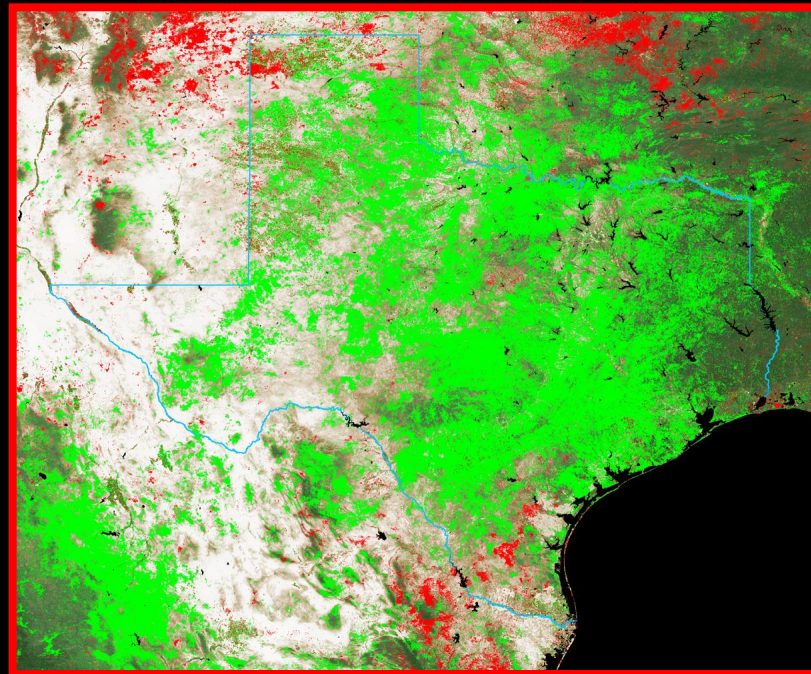


Satellite Monitoring of Changing Vegetation Conditions in 2011 and 2012

Gordon Wells

with Teresa Howard, Larry Teng and Solar Smith

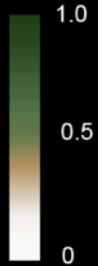
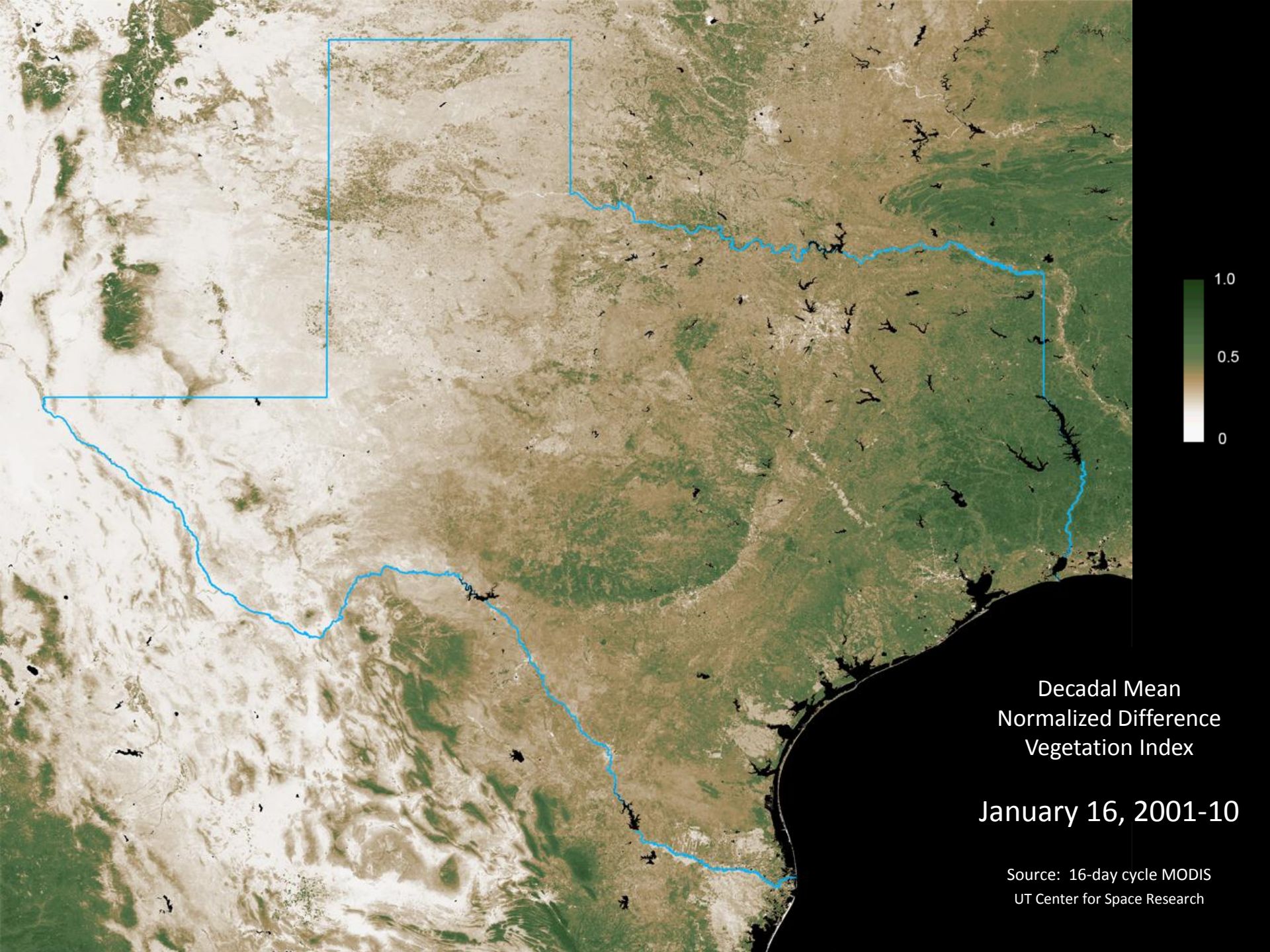
Center for Space Research
The University of Texas at Austin



Second Water Forum: “Texas Drought and Beyond”

Center for Integrated Earth System Science, The University of Texas at Austin

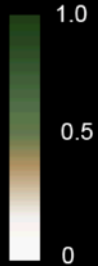
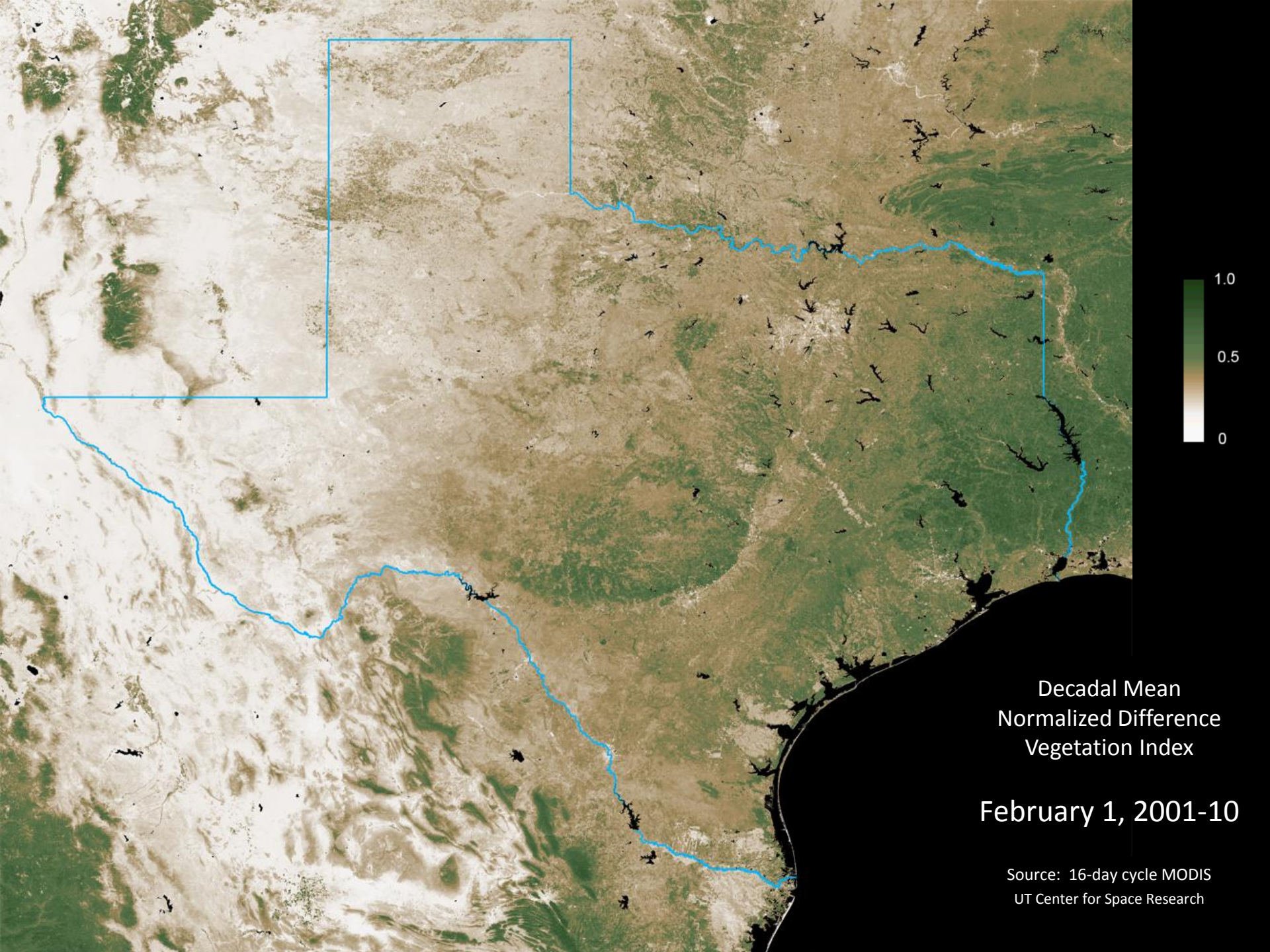
October 22, 2012



Decadal Mean
Normalized Difference
Vegetation Index

January 16, 2001-10

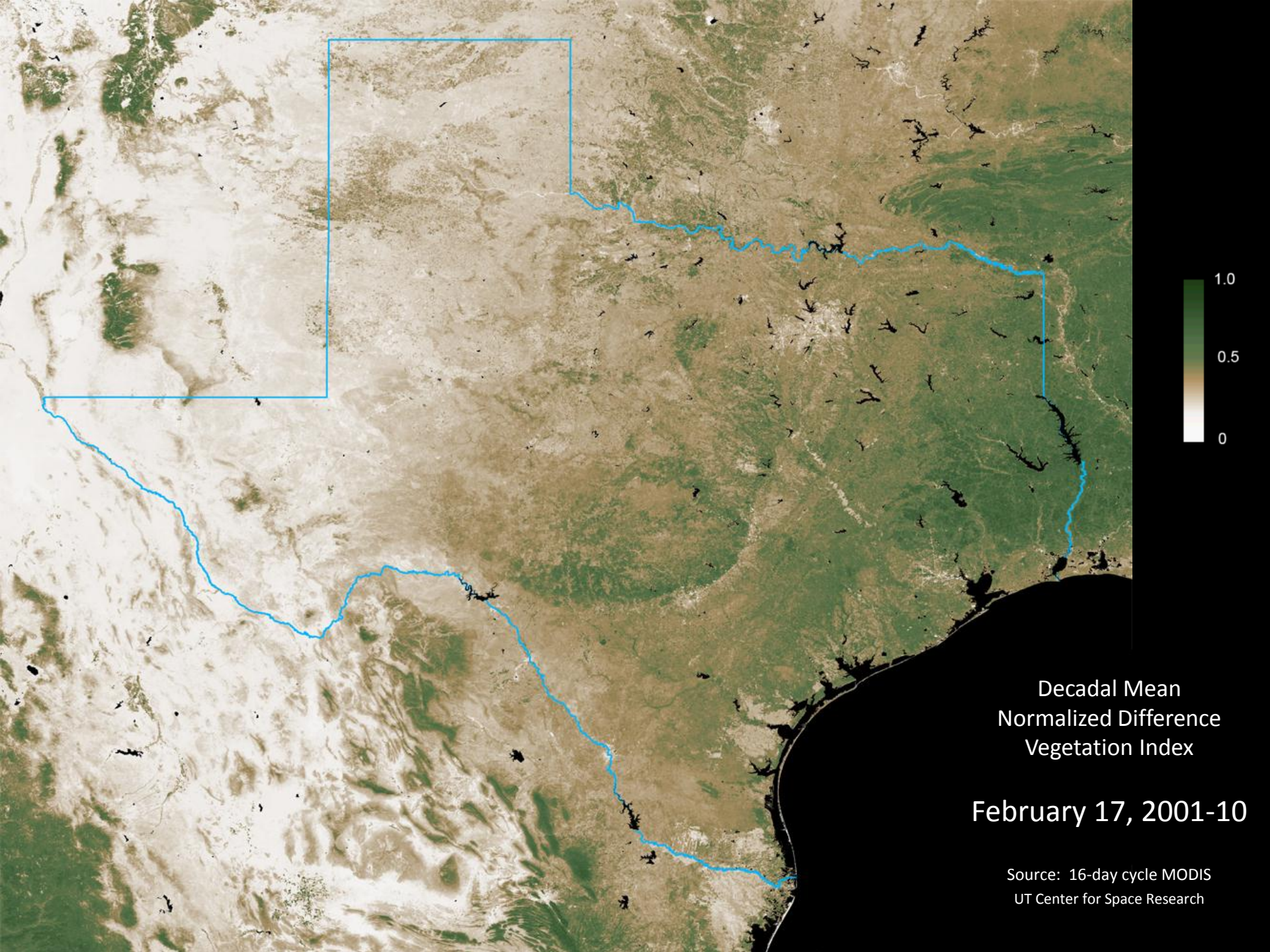
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

February 1, 2001-10

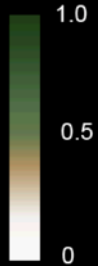
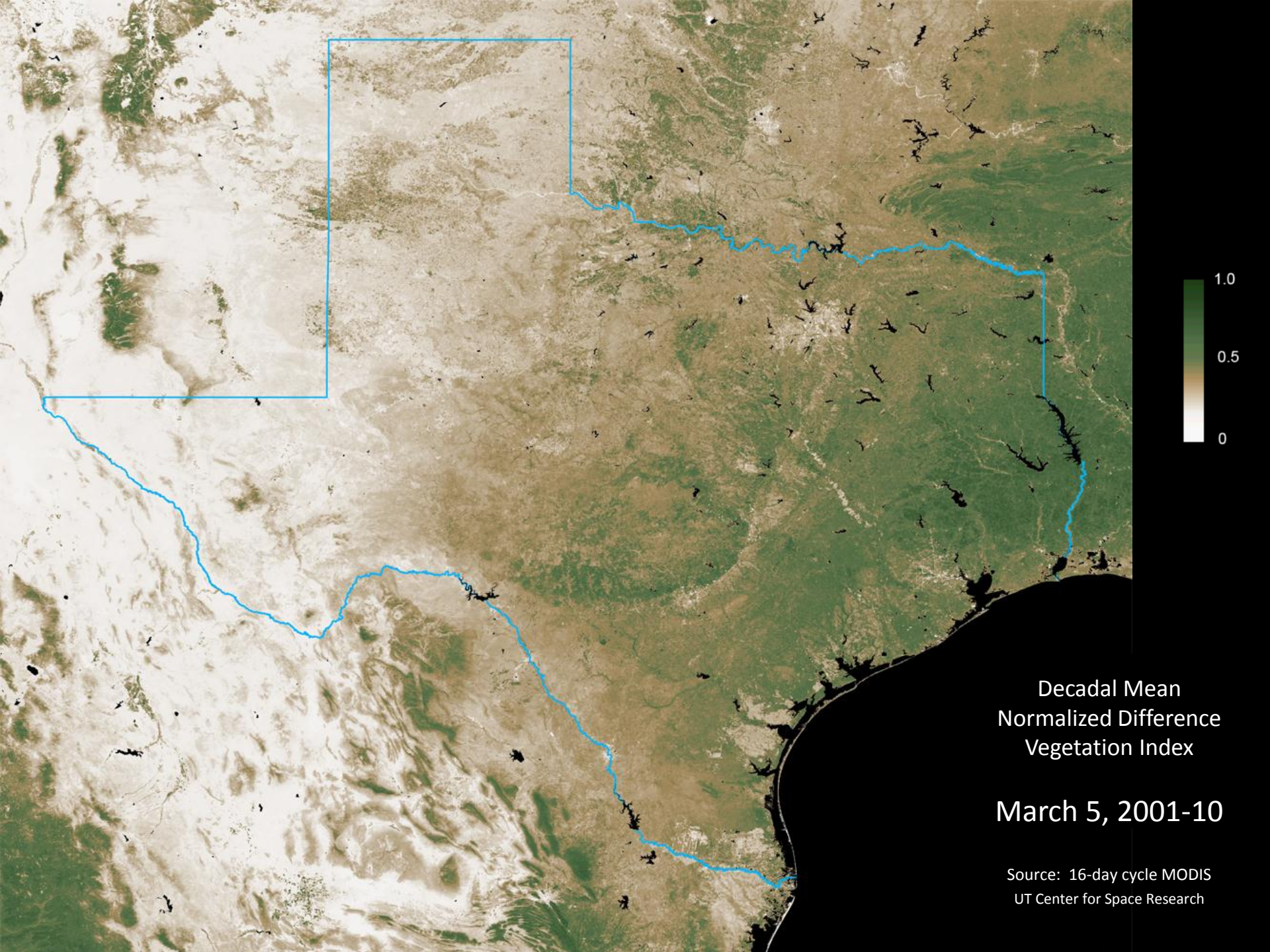
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

February 17, 2001-10

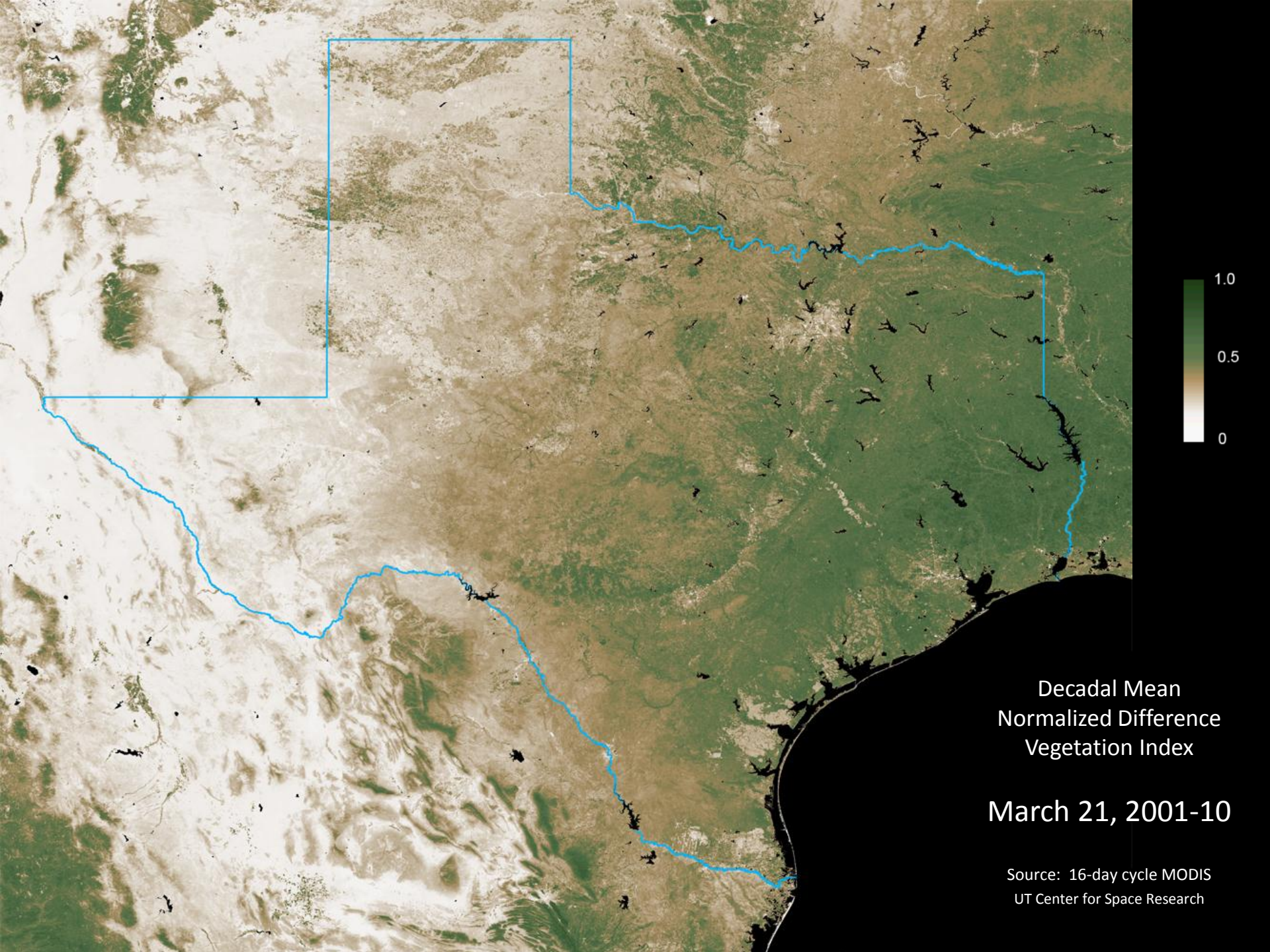
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

