counties: 622**

**DOQQs: 34,790**



**1 METER**

# 2003 NAIP DIGITAL



**Square Miles: 89,547**

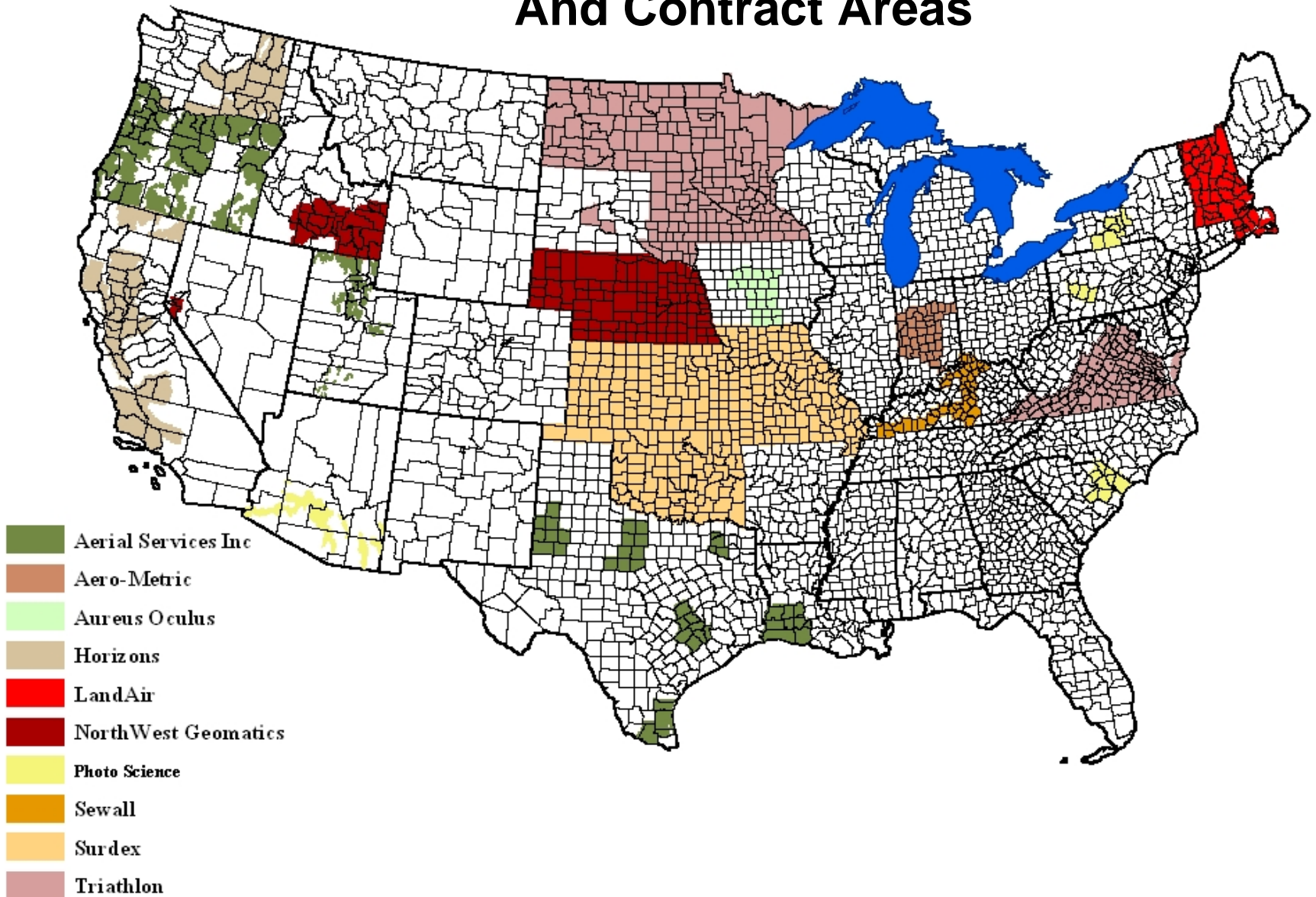
**Counties: 115**

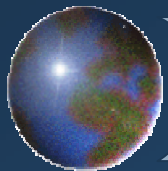
**DOQQs: 6,824**

 **DIGITAL**

**Nebraska - One meter acquired with ADS40**  
**Iowa - Two meter acquired with small format**

# 2003 NAIP Contractors And Contract Areas

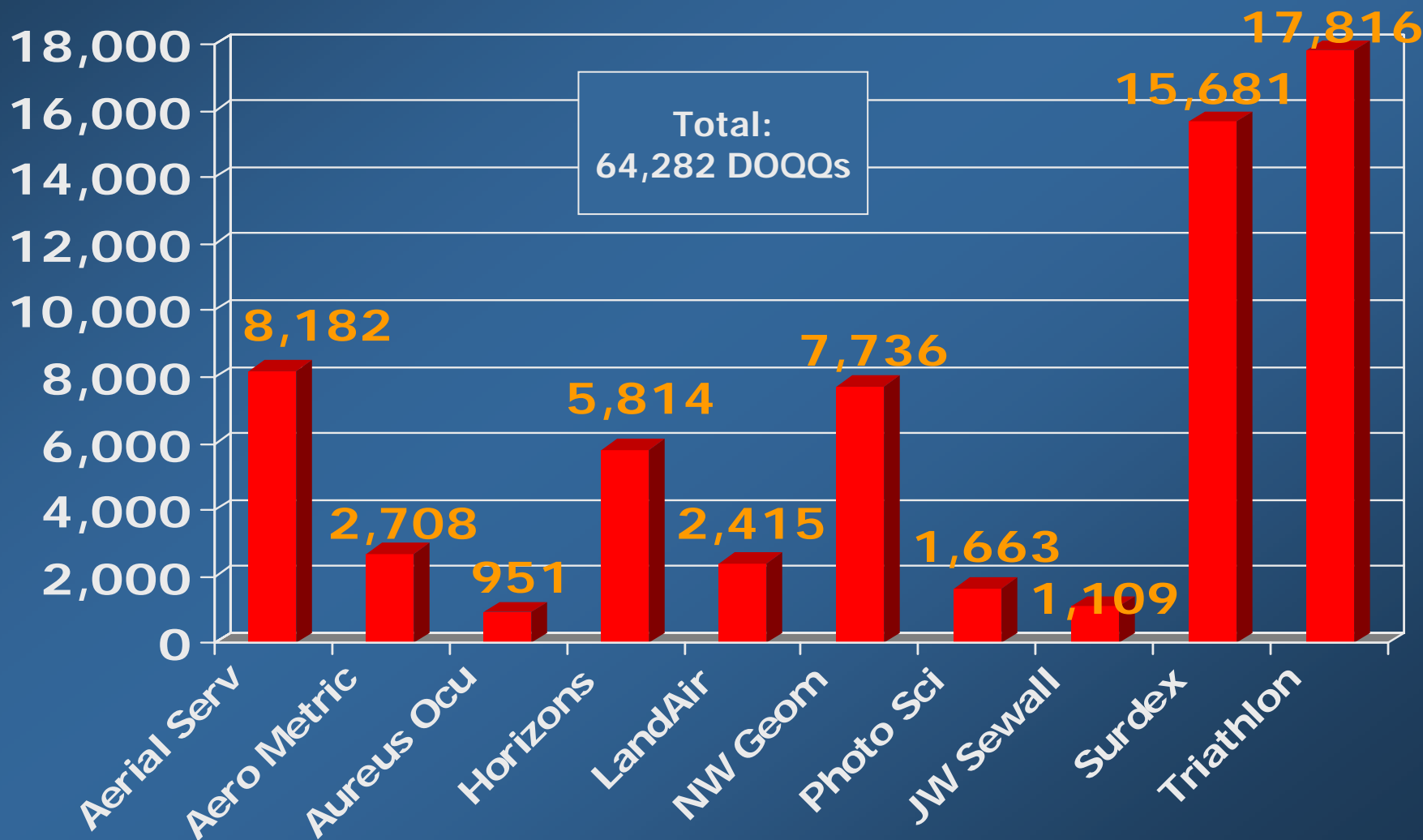


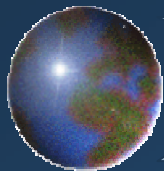


# 2003 NAIP Awards



## DOQQ Quantities Awarded

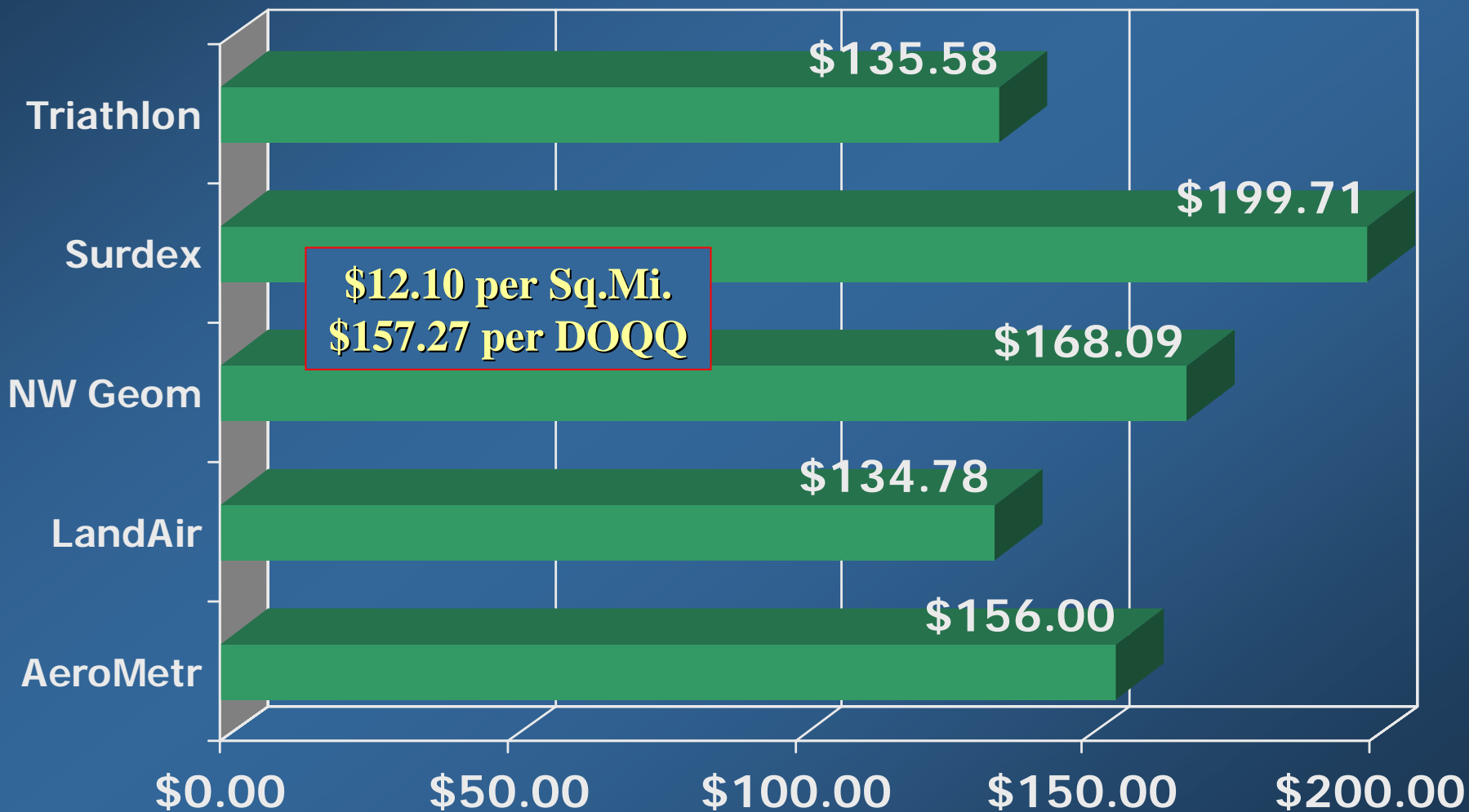




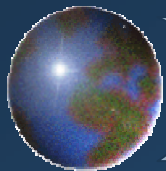
# 2003 NAIP Awards



## Price per DOQQ – One Meter



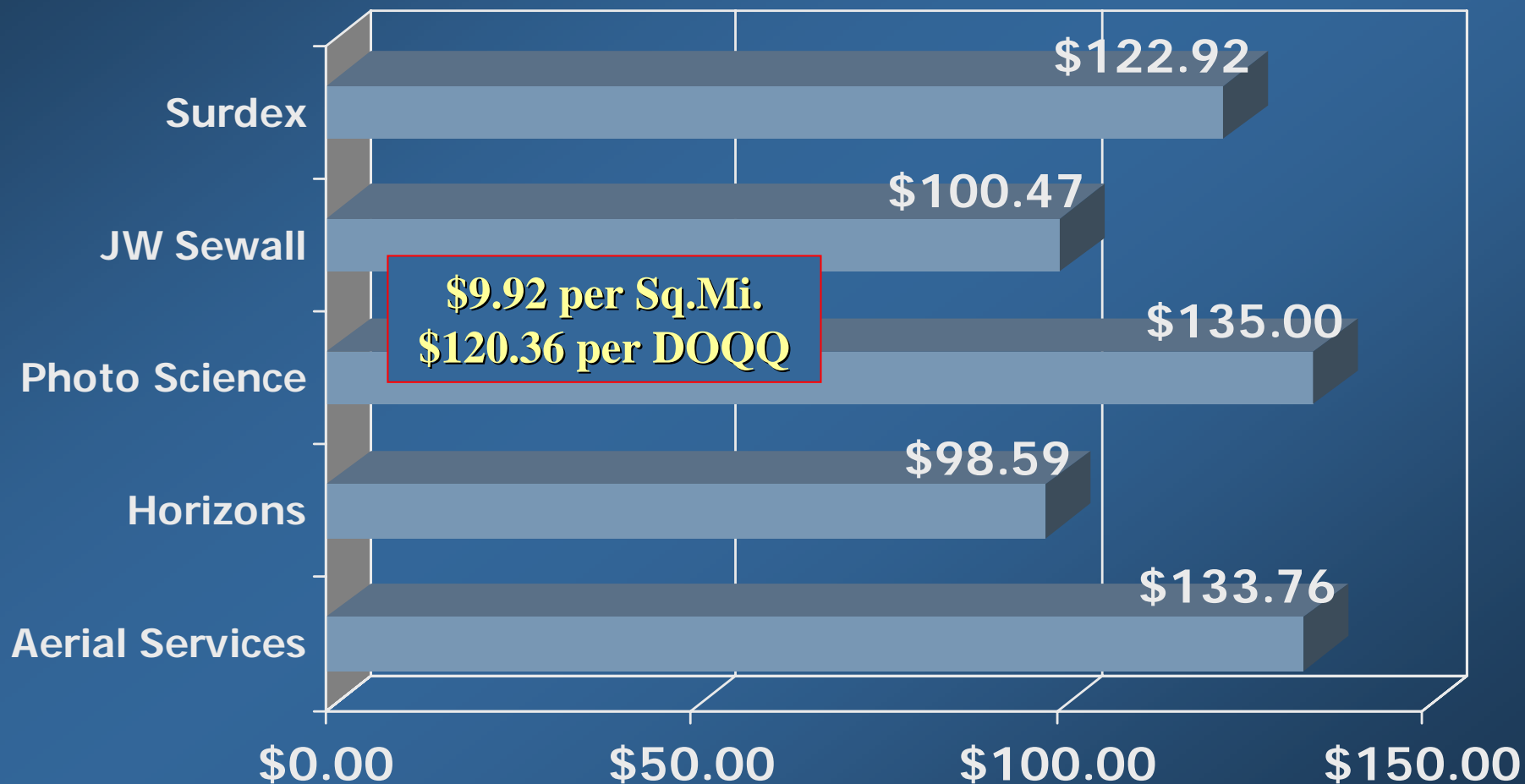


