

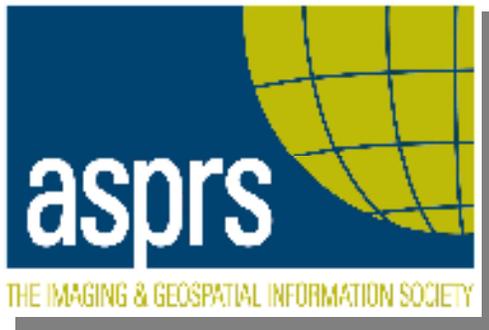
# Mapping, Monitoring, and the Role of Remote Sensing

*Presented at the JACIE Workshop  
Fairfax, Virginia*

*March 31, 2009*

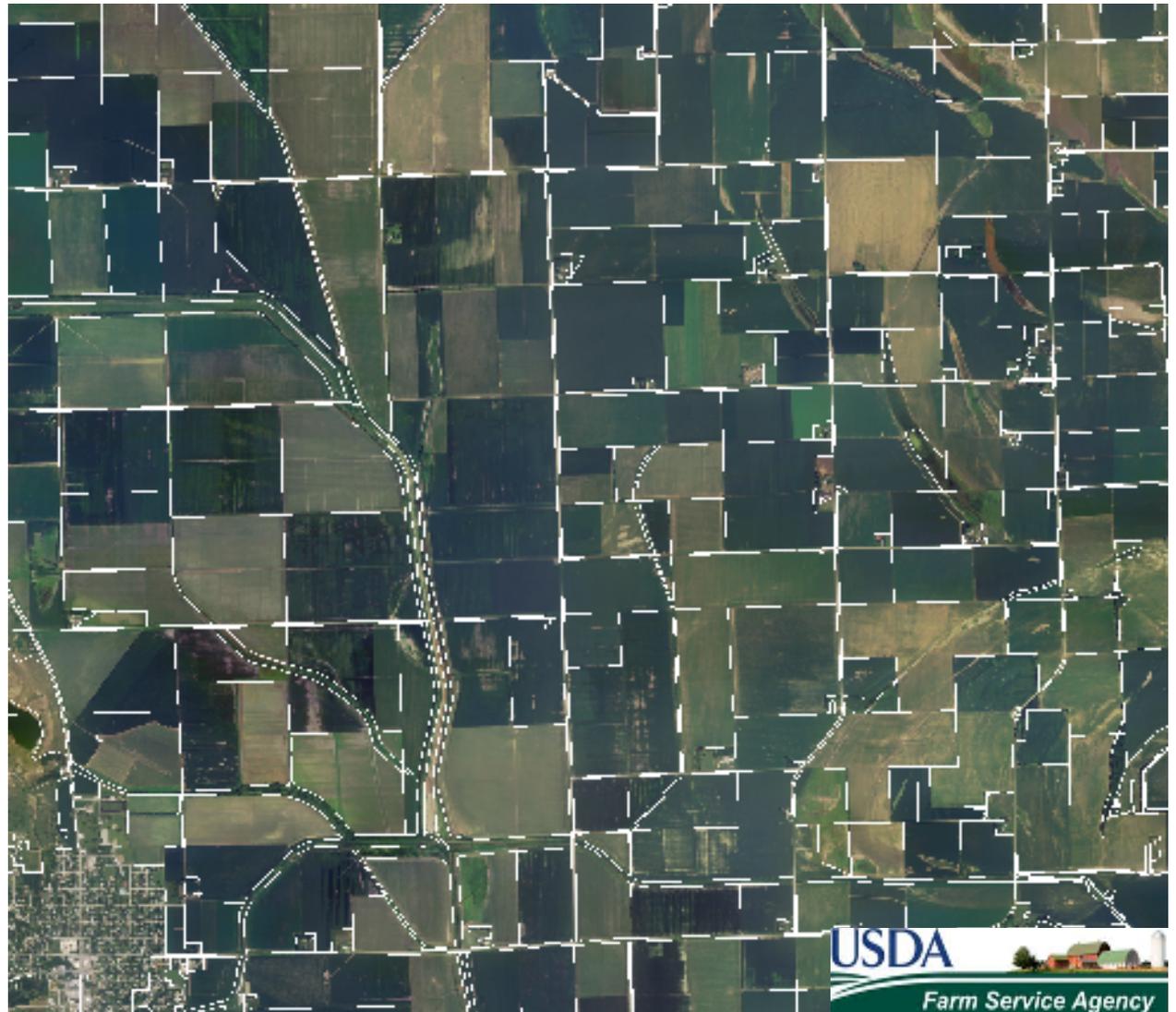
*by*

*Bradley Doorn  
ASPRS President*



# Mapping.....slow monitoring

**NAIP  
Imagery  
with  
Common  
Land Units  
(demo  
Information)**





# *Mapping representation of our world in 2-D or 3-D space*

- *Mapping fills the needs of*
  - Navigation*
  - Resource inventories*
  - Planning*
  - .....*

*Actionable analysis to earth resource  
change MUST be derived from geospatial  
monitoring through time*

