

Rio Grande Hydrologic Applications

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Texas Commission on Environmental Quality

Remote Sensing Workshop

Water Education Foundation

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San Diego, California



Texas Commission on Environmental Quality



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Commissioner



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Commissioner



Outline

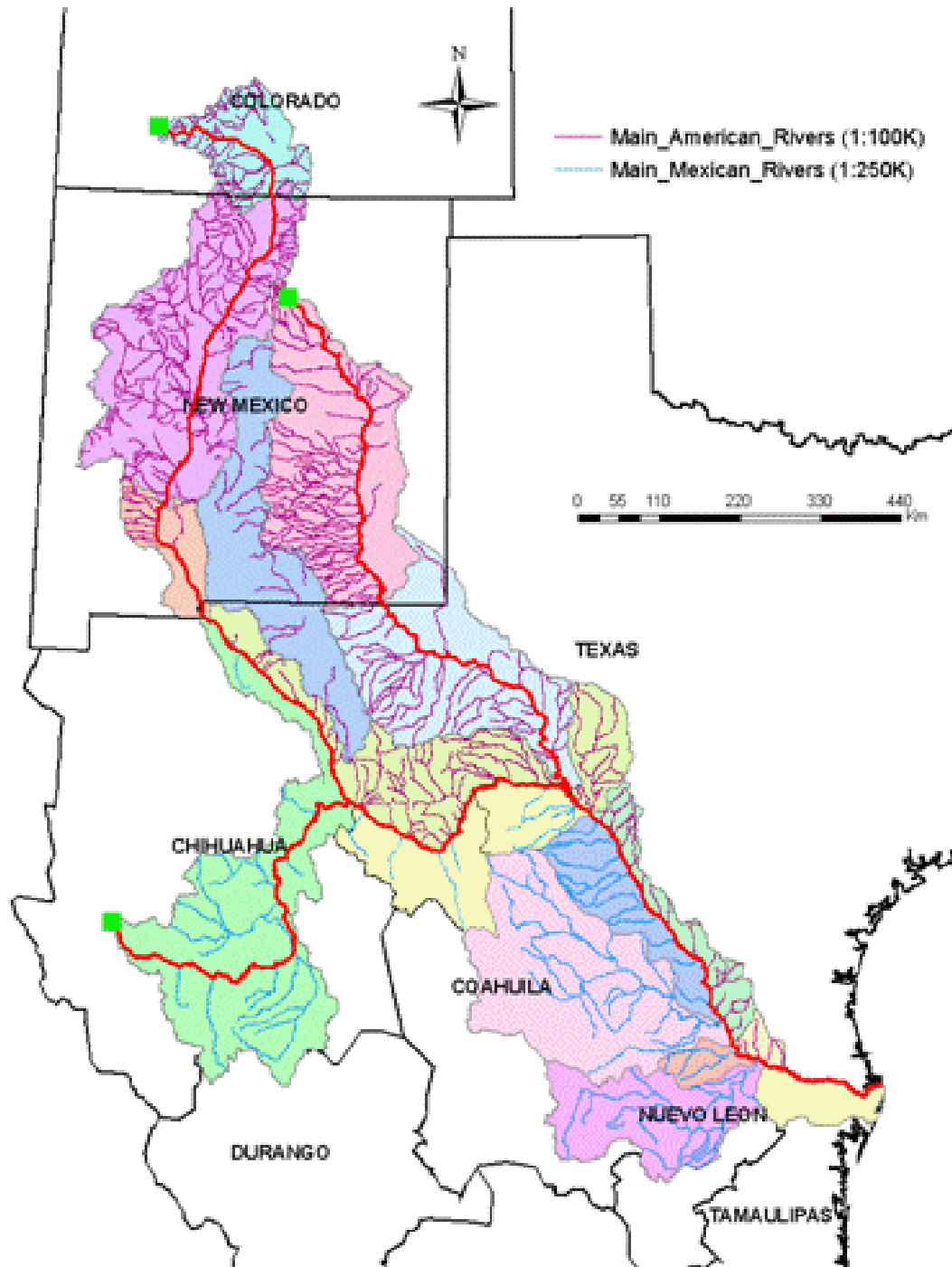
- Overview of Rio Grande basin
- Flooding
- Invasive Species
- Water Quality
- Water Shortages



Rio Grande: Context

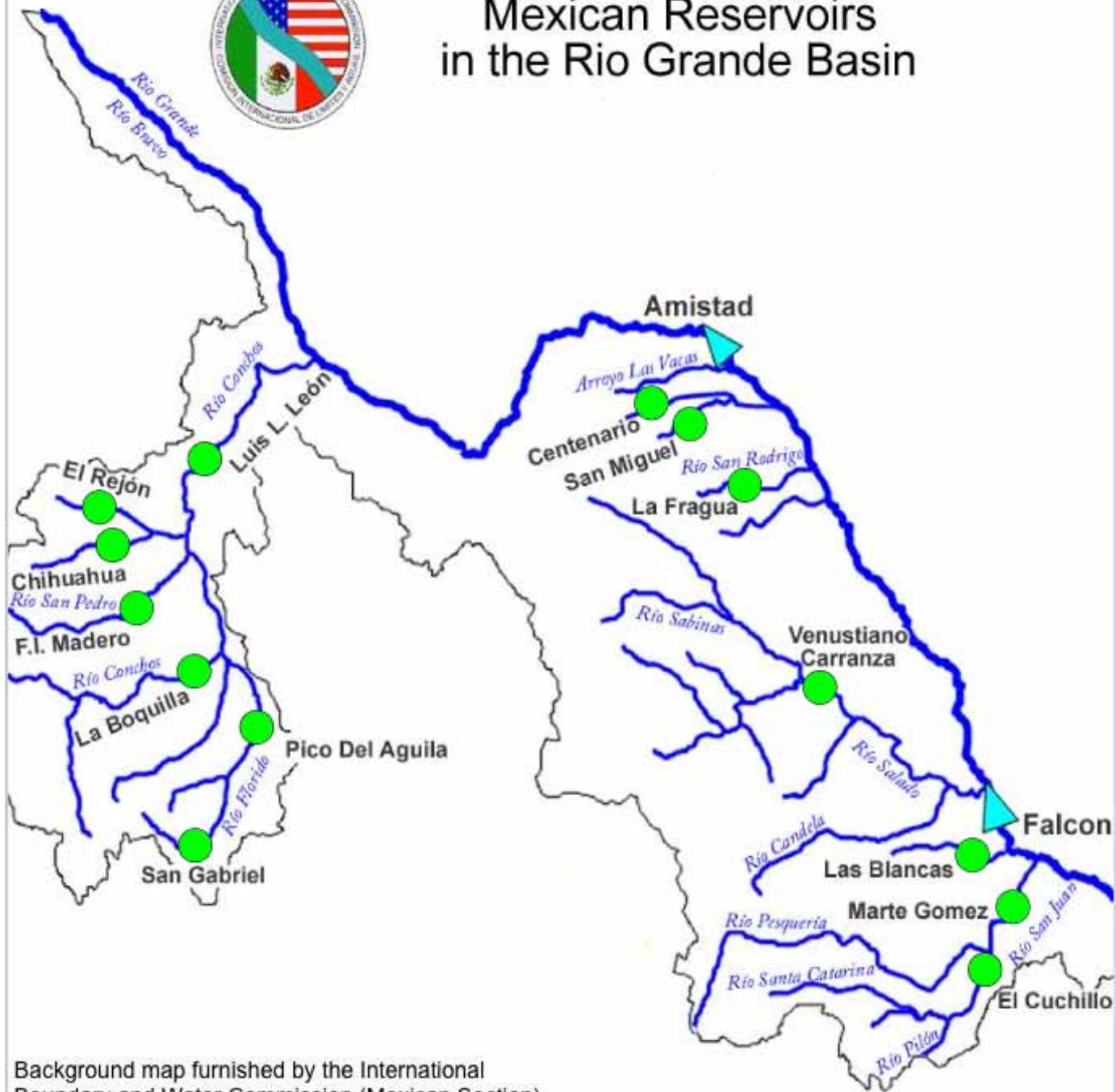
- 335,000 sq. miles
- 1944 Water Treaty
 - Allocates water between U.S. & Mexico
 - Mexico must provide 350,000 acre-feet every year to U.S., in cycles of five years
- Principal agricultural areas in Conchos basin (Mexico) and Lower Rio Grande Valley (Tamaulipas and Texas)