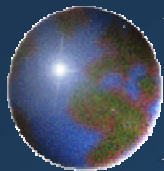


# 2003 NAIP Awards



## Price per DOQQ – Two Meter

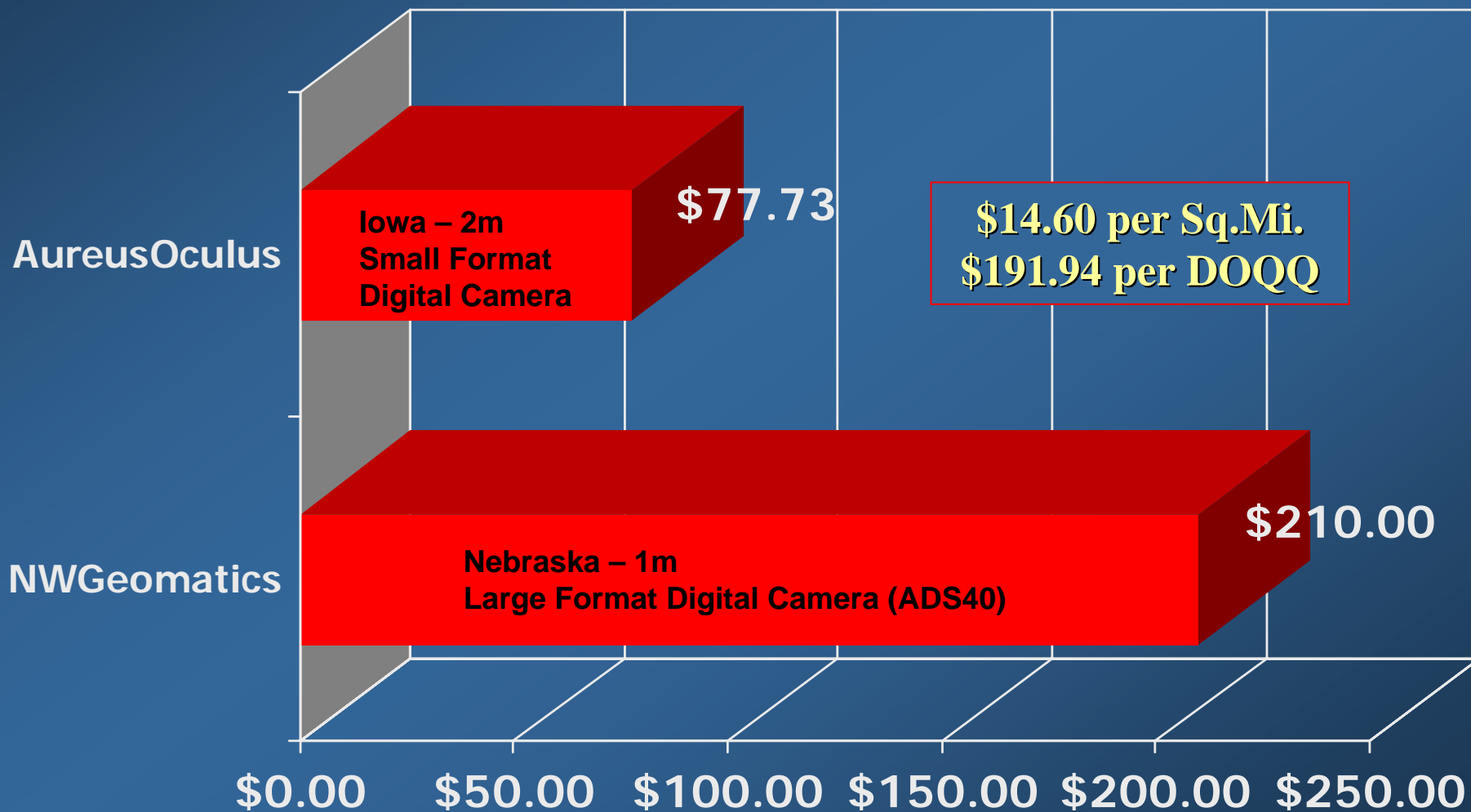


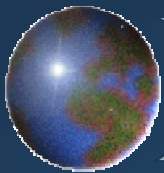


# 2003 NAIP Awards



## Price per DOQQ – Digital Acquisition



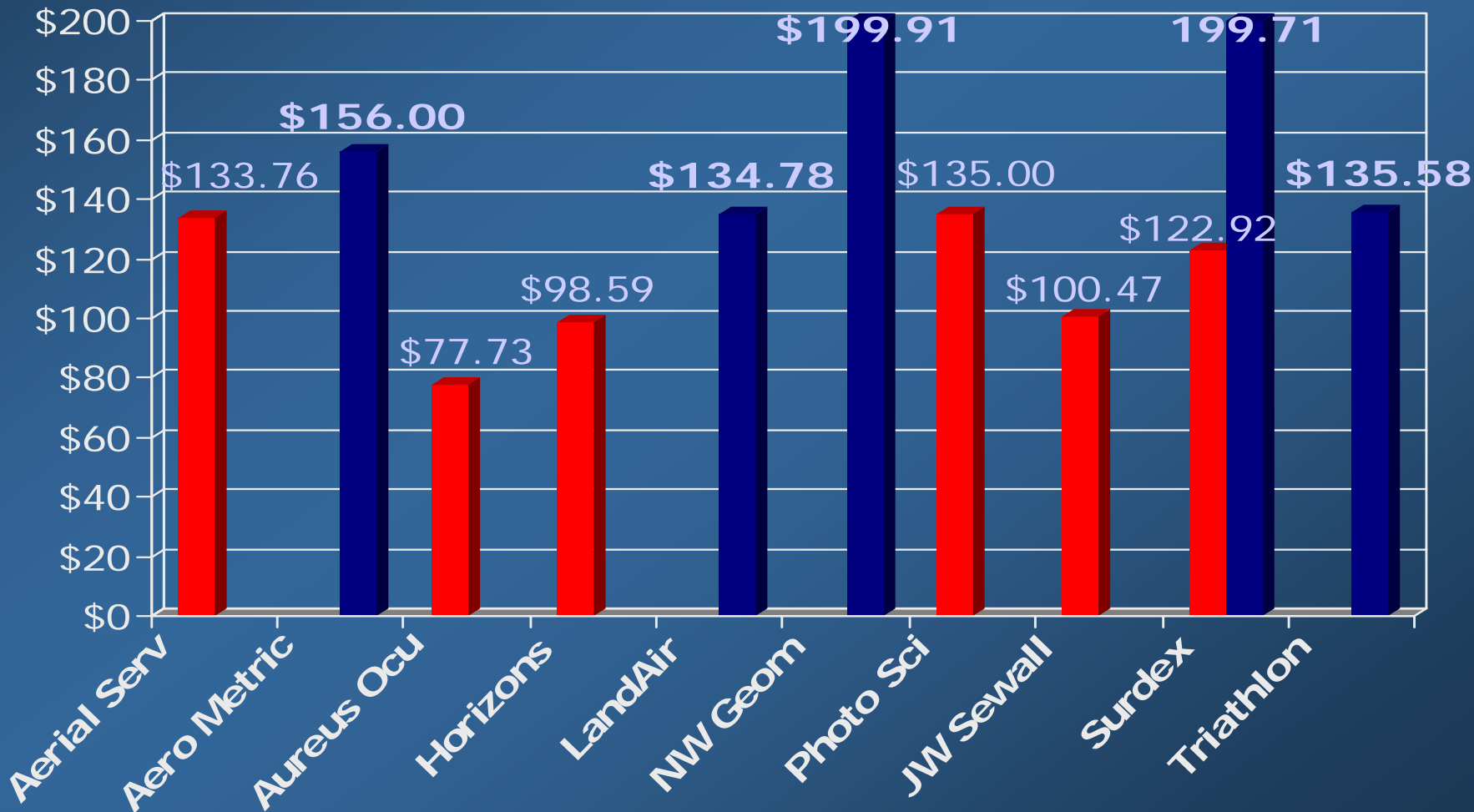


# 2003 NAIP Contract Awards



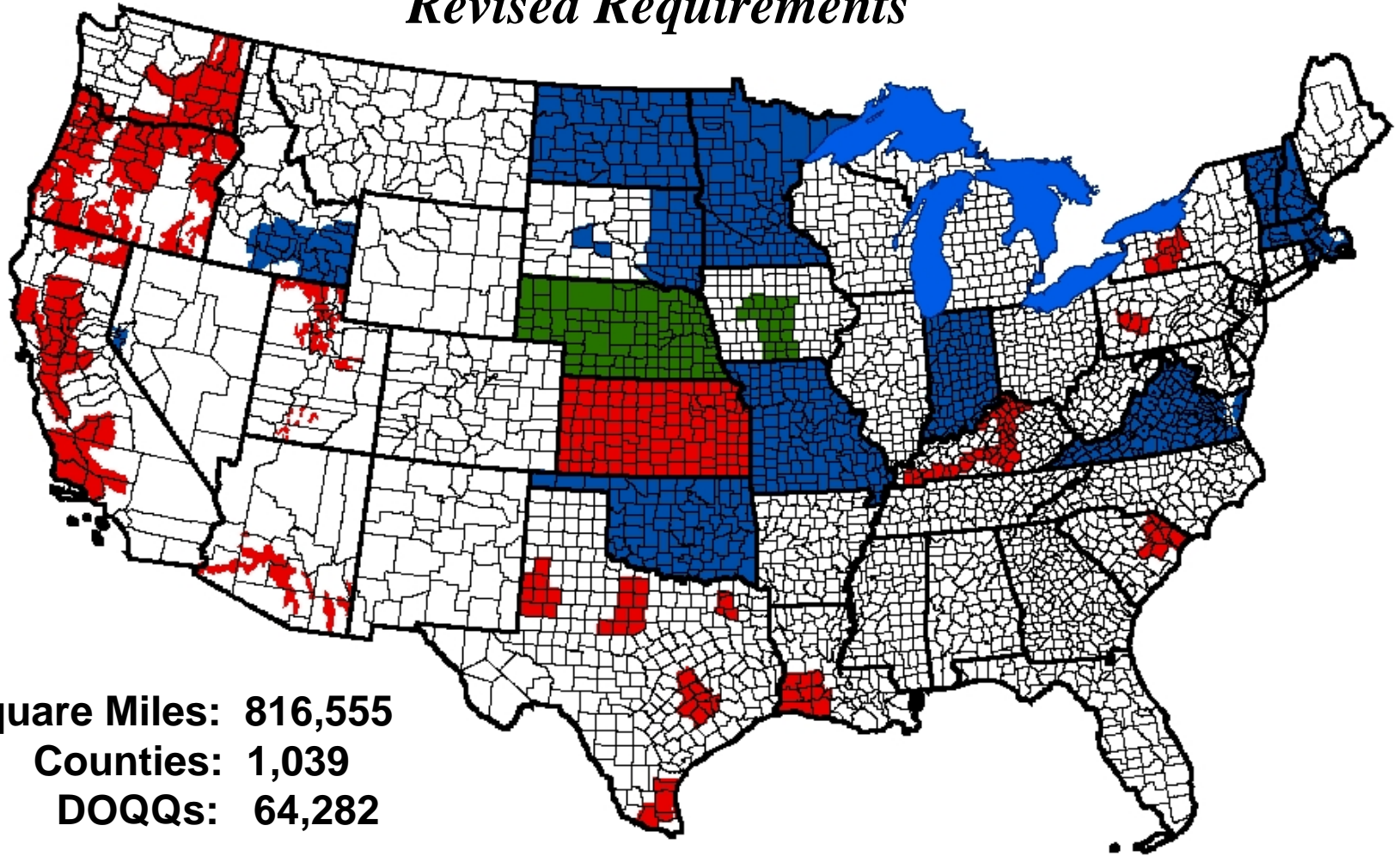
## Awarded Price Per DOQQ

1 Meter Average: \$164.88  
2 Meter Average: \$118.77



# NAIP 2003 CONTRACTS

## *Revised Requirements*



**Square Miles: 816,555**

**Counties: 1,039**

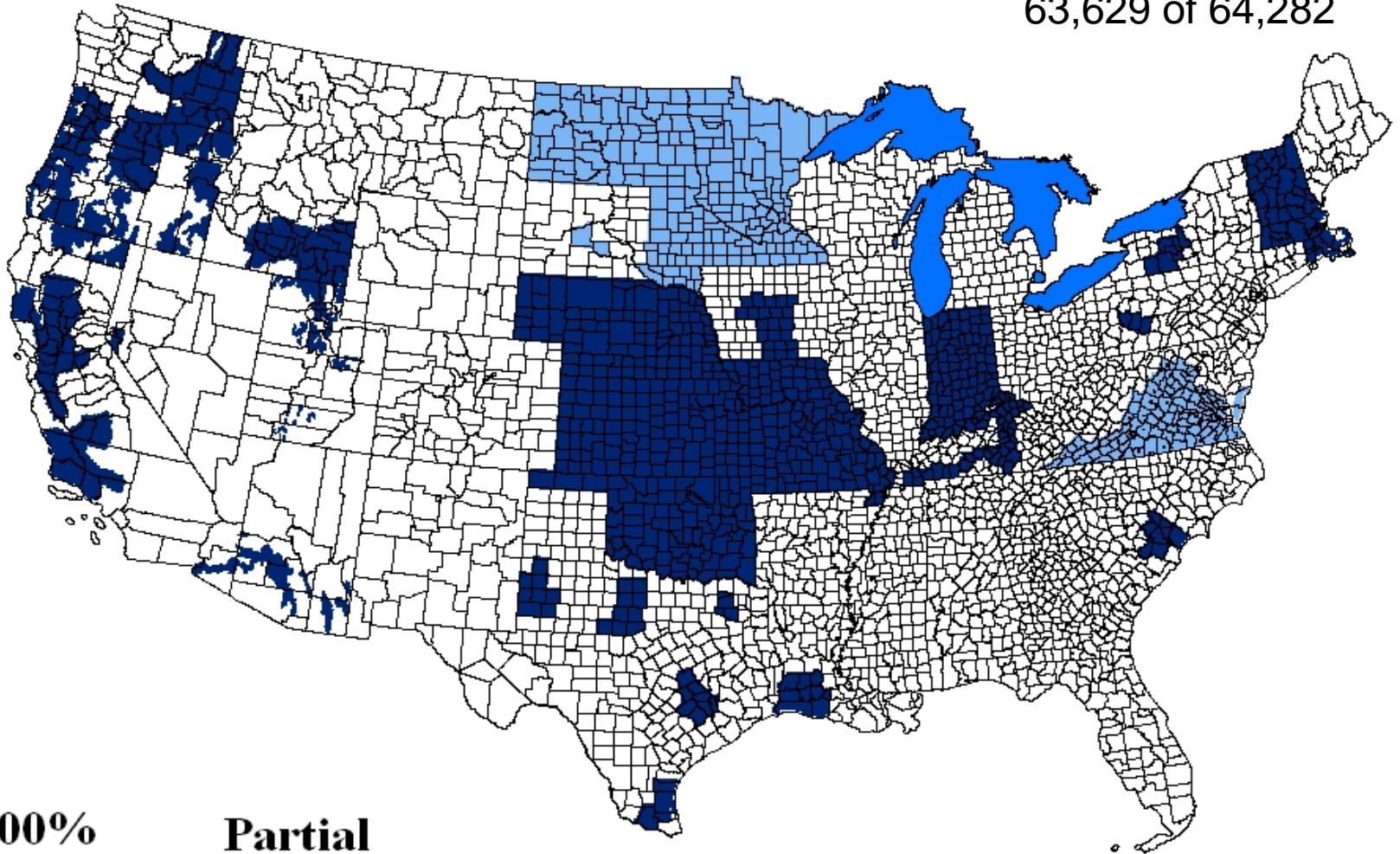
**DOQQs: 64,282**

**1 METER 2 METER DIGITAL**



# 2003 NAIP STATUS

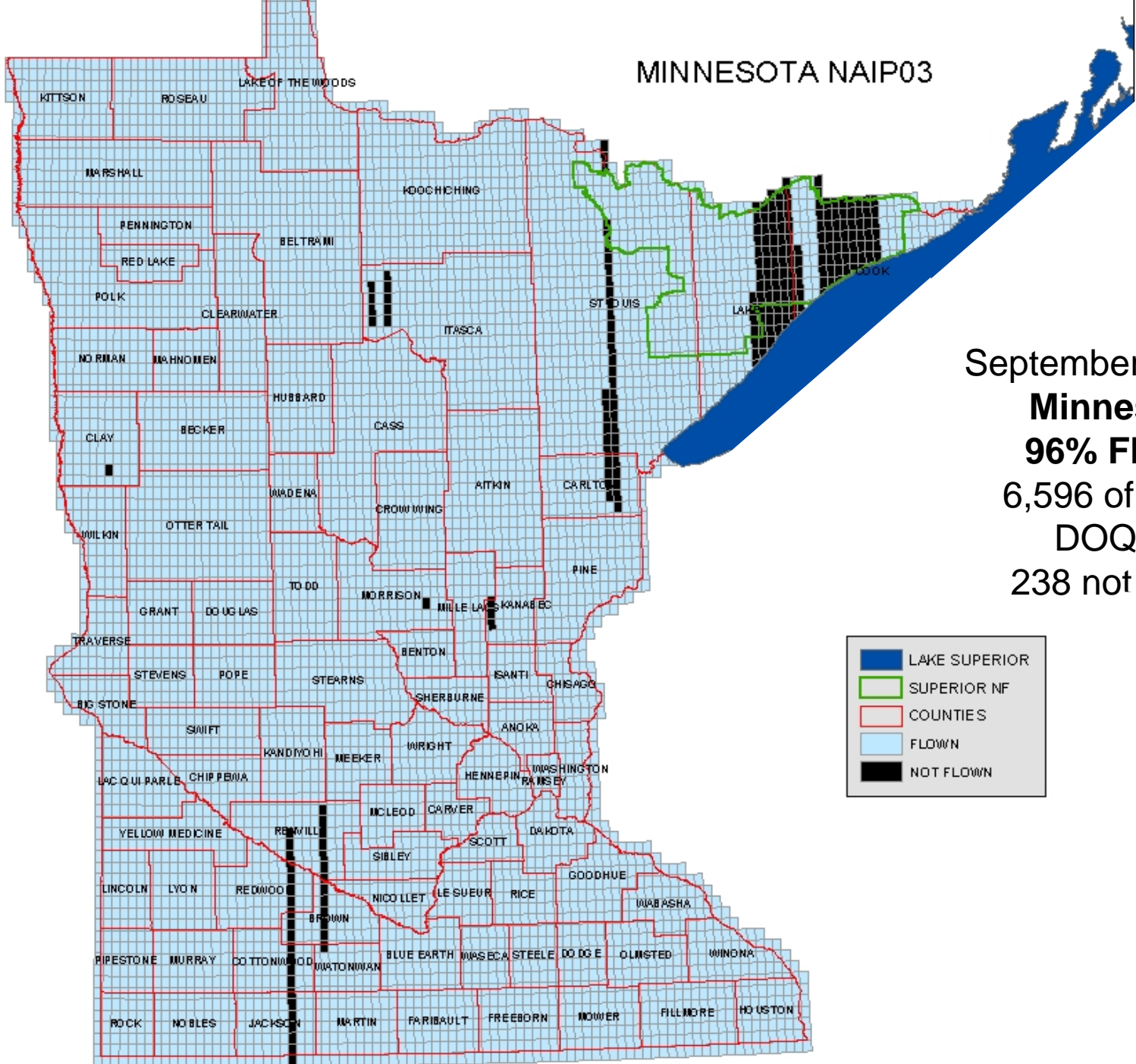
September 18, 2003  