March 5, 2001-10

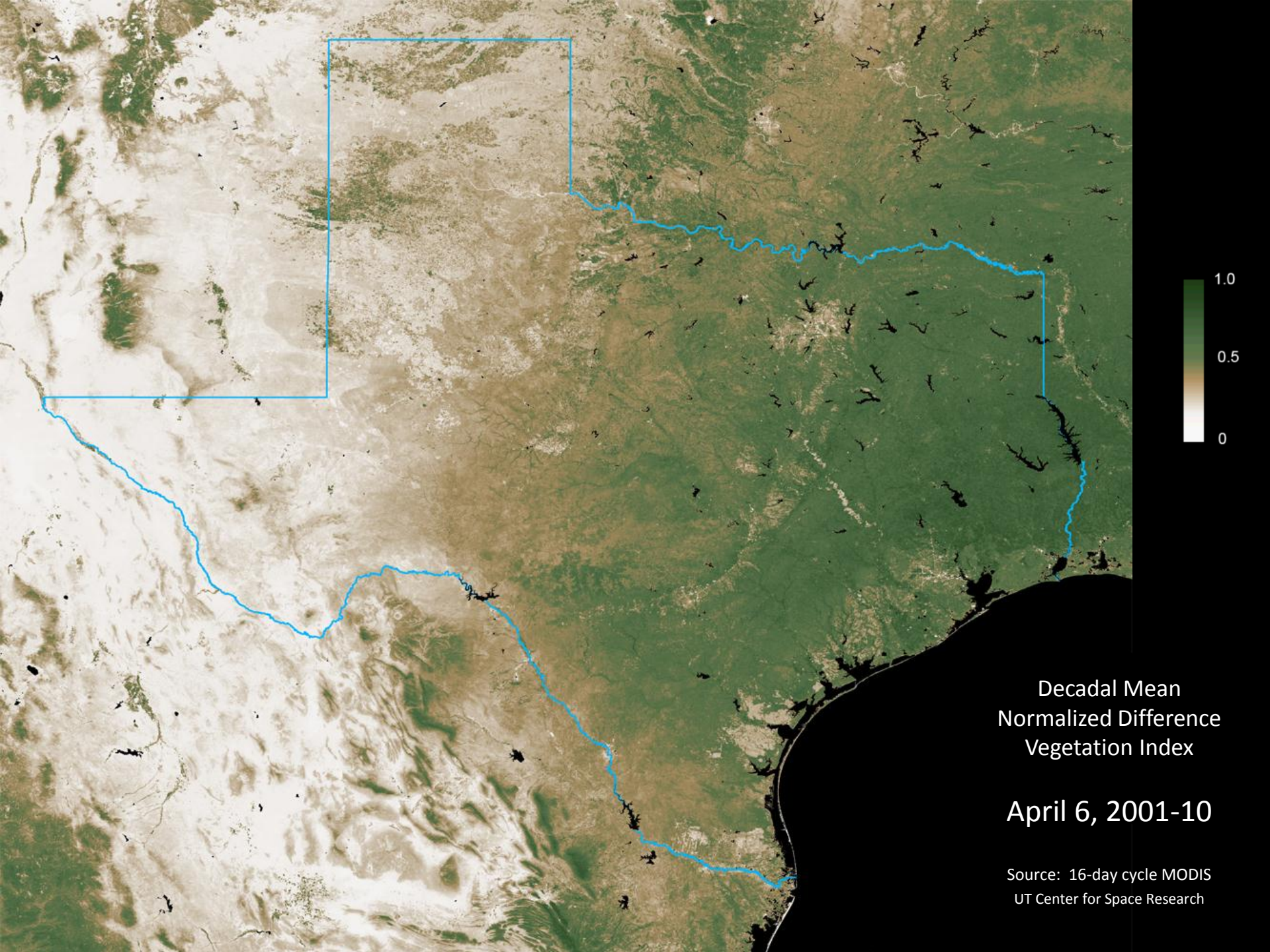
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

March 21, 2001-10

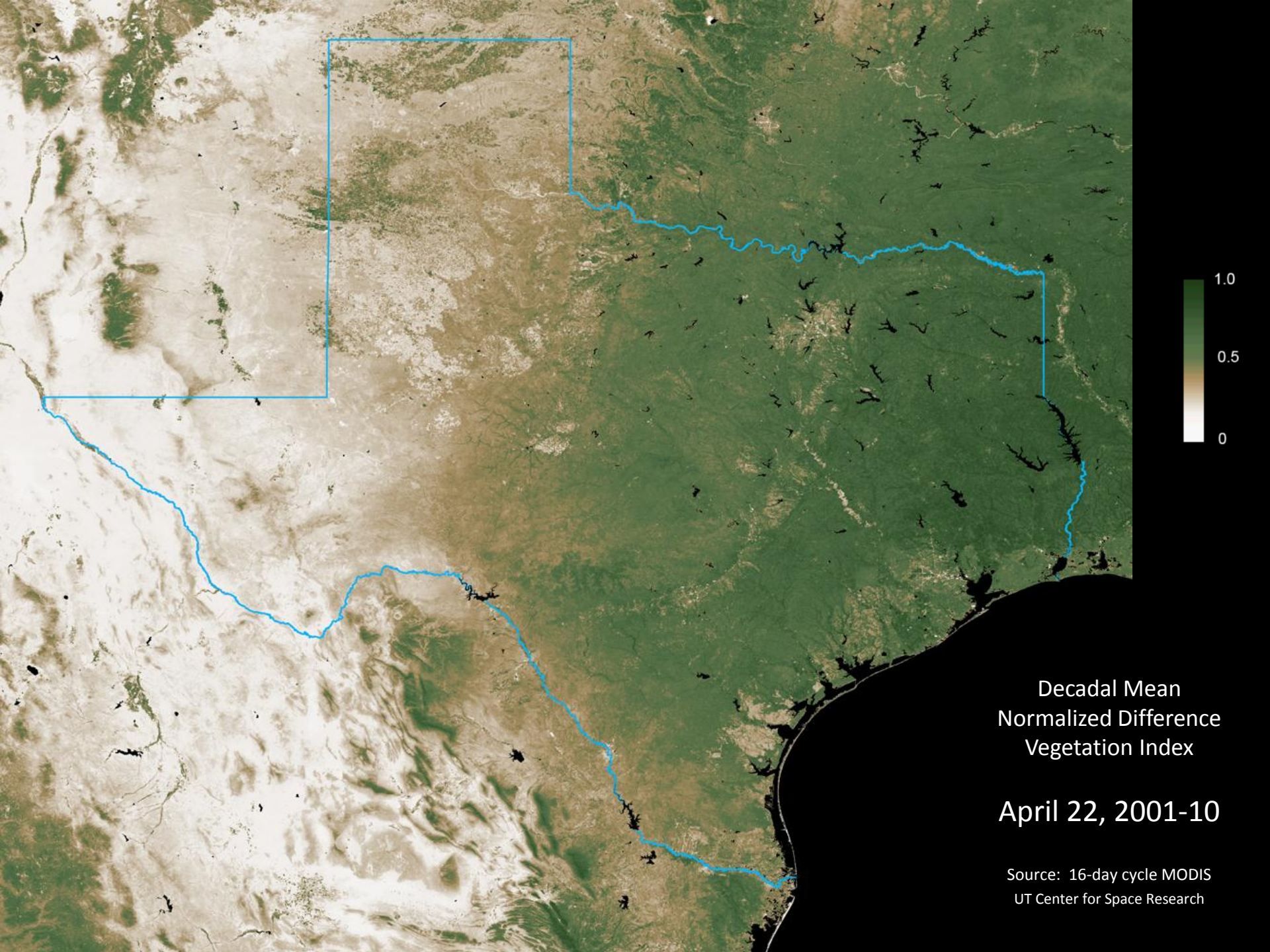
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

April 6, 2001-10

Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

April 22, 2001-10

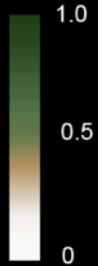
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

May 8, 2001-10

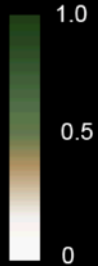
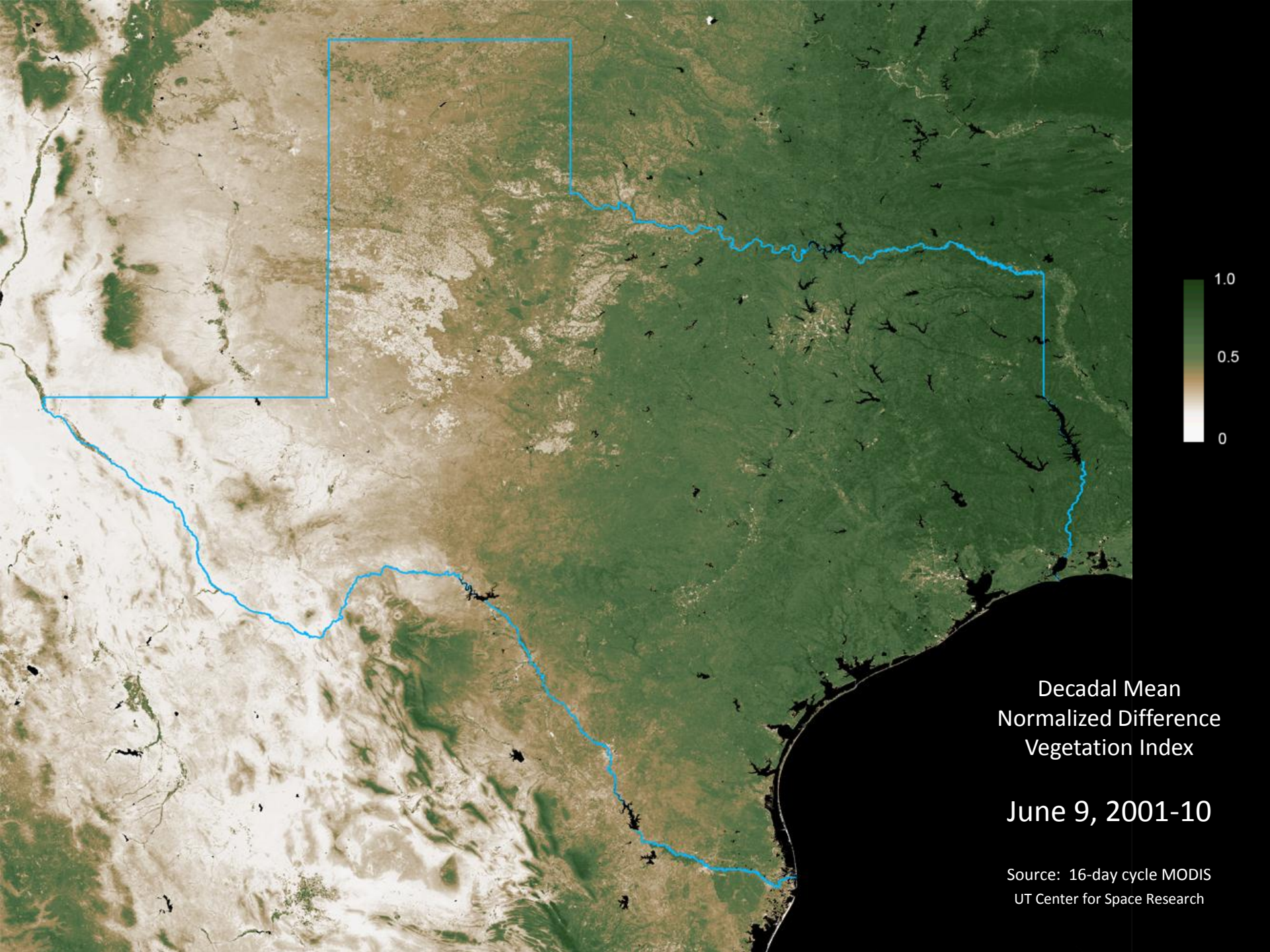
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

May 24, 2001-10

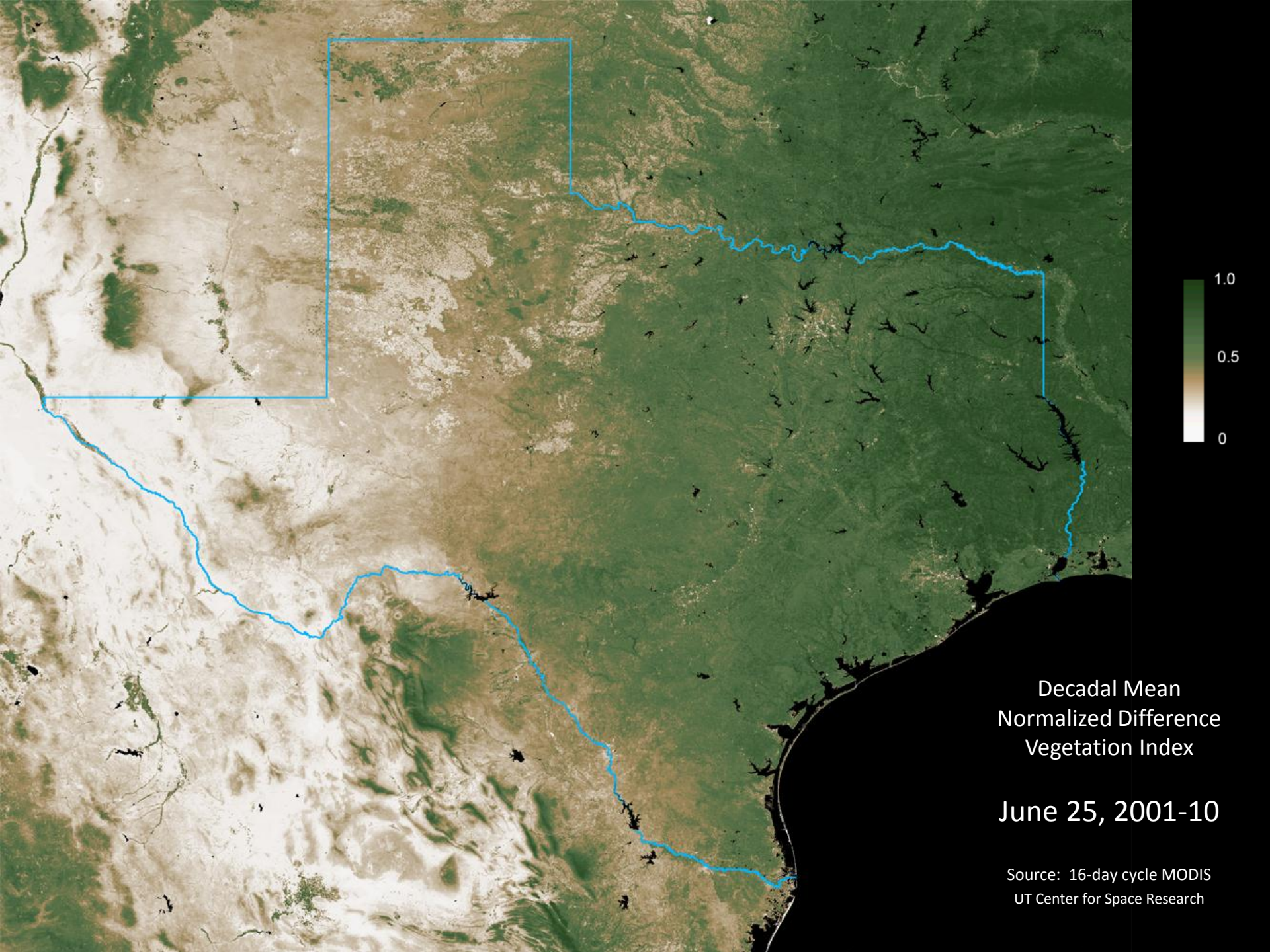
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

June 9, 2001-10

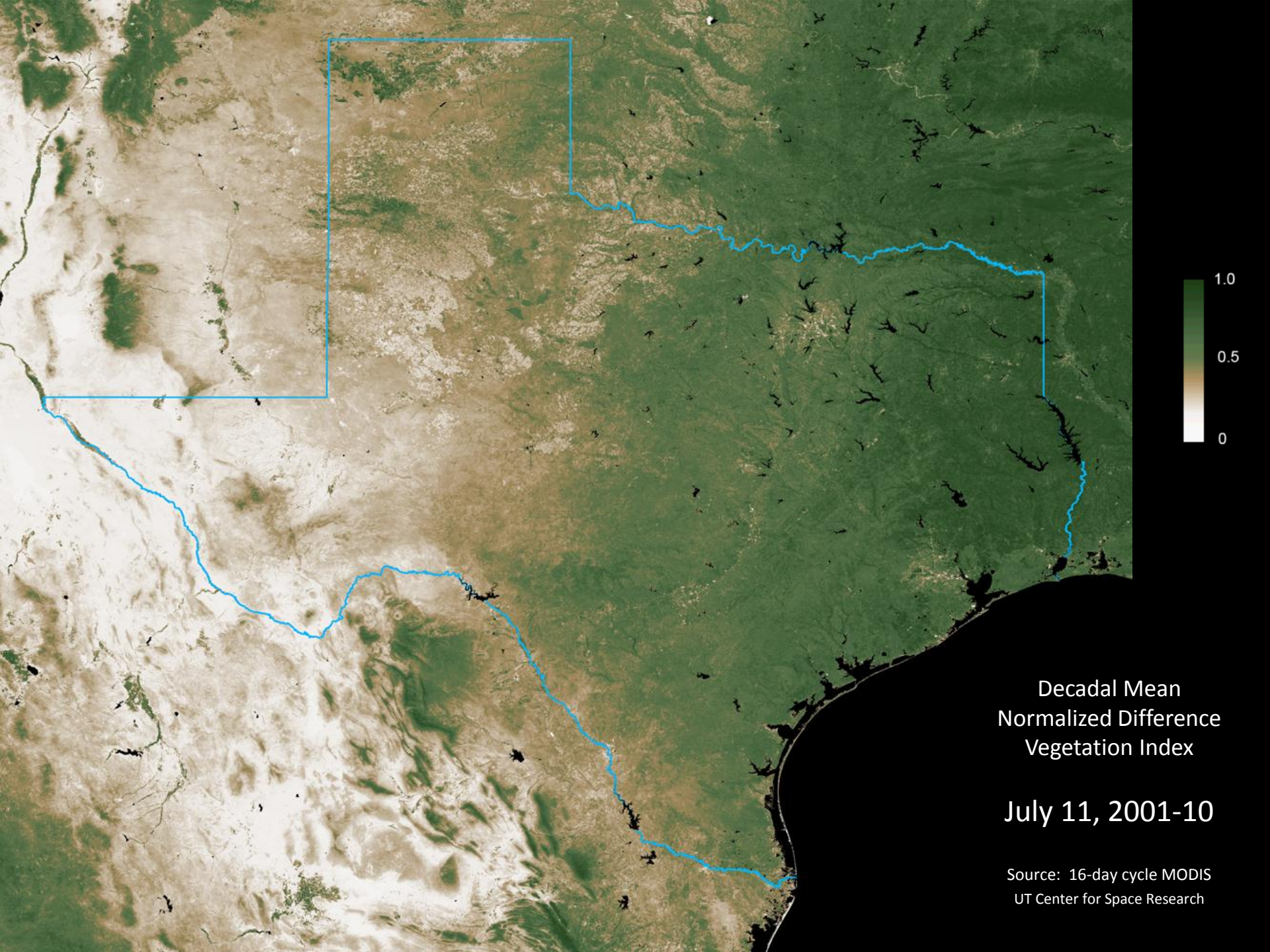
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

June 25, 2001-10

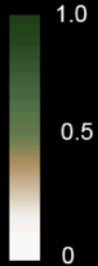
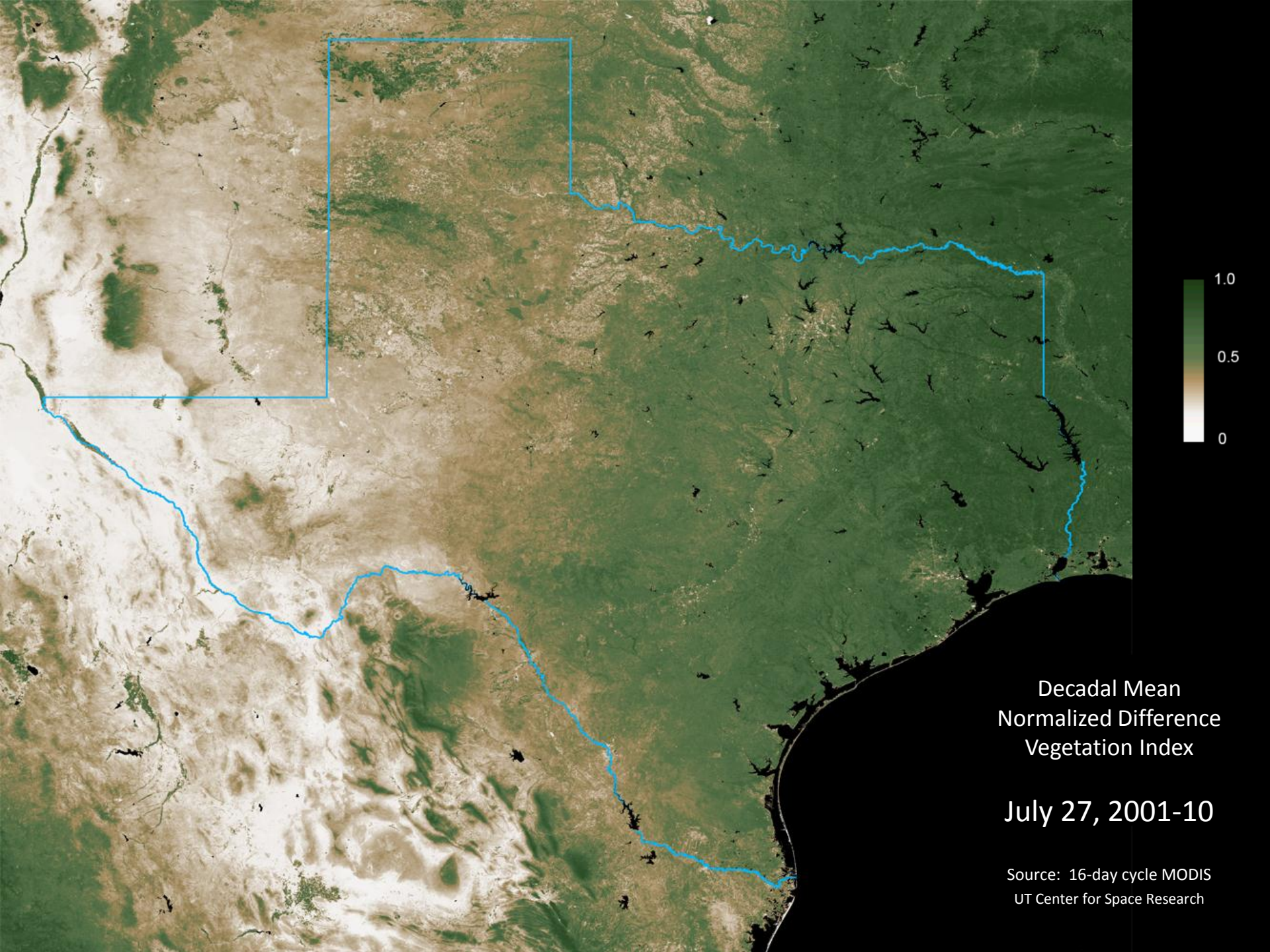
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