Mexican Reservoirs in the Rio Grande Basin



Background map furnished by the International Boundary and Water Commission (Mexican Section).



Hurricane Alex

- Massive precipitation affecting Nuevo León and Lower Rio Grande Valley of Texas
- Infrastructure damages to Monterrey
 - Roads
 - Water/wastewater service
 - Utilities
 - Flooding in Anahuac



Hurricane Alex

Hurricane Alex, 2010

Storm Lifecycle
Storm description not available.

» Storms Named "Alex" in History
» Similar Storms in History

**National Hurricane Center—
Last Messages for Alex**

07.02.2010 Forecast/Advisory #26
 Discussion #26
 Public Advisory #26

Complete Message Archives
Hurricane Alex »
SOURCE: National Hurricane Center.

2010 Hurricane Season Summary

Name	Active?
Tropical Storm Danielle	Y <input checked="" type="checkbox"/>
Tropical Depression Five	N <input type="checkbox"/>
Tropical Storm Colin	N <input type="checkbox"/>
Tropical Storm Bonnie	N <input type="checkbox"/>
Tropical Depression Two	N <input type="checkbox"/>
Hurricane Alex	N <input checked="" type="checkbox"/>

« 2009 Season

Storm Names for 2010
Alex, Bonnie, Colin, Danielle, Earl, Fiona, Gaston, Hermine, Igor, Julia, Karl, Lisa, Matthew, Nicole, Otto, Paula, Richard, Shary, Tomas, Virginie, Walter

Hurricane Alex Tracking Map

Zoom

In

Out

[Tweet this](#)

[Share map](#)

[Full-Screen »](#)

T.D. Alex, Advisory I Stormpulse

6-25 Historical Position Wind Speed Pressure Movement

4:00 PM 16.5° N, 83.5° W 35 mph 1004 mb WNW at 10 mph

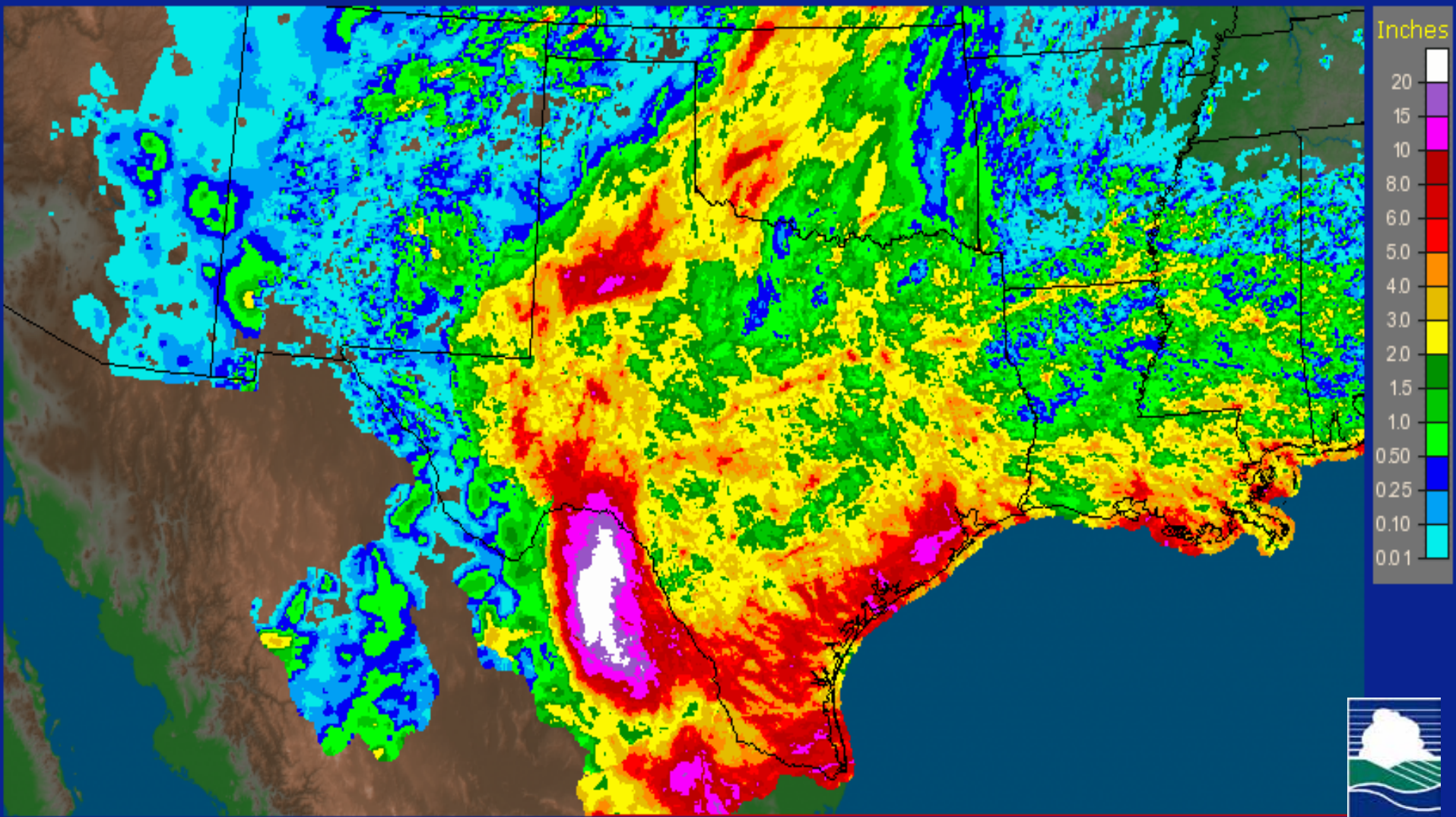
© 2010 Stormpulse - Ibis v5 Base imagery: NASA. Clouds: NERC Satellite Station, Univ. of Dundee.