99% Flown  
63,629 of 64,282



**100%**      **Partial**  
■ FLOWN    ■



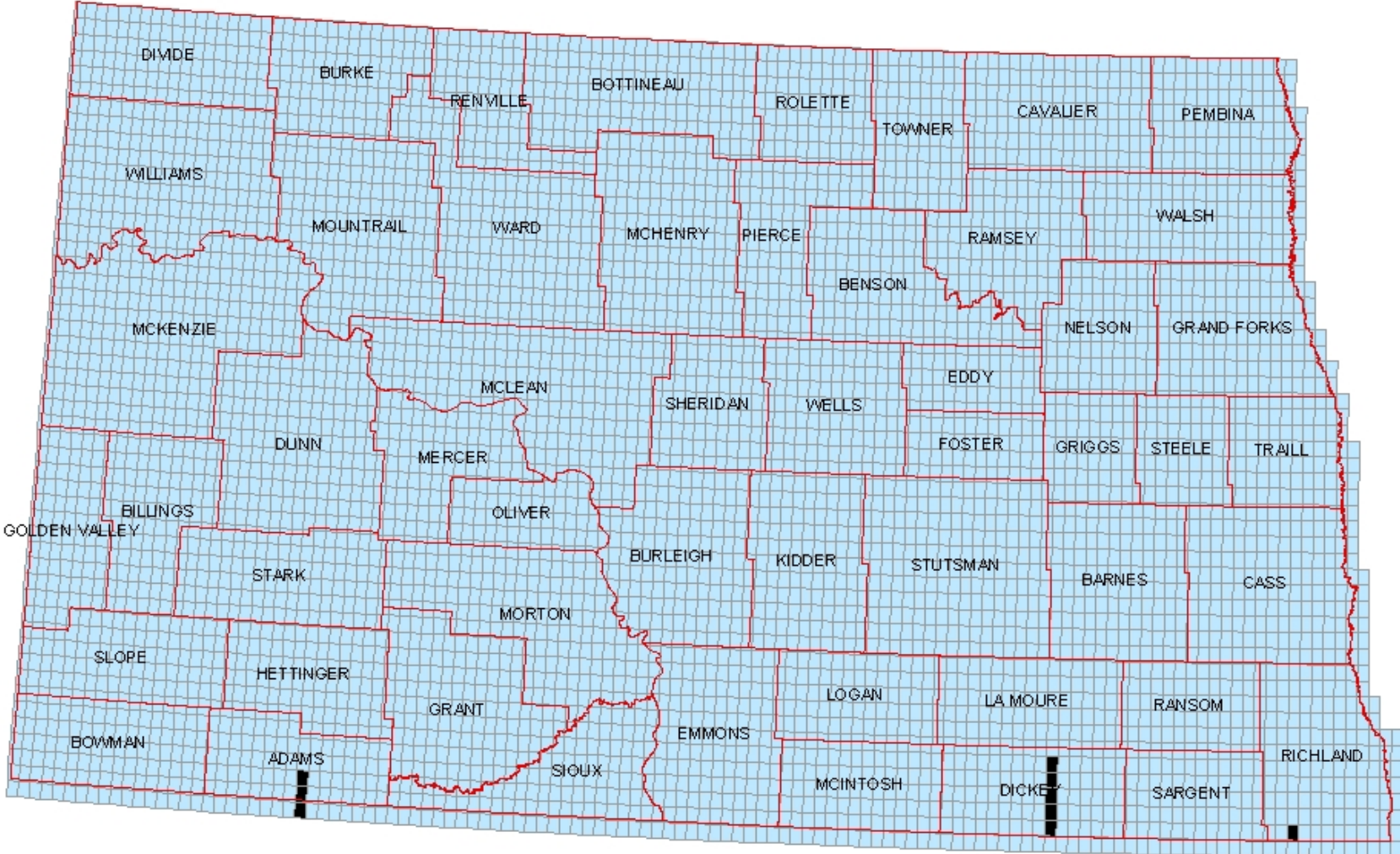
# MINNESOTA NAIP03



September 9, 2003  
**Minnesota**  
**96% Flown**  
6,596 of 6,834  
DOQQs  
238 not flown

- LAKE SUPERIOR
- SUPERIOR NF
- COUNTIES
- FLOWN
- NOT FLOWN

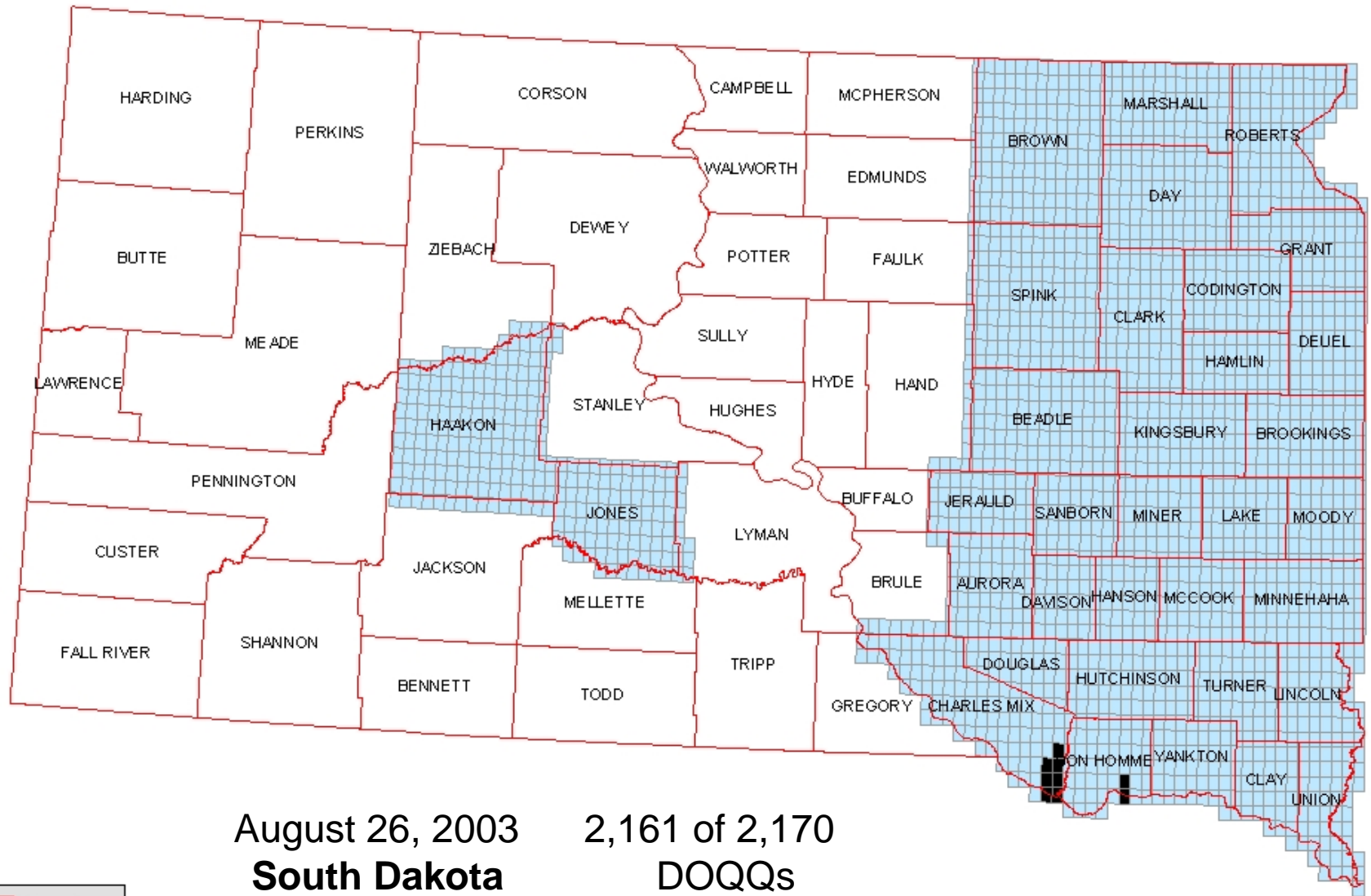
# NORTH DAKOTA NAIP03



August 24, 2003      5,787 of 5,796  
**North Dakota**      DOQQs  
**99% Flown**      9 not flown

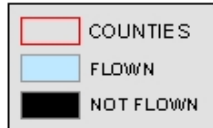
COUNTIES  
 NOT FLOWN  
 FILED IN

# SOUTH DAKOTA NAIP03



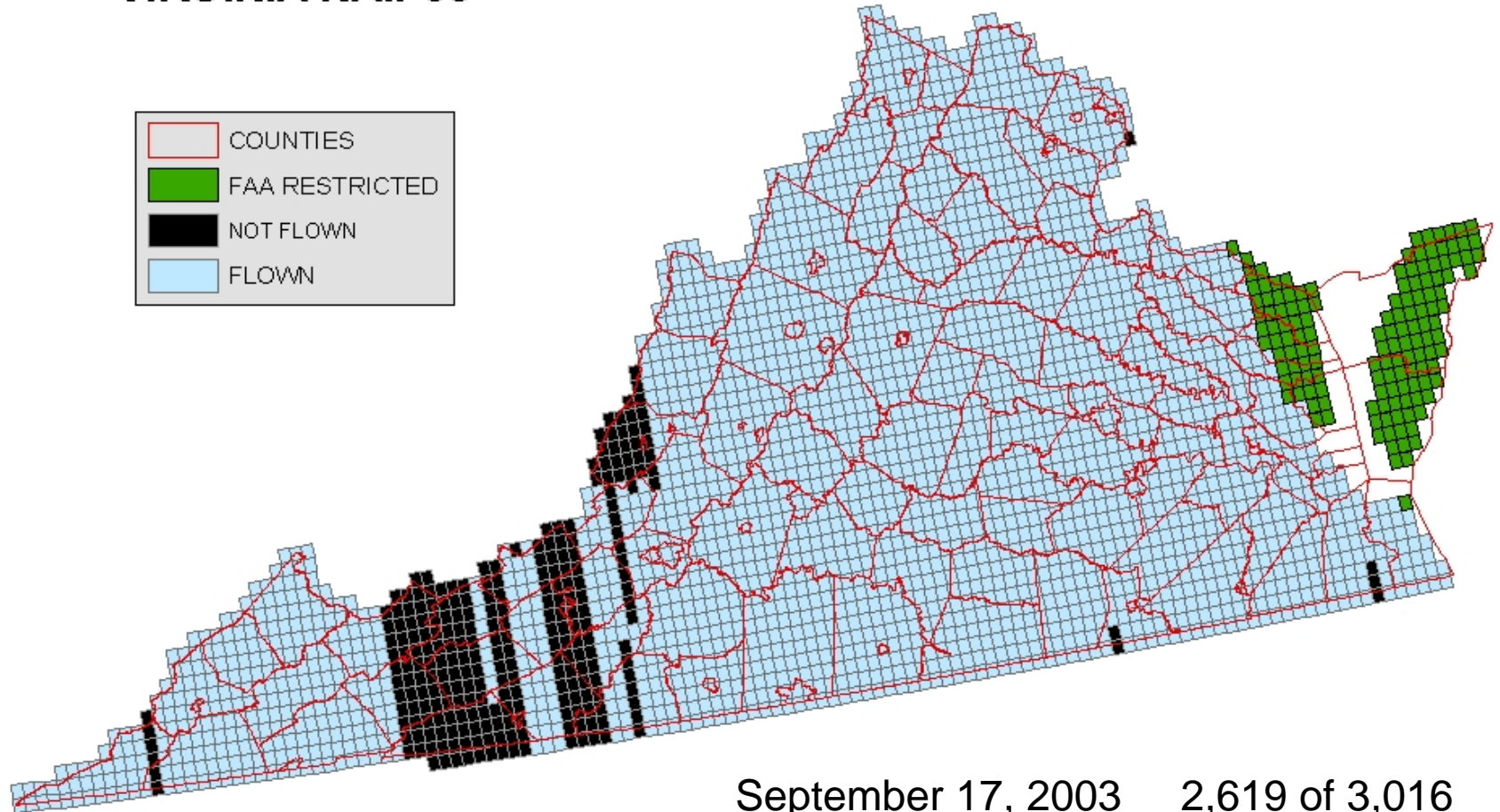
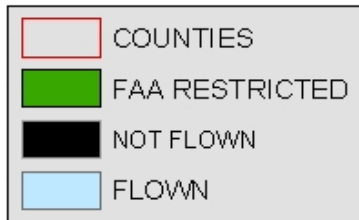
August 26, 2003  
**South Dakota**  
**99% Flown**