July 11, 2001-10

Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

July 27, 2001-10

Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

August 12, 2001-10

Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

August 28, 2001-10

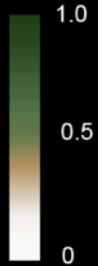
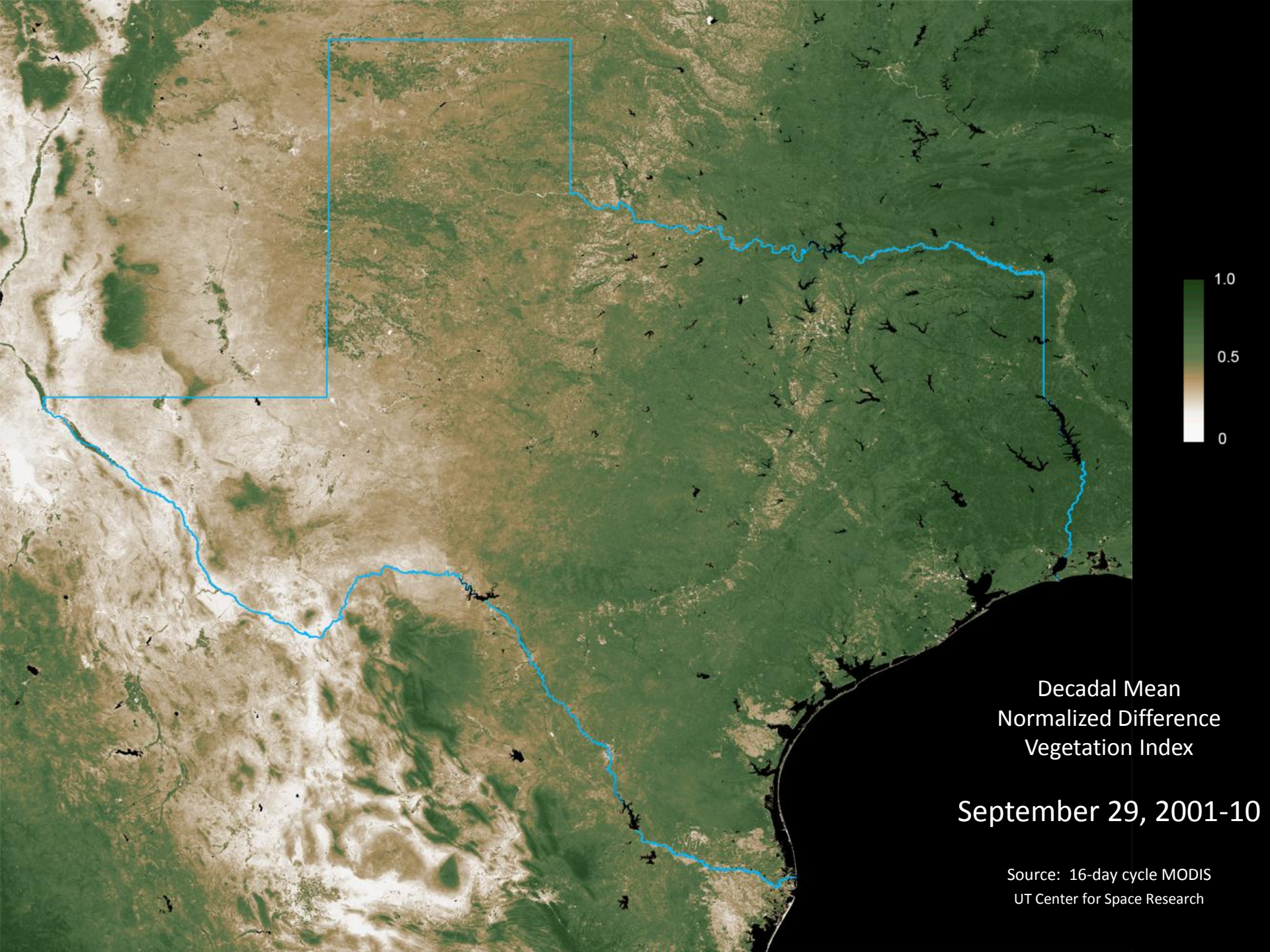
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

September 13, 2001-10

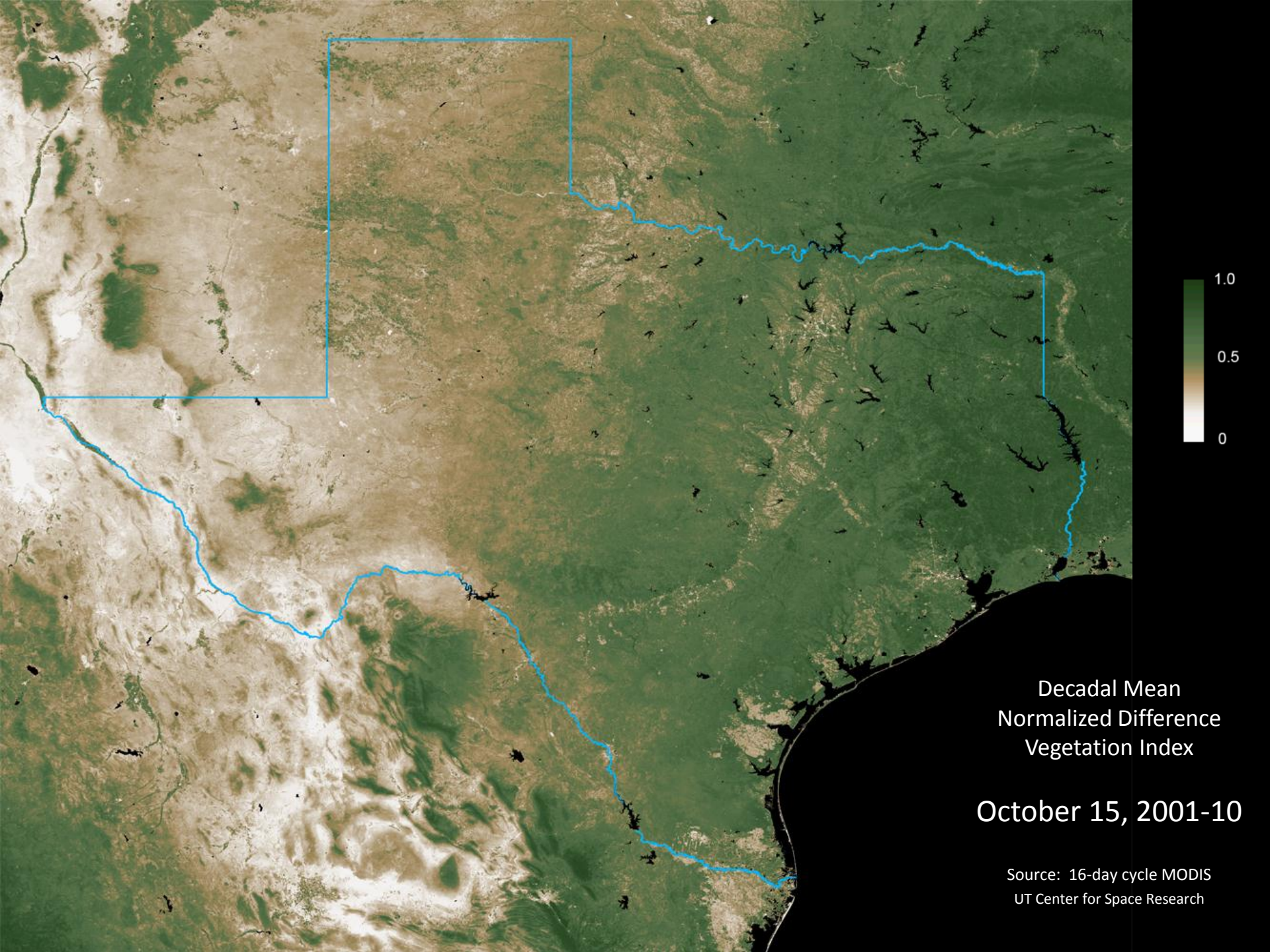
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

September 29, 2001-10

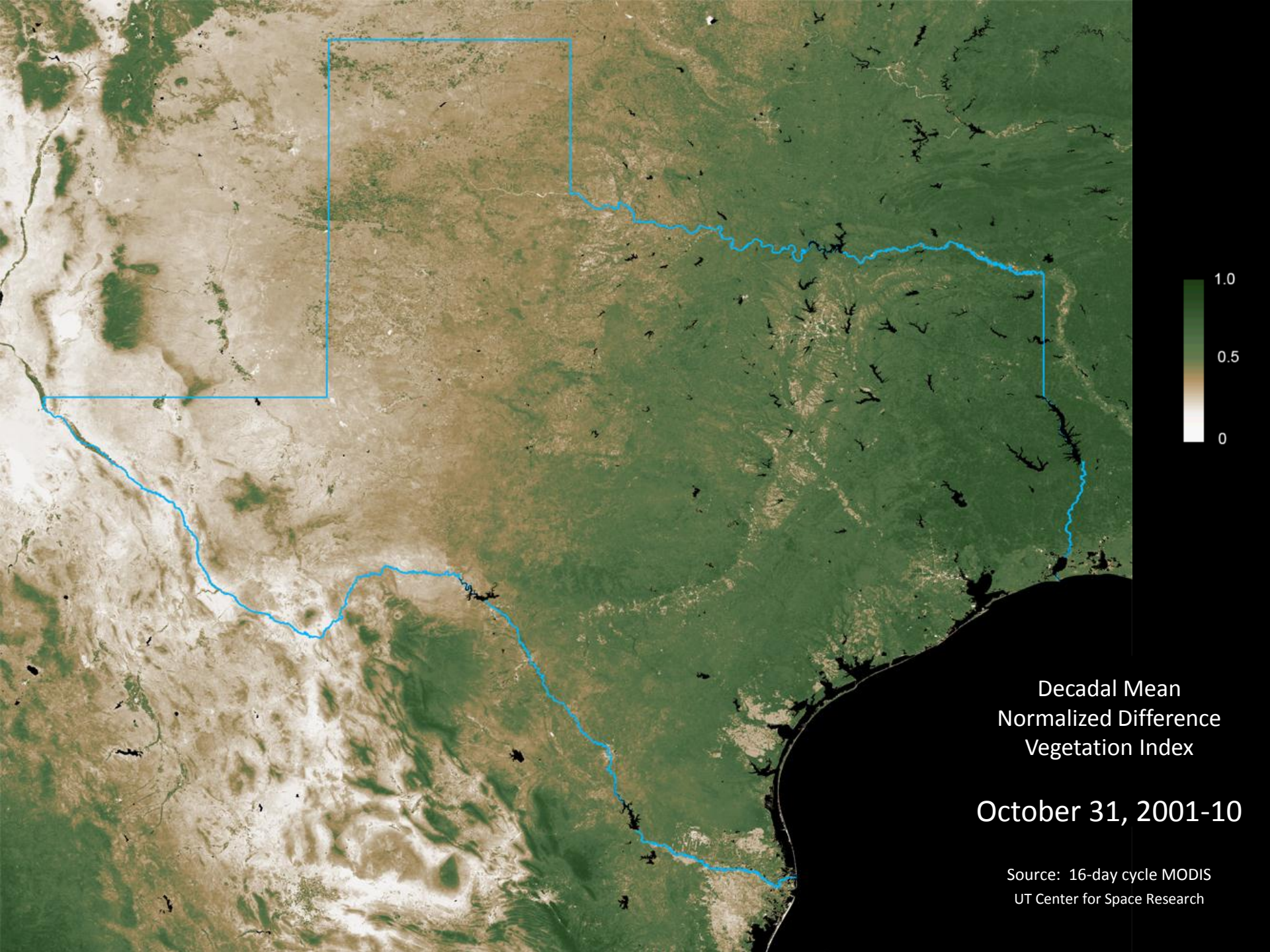
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

October 15, 2001-10

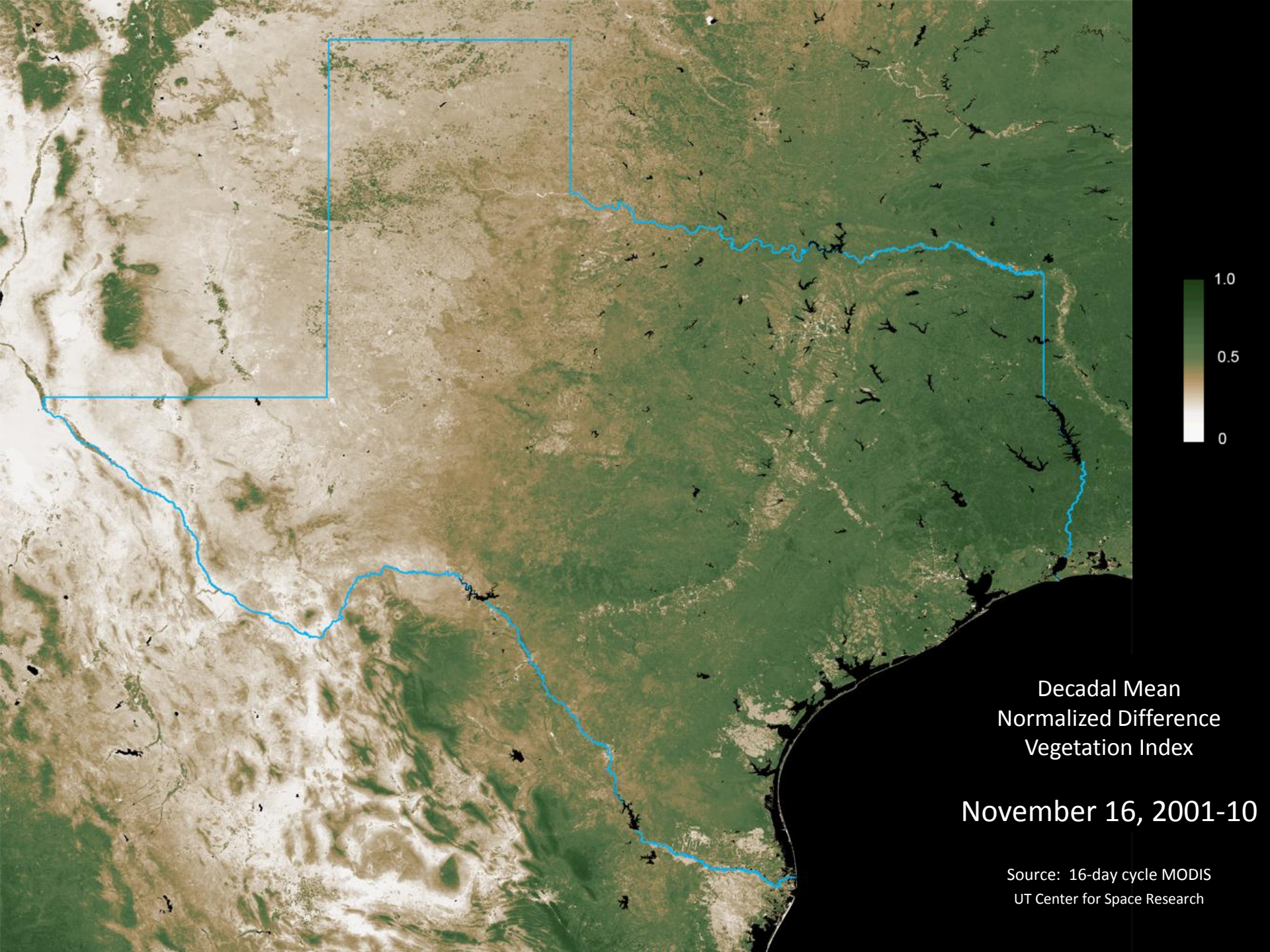
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

October 31, 2001-10

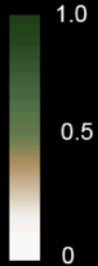
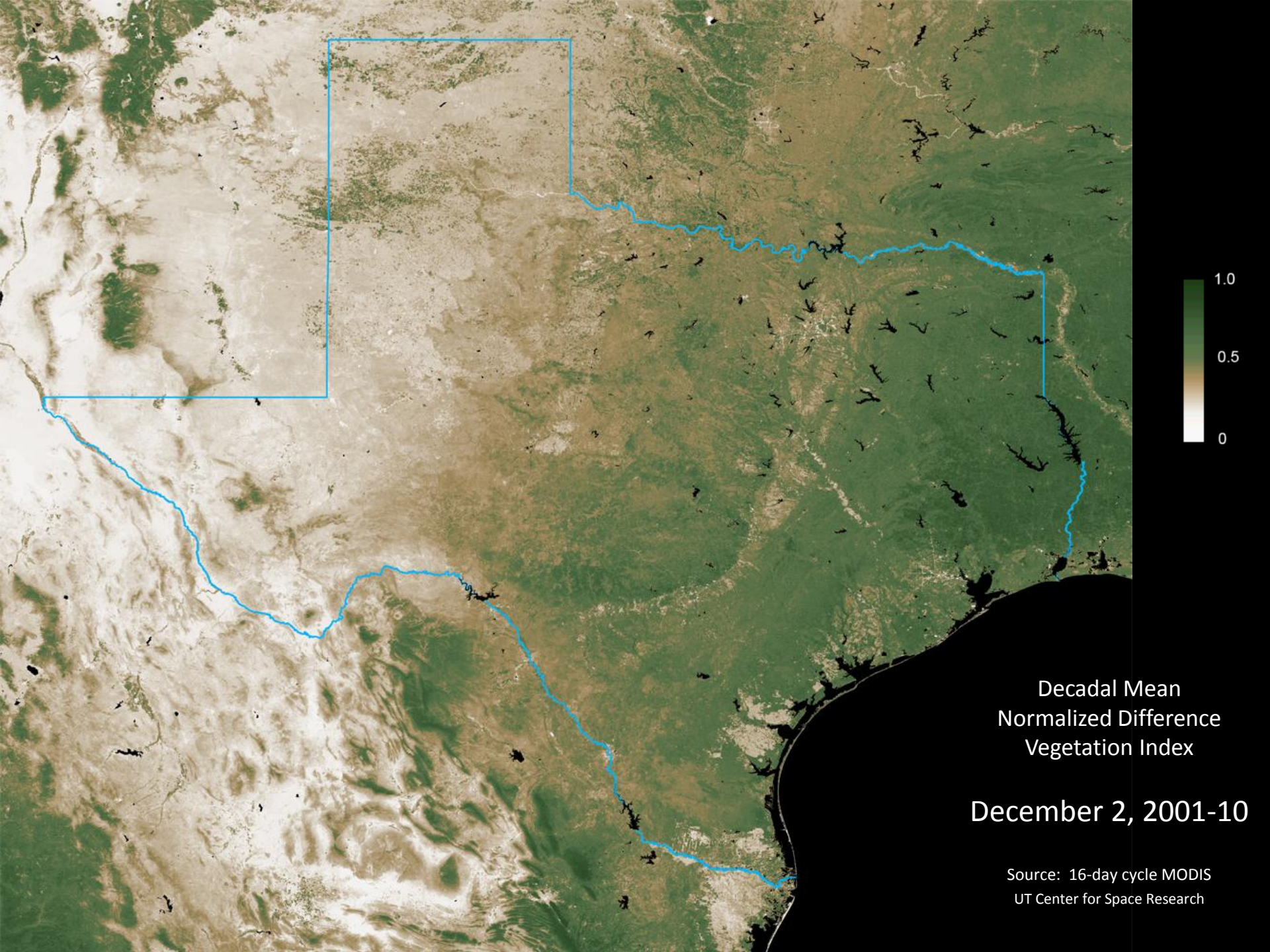
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

November 16, 2001-10

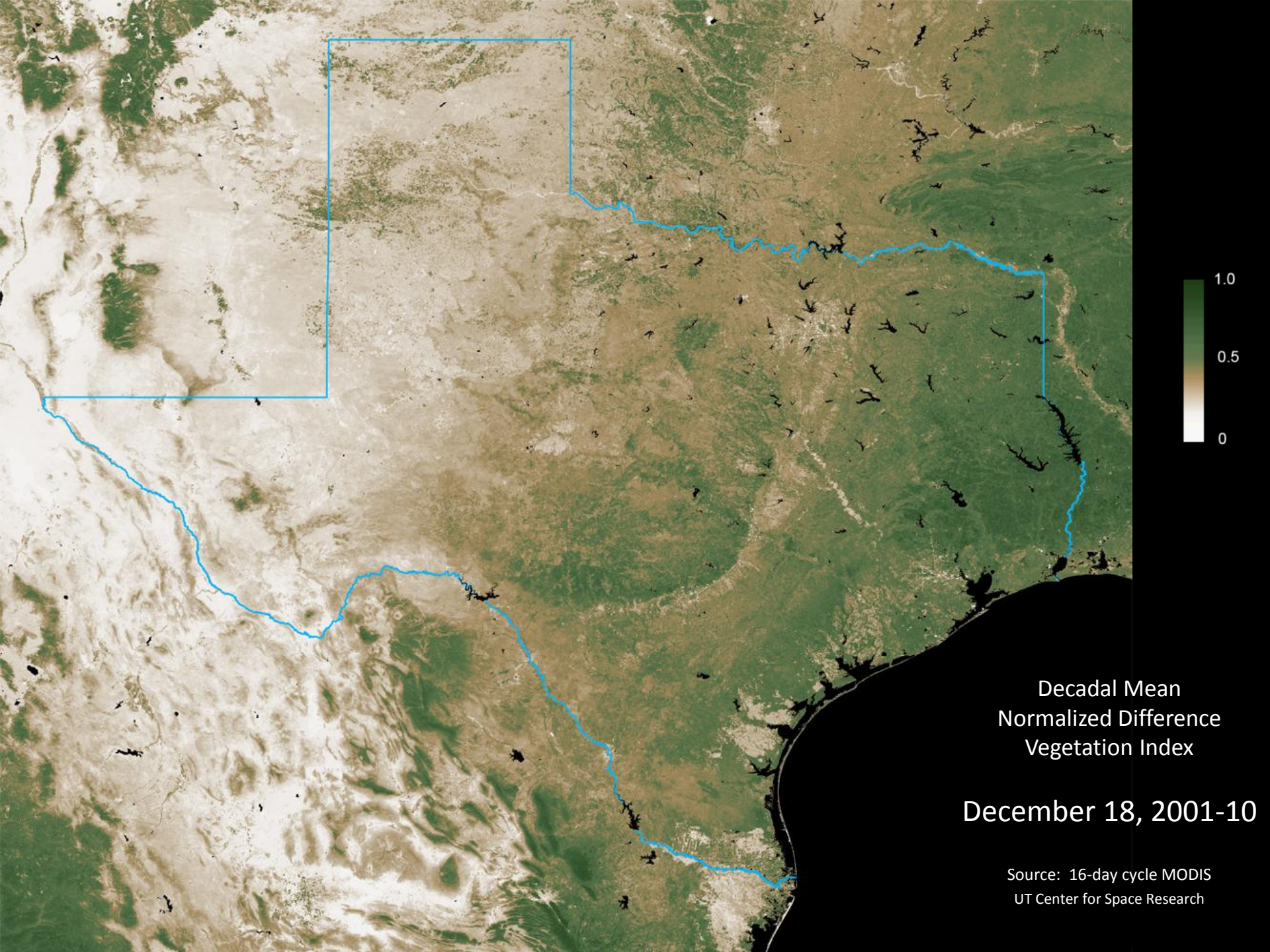
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