# Historic Change

Quay County, New Mexico, 1936



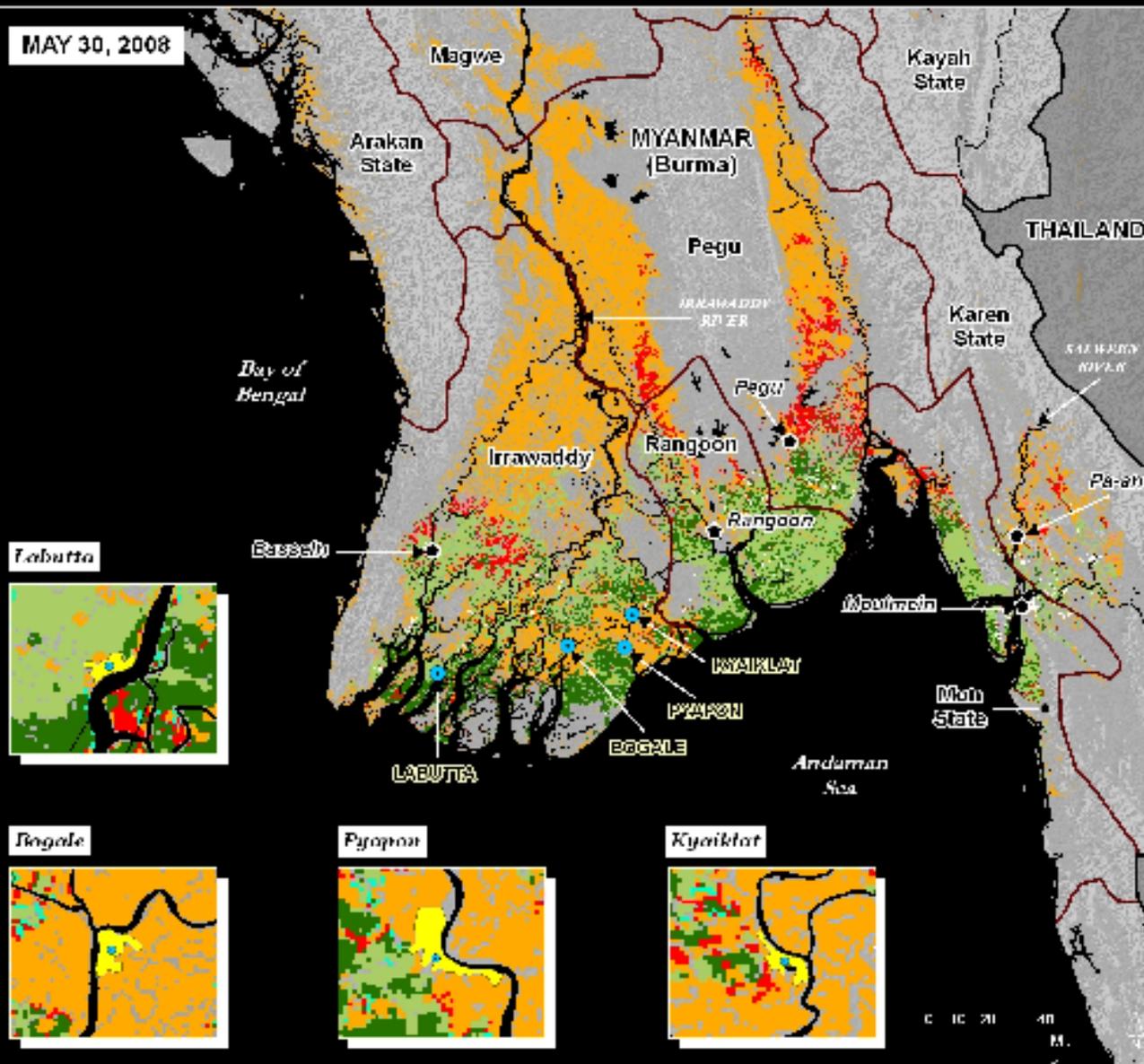
Quay County, New Mexico, 1991



USGS

# Myanmar (Burma) - Cropland Recovery Analysis of Tropical Storm Nargis - 2008

MAY 30, 2008



## Map Legend

- Highly Affected Villages
- Provincial Capital
- Village - Boundary Limits
- Water

## Flood Recovery Analysis

- Never Flooded - Rice/Paddy Areas
  - Full Recovery
  - Flooding Improved
  - Flooding Worsened
  - No Change
- Data Goes In More Than One Date

Prepared by: NADIA M. WILSON  
 USDA Foreign Agricultural Service  
 International Food Security and Nutrition Assistance Administration  
 Office of International Programs  
 1400 Independence Avenue, SW  
 Washington, DC 20250-1500  
 Tel: 202-720-1500  
 Email: nadia.wilson@aphis.usda.gov  
 Project: 2008-2009 Myanmar Flood Recovery





# *Reacting to Change Today*

## *● World reacts to change*

### *-Options*

- a) React from actionable analysis  
using trusted information*
- b) React.....*

*Trusted information is timely, reliable,  
transparent, and objective*

# The Washington Post

NORTH KOREA

## Huge Gap Predicted In Supply Of Food

By [Blaine Harden](#)

Washington Post Foreign Service  
Thursday, April 17, 2008; Page A14

BBC  
NEWS

Last Updated: Friday, 23 March 2007, 00:25 GMT

## Biofuel demand makes food expensive

Published: May 5, 2008

INTERNATIONAL  
**Herald Tribune** | Asia - Pacific

## US announces US\$40 million in food aid for Bangladesh amid shortages

# The New York Times

ON THE WEB  
Saturday, May 10, 2008

[guardian.co.uk](#) | TheObserver

## Food aid to poorest countries slashed as price of grain soars

UN warns of drastic crisis as relief workers urge donor countries to help beat shortages by switching to giving cash or vouchers

# The New York Times

Across Globe, Empty Bellies Bring Rising Anger



## Drought's Toll



A deep drought in Australia has...

**TIME** IN PARTNERSHIP WITH  
CNN

## The World's Growing Food-Price Crisis

By VIVIENNE WALT

Wednesday, Feb. 27, 2008

Bloomberg.com Updated: New York, May 1

## Rice Jumps to Record on Philippine Imports, Cuts Exports

BBC  
NEWS

Page last updated at 10:23 GMT, Wednesday, 7 May 2008 11:23 UK

## Bangladesh bans most rice exports

Bangladesh has banned exports of nearly all the rice it produces to prevent shortages and keep food costs down.

The government said the ban began on Tuesday and will last six months.

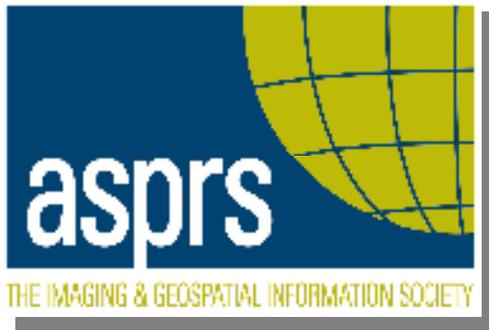


People push to receive food distributed by the Kenyan Red Cross in the Mathare slum in Nairobi.