2,161 of 2,170  
**DOQQs**  
9 not flown





# VIRGINIA NAIP03



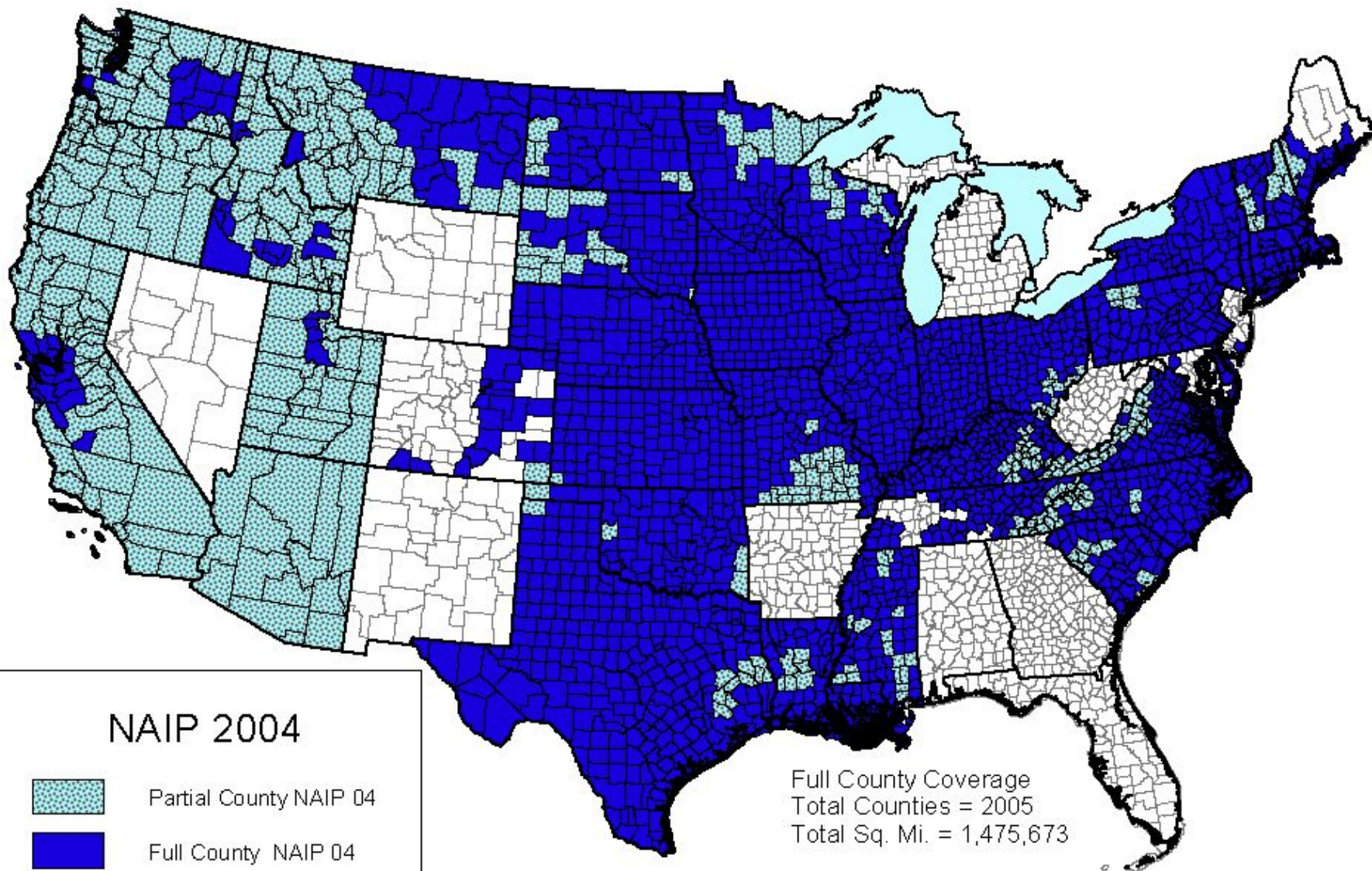
September 17, 2003

**Virginia**  
**87% Flown**



2,619 of 3,016

DOQQs  
397 not flown

# PROPOSED NAIP 2004 COVERAGE



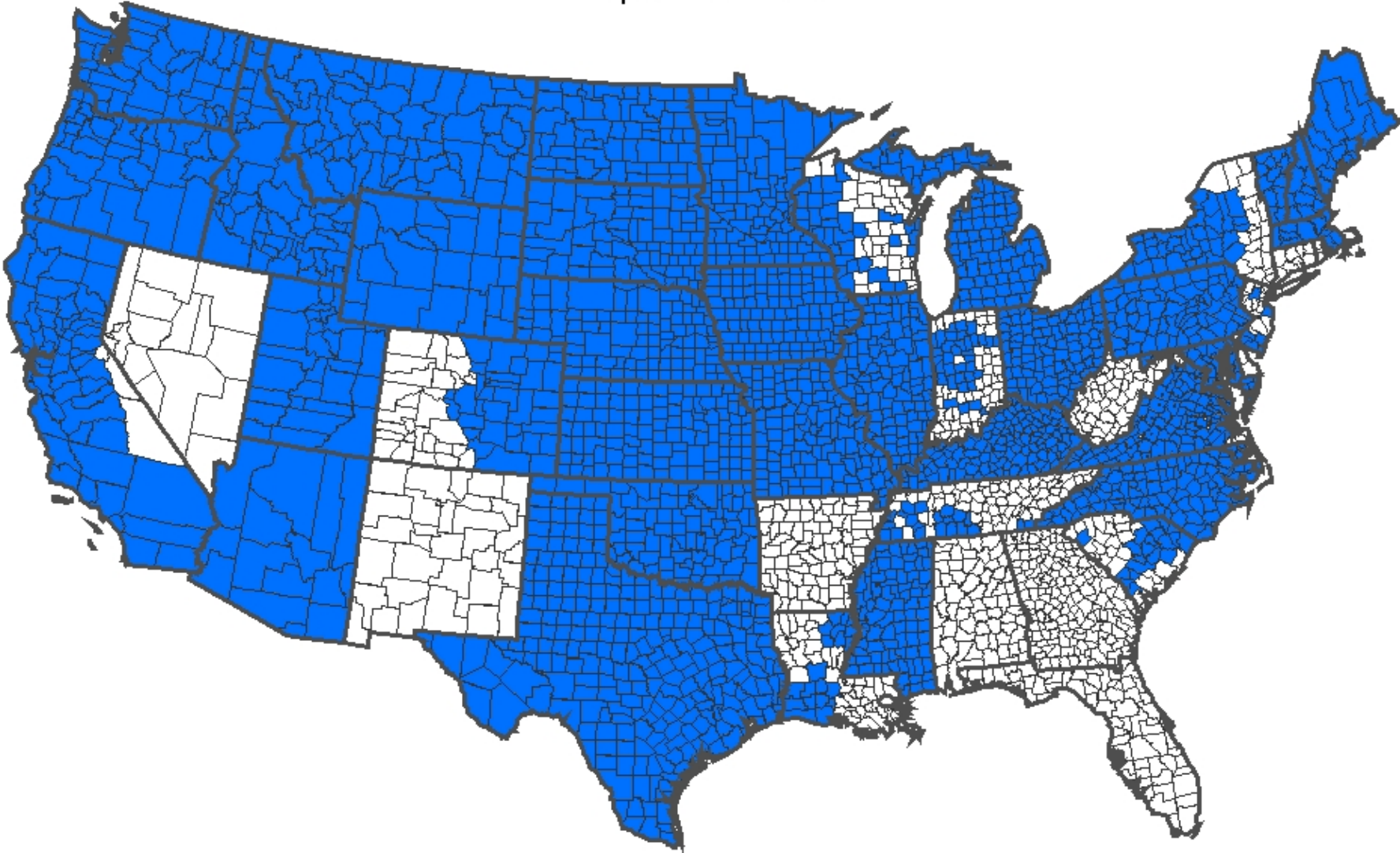
**NAIP 2004**

-  Partial County NAIP 04
-  Full County NAIP 04

Full County Coverage  
Total Counties = 2005  
Total Sq. Mi. = 1,475,673

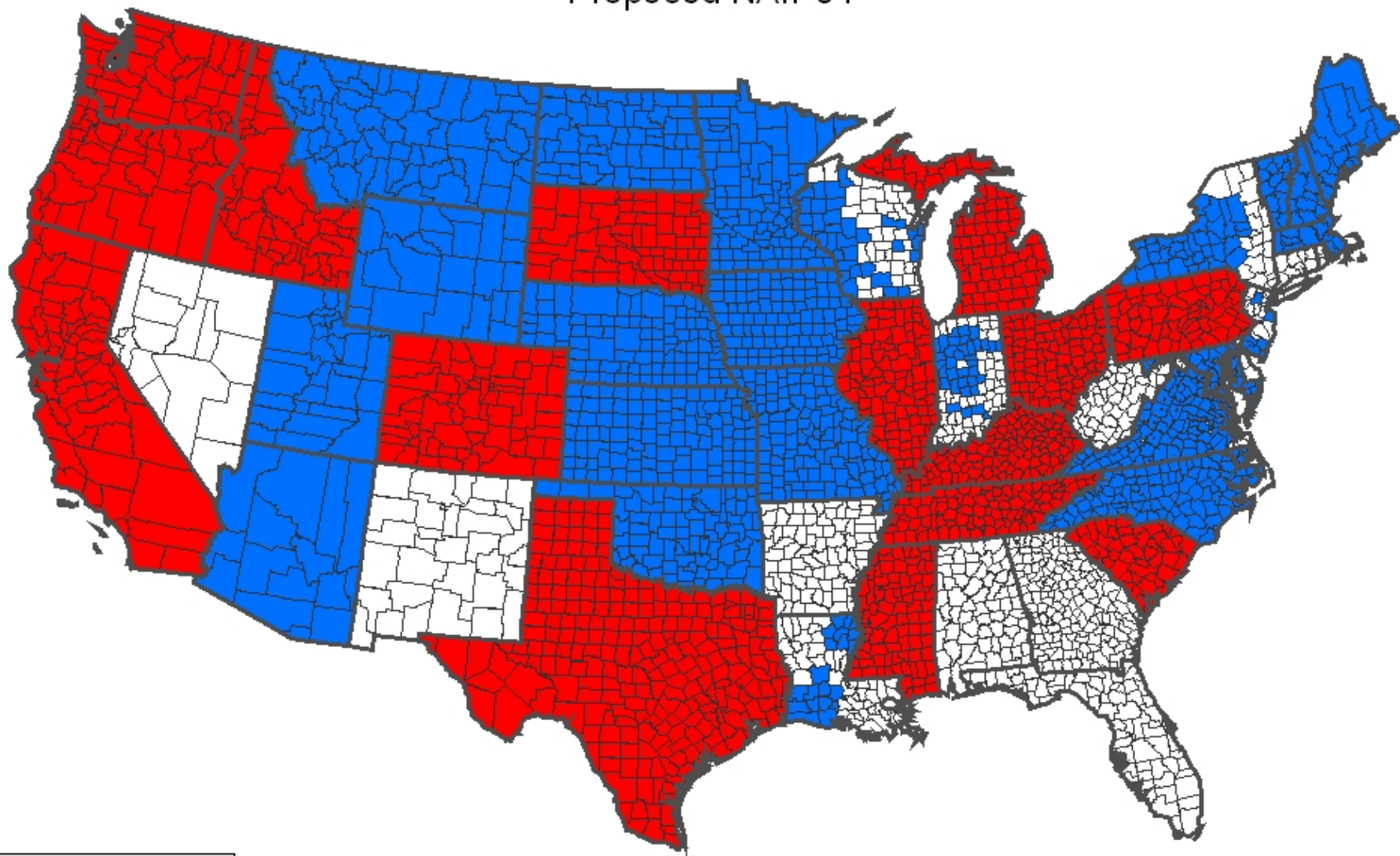
Partial County Coverage  
Total Counties = 407  
Total Sq. Mi. = 395,321

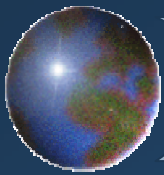
# Proposed NAIP04



Proposed NAIP04 Coverage

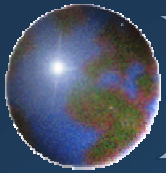
# Proposed NAIP04





## Estimated RFP Timeline:

FedBizOpps Ad	February 2, 2004
Issue RFP	February 18, 2004
Proposals Due	March 19, 2004
Proposal Evaluations	April 2, 2004
Contract Negotiations	April 16, 2004
Contract Awards	April 30, 2004



# *NAIP 2004 Procurement Process*



## Proposal Evaluations

April 2, 2004

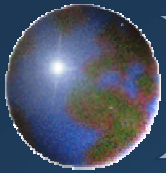
Technical evaluations will be performed prior to pricing evaluations, then combined for an overall score.

Overall highest ranked proposals will be considered and negotiated first followed by next ranked proposals.

## Contract Negotiations

April 16, 2004

Proposal negotiations and subsequent contract awards will be based on which proposal provides the Government the "Best Value".

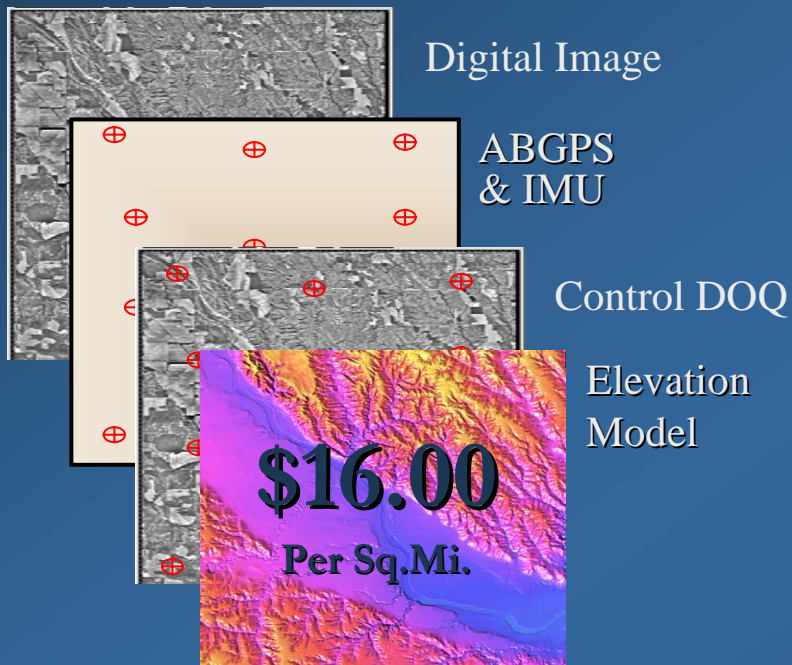


## Proposed Changes to NAIP 2004

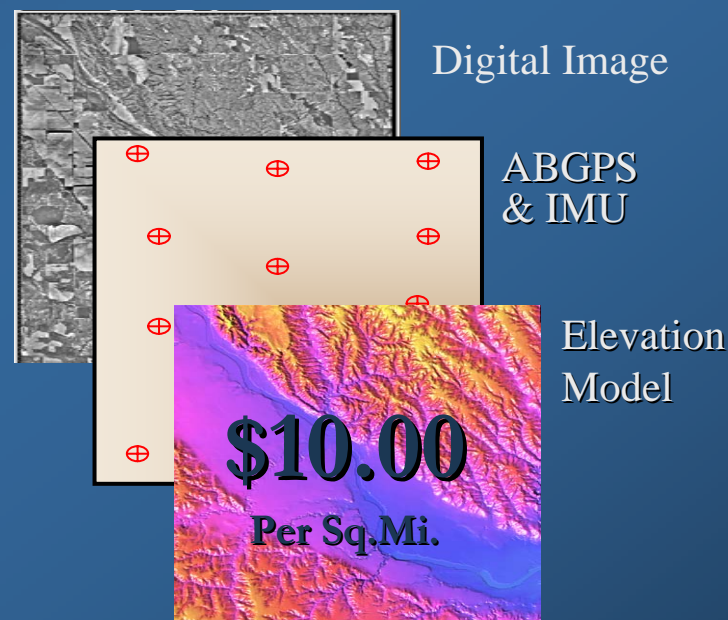
- Radiometric Correction Required (color/tone balance)
- Metadata Required for Compressed County Mosaics
- One Year Product Warranty Required
- Electronic Progress Reports Required
- Digital Cameras Considered



# 2004 Estimated Costs and Products

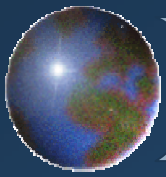


**1m Ortho Rectified**



**2m Ortho Rectified**





# *Types of Partnership Opportunities*



Federal, State, or  
County Cost Share  
with FSA for:

New Coverage  
Beyond FSA Counties

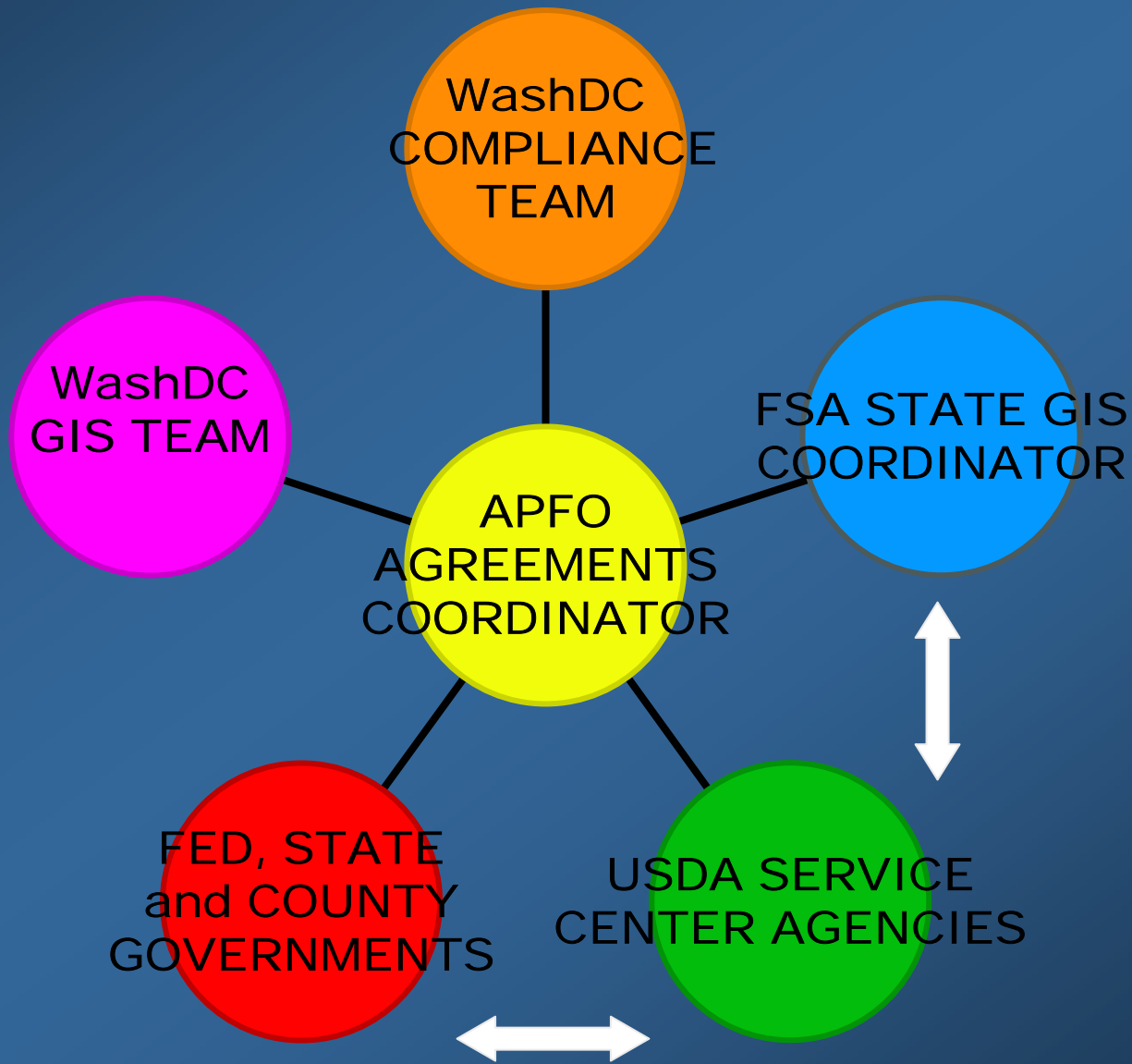
New Coverage  
Beyond Agricultural  
Areas of a County

Higher Resolution  
Image Upgrade





# *NAIP Partnership Development*



**USDA Aerial Photography Field Office**  
**2222 West 2300 South**  
**Salt Lake City, Utah 84119-2020**  
**[www.apfo.usda.gov](http://www.apfo.usda.gov)**

**Contacts for Partnership Information:**  
**Cindy Sessions (801) 975-3500 Ext. 208**  
**Geoff Gabbott (801) 975-3500 Ext. 207**



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# *2003 Contracting Activities*



## **EXAMPLES OF 2003 NAIP IMAGERY**

**One Meter Color Infrared (Missouri)**

**One Meter Direct Digital Color (Nebraska)**

**Other One Meter Color Imagery**

**Two Meter Color Imagery**

**Examples of Non-Conforming Imagery Submitted**



NAIP03 Missouri CIR Image



**New Madrid County, MO**



**New Madrid County, MO**

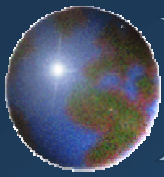


**Washington County, MO**



An aerial photograph of Washington County, Missouri, showing a patchwork of agricultural fields, roads, and water bodies. The image is dominated by various shades of brown, tan, and green, representing different types of land use and vegetation. A network of roads and highways is visible, along with several small ponds and reservoirs. The overall appearance is that of a rural, agricultural landscape.

**Washington County, MO**



# *2003 Contracting Activities*



## **EXAMPLES OF 2003 NAIP IMAGERY**

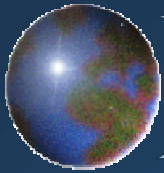
One Meter Color Infrared (Missouri)

**One Meter Direct Digital Color (Nebraska)**

Other One Meter Color Imagery

Two Meter Color Imagery

Examples of Non-Conforming Imagery Submitted

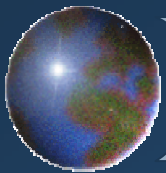


**ADS  
40**

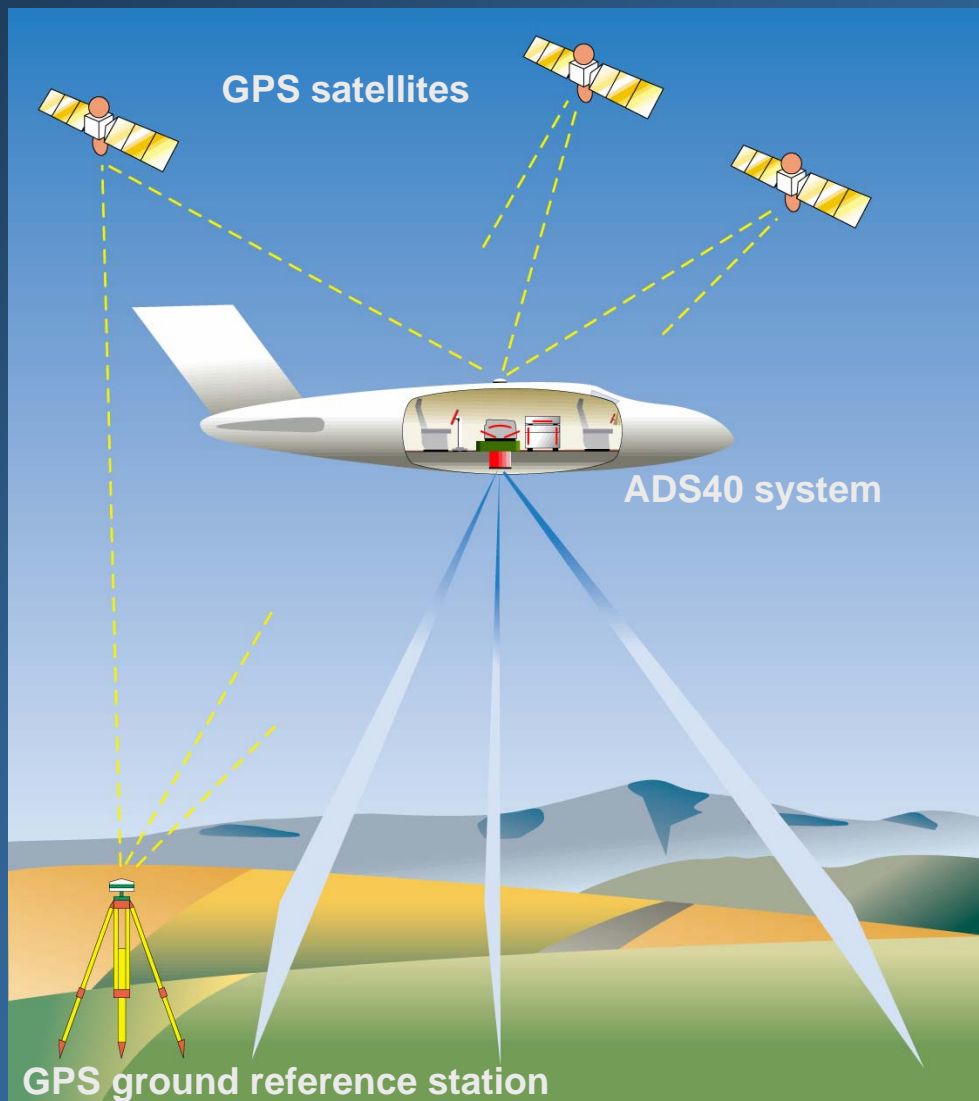
# *Airborne Digital Sensor*



- 3 panchromatic CCD lines each 2 x 12,000 pixels, staggered by 3.25  $\mu\text{m}$
- 4 multispectral CCD lines, each 12,000 pixels
- Pixel size: 6.5  $\mu\text{m}$  x 6.5  $\mu\text{m}$
- Field of view (FoV) or swath angle: 64°
- Focal length: 62.77 mm
- Stereo angles: 14°, 28°, 42°

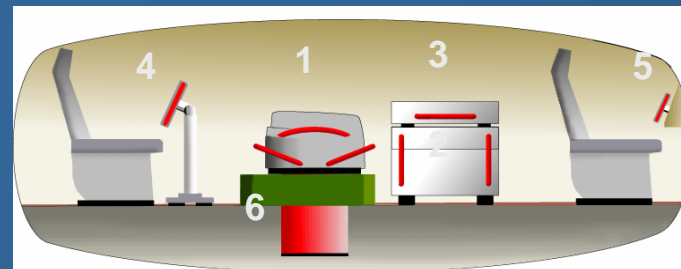


# Airborne ADS40 System

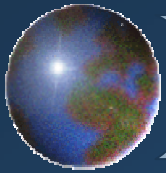


## ADS40 System

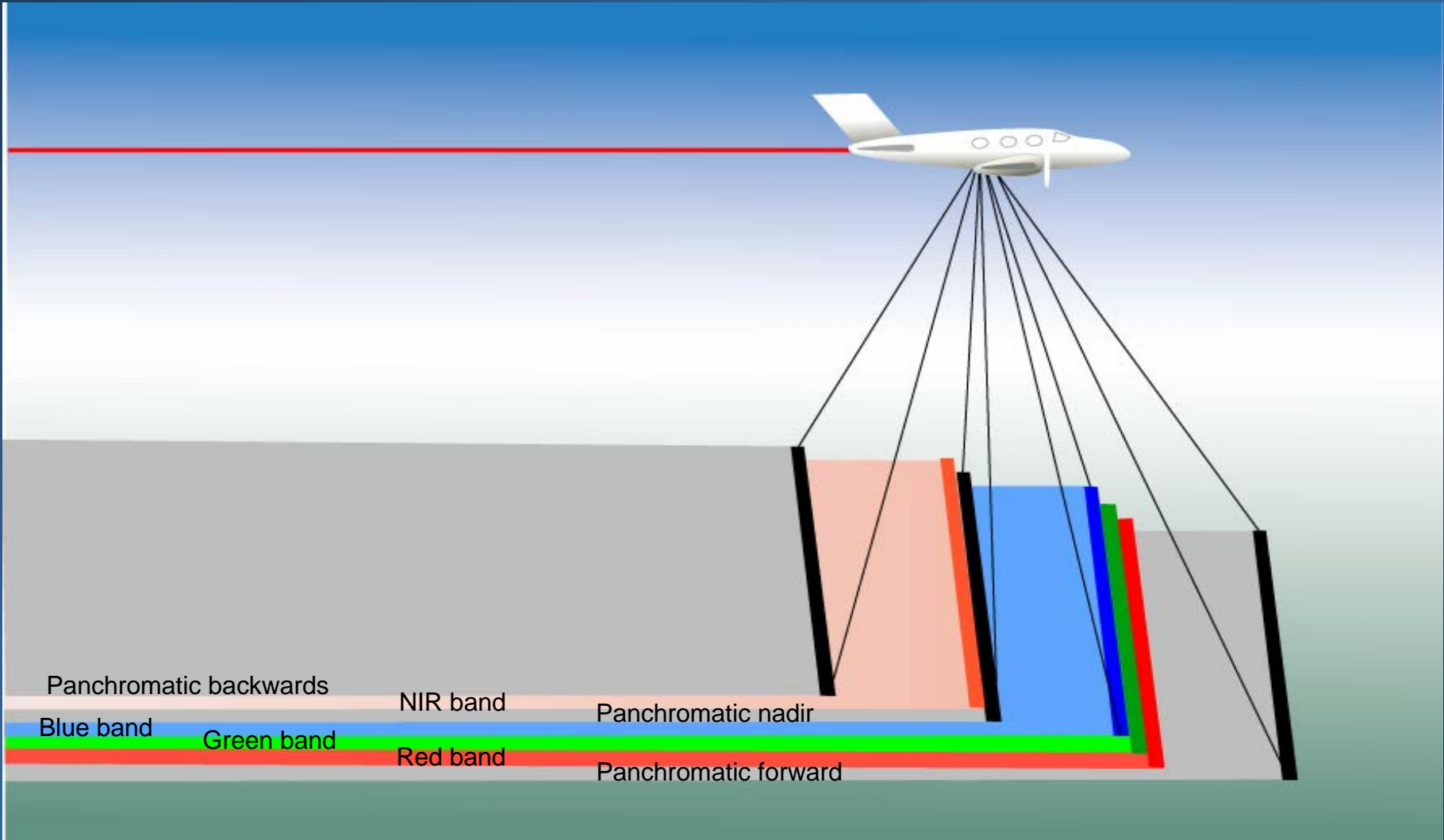
- 1 Sensor head SH40 with:
  - Digital optics DO64 & IMU



- 2 Control unit CU40 with:
  - position & attitude computer POS
- 3 Mass Memory MM40
- 4 Operator interface OI40
- 5 Guidance Indicator GI40
- 6 Mount PAV30