December 2, 2001-10

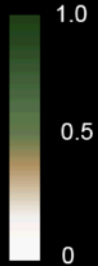
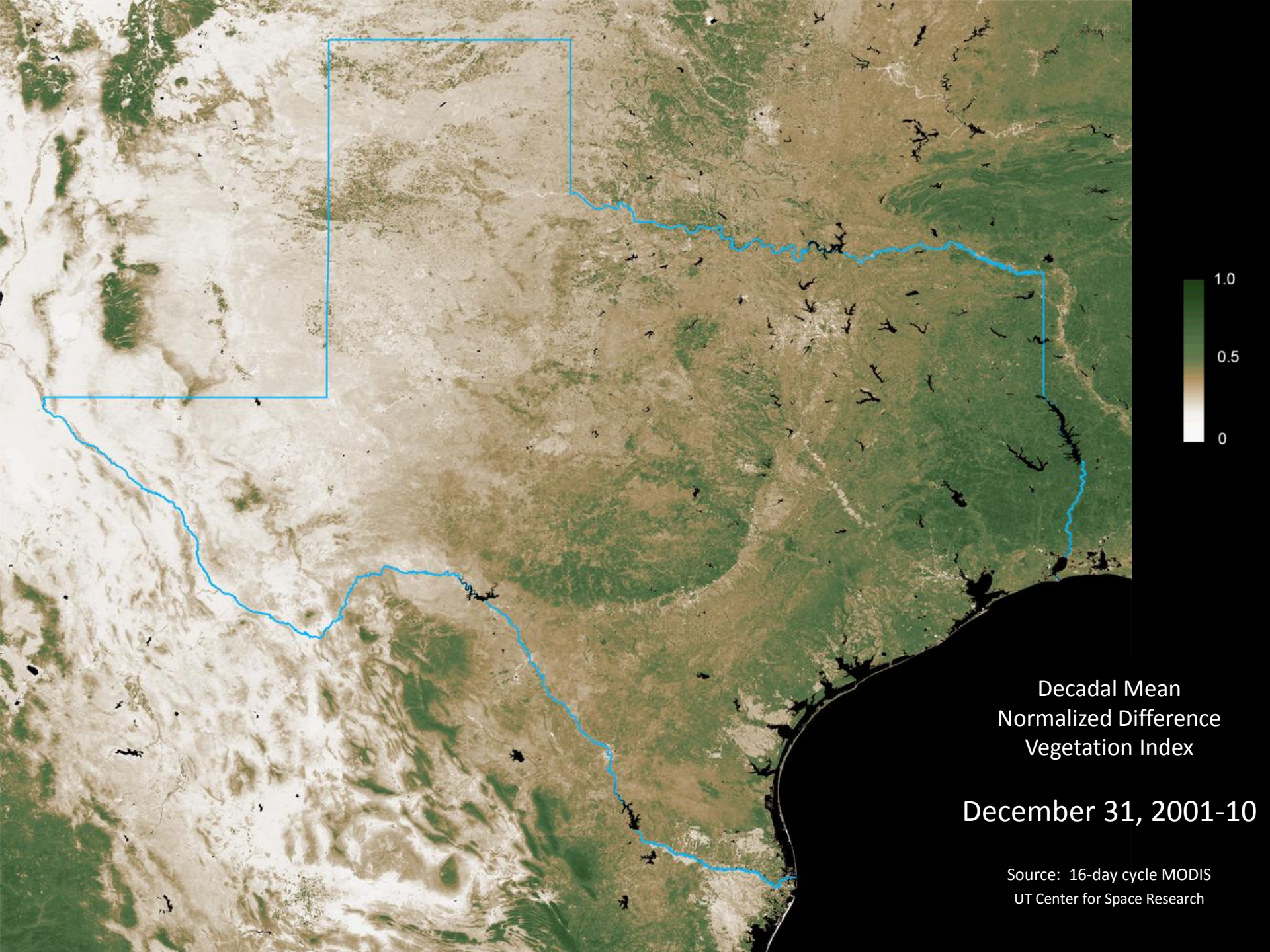
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

December 18, 2001-10

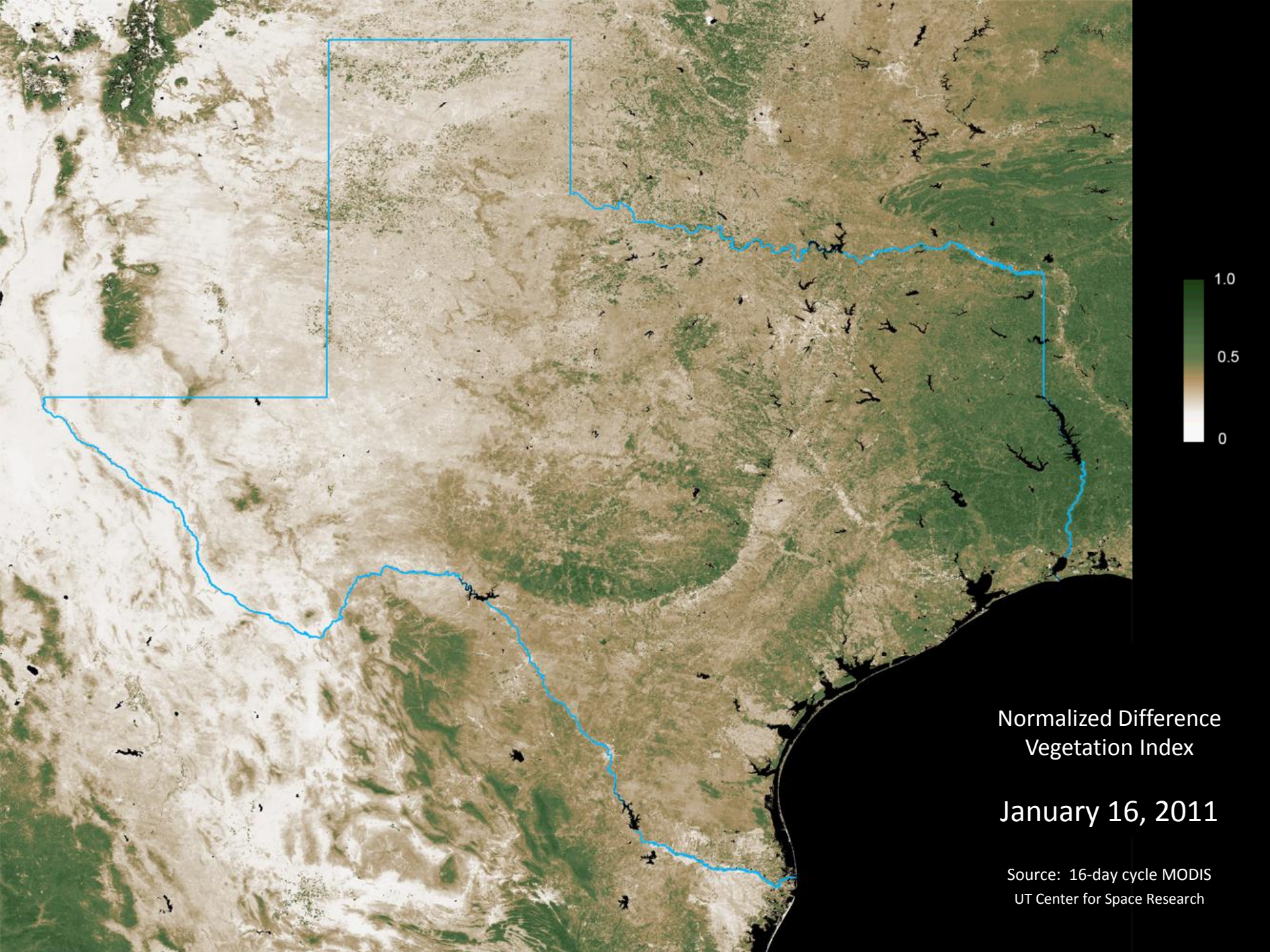
Source: 16-day cycle MODIS
UT Center for Space Research



Decadal Mean
Normalized Difference
Vegetation Index

December 31, 2001-10

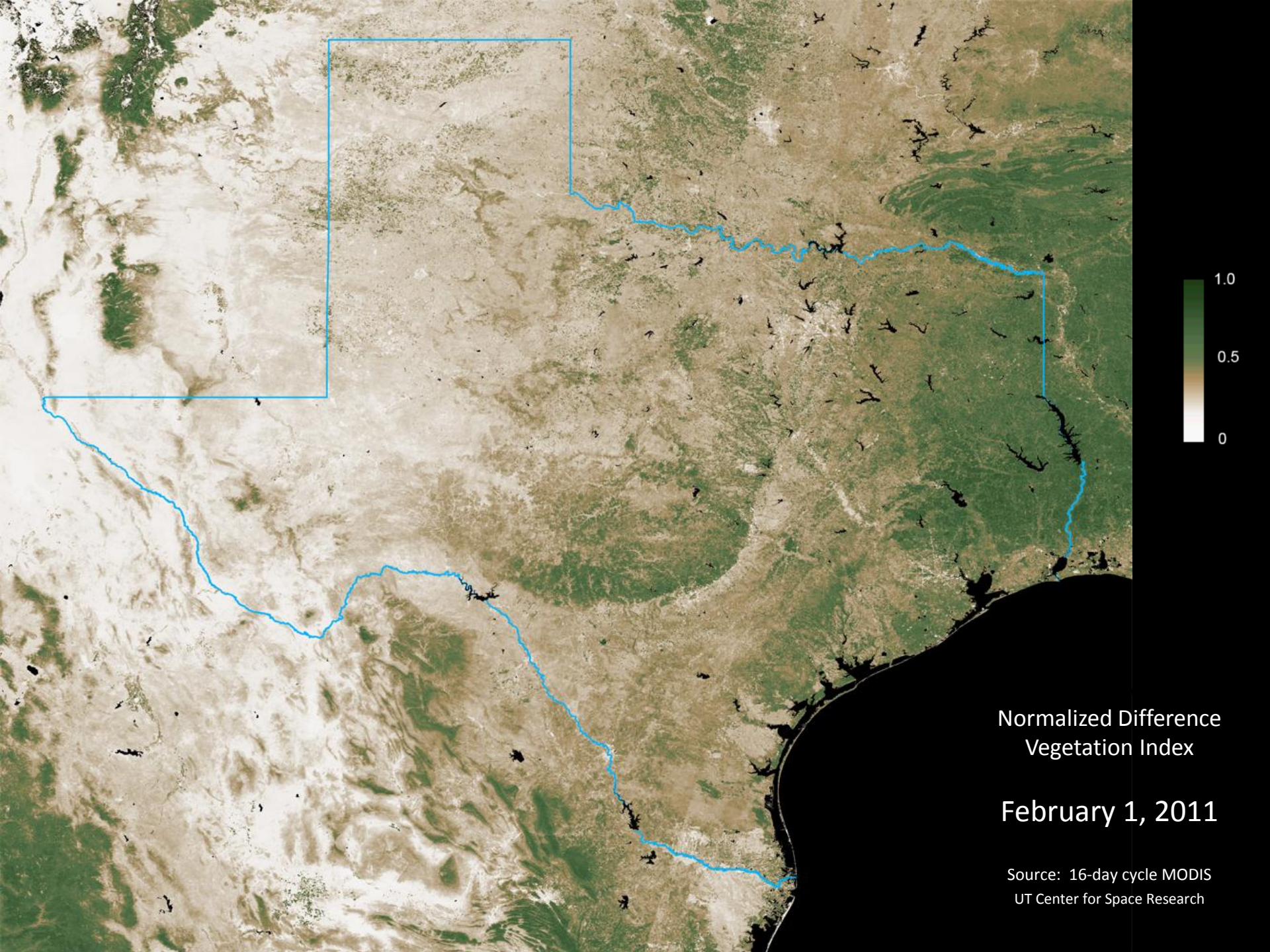
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

January 16, 2011

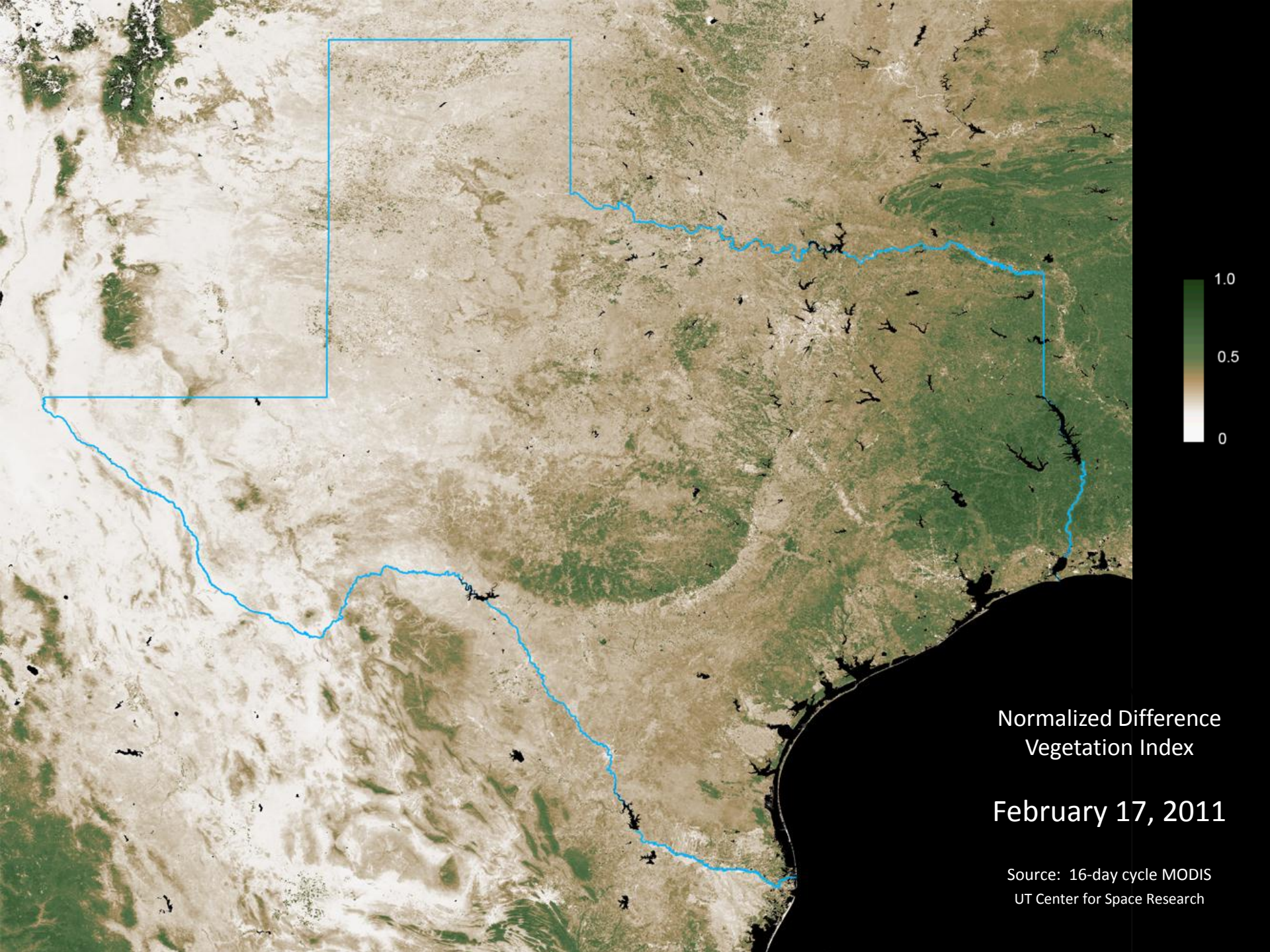
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

February 1, 2011

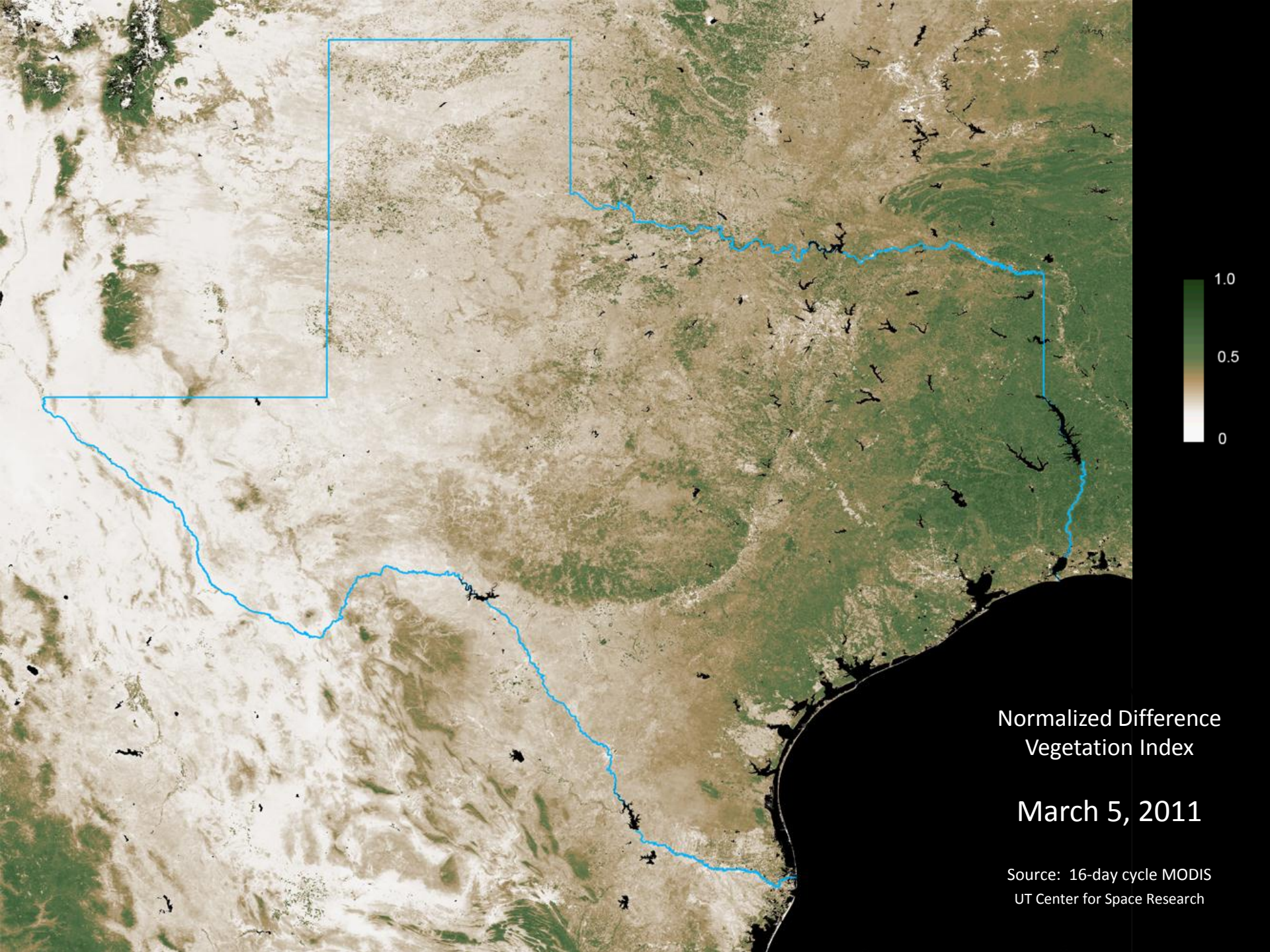
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

February 17, 2011

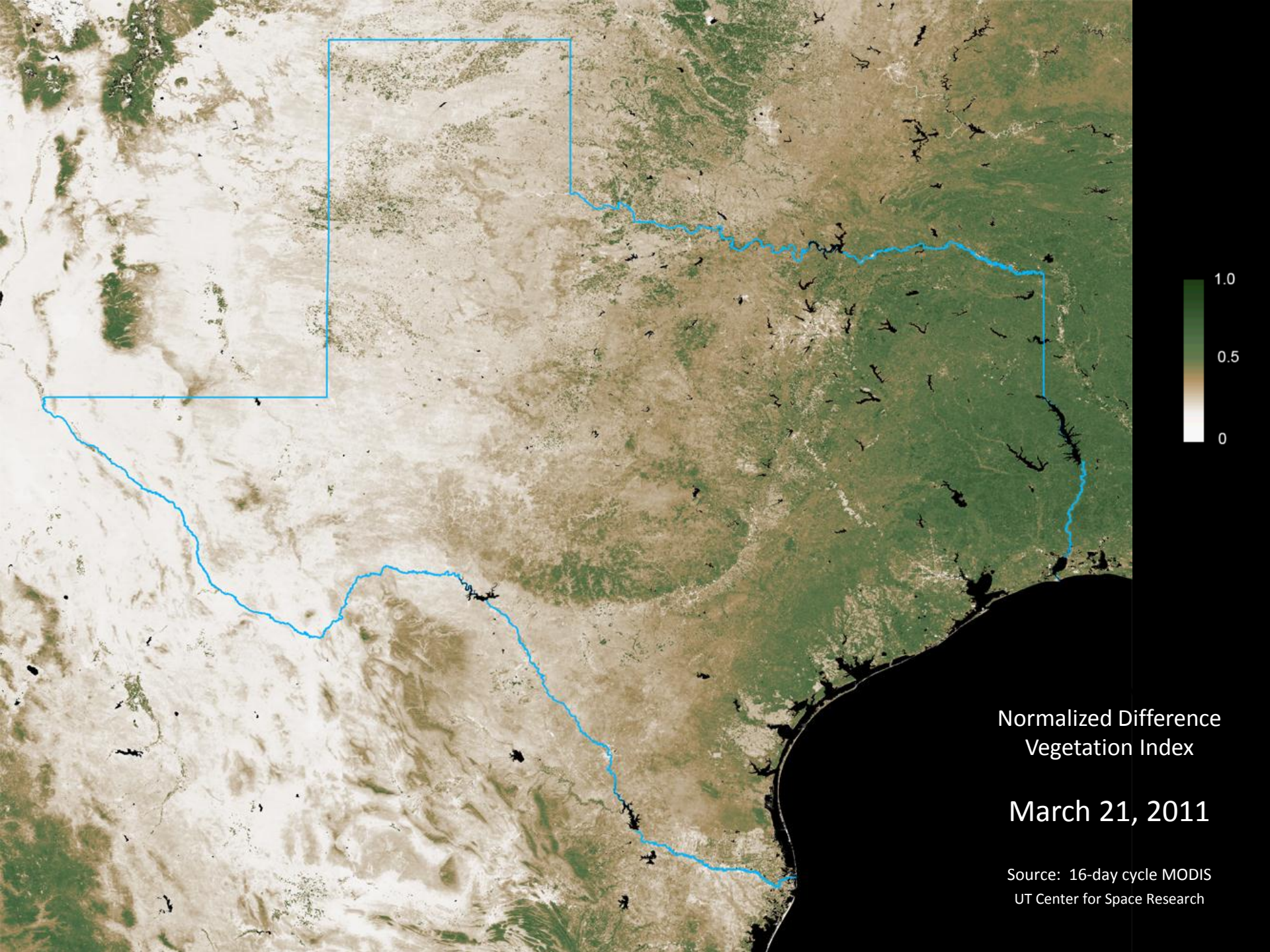
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