AFP / GETTY

# REUTERS Food riots to worsen without global action: U.N.

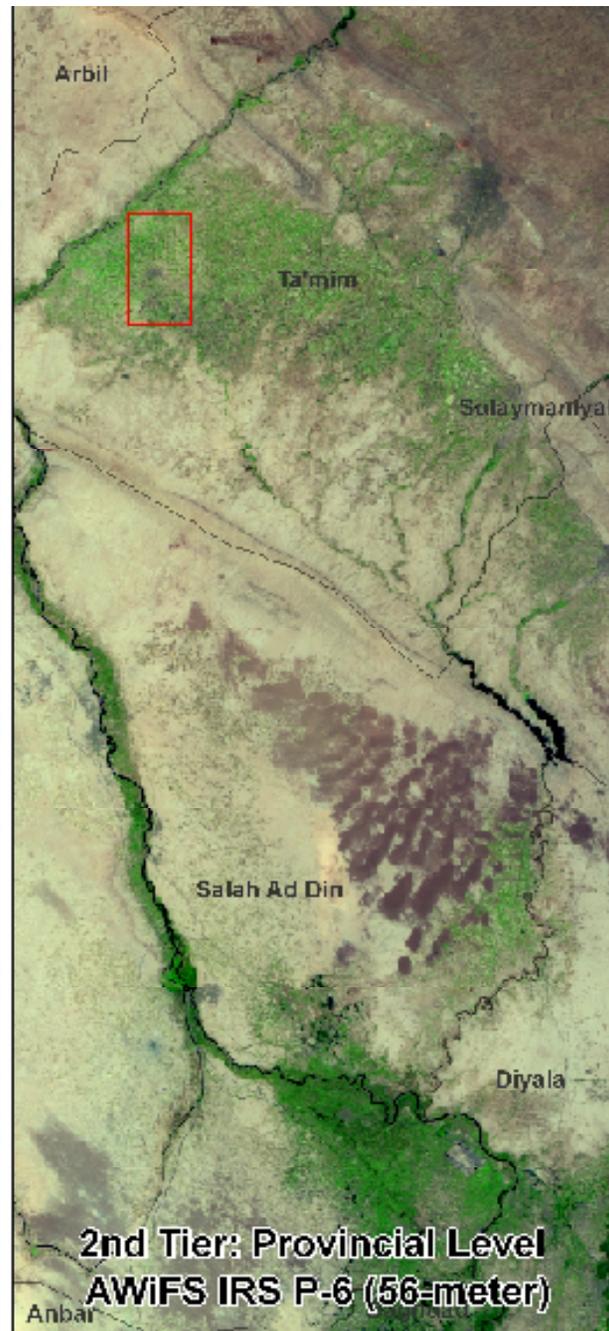
Fri Apr 11, 2008 1:57pm EDT

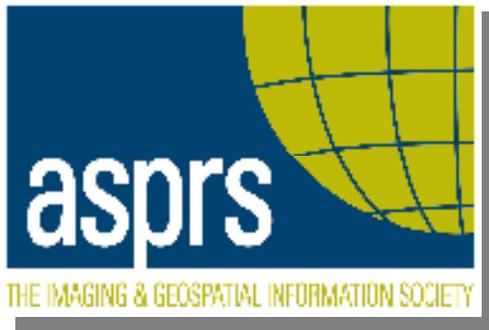


# Remote Sensing THE tool for measuring change

- *Integrated data analysis*
  - *Accessible information*
  - *Multiple data sources*

# Multiple sensor analysis is no longer an option, but a reality



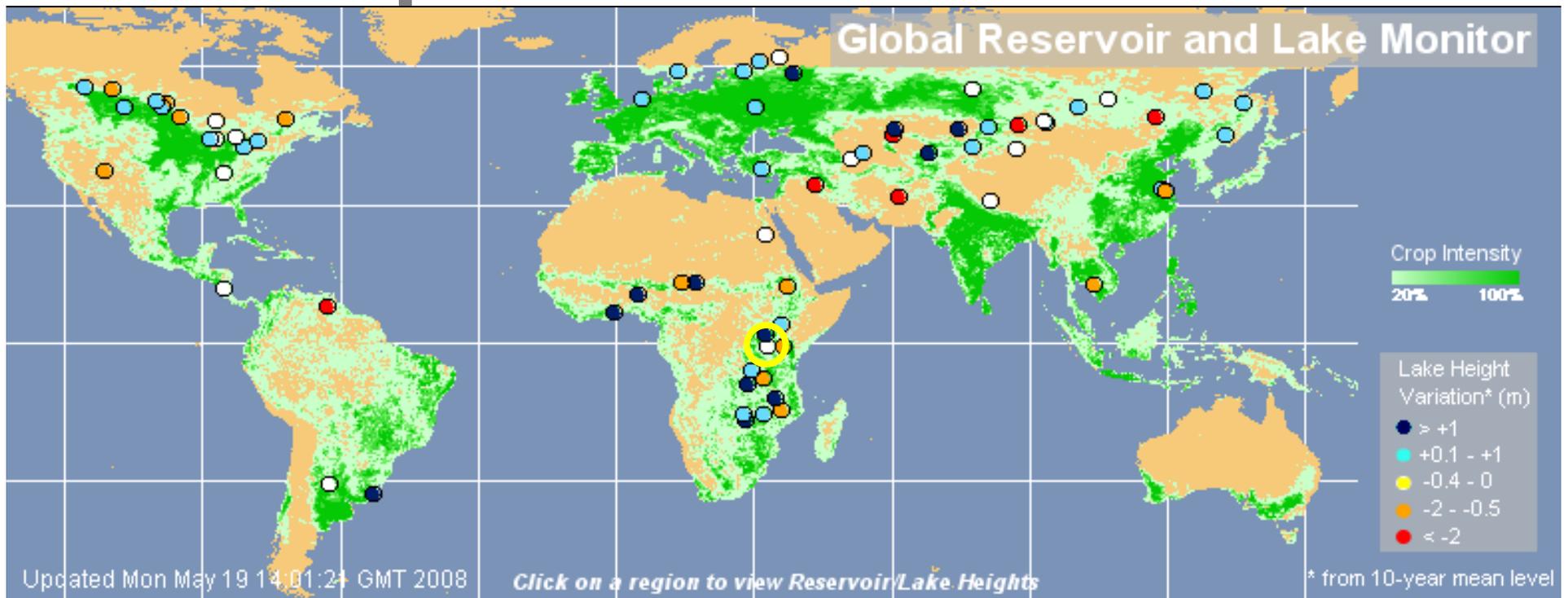


# Preparing for Change

- *Integrated data analysis*
  - *Accessible information*
  - *Multiple data sources*
- *Global scope*

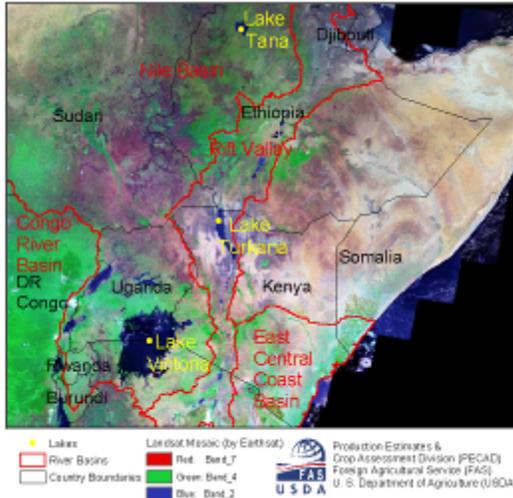


# Global Reservoir and Lake Monitor



**Reservoir Monitor connects satellites TOPEX/Poseidon and JASON-1 for altimeter data with Landsat data from the Landsat Global Visualization from USGS (GloVis). *An Integrated Geospatial Information Solution.***