# *Panchromatic and spectral band filters*





# ADS40 System Components



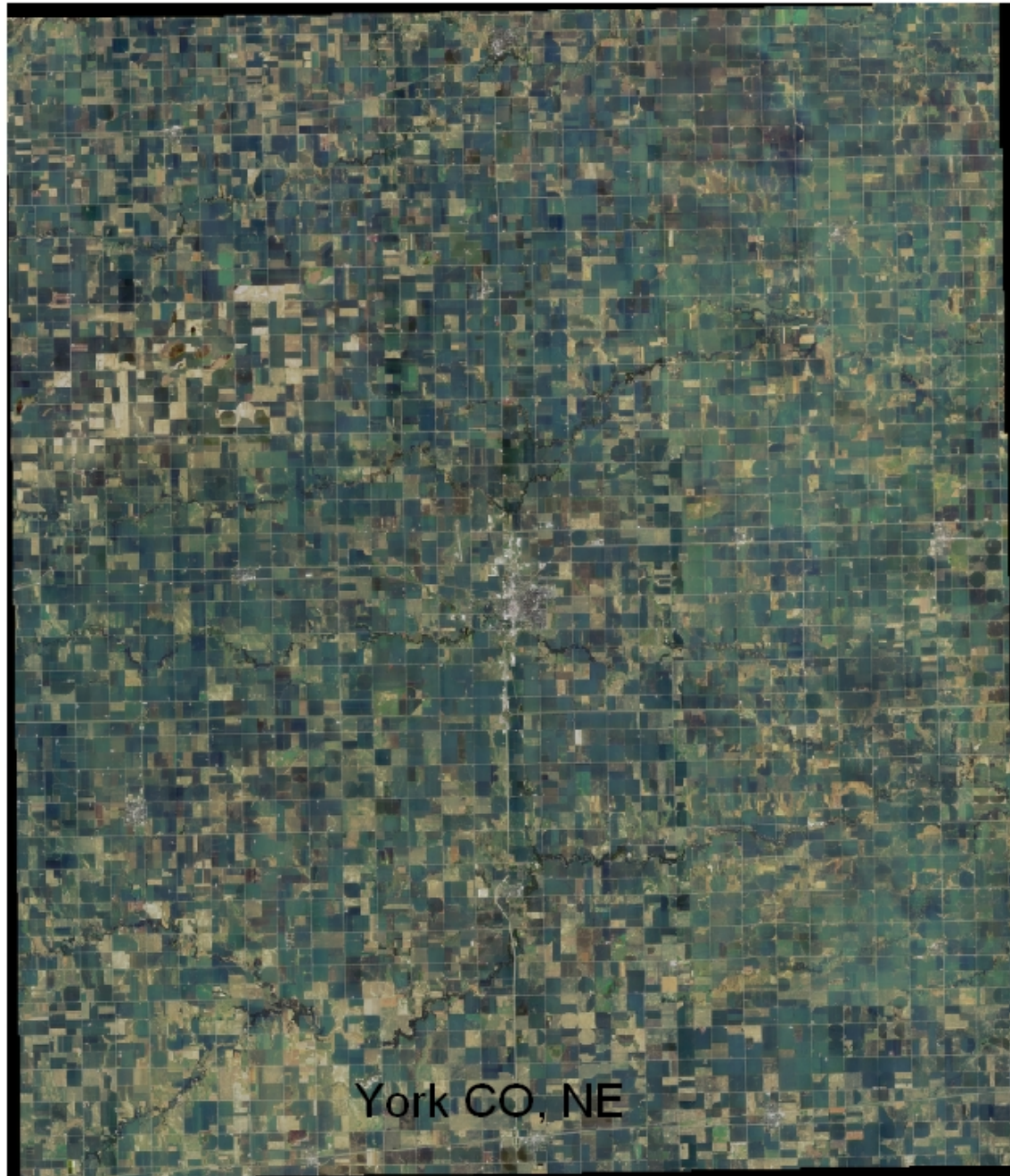
## Applanix IMU System



Control Unit CU40



Mass Memory Unit MM40

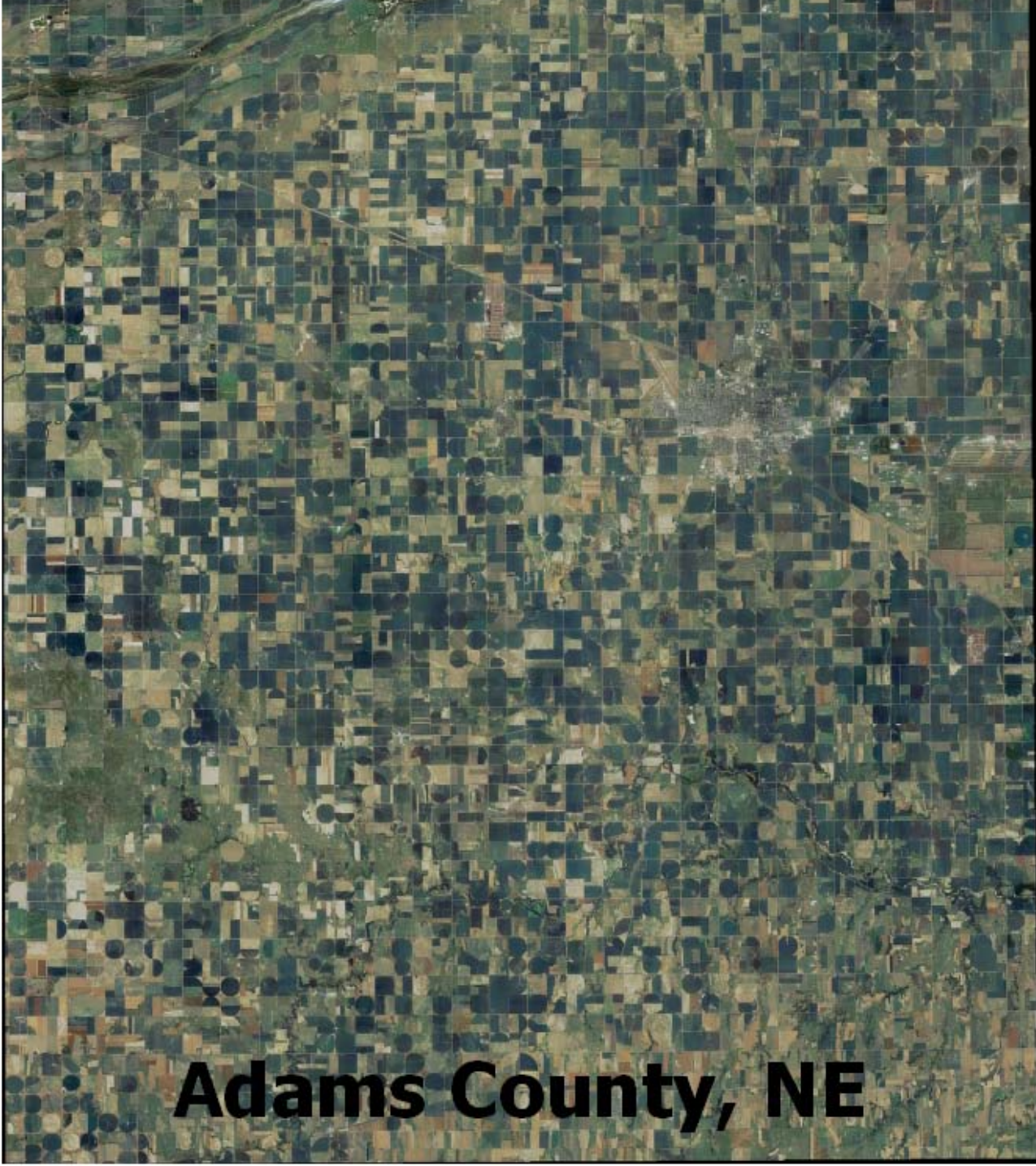


York CO, NE



York CO, NE





**Adams County, NE**



**Adams County, NE**



**Greeley County, NE**



**Greeley County, NE**



**Lincoln County, NE**



**Lincoln County, NE**



# *2003 Contracting Activities*



## **EXAMPLES OF 2003 NAIP IMAGERY**

One Meter Color Infrared (Missouri)

One Meter Direct Digital Color (Nebraska)

**Other One Meter Color Imagery**

Two Meter Color Imagery

Examples of Non-Conforming Imagery Submitted

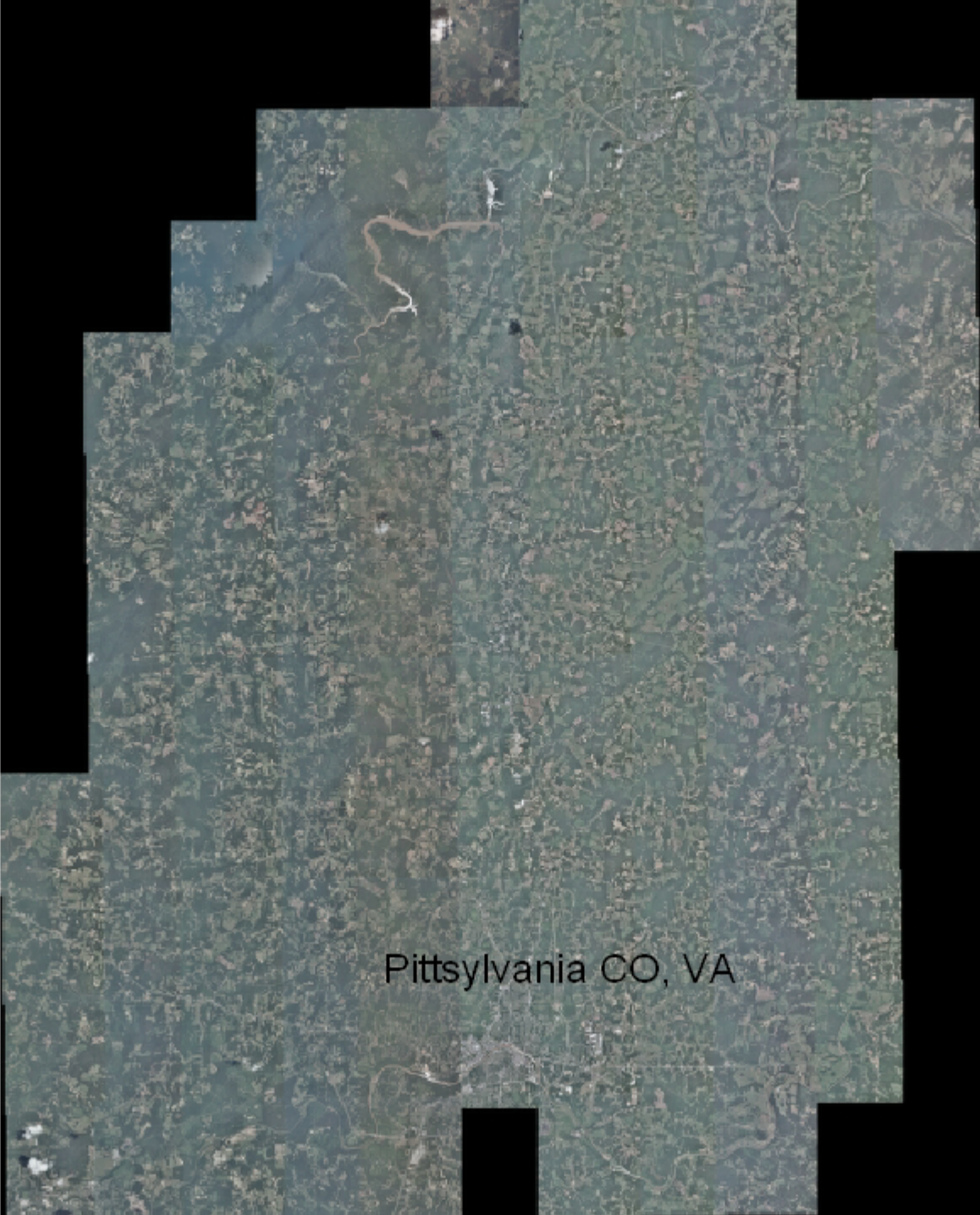


Washington CO, OK





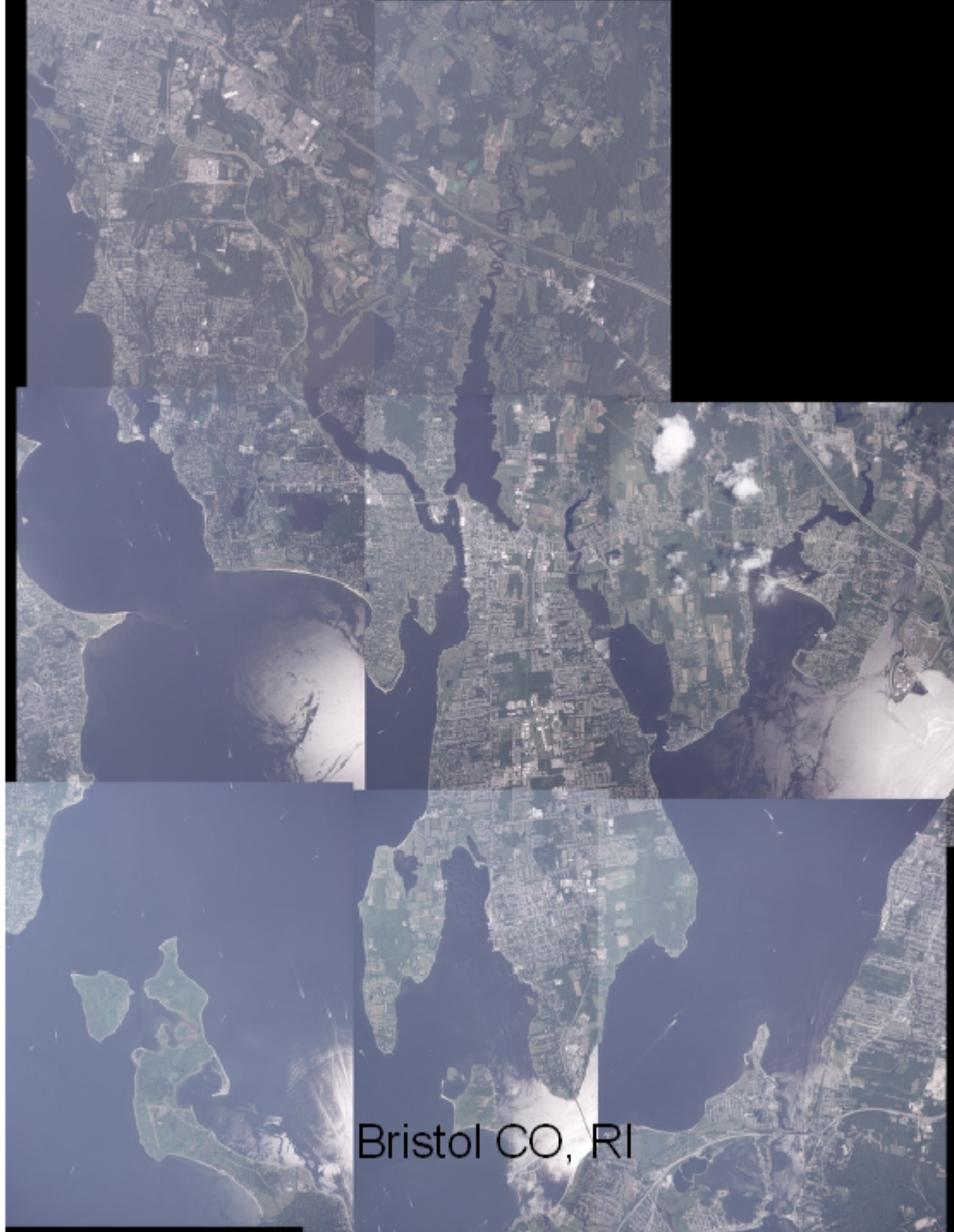
Washington CO, OK



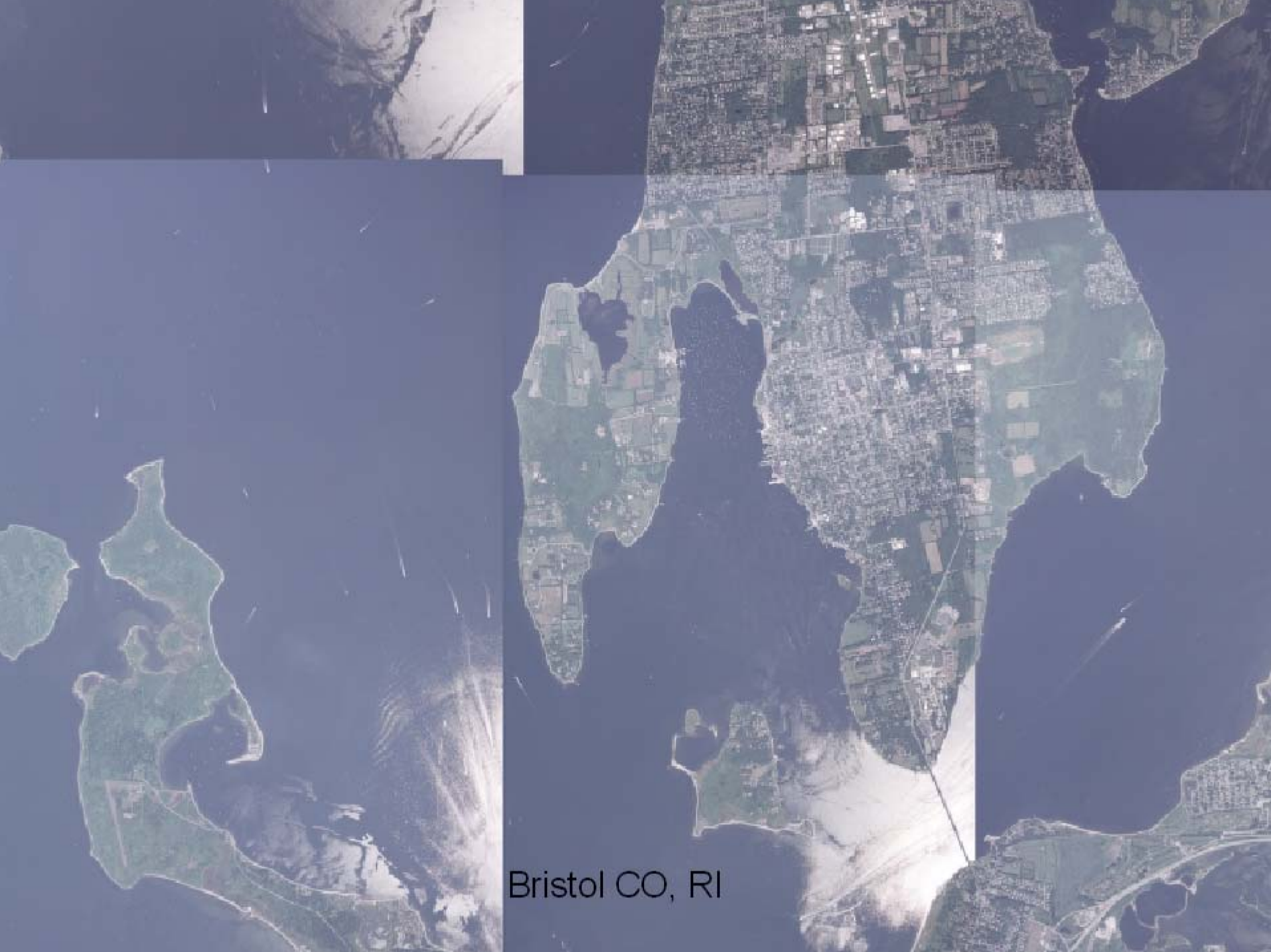
Pittsylvania CO, VA



PITTSYLVANIA CO, VA



Bristol CO, RI



Bristol CO, RI



# *2003 Contracting Activities*



## **EXAMPLES OF 2003 NAIP IMAGERY**

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Other One Meter Color Imagery