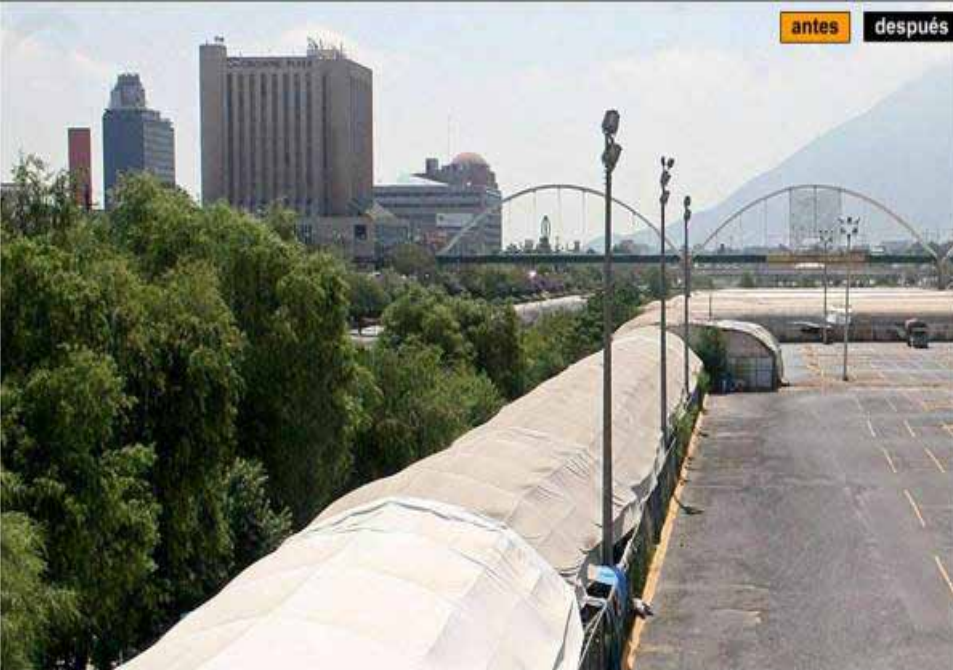


Flooding in Mexico during Hurricane Alex

7-day Precipitation Estimates in the Rio Grande Basin

Texas: Current 7-Day Observed Precipitation
Valid at 7/6/2010 1200 UTC - Created 7/7/10 0:01 UTC





PUESTEROS
La crecida borró literalmente la pulga que se instala bajo el Puente del Papa, en el lecho del Río Santa Catarina.

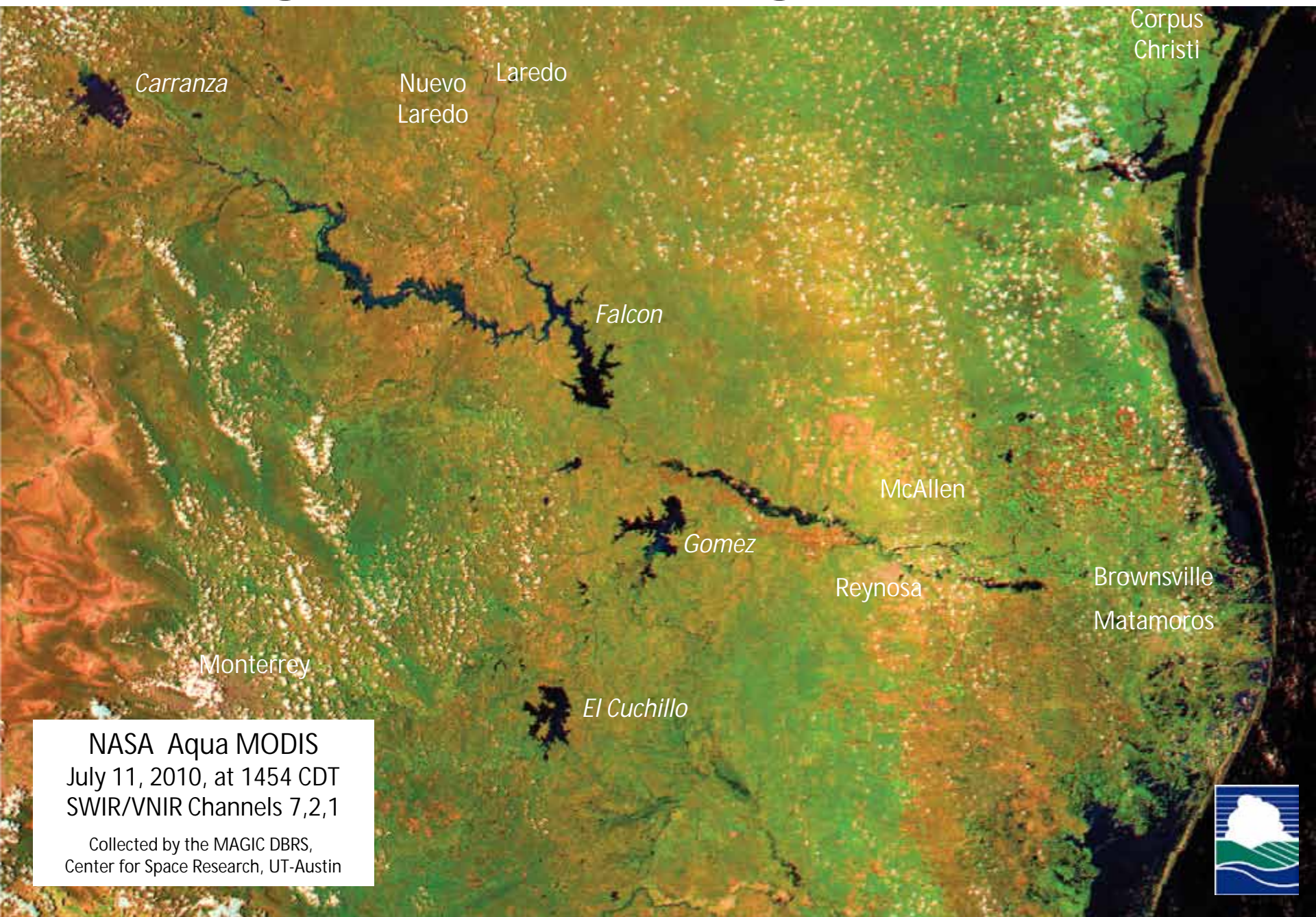
PUESTEROS
La crecida borró literalmente la pulga que se instala bajo el Puente del Papa, en el lecho del Río Santa Catarina.