# Ex: Variation in Reservoir Heights



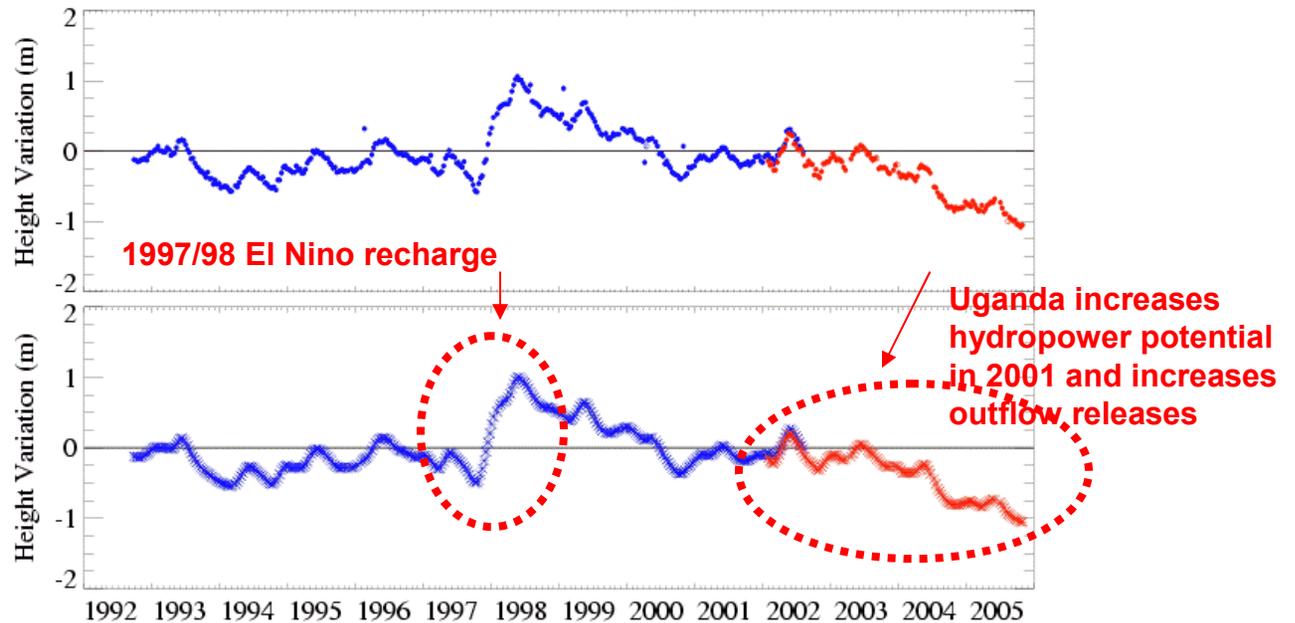
Global Radar Altimetry: Global Reservoir and Lake Elevation Database - Lake Victoria - Microsoft I

View Favorites Tool » | Back | Search | Favorites | Media | http://www.pecad.fas.usda.gov/cropexplorer/global\_reservoir/gr\_regional\_chart.cfm?regionid=eafrica&region=&reservoir\_name



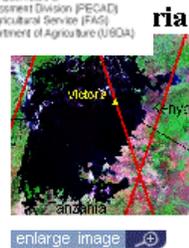
## Lake Level Variations from TOPEX/POSEIDON and Jason-1 Altimetry

Lake Victoria Height Variations  
TOPEX 10 Year Geo-referenced 10Hz Along Track Reference



\*\*\* TOPEX/Poseidon historical archive  
 \*\*\* Jason-1 interim near real time product

Last observation entry: 29 Oct., 2005  
 Last valid elevation : 29 Oct., 2005



[LakeNet Profile](#)

[View Satellite Image](#)

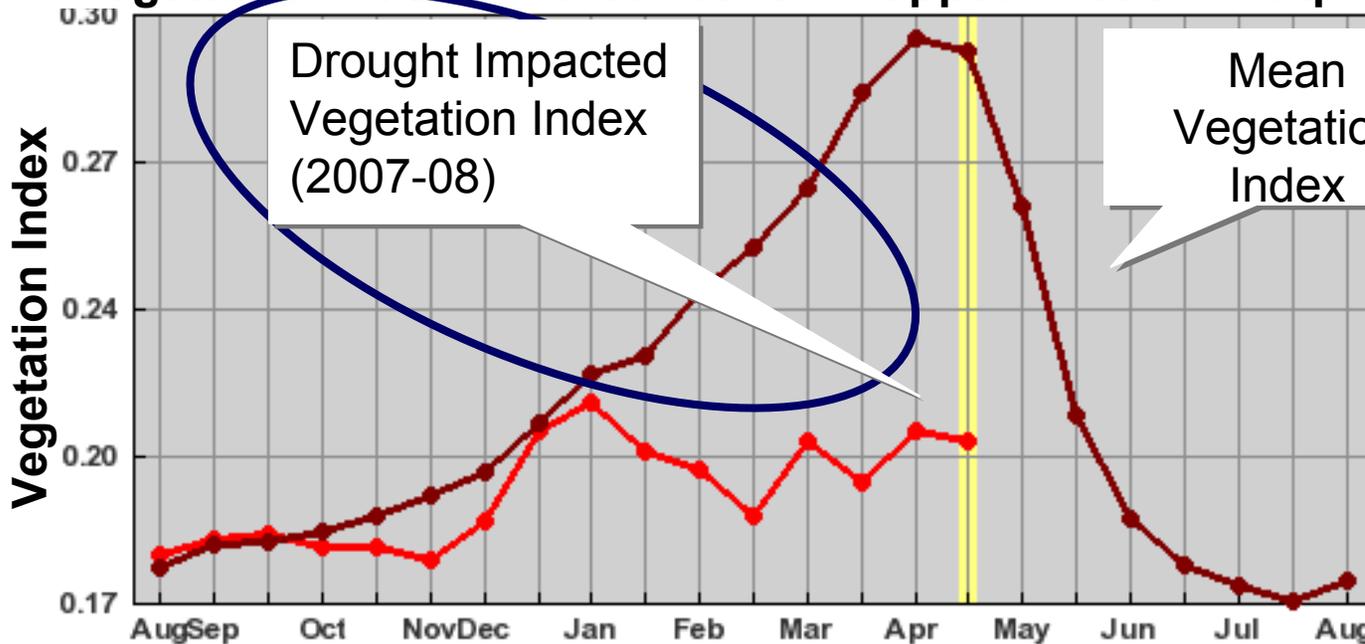
[View 3D Image](#)

[http://www.pecad.fas.usda.gov/cropexplorer/global\\_reservoir/](http://www.pecad.fas.usda.gov/cropexplorer/global_reservoir/)

# Tracking Severe Drought in Iraq/Syria with GLAM System

May 9, 2008

### Vegetation Index Time Series for Cropped Areas in Iraq



Drought Impacted Vegetation Index (2007-08)

Mean Vegetation Index

Droughts in the years  
 Wheat and barley production expected to be 51% down compared to last year  
 Significant domestic supply shortage requiring increased grain imports in 2008/09

Current Season (2007-2008)