March 5, 2011

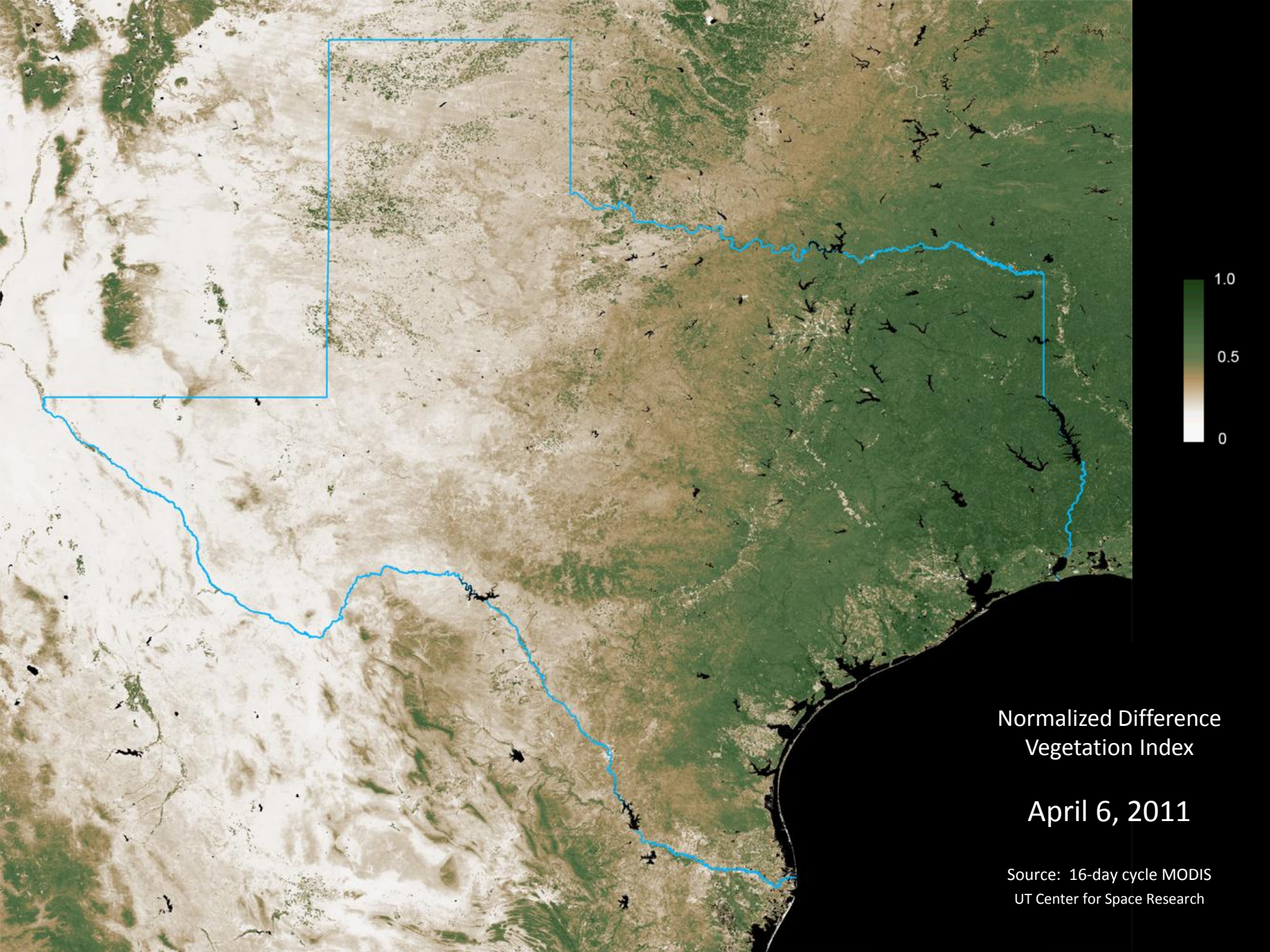
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

March 21, 2011

Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

April 6, 2011

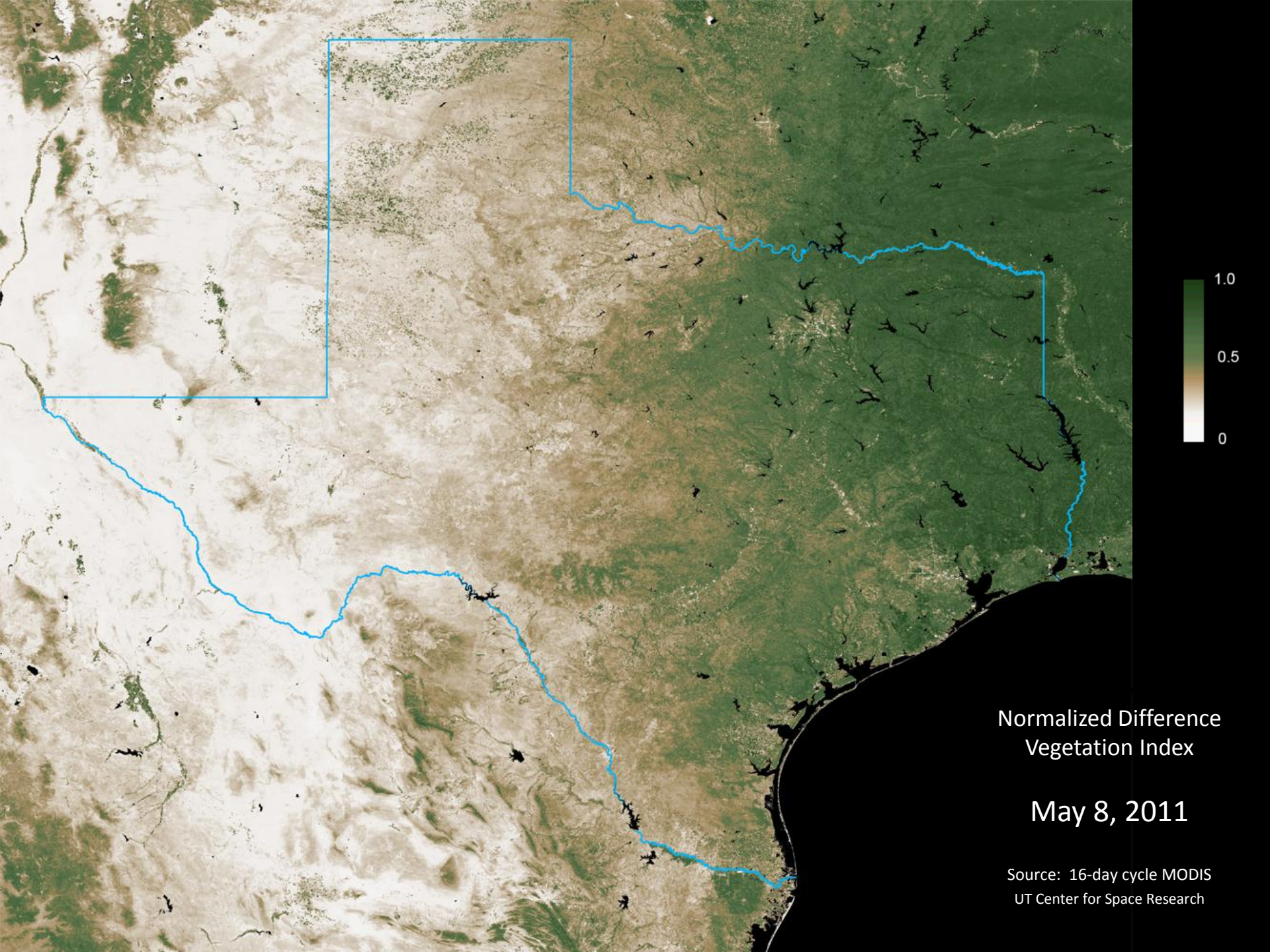
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

April 22, 2011

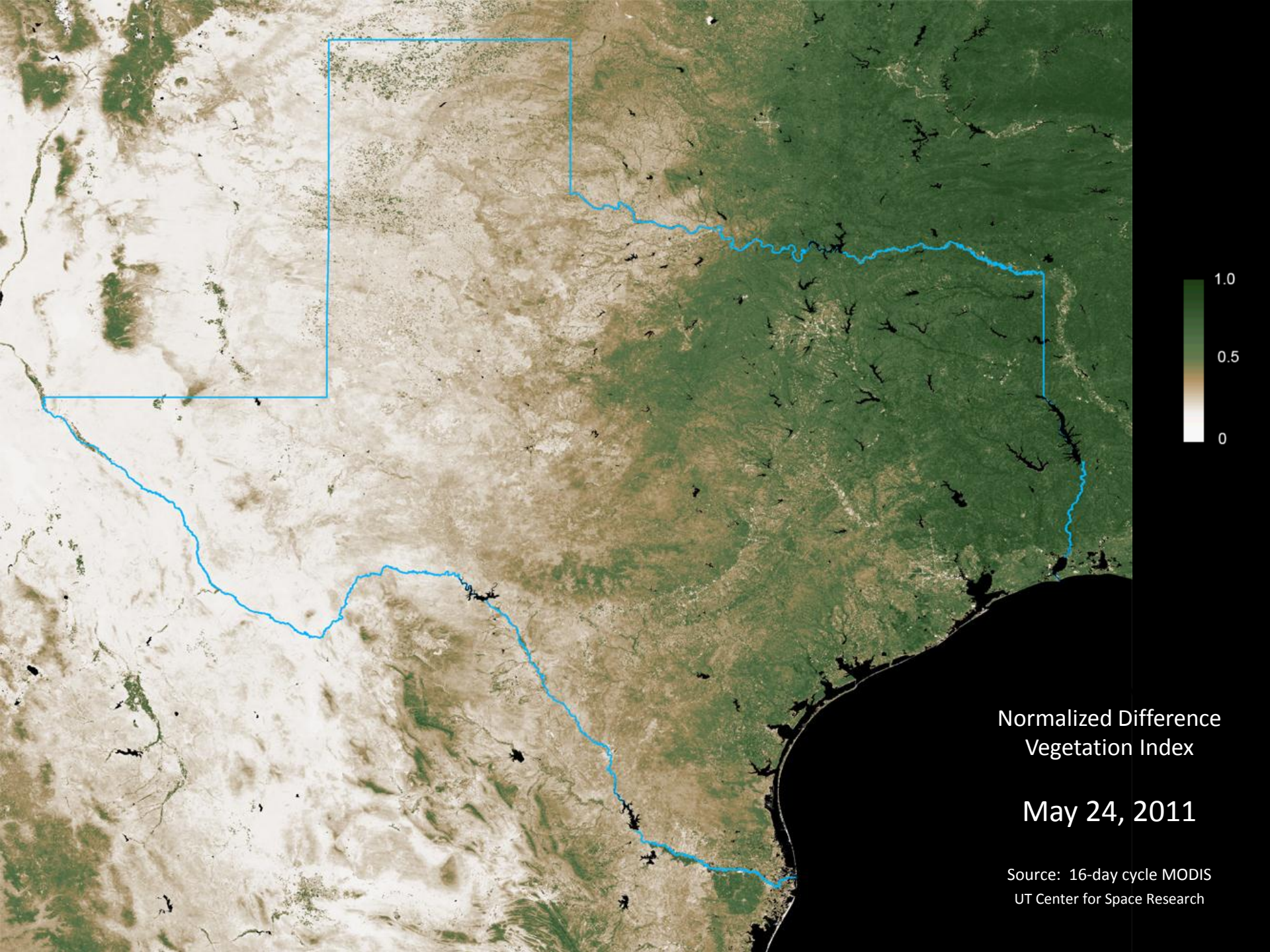
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

May 8, 2011

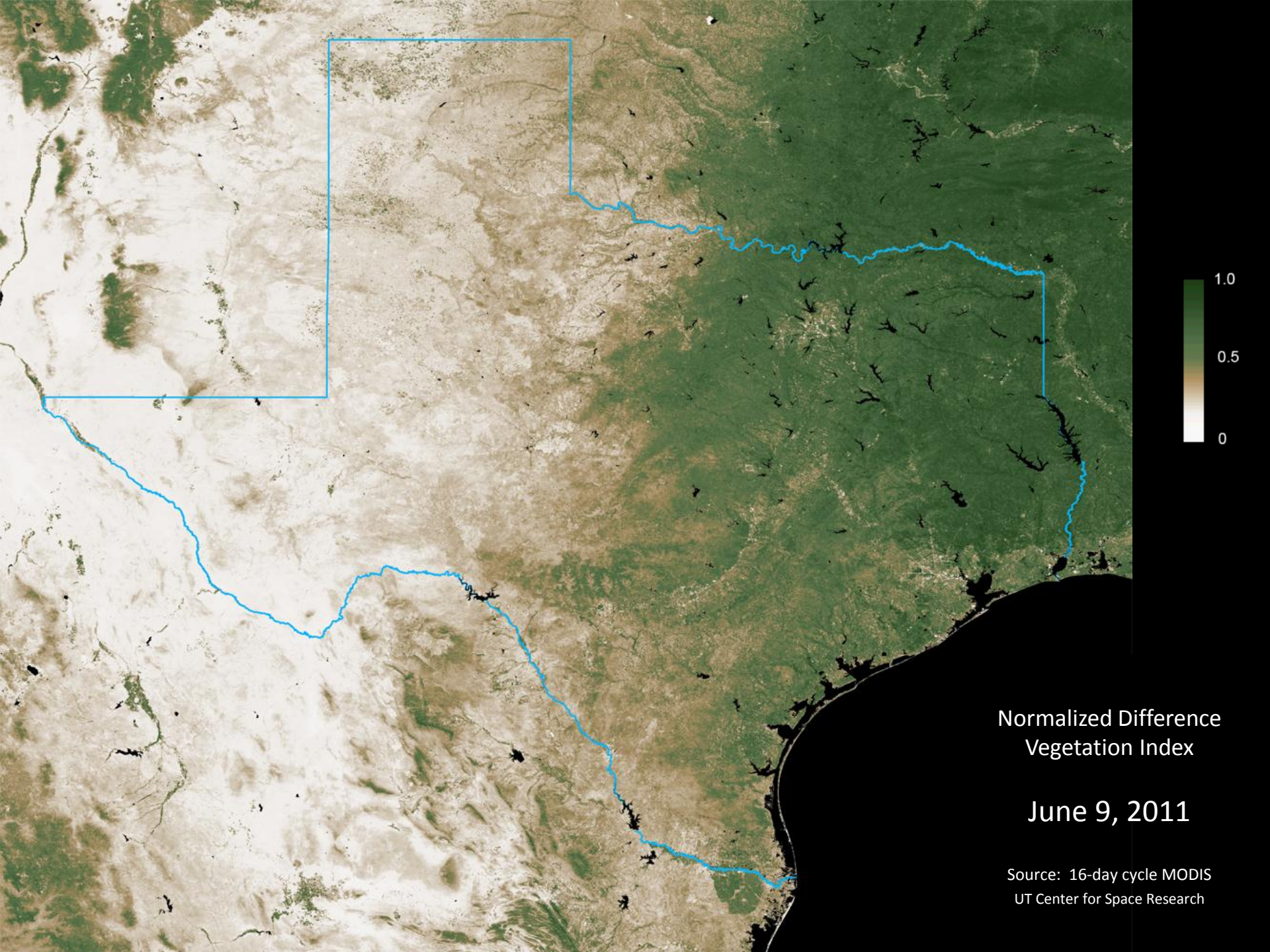
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

May 24, 2011

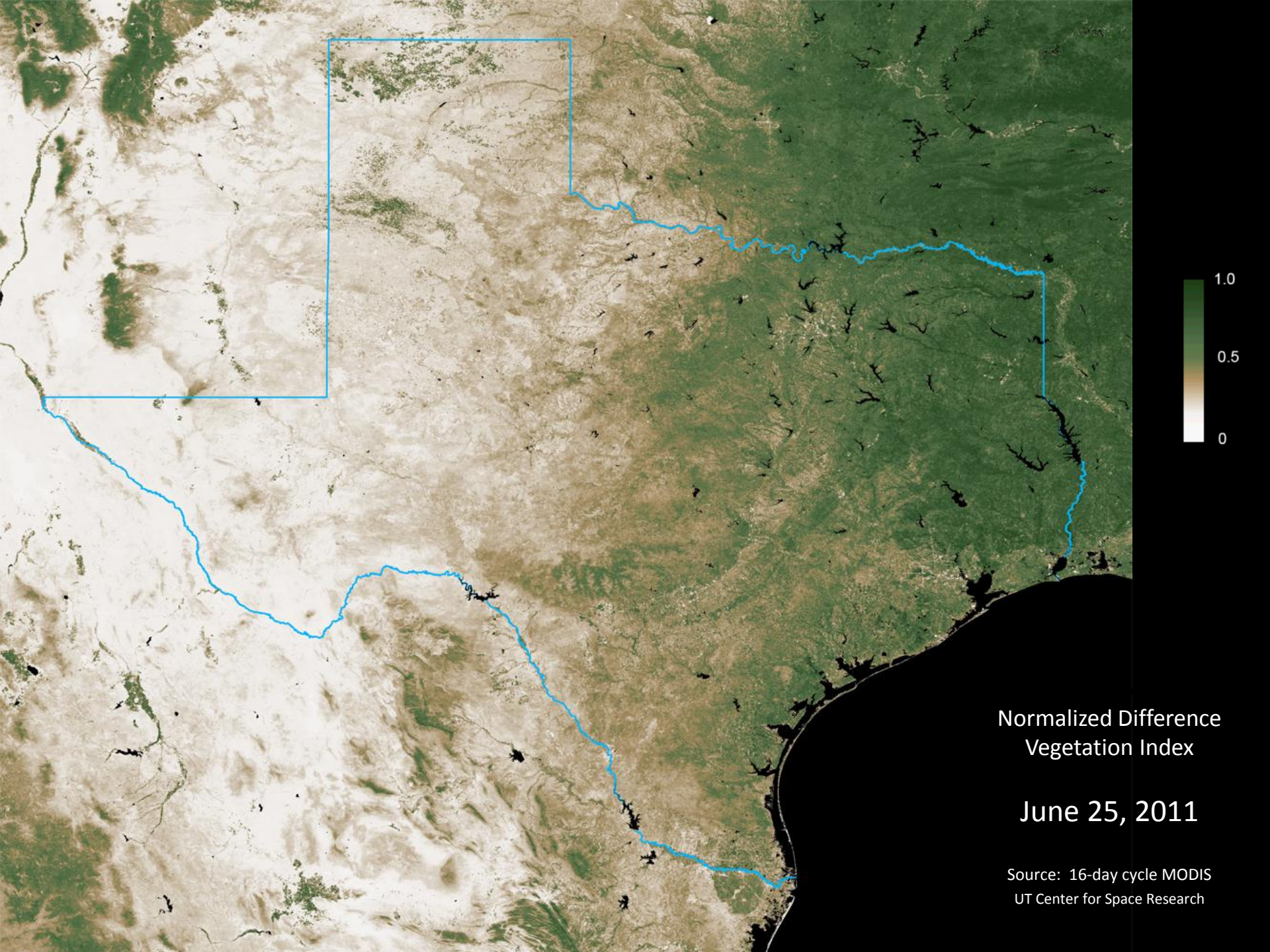
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