CANCHAS
El Parque Río, que comprendía canchas de fútbol, arrolla, una plataforma de práctica y un campo de golf, fue arrasado por la crecida del Santa Catarina.



Flooding in Mexico during Hurricane Alex

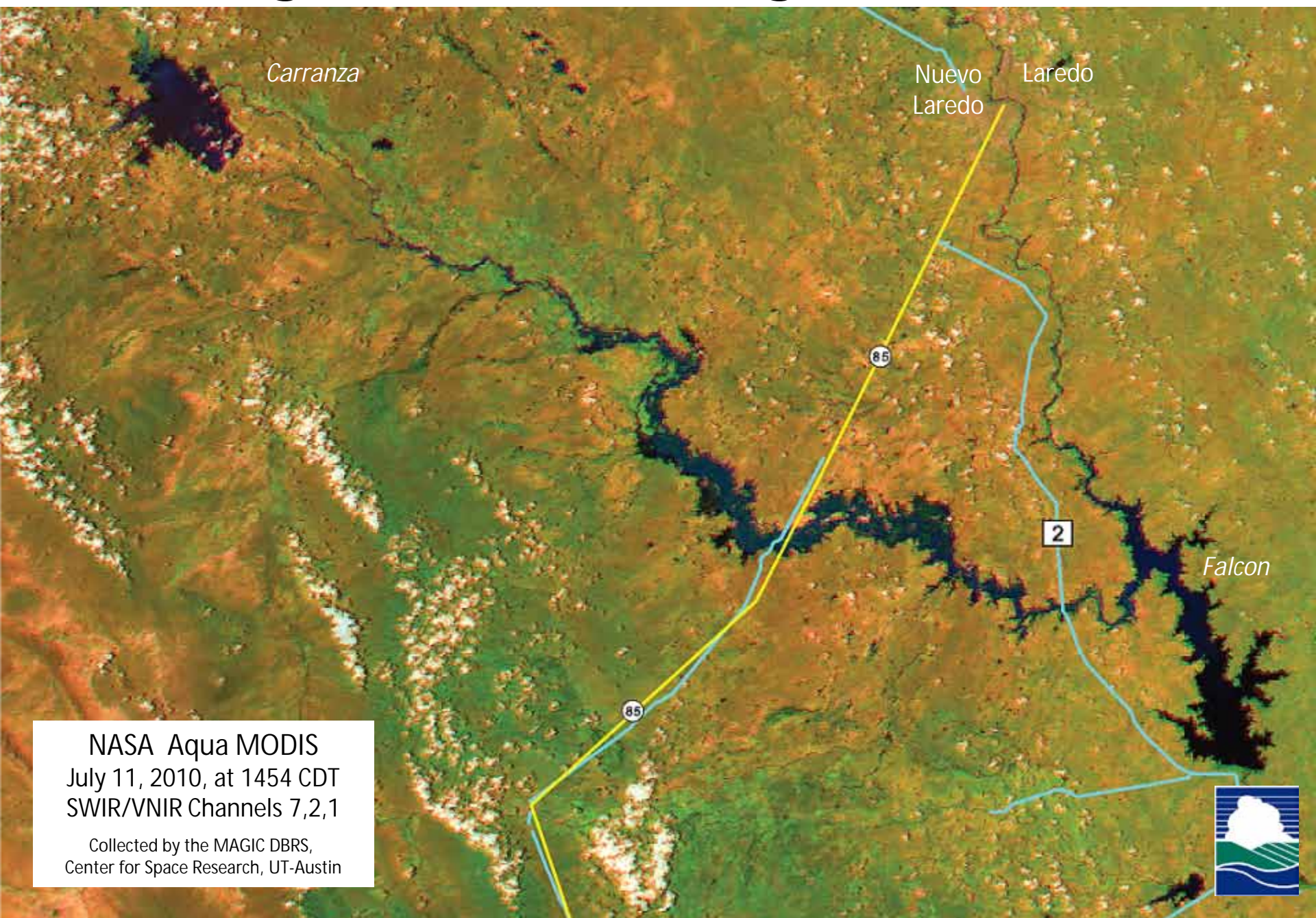


NASA Aqua MODIS
July 11, 2010, at 1454 CDT
SWIR/VNIR Channels 7,2,1

Collected by the MAGIC DBRS,
Center for Space Research, UT-Austin



Flooding in Mexico during Hurricane Alex



Carranza

Nuevo
Laredo

Laredo

85

2

Falcon

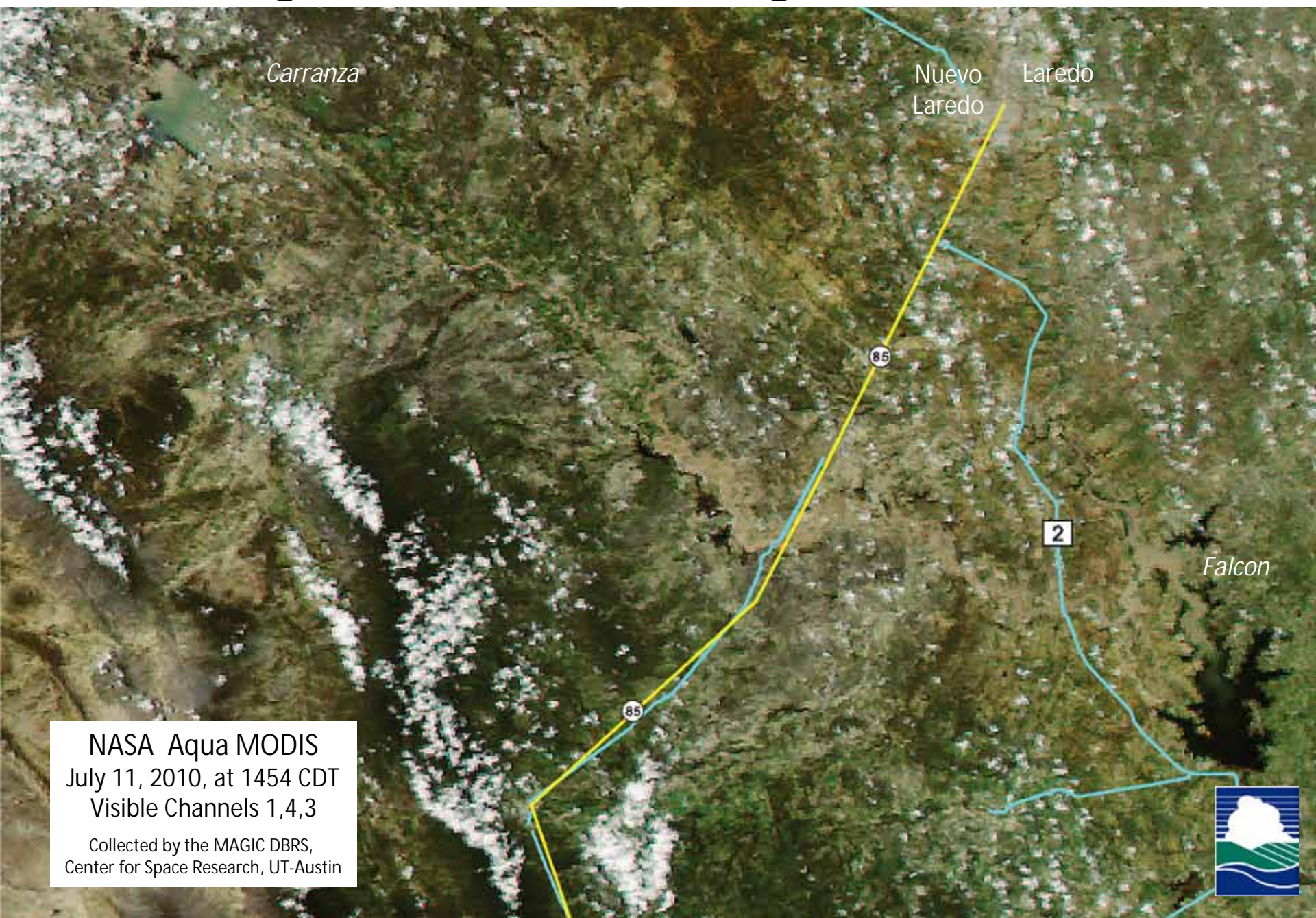
85

NASA Aqua MODIS
July 11, 2010, at 1454 CDT
SWIR/VNIR Channels 7,2,1

Collected by the MAGIC DBRS,
Center for Space Research, UT-Austin



Flooding in Mexico during Hurricane Alex



NASA Aqua MODIS