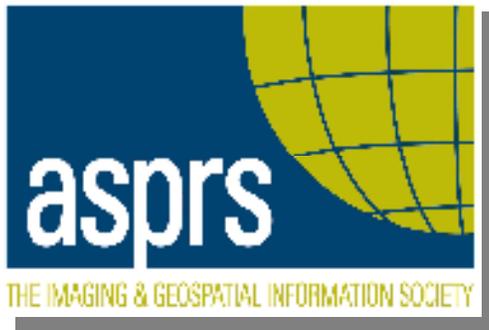


worse than average

average

better than average

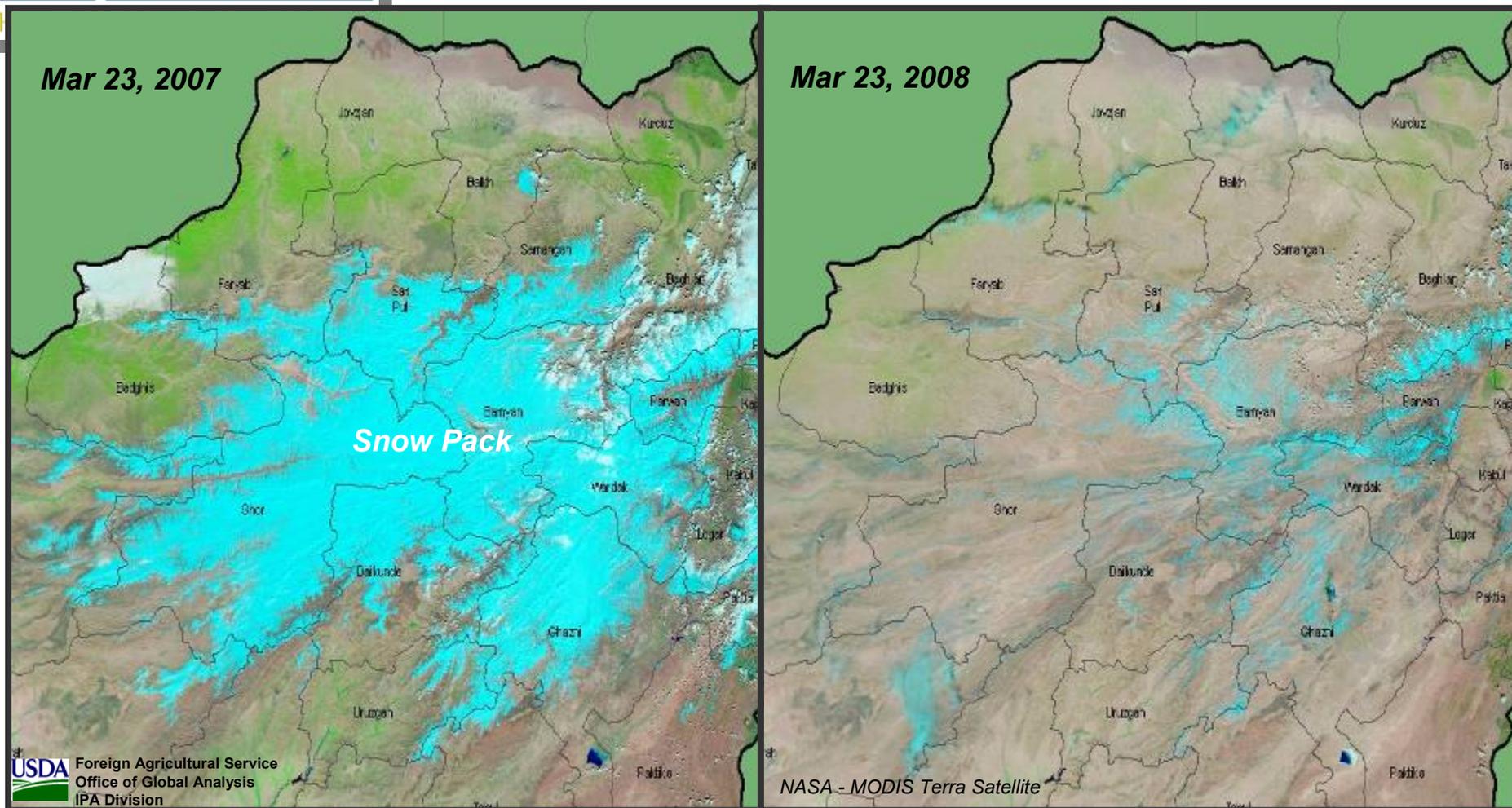
Source: NASA MODIS NDVI



# Preparing for Change

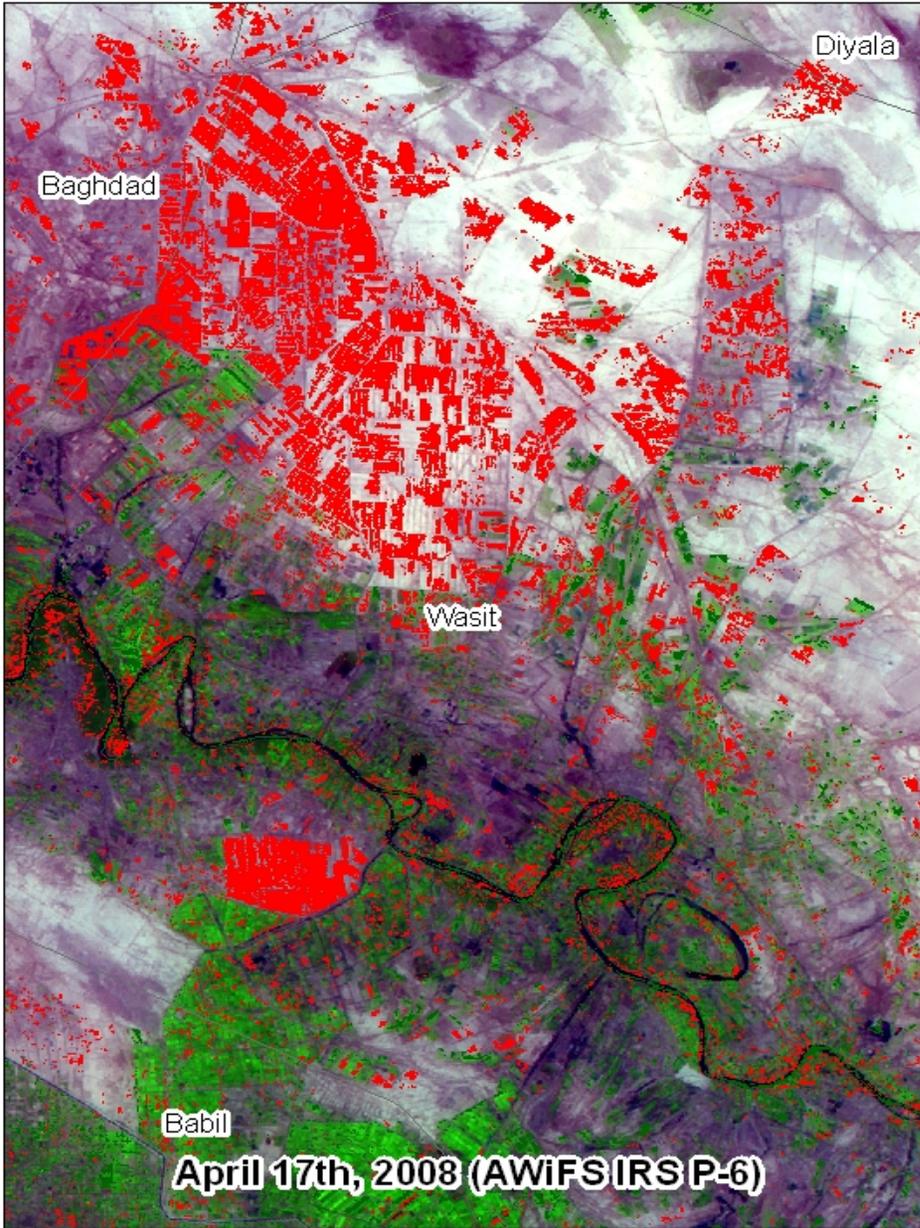
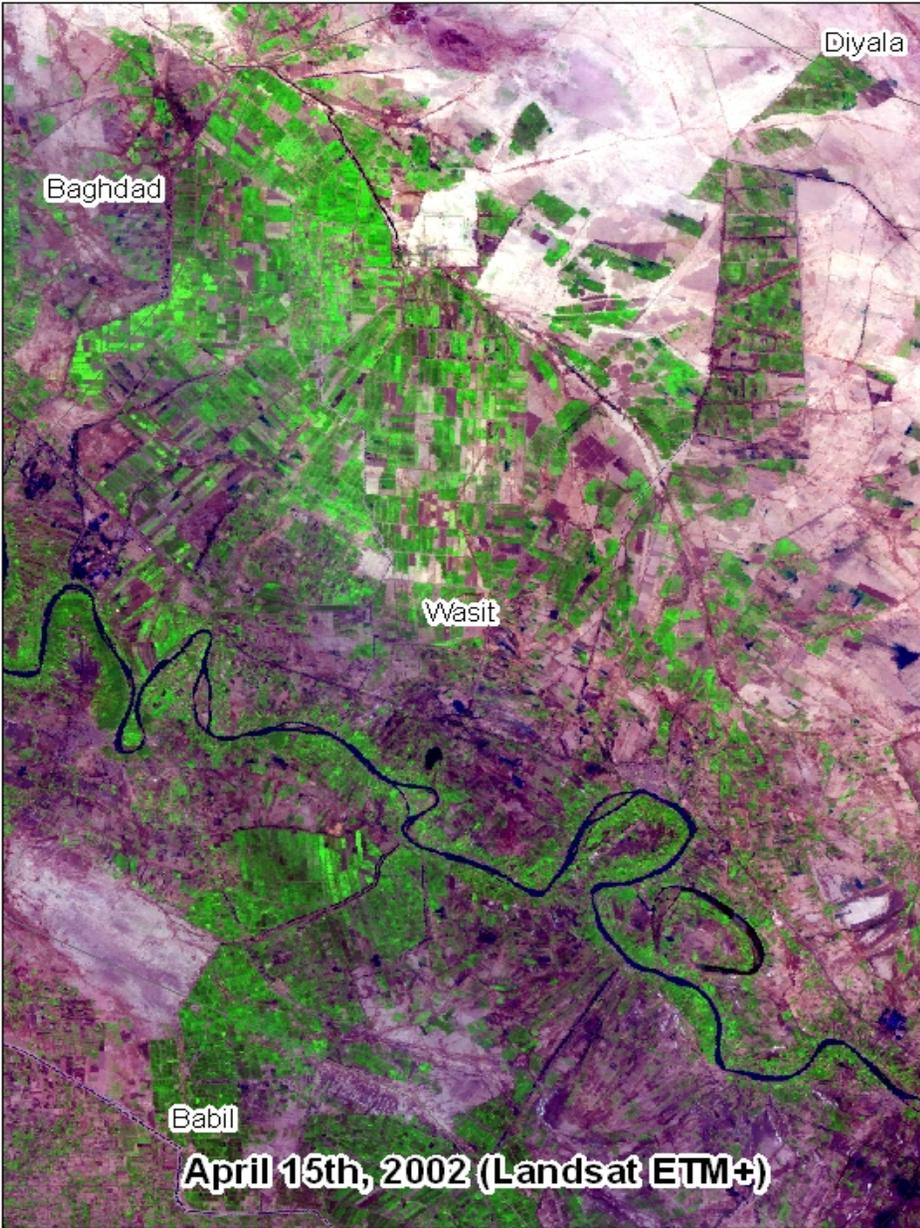
- *Integrated data analysis*
  - *Accessible information*
  - *Multiple data sources*
- *Global scope*
- *Rapid and continuous observations*

## CENTRAL AFGHANISTAN



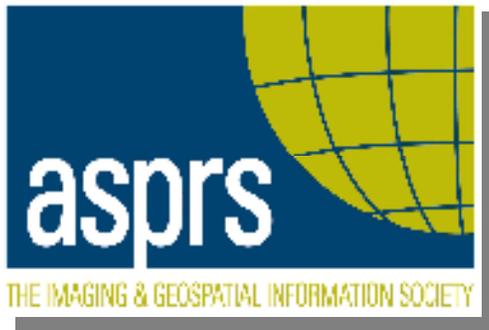
Winter snowfall was extremely limited in 2008, leading to a critically diminished regional snowpack situation.

# Multi-temporal Change Detection: Comparison of Current and Archived Data



Data Source: Landsat ETM+/AWIFS IRS P-6  
Data Provided by: Archive Explorer/NGA  
Supporting: USDA/FAS/OGA  
International Production Assessment Division





# GLAM (FAS-NASA-UMD) System Web Interface for querying and analyzing MODIS VI Time Series

250-meter MODIS NDVI Time Series Database (Australia, West)  
2008-Jul-11 to Jul-26

Select Region:

Date Source:

Preferred Data:

Short-Term Mean:

[Go To Data Access Page](#)

[View Data Access Policy](#)

Regional Image [View](#)

Regional Image Date Select  