**Two Meter Color Imagery**

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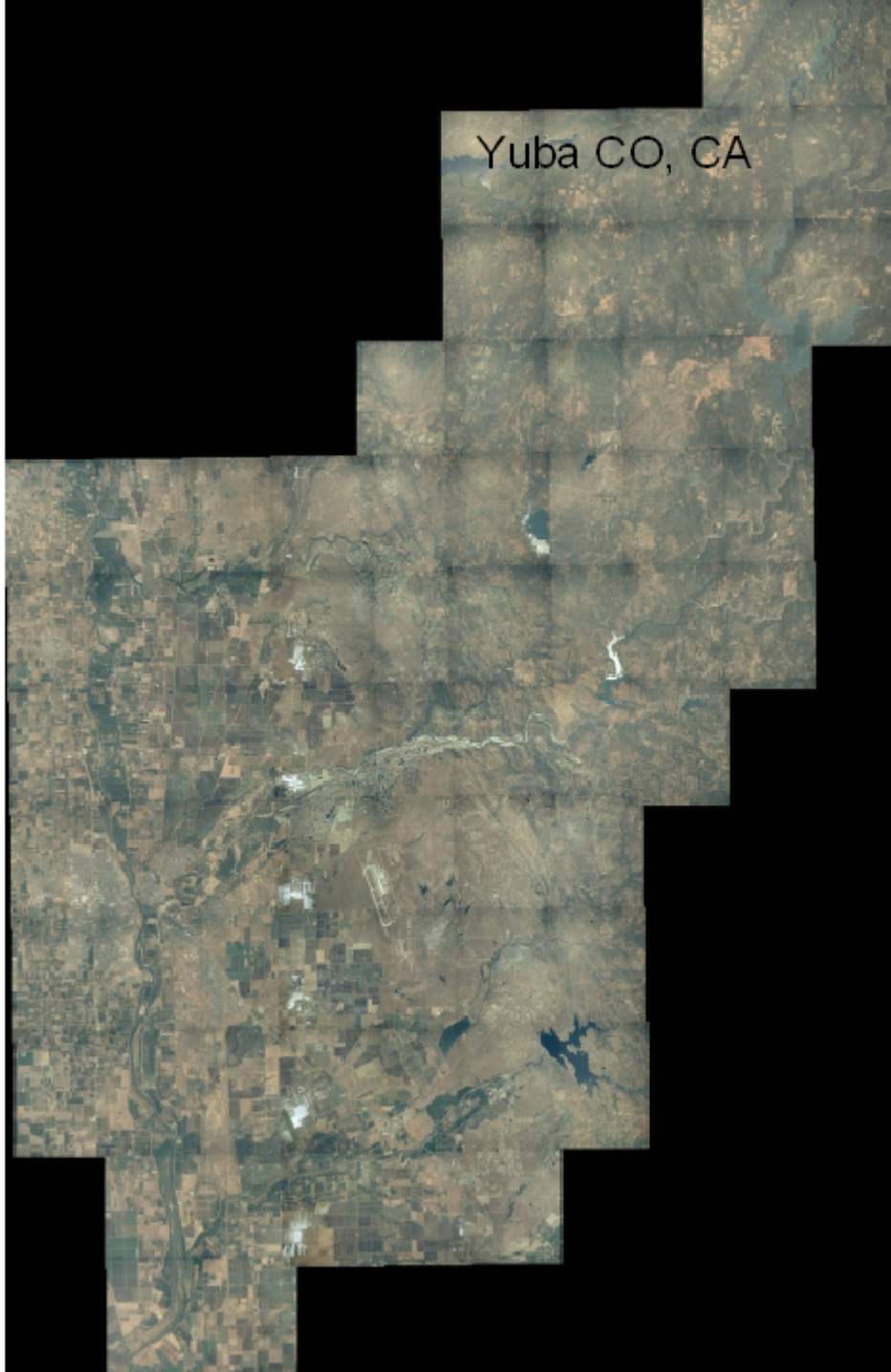
Rice County, KS



OSAGE, KS



Yuba CO, CA





YUBA CO, CA



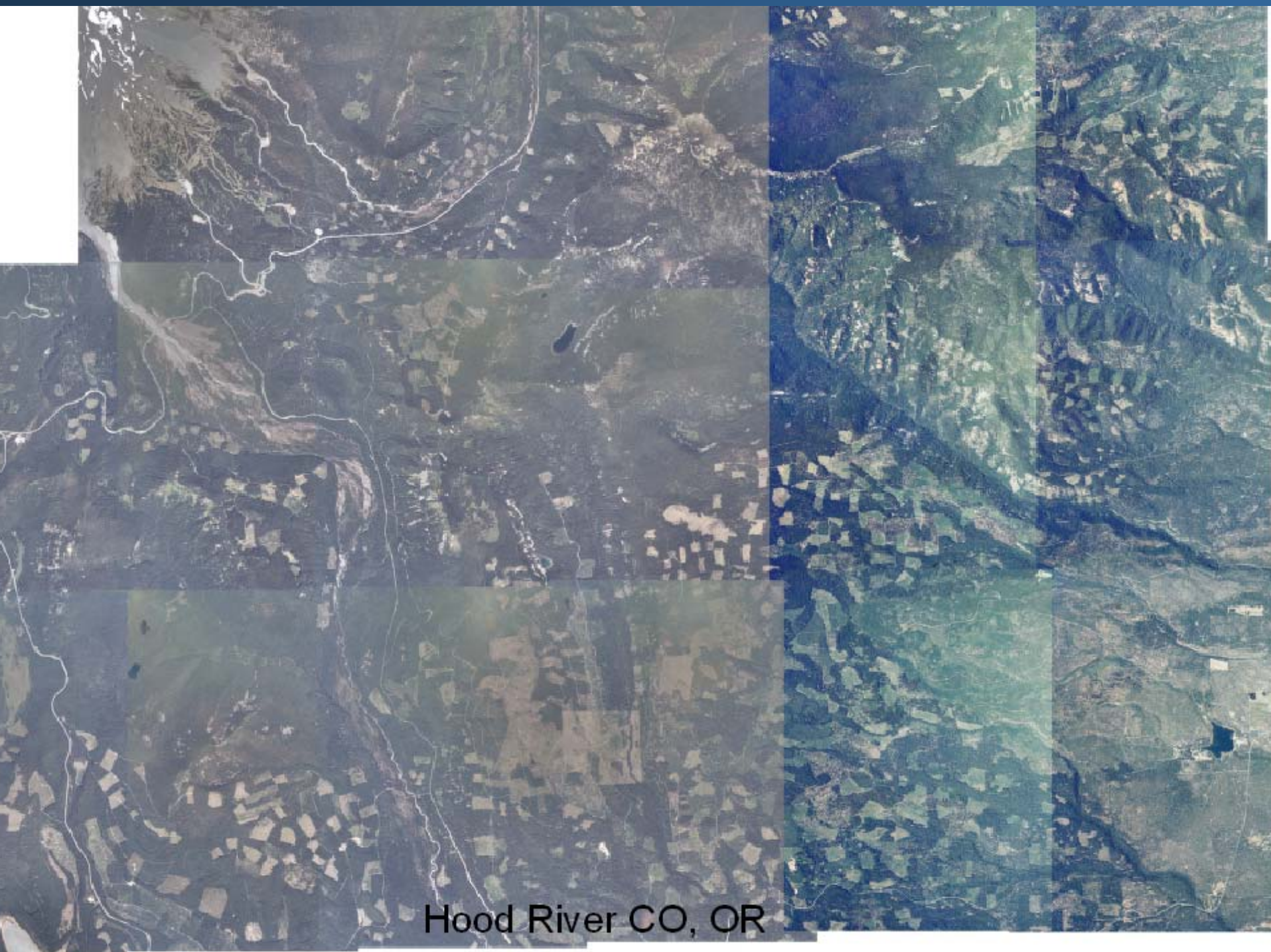
Whitman CO, WA



Whitman CO, WA



Hood River CO, OR



Hood River CO, OR



# *2003 Contracting Activities*



## **EXAMPLES OF 2003 NAIP IMAGERY**

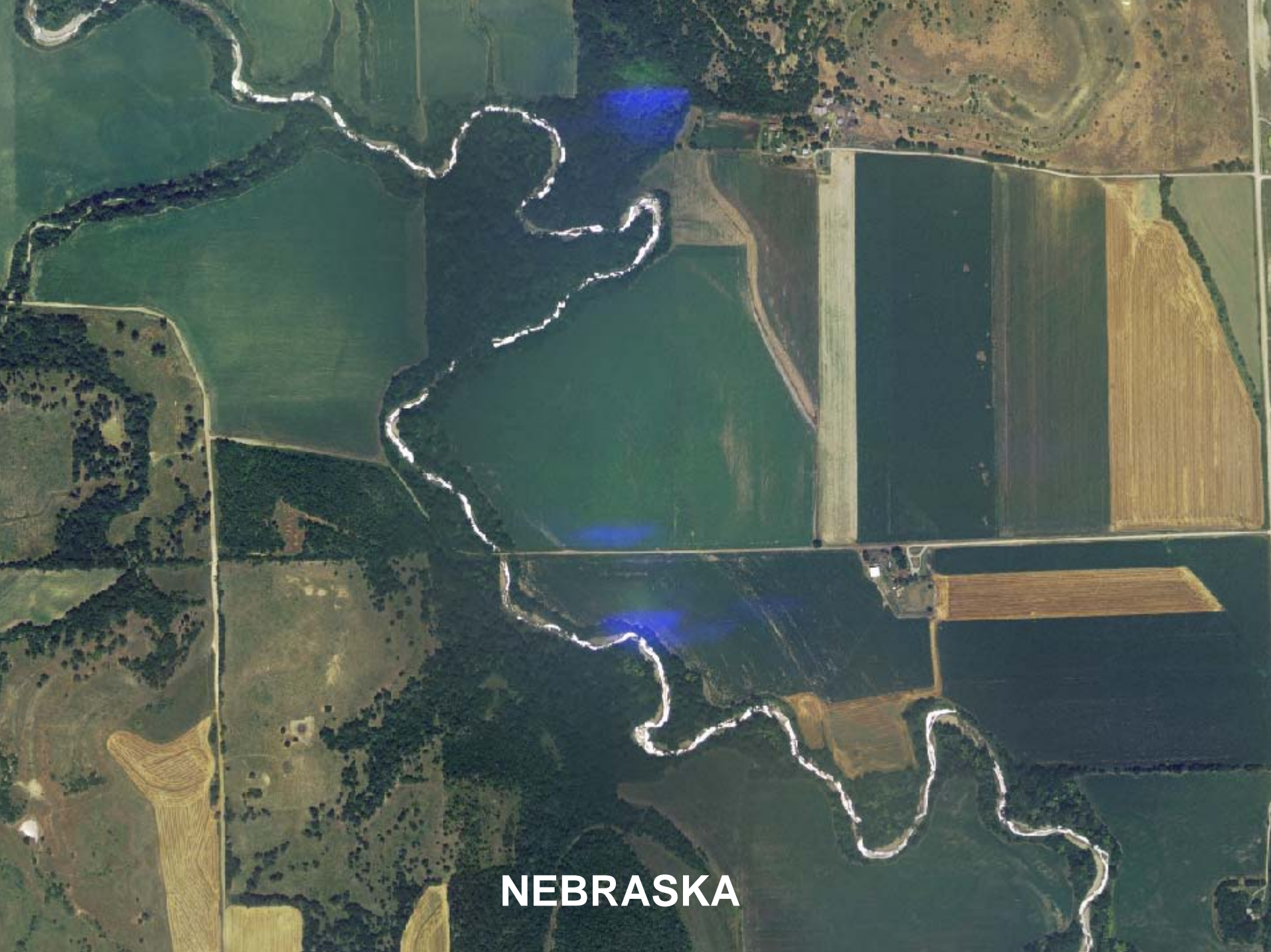
One Meter Color Infrared (Missouri)

One Meter Direct Digital Color (Nebraska)