July 11, 2010, at 1454 CDT
Visible Channels 1,4,3

Collected by the MAGIC DBRS,
Center for Space Research, UT-Austin



Eagle Pass-Piedras Negras, Coahuila Port of Entry



Laredo Nuevo Laredo POE-Bridge 1



Falcon Reservoir releasing flood waters into the Rio Grande in July 2010

Falcon Dam view from



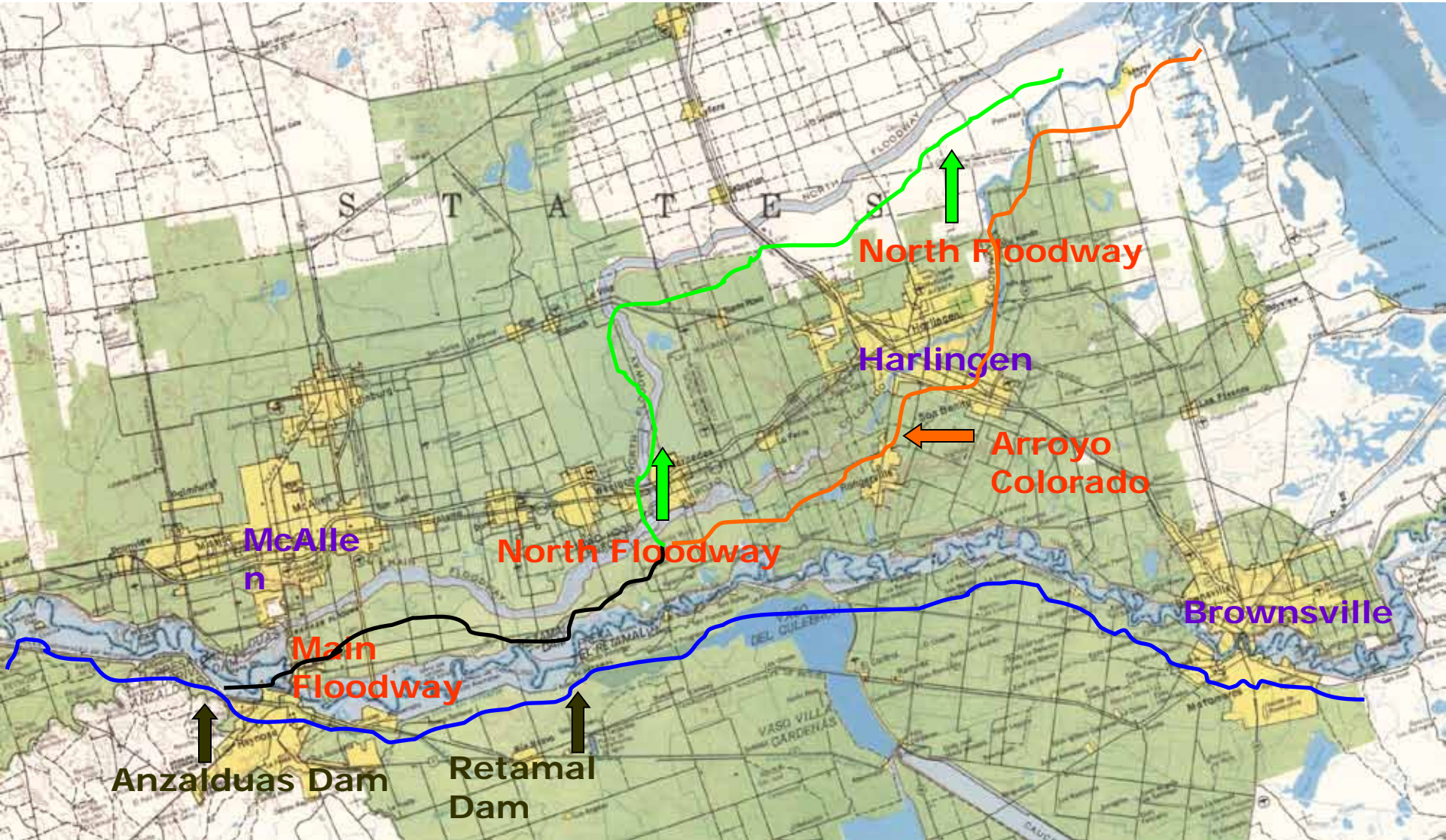
Falcon Dam -



Rio Grande City-Camargo POE July 2010



LOWER RIO GRANDE FLOOD CONTROL PROJECT



2010 FLOOD OPERATIONS DIVERSIONS INTO THE US FLOODWAY



Anzalduas Dam
8/15/10





Water Hyacinth

- Invasive Species
- Explosive Growth
 - Up to 200 tons/acre
 - Can completely clog waterways
- Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) can monitor infestation