Click to Select Regional Image Date

2008-Jul-11 to Jul-26
2008-Jun-25 to Jul-10
2008-Jun-09 to Jun-24
2008-May-24 to Jun-08
2008-May-08 to May-23
2008-Apr-22 to May-07
2008-Apr-06 to Apr-21
2008-Mar-21 to Apr-05
2008-Mar-05 to Mar-20
2008-Feb-19 to Mar-04
2008-Feb-02 to Feb-17
2008-Jan-17 to Feb-01
2008-Jan-01 to Jan-16
2007-Dec-19 to Jan-03
2007-Dec-03 to Dec-18
2007-Nov-17 to Dec-02
2007-Nov-01 to Nov-16
2007-Oct-16 to Oct-31
2007-Sep-30 to Oct-15
2007-Sep-14 to Sep-29
2007-Aug-29 to Sep-13
2007-Aug-13 to Aug-28
2007-Jul-28 to Aug-12
2007-Jul-12 to Jul-27

Image:

Graph:

Colorize Style:  (Region default)

Detail Box / Print

Year:

No Short-Term Mean

MODIS NDVI (Terra) Graph [View](#) [Download Graph Data](#) [Download Graph Data](#)

MODIS NDVI (Terra) : Australia Wheatbelt: Western Australia (No Water)

Region: Australia, West  
Date Range: 2008-Jul-11 to Jul-26  
Shape: Australia (Wheatbelt) - Western Australia  
Detail File: 2008-07-11-09-27  
White-to-Black: (NO) (N)

Image:

Graph:

Colorize Style:  (Region default)

Detail Box / Print

Year:

No Short-Term Mean

Detail Image [View](#)  
Click to Show MODIS NDVI (Terra) Graph. Each pixel is 250m