June 9, 2011

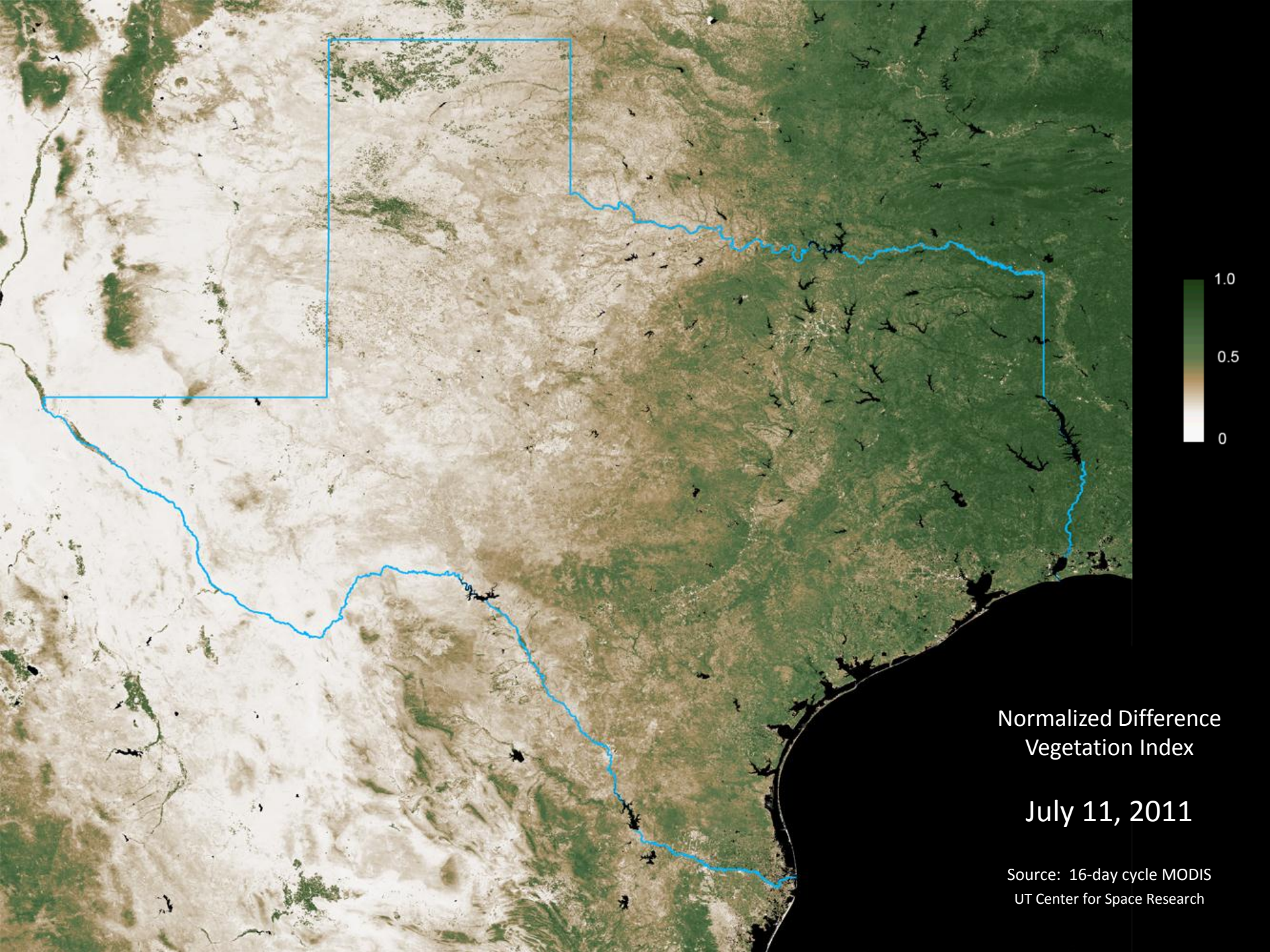
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

June 25, 2011

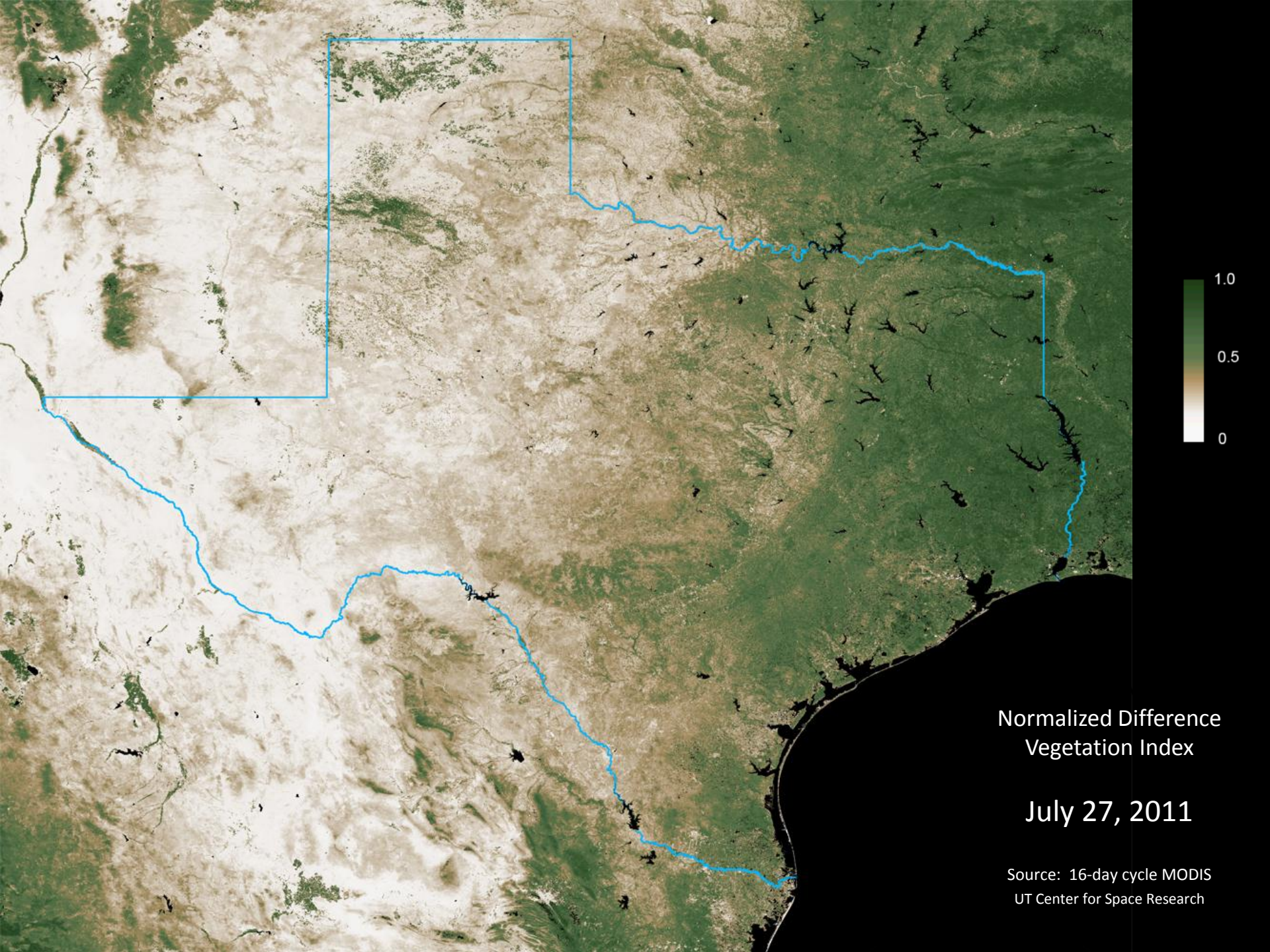
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

July 11, 2011

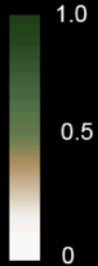
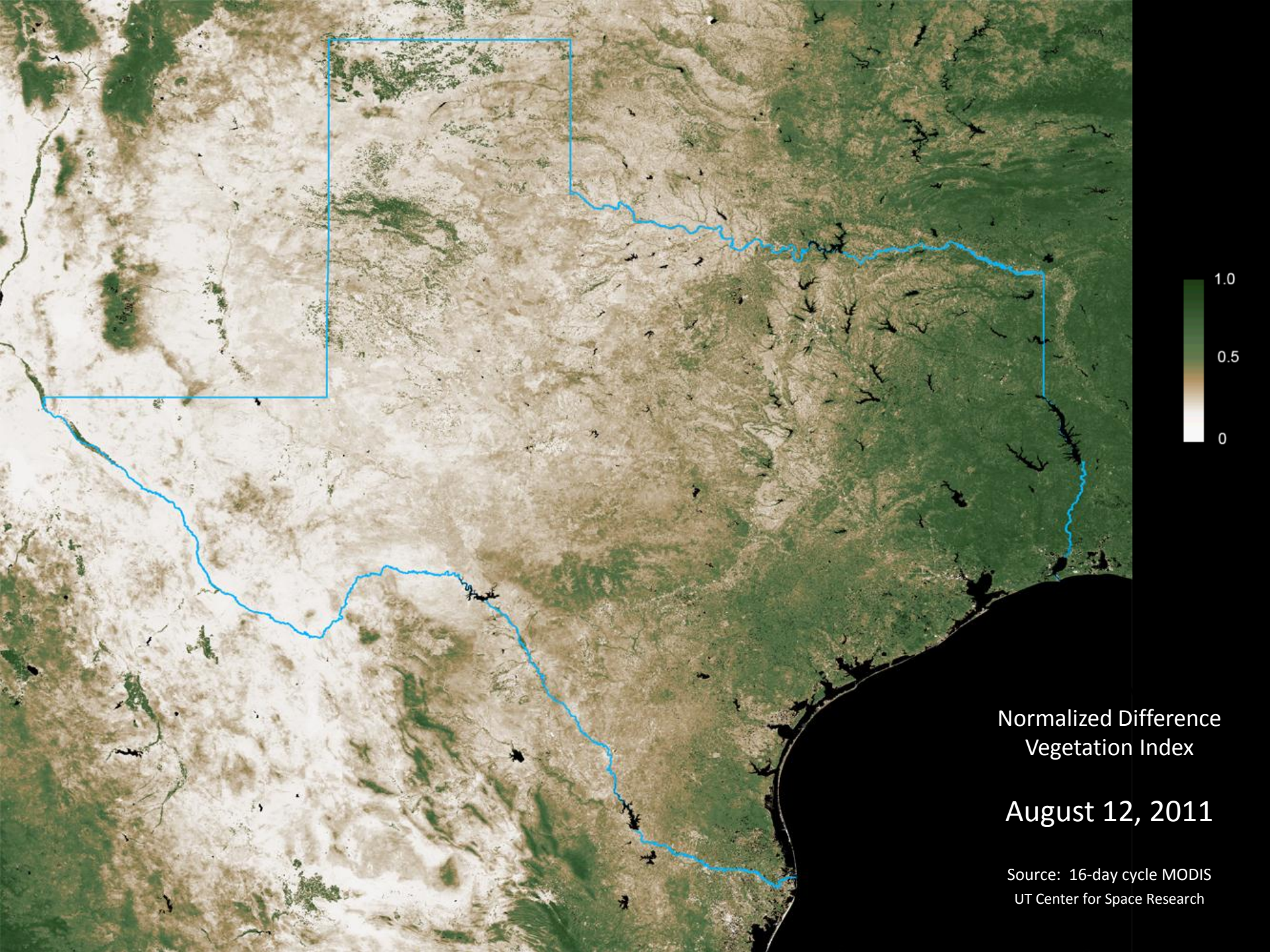
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

July 27, 2011

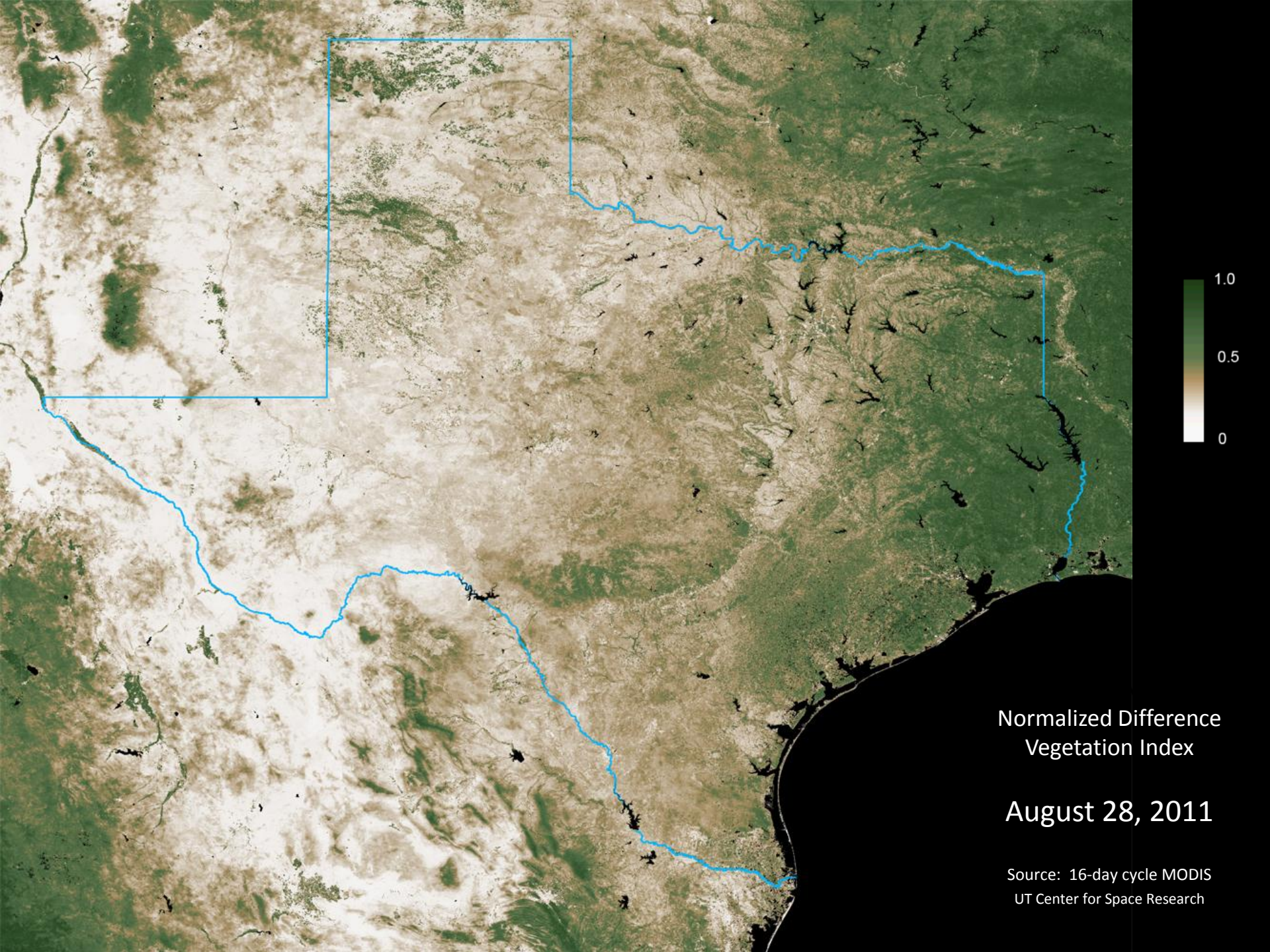
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

August 12, 2011

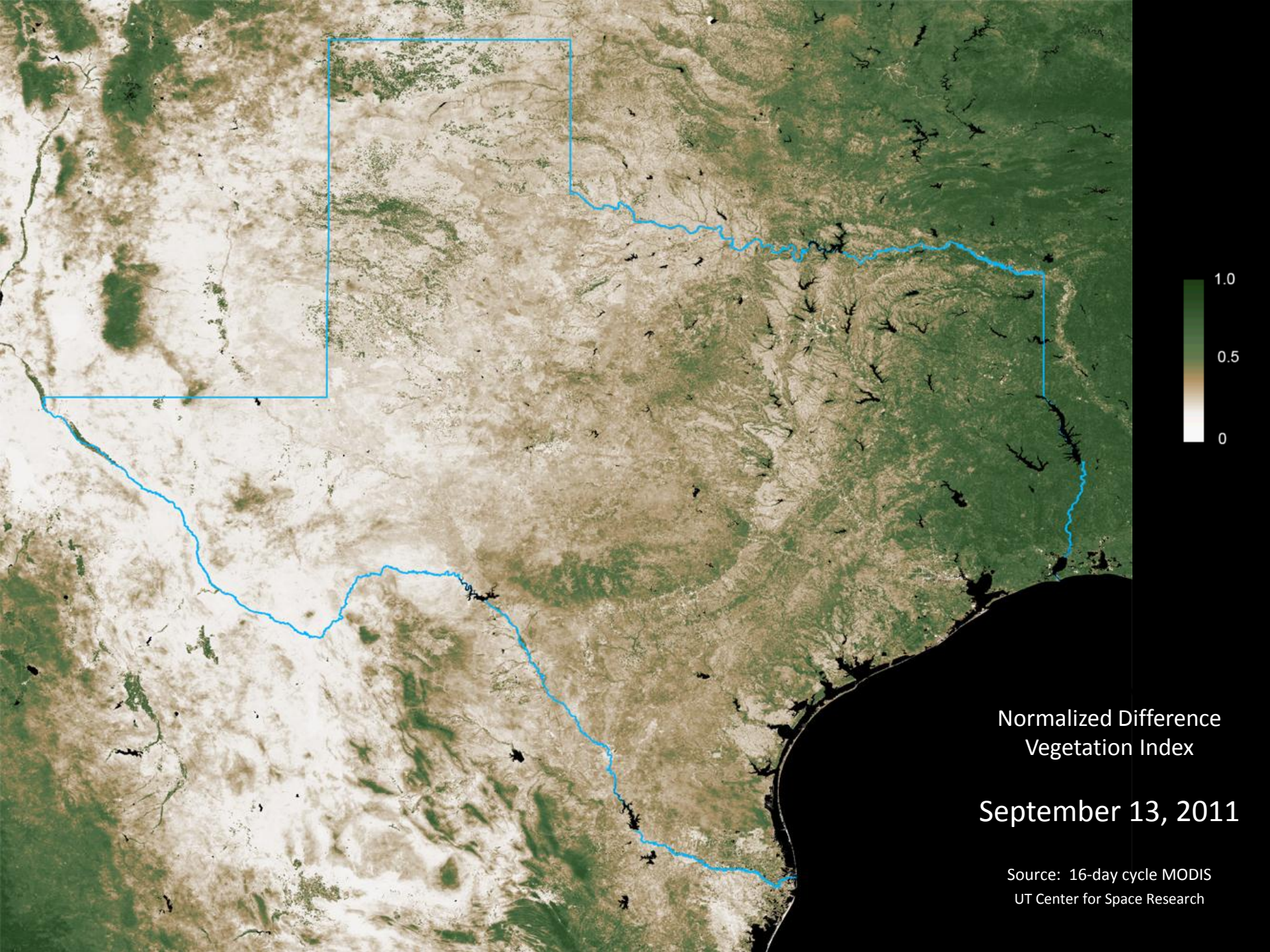
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

August 28, 2011

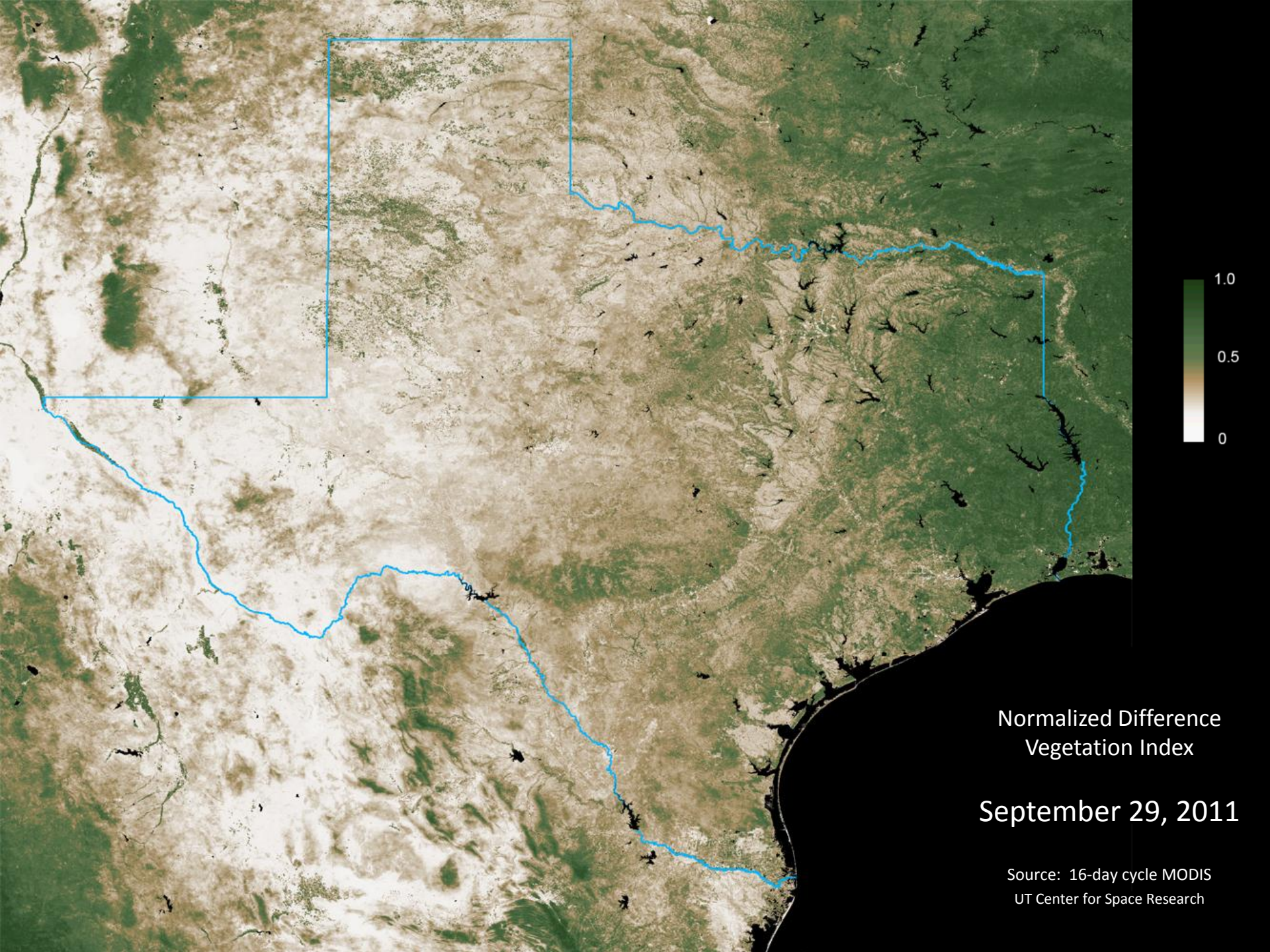
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