Water Hyacinth

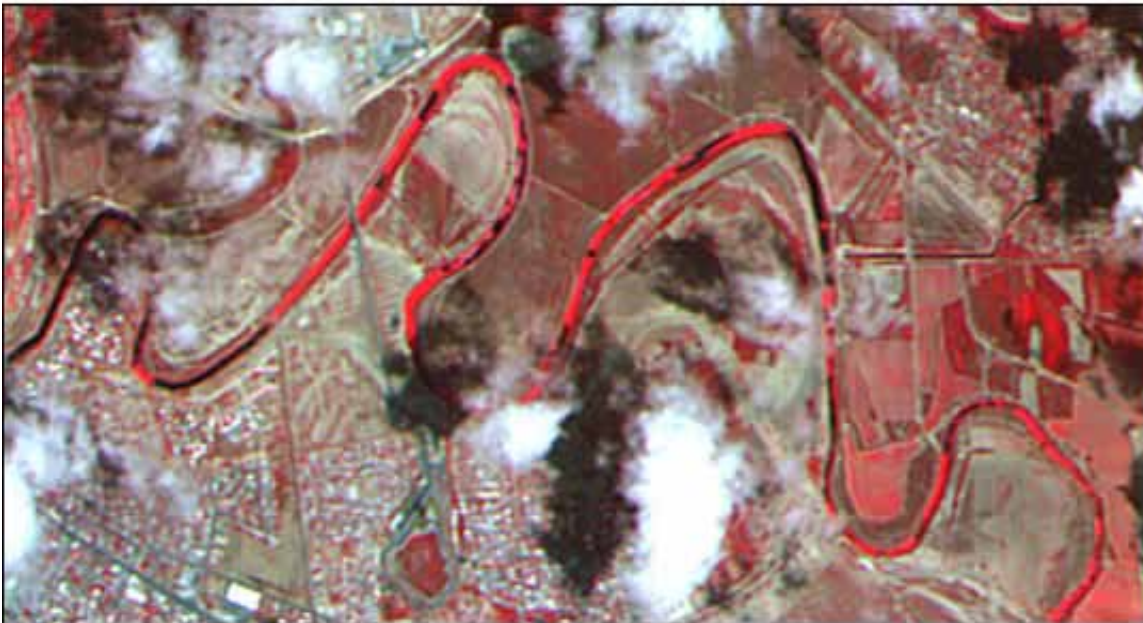
- ASTER infrared imagery

Top:
Mar. 30, 2002

Bottom:
May 9, 2002



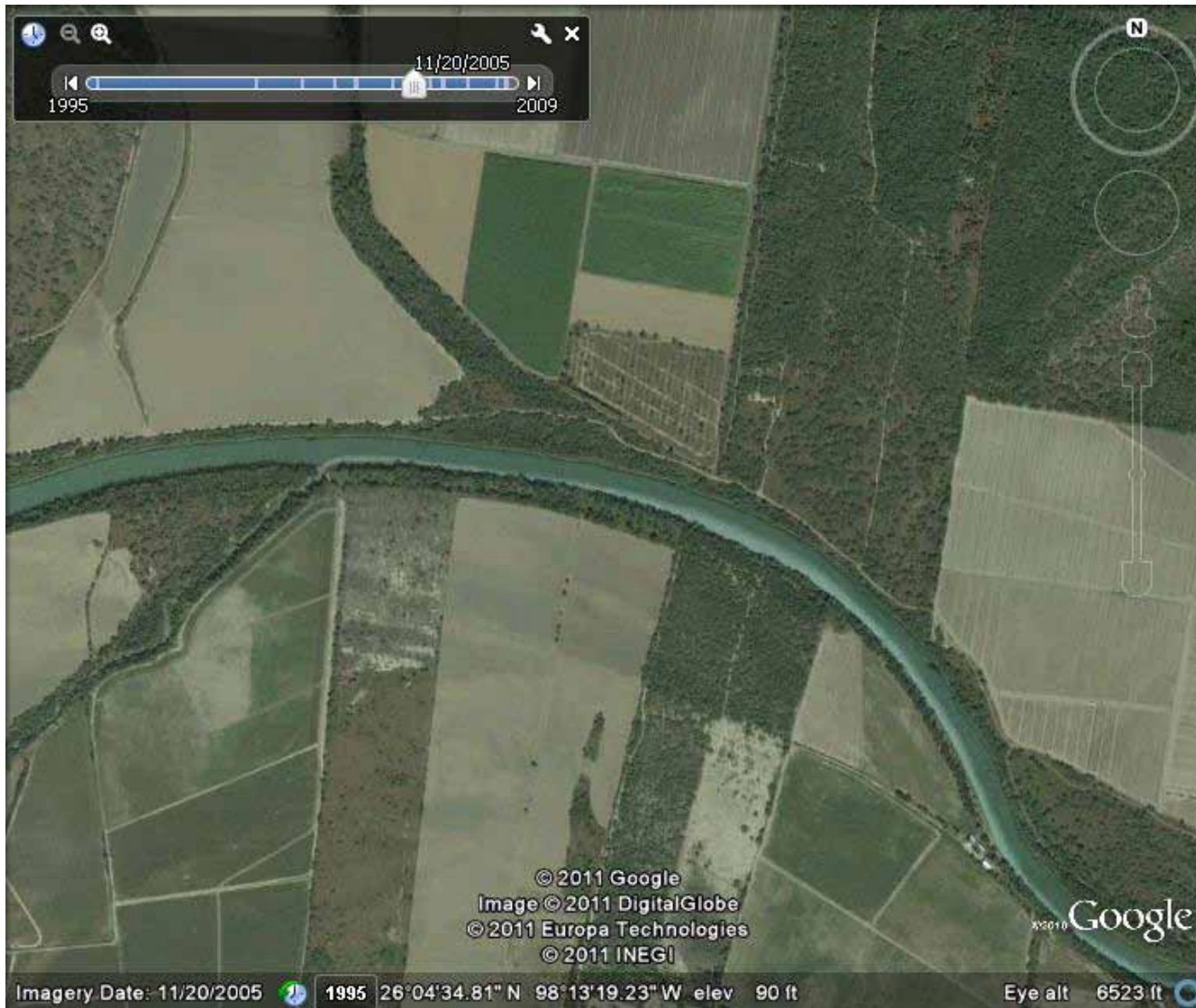
March 30, 2002



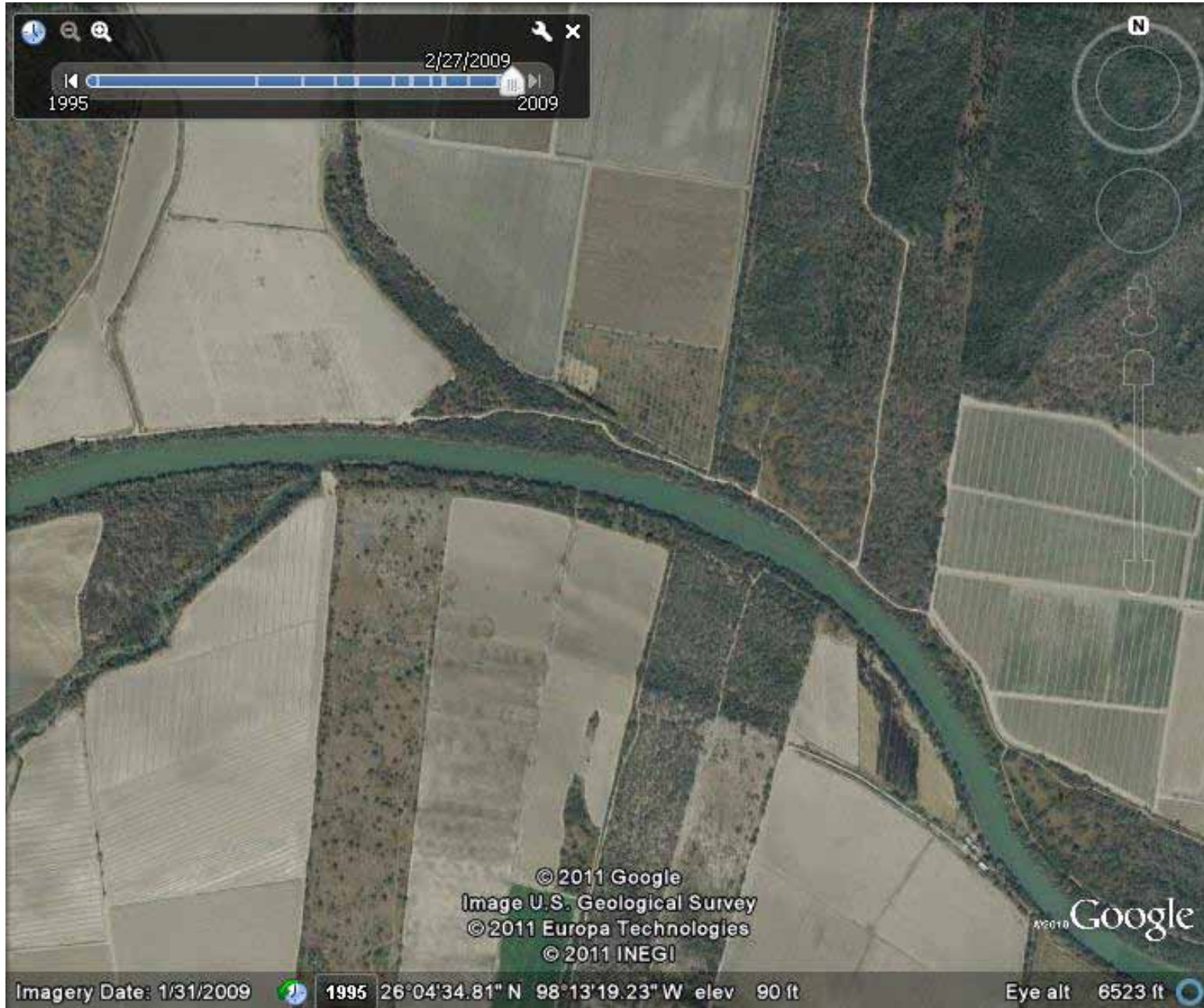
May 9, 2002