MODIS NDVI (Terra) Histogram [View](#) [Download Histogram Data](#)

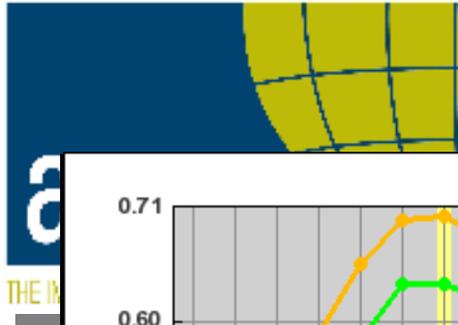
MODIS NDVI (Terra) Histogram - Australia Wheatbelt: Western Australia (Crops Only) (No Water)

Region: Australia, West  
Date Range: 2008-Jul-11 to Jul-26  
Shape: Australia (Wheatbelt) - Western Australia  
Detail File: 2008-07-11-09-27  
White-to-Black: (NO) (N)

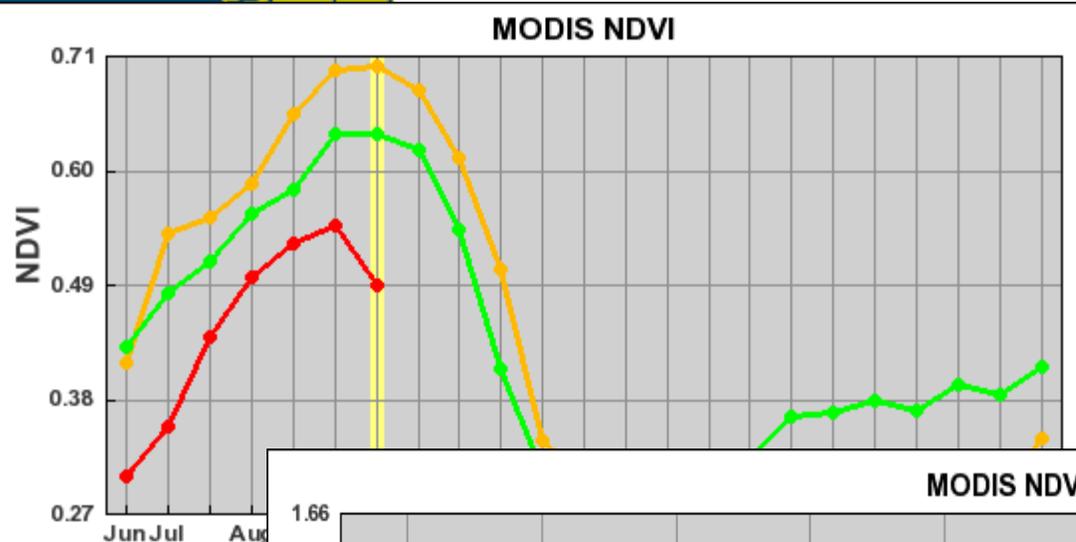
Year:

Show Short-Term Mean

# Example of Utility of the GLAM MODIS NDVI DBMS to Track Drought impact on Crops in Australia



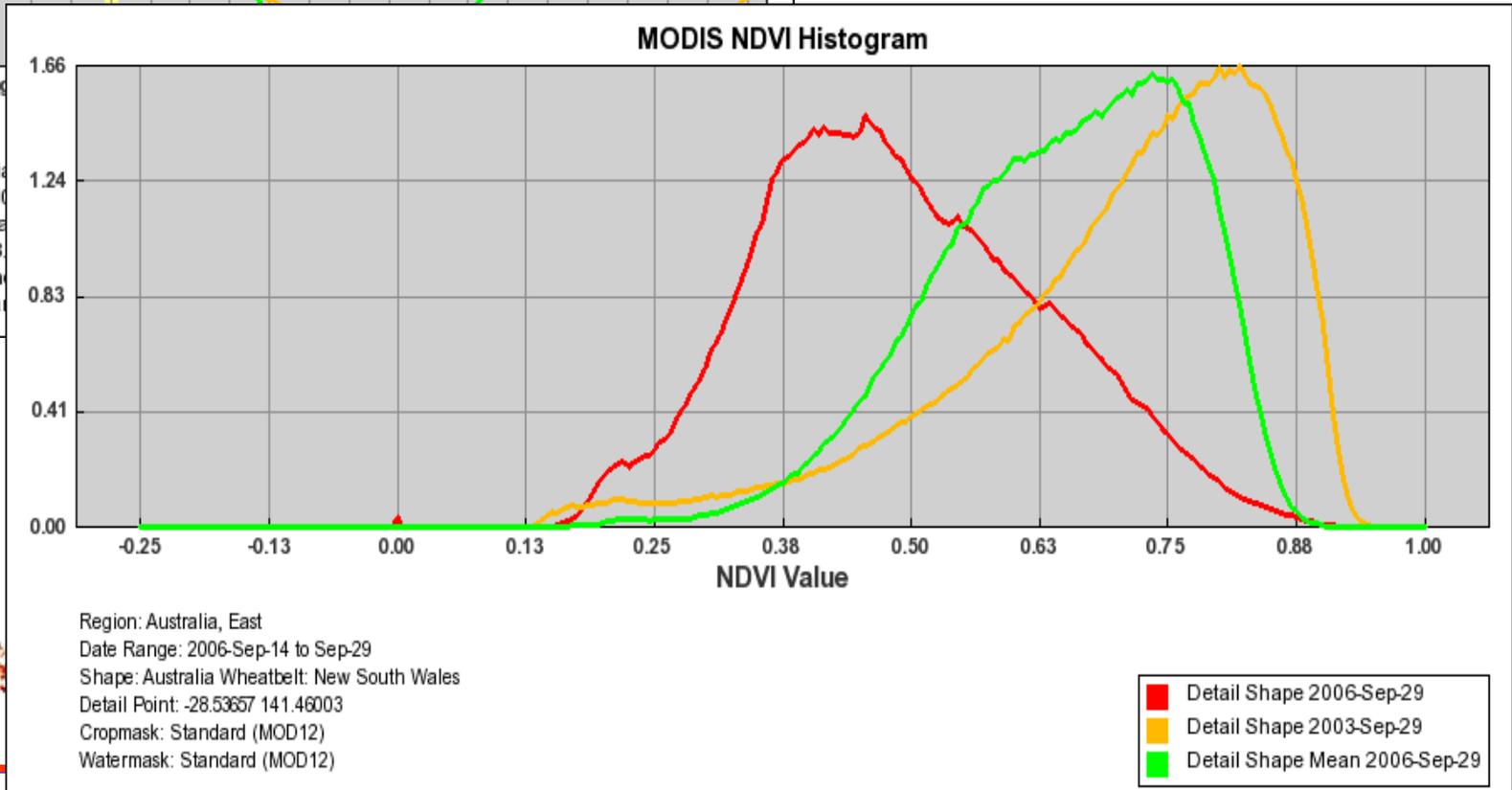
THE IM



at 11.0 million  
smallest wheat  
ct 20th 2006)