September 13, 2011

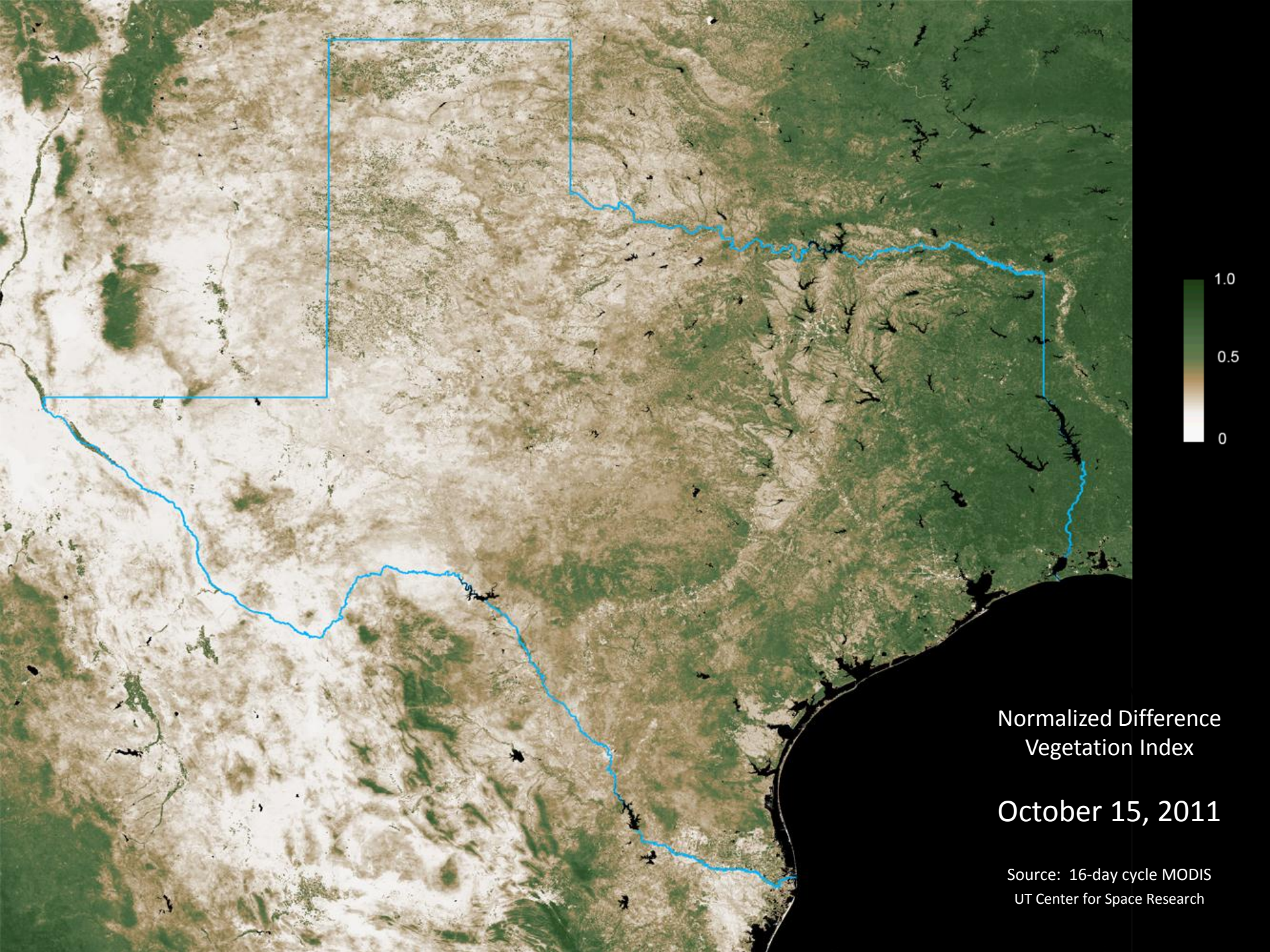
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

September 29, 2011

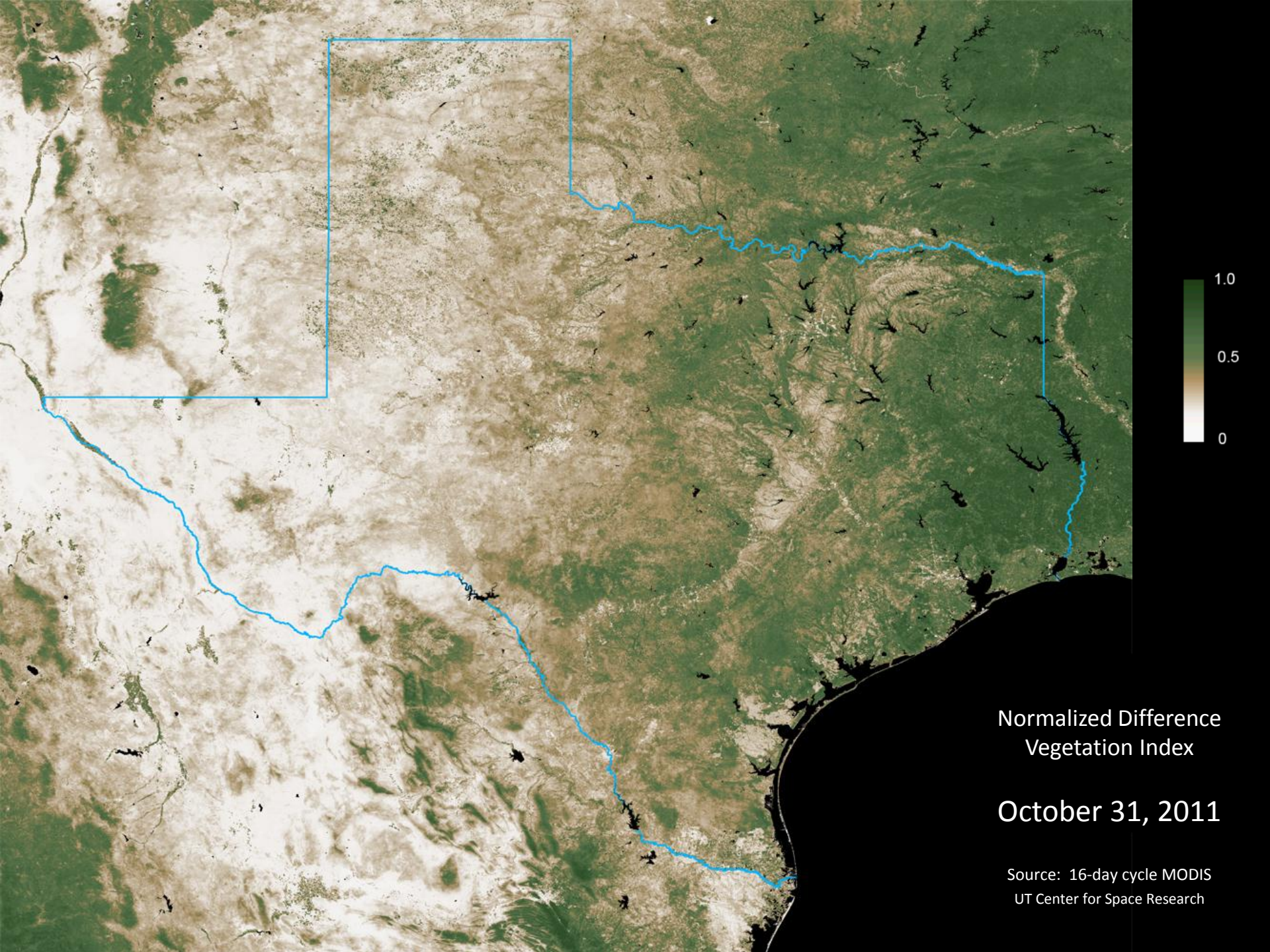
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

October 15, 2011

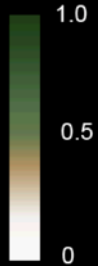
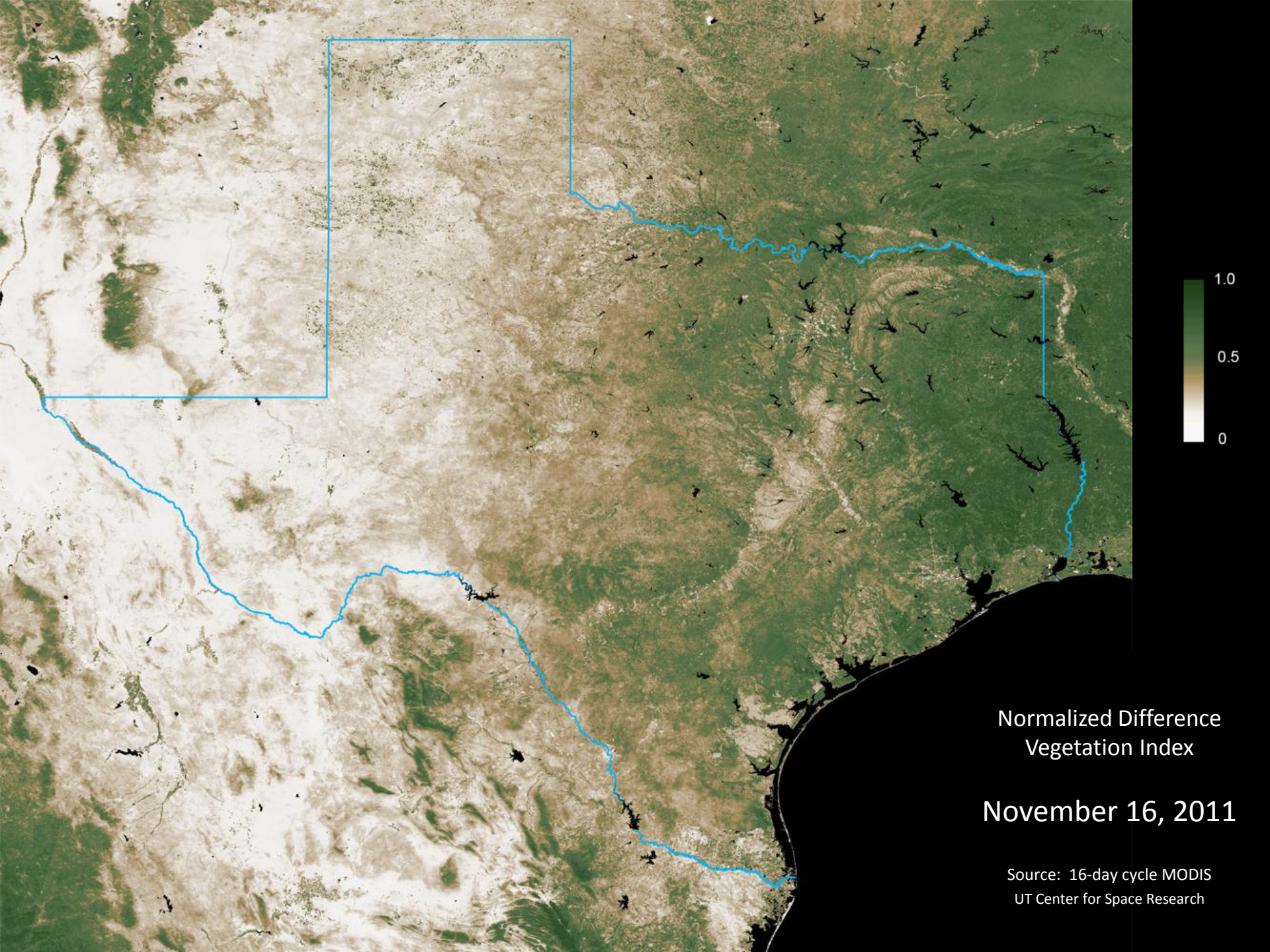
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

October 31, 2011

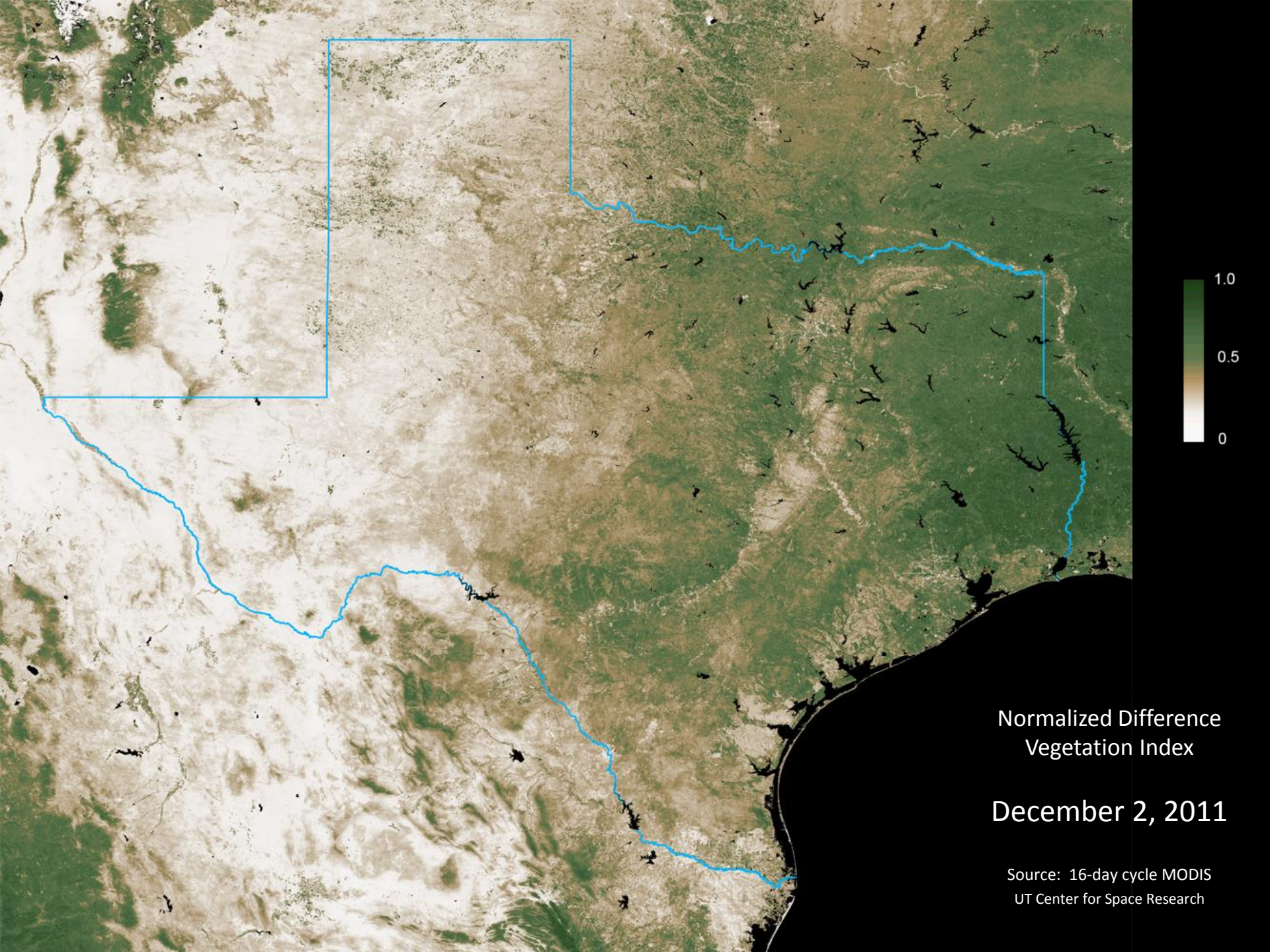
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

November 16, 2011

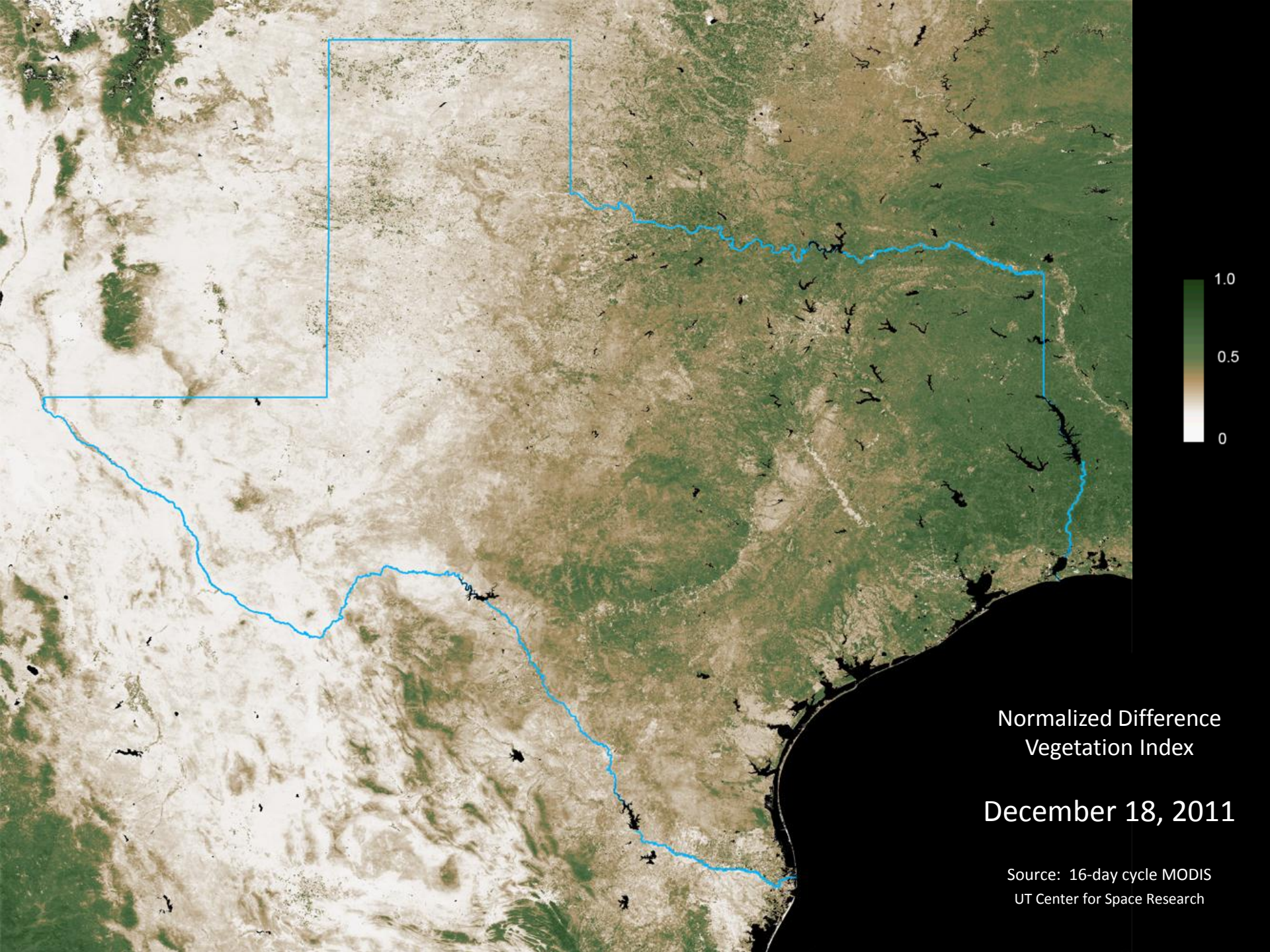
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

December 2, 2011

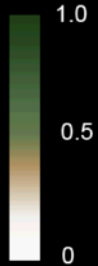
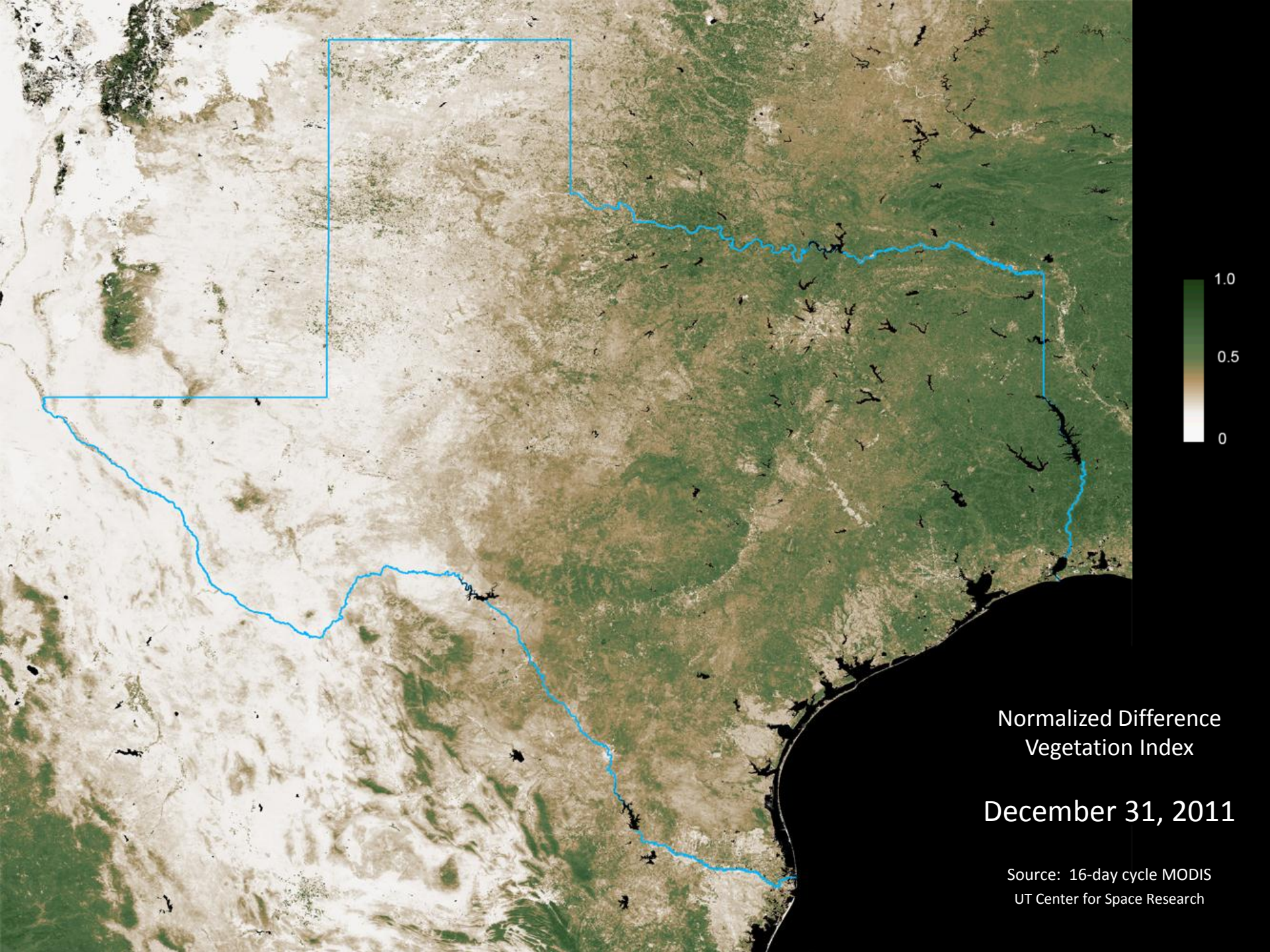
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