Other One Meter Color Imagery

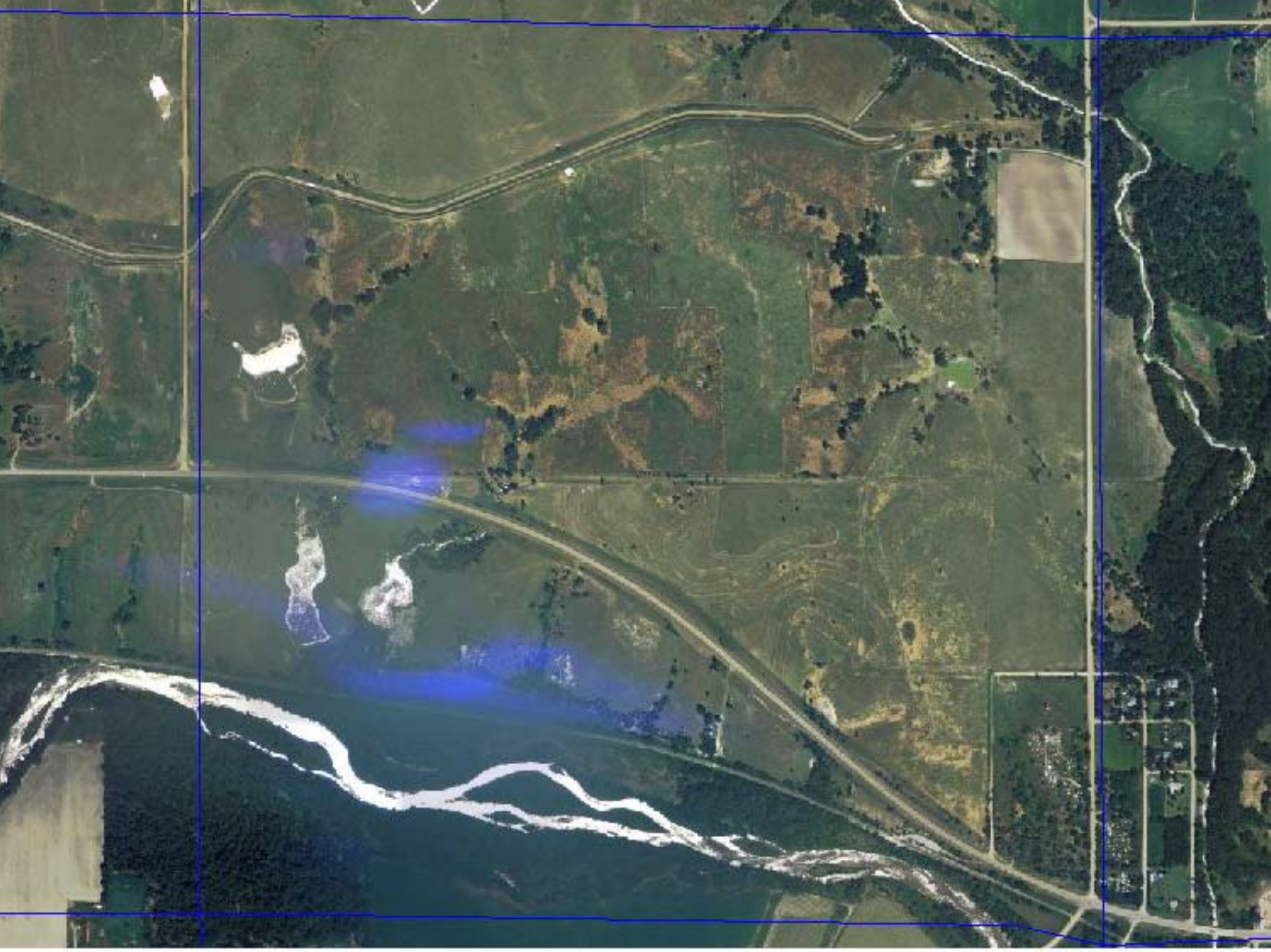
Two Meter Color Imagery

**Examples of Non-Conforming Imagery Submitted**



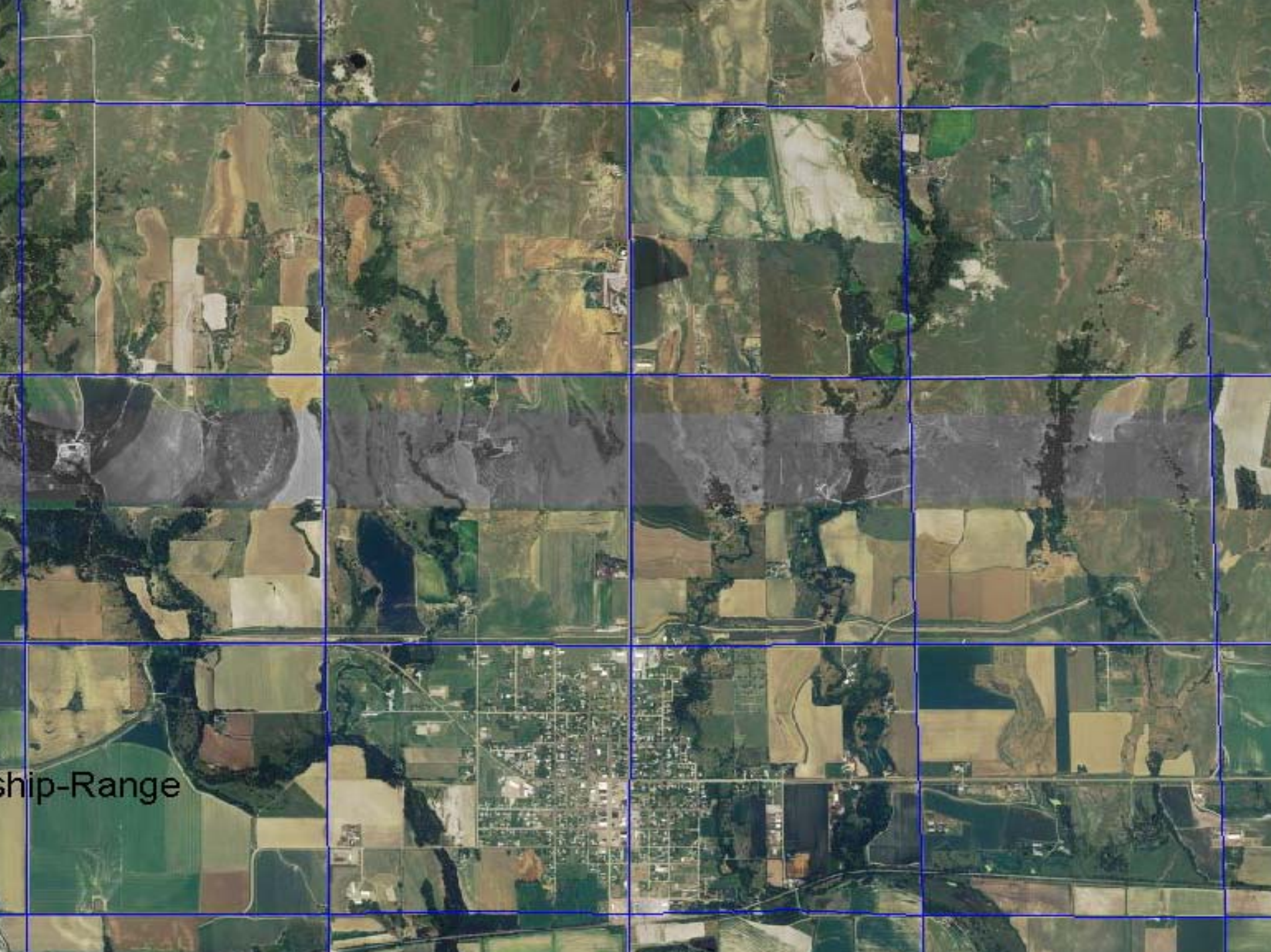
**NEBRASKA**











Ship-Range



11-05-11

ALAMEDA, CA



USDA-FSA 40 NAIP03 03014-9

03

USDA-FSA 40



NAIPUS 0307-07-03

804





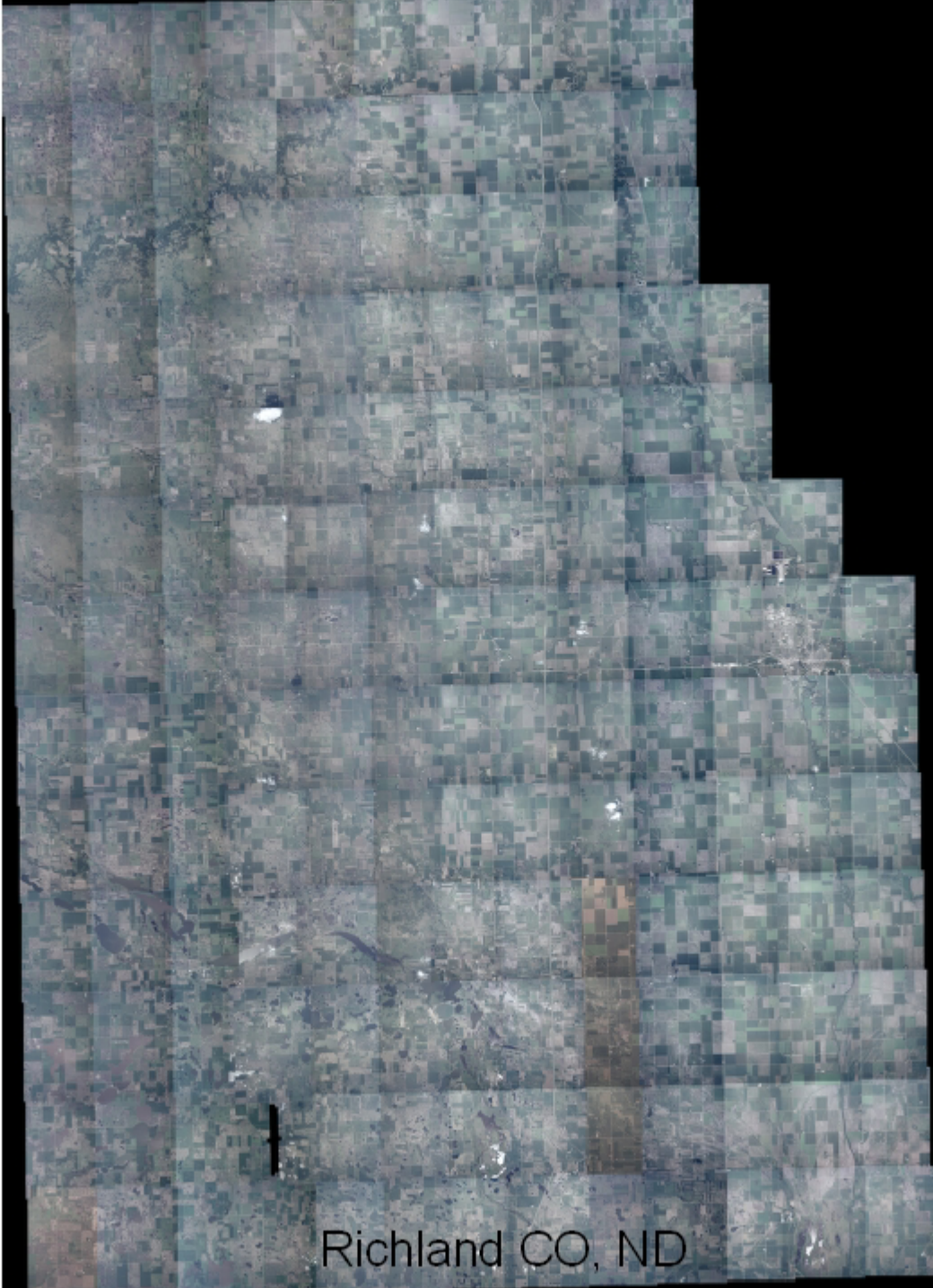




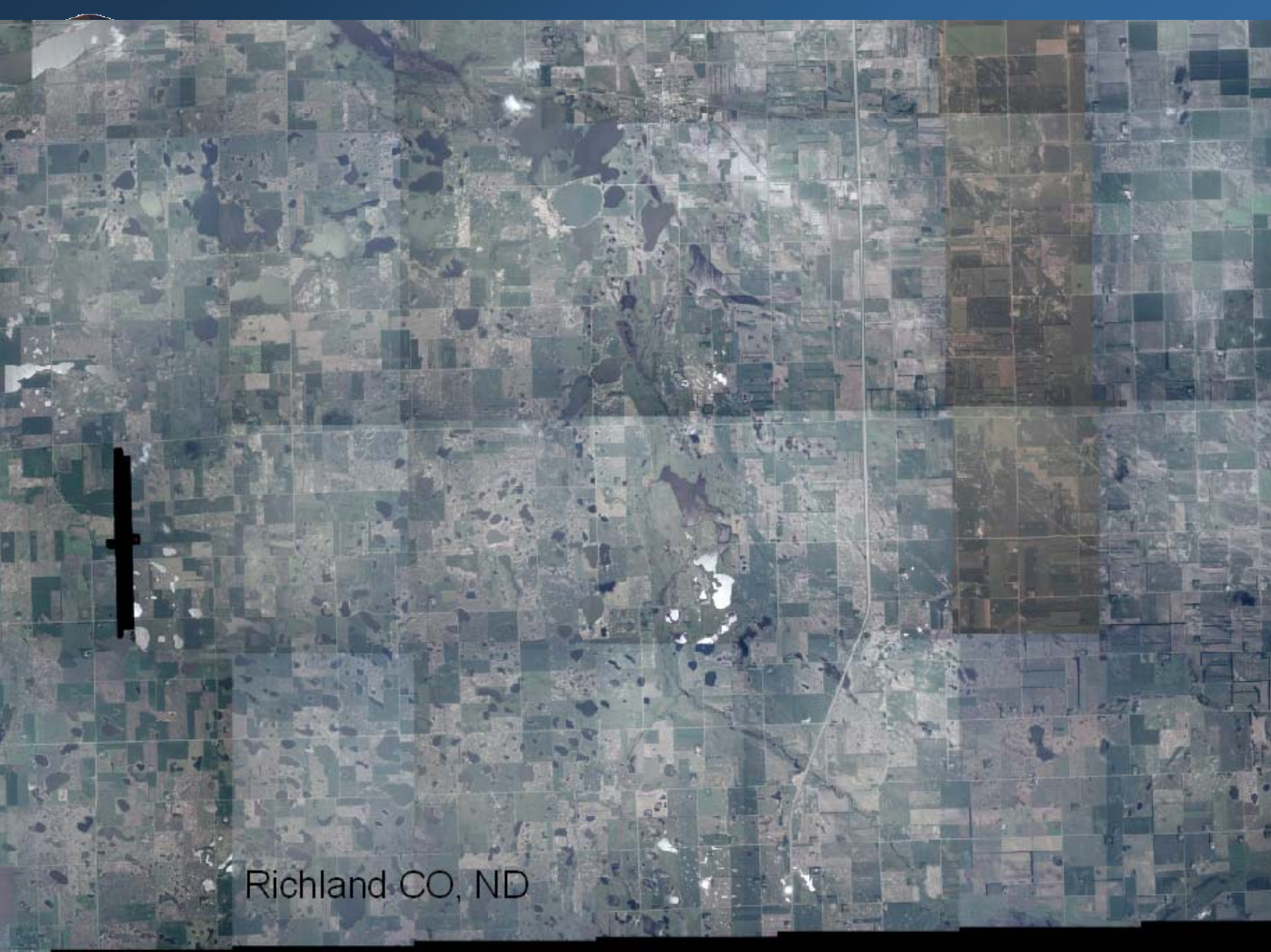
Kleberg CO, TX



Kleberg CO, TX



Richland CO, ND



Richland CO, ND

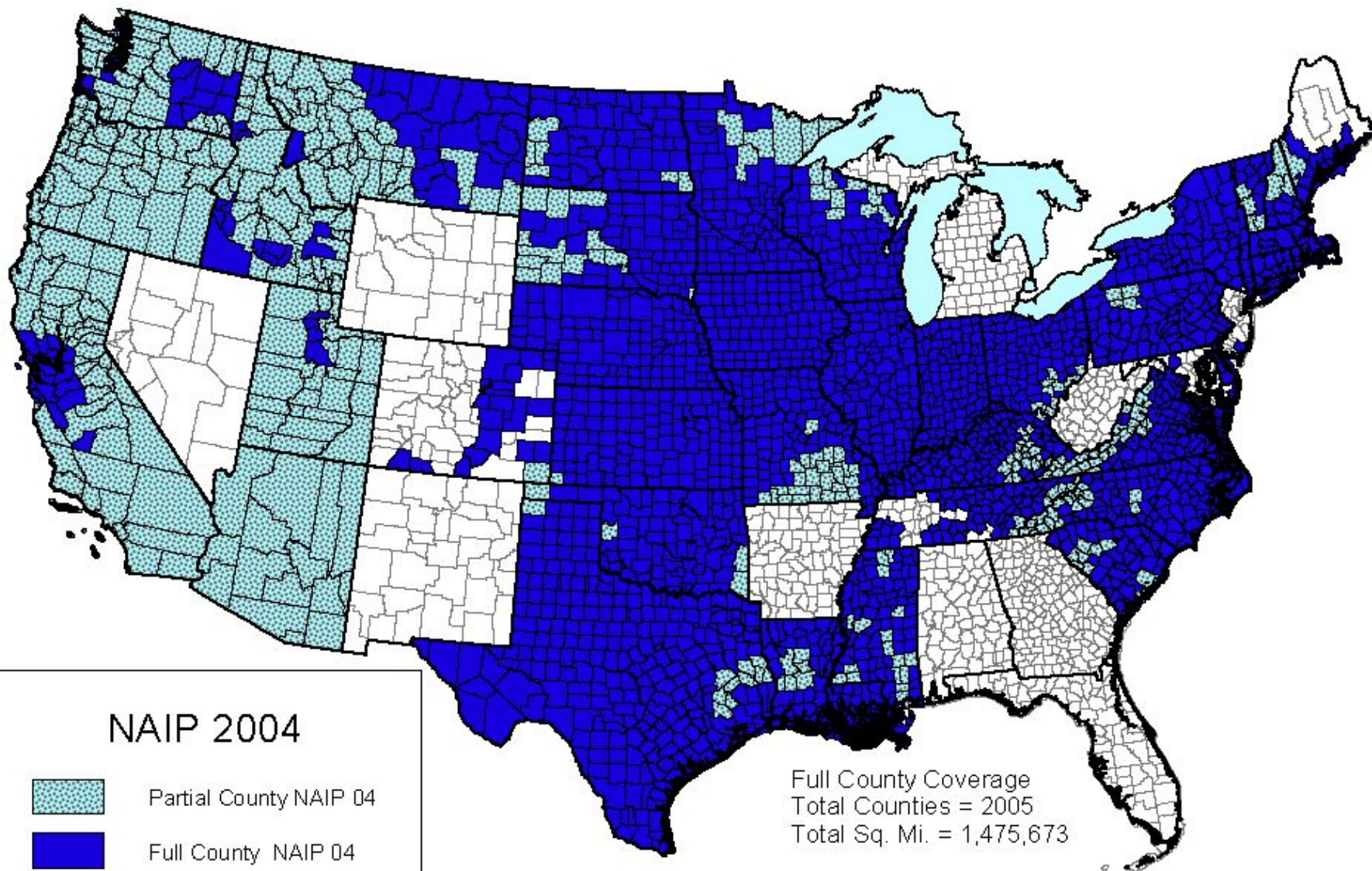
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# PROPOSED NAIP 2004 COVERAGE



**NAIP 2004**

-  Partial County NAIP 04
-  Full County NAIP 04

Full County Coverage  
Total Counties = 2005  
Total Sq. Mi. = 1,475,673

Partial County Coverage  
Total Counties = 407  
Total Sq. Mi. = 395,321