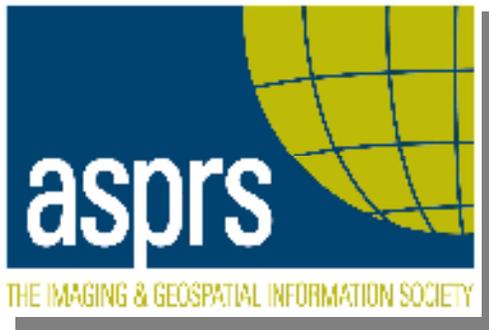
Region: Australia  
Date Range: 2006-Sep-14 to Sep-29  
Shape: Australia  
Detail Point: -28.53657 141.46003  
Cropmask: Standard (MOD12)  
Watermask: Standard (MOD12)



Region: Australia, East  
Date Range: 2006-Sep-14 to Sep-29  
Shape: Australia Wheatbelt: New South Wales  
Detail Point: -28.53657 141.46003  
Cropmask: Standard (MOD12)  
Watermask: Standard (MOD12)

- Detail Shape 2006-Sep-29
- Detail Shape 2003-Sep-29
- Detail Shape Mean 2006-Sep-29





# Preparing for Change

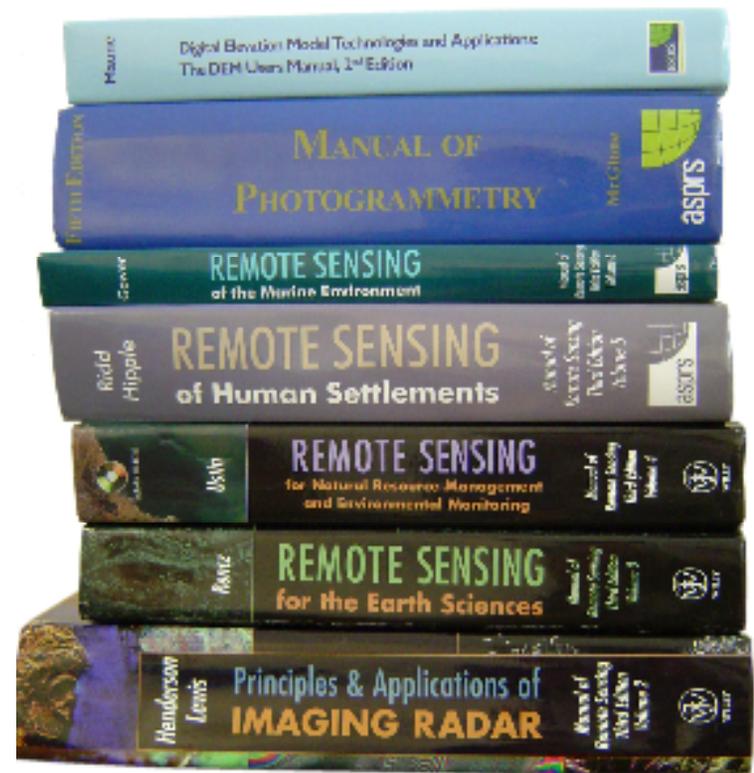
- *Integrated data analysis*
  - *Accessible information*
  - *Multiple data sources*
- *Global scope*
- *Rapid and continuous observations*
- *...ASPRS members that provide the standards, training, technology, and data to drive actionable analysis for a changing world.*



# *Enhance the Strength and Value of ASPRS Publications*

## *Upcoming significant publications*

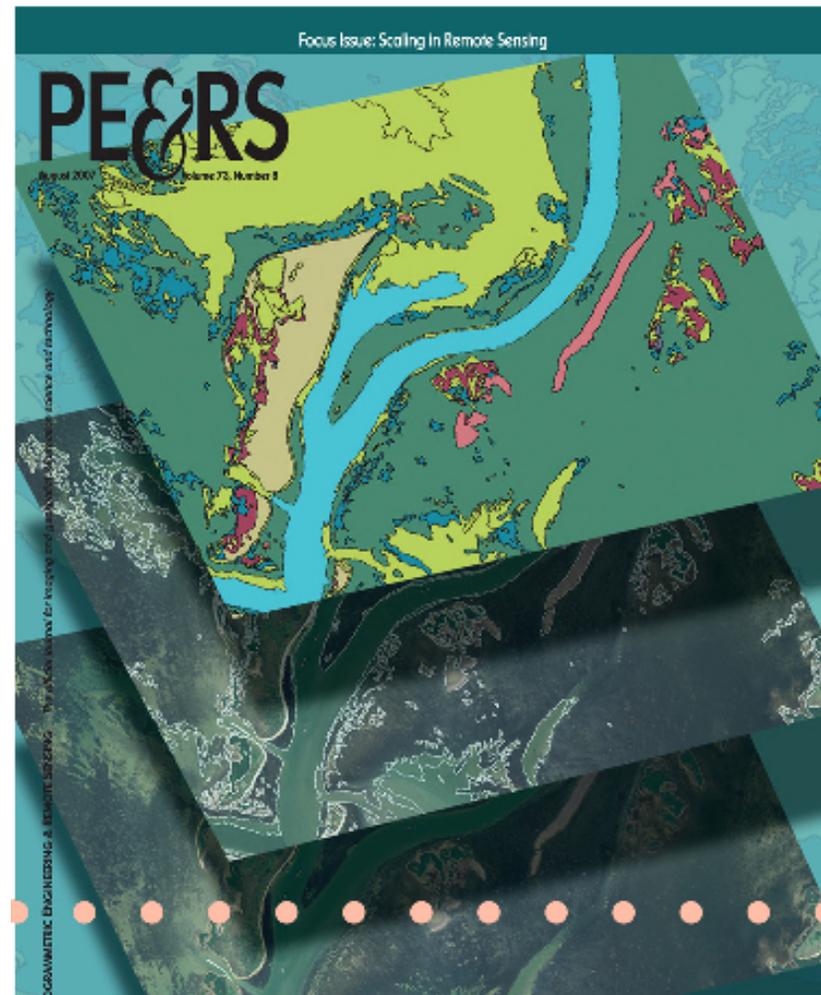
- *GIS Manual*
- *Sensors and Platforms*
- *Lidar Manual*





# *PE&RS - an ASPRS Jewel*

- *PE&RS delivers the latest science developments in remote sensing and photogrammetry.*





*..among numerous ASPRS activities*

- *Standards and Guidelines*
- *Student programs growing*
- *International partnerships*
  - *ISPRS*
- *National leadership*
- *Financial stability*



# SUCCESS: only when database is integrated and accessible

*“The earth is a finite planet with limited resources. As population continues to grow, placing ever increasing demands on this resource base, wise and prudent management.....remote sensing does offer mankind the potential to produce a broadly consistent database at a spatial, spectral, and temporal resolution, that is useful to resource managers.”*

- *Simonett, D., **1983**, ASPRS Manual of Remote Sensing, Vol. 1, Chapter 1*



THE IMAGING & GEOSPATIAL INFORMATION SOCIETY

---