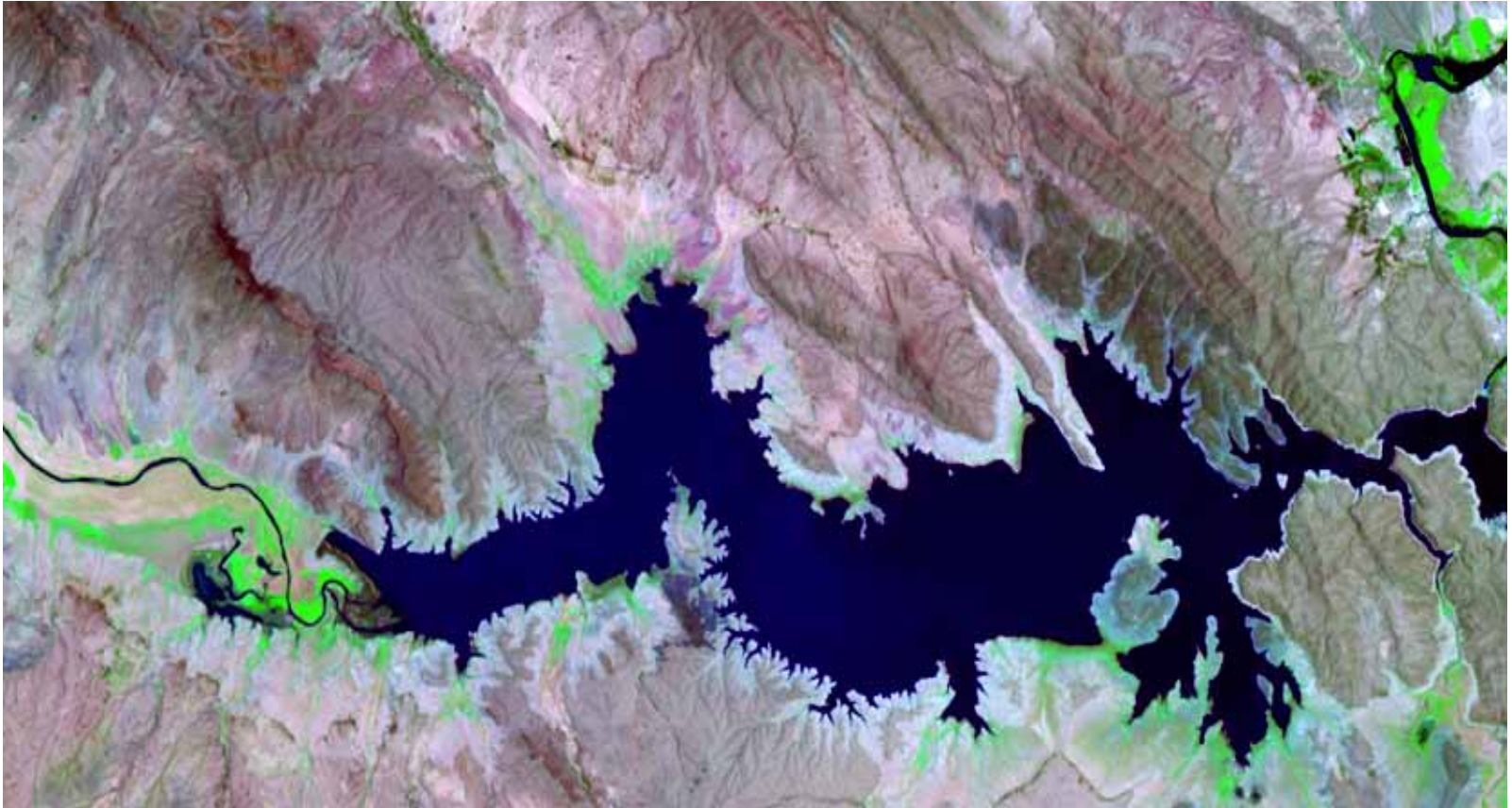
Reynosa outfall November 2005



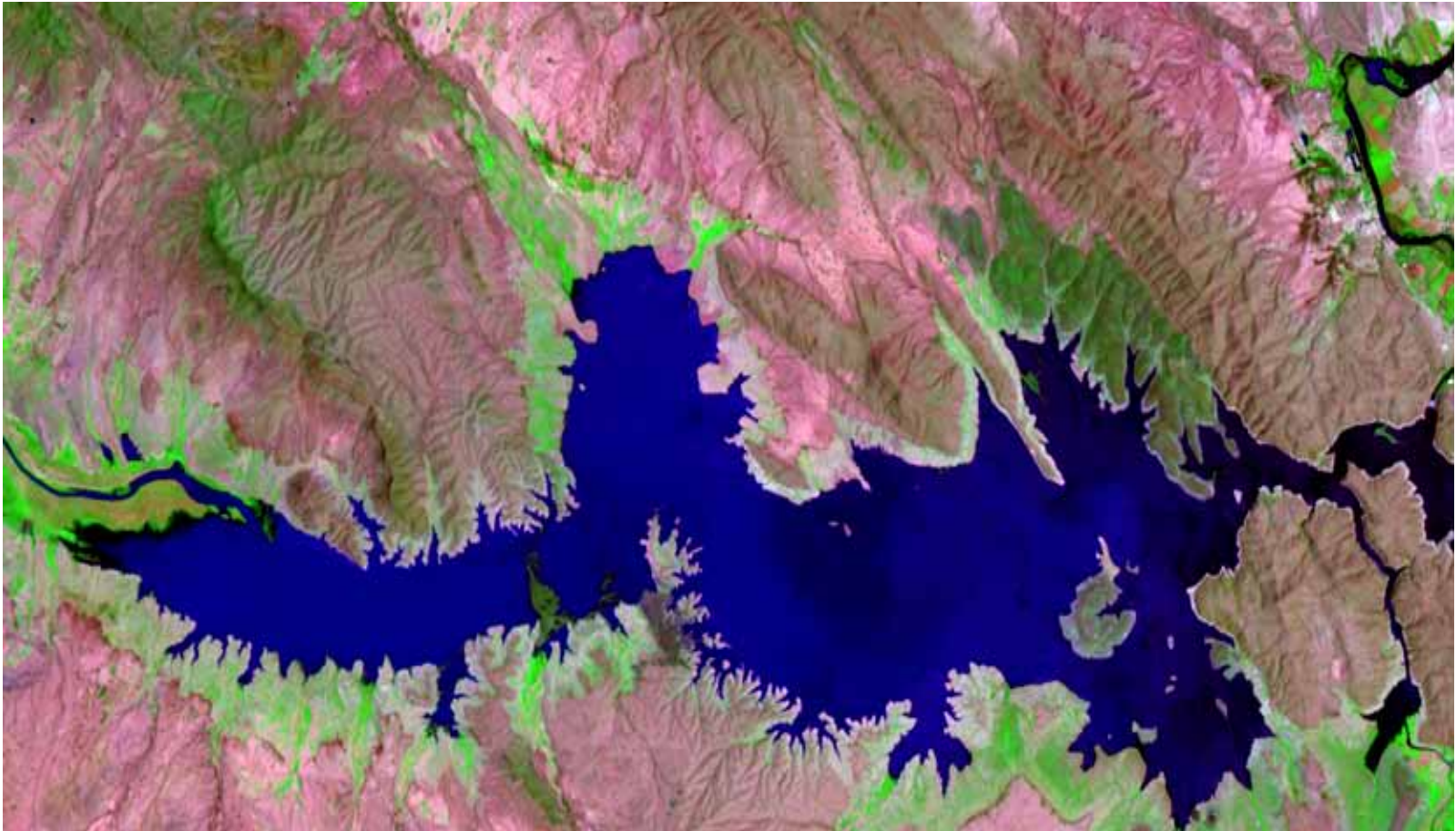
Reynosa outfall January 2009



La Boquilla June 25, 2002



La Boquilla August 28, 2002



Rio Grande May 2, 2002



TCEQ Needs

- Precipitation data for storm events in Rio Grande basin
- Types and acreage of crops in the Rio Grande basin
- Groundwater use in Mexico
 - May 30 NYT article about GRACE
- Flows?



iFin!

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