December 18, 2011

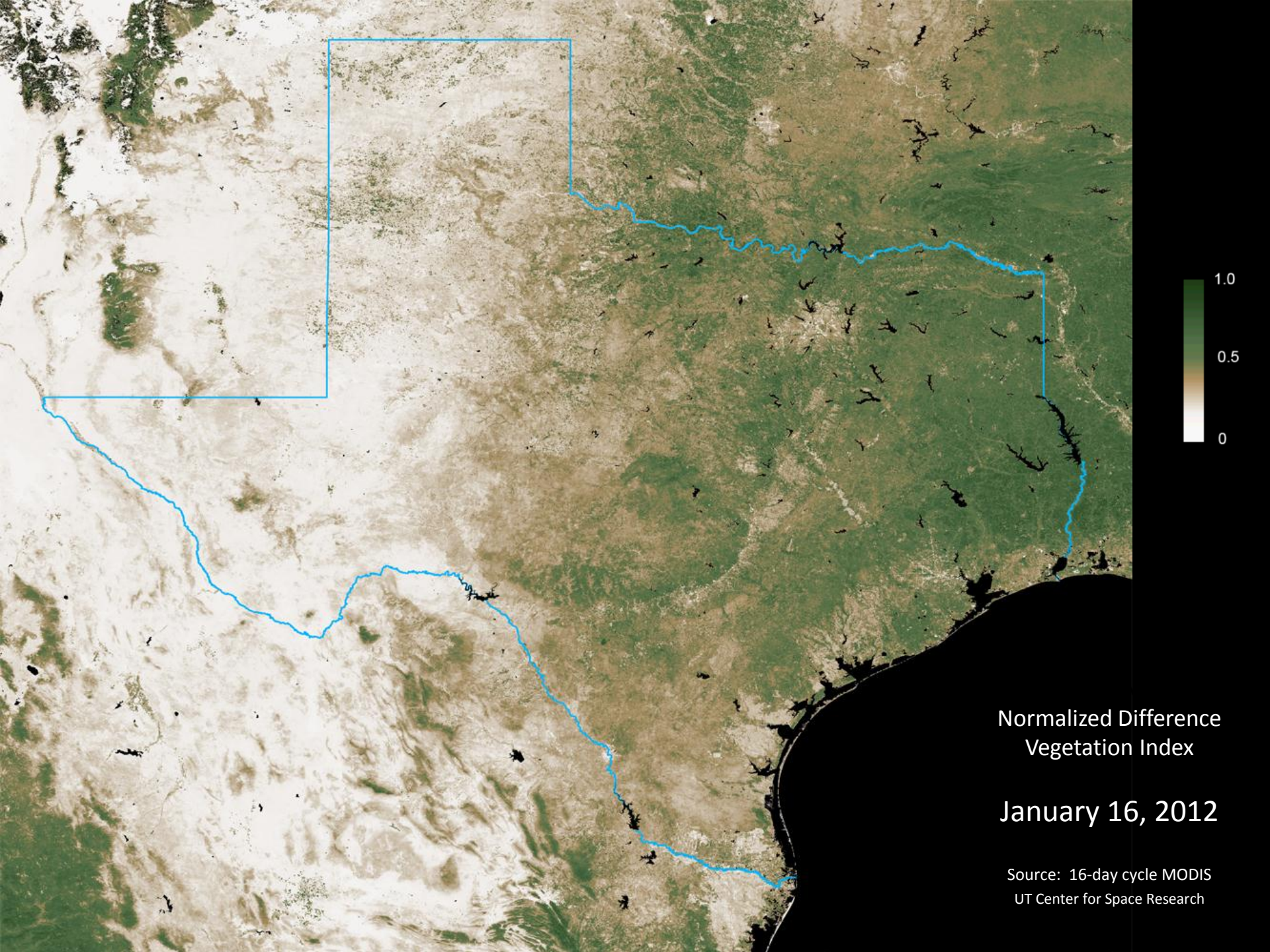
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

December 31, 2011

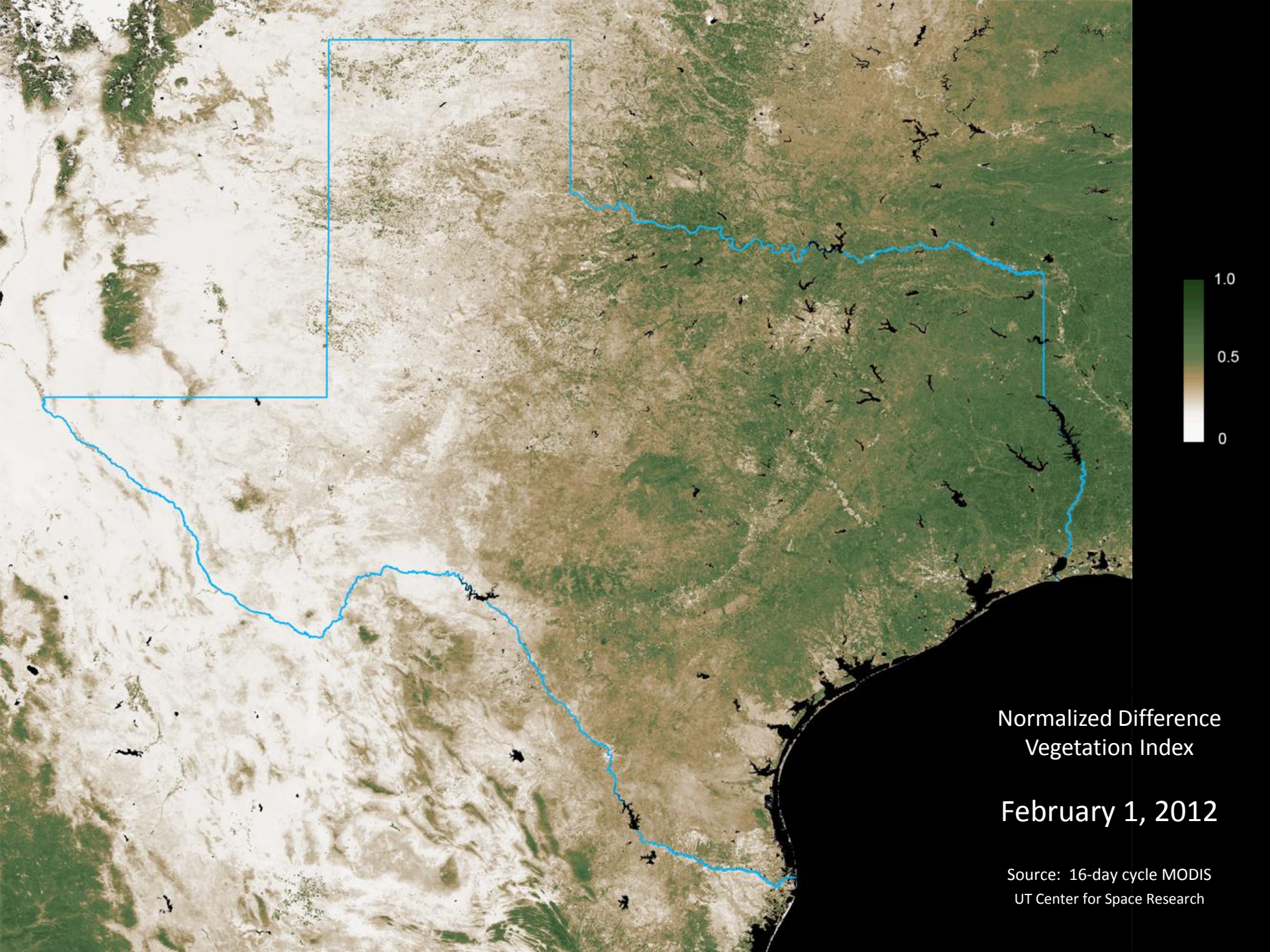
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

January 16, 2012

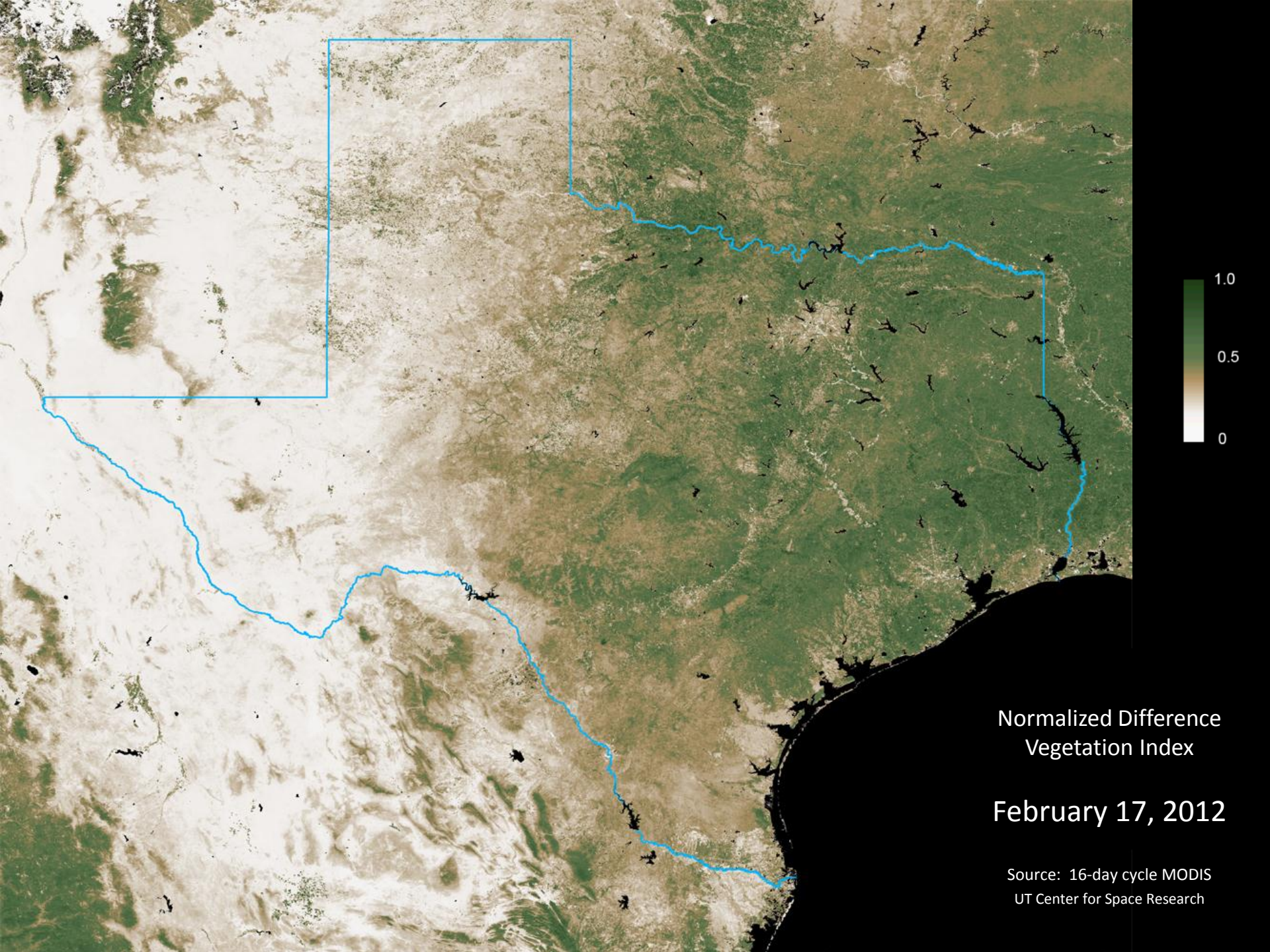
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

February 1, 2012

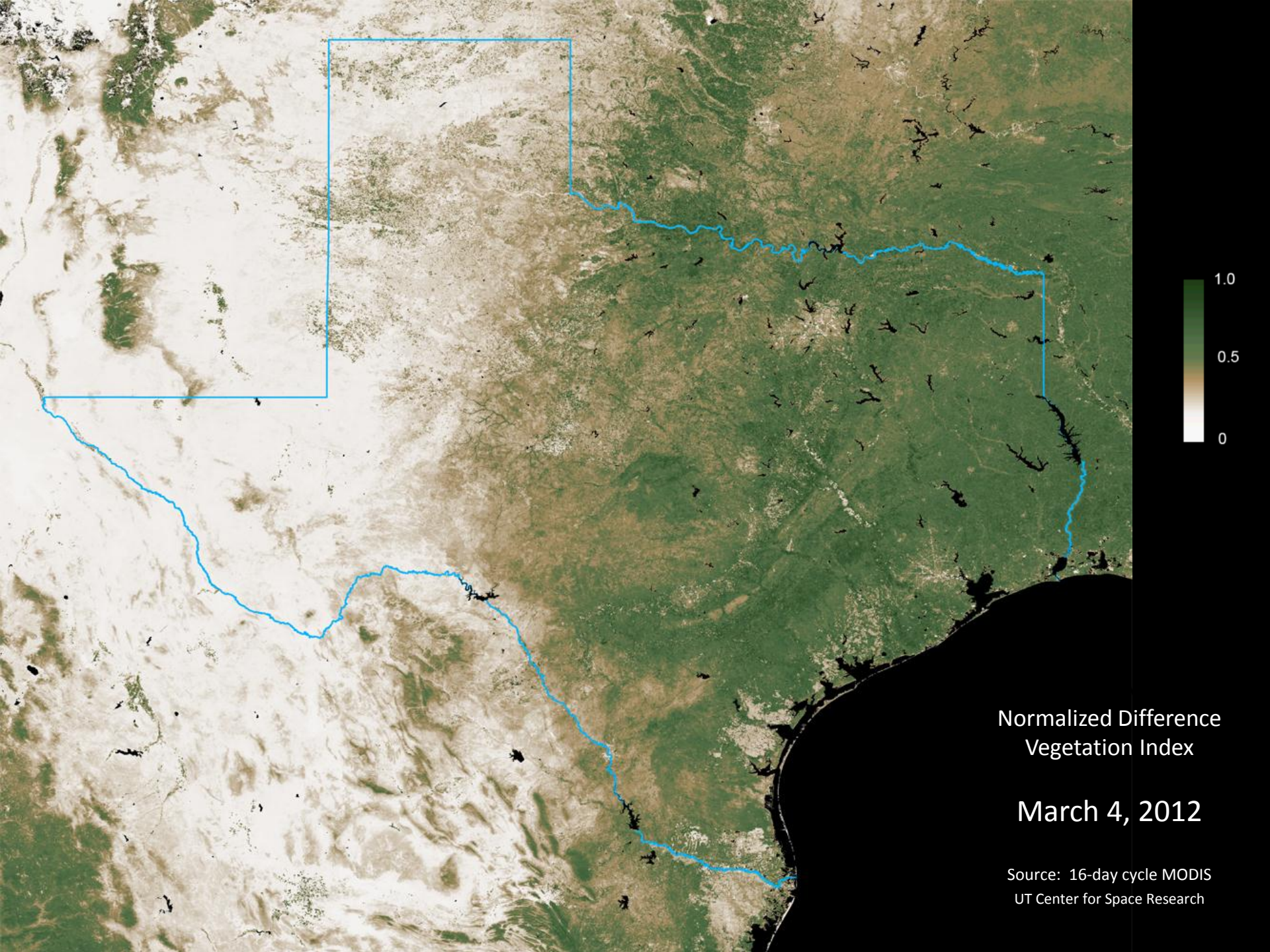
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

February 17, 2012

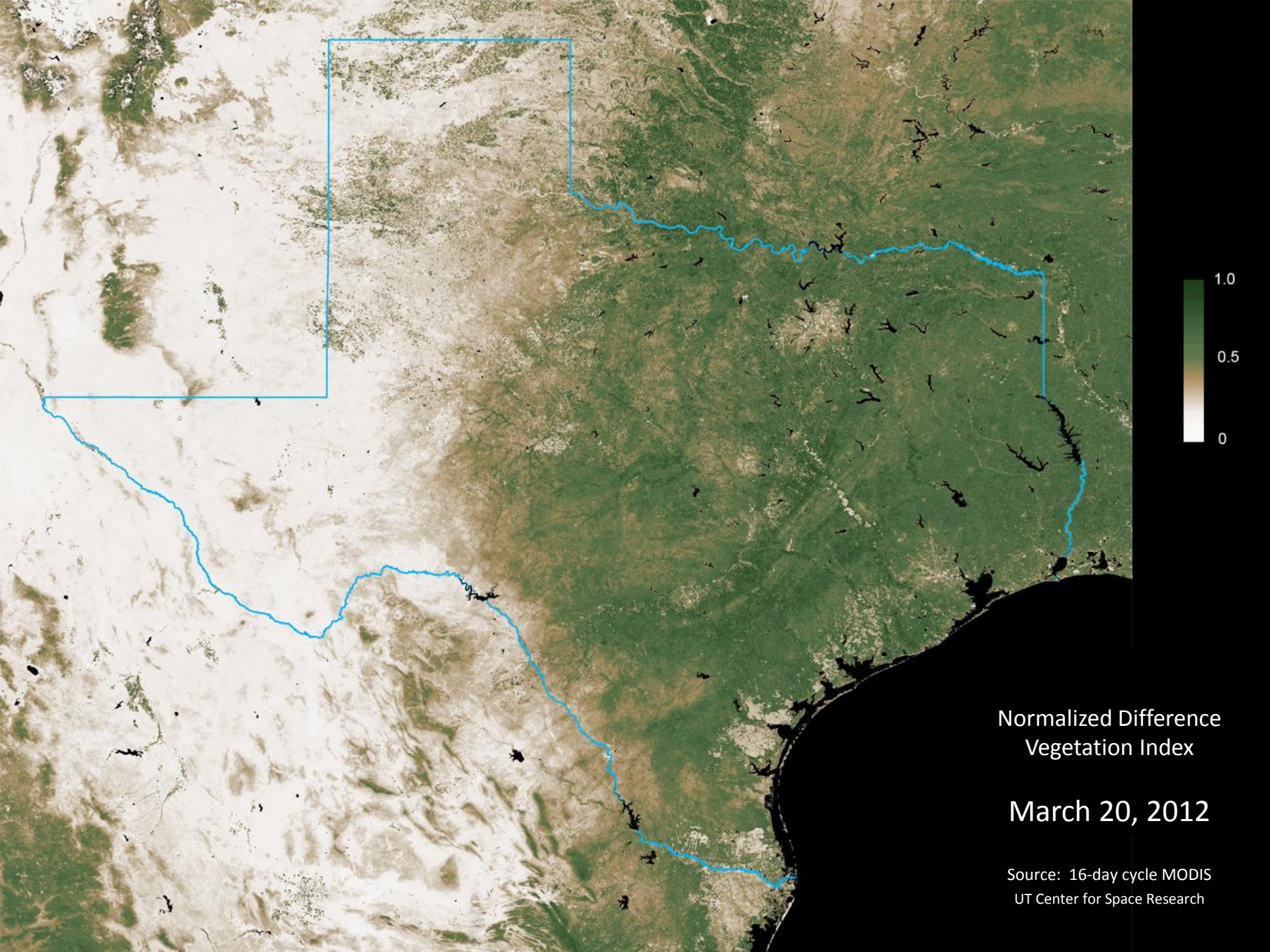
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

March 4, 2012

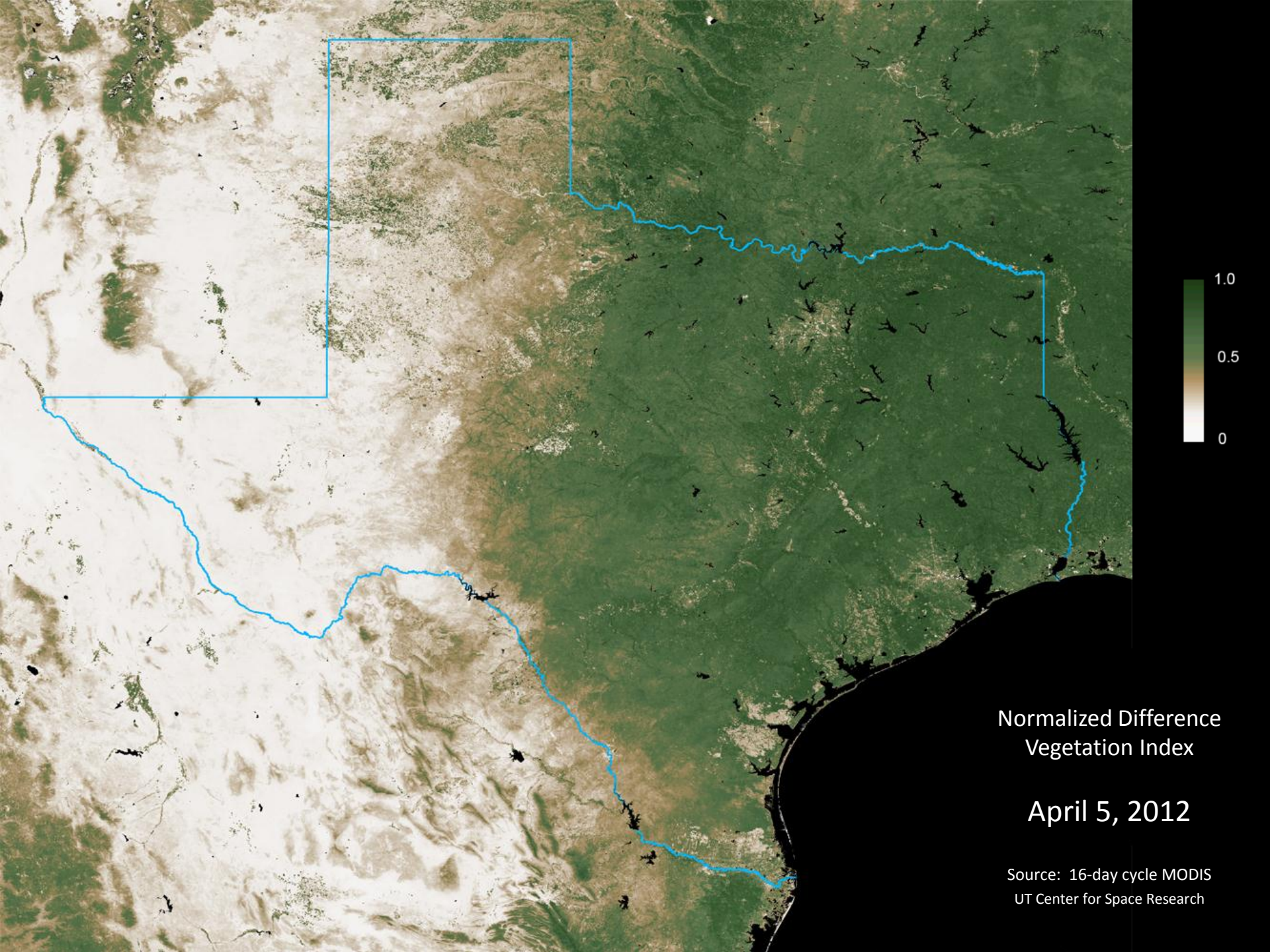
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

March 20, 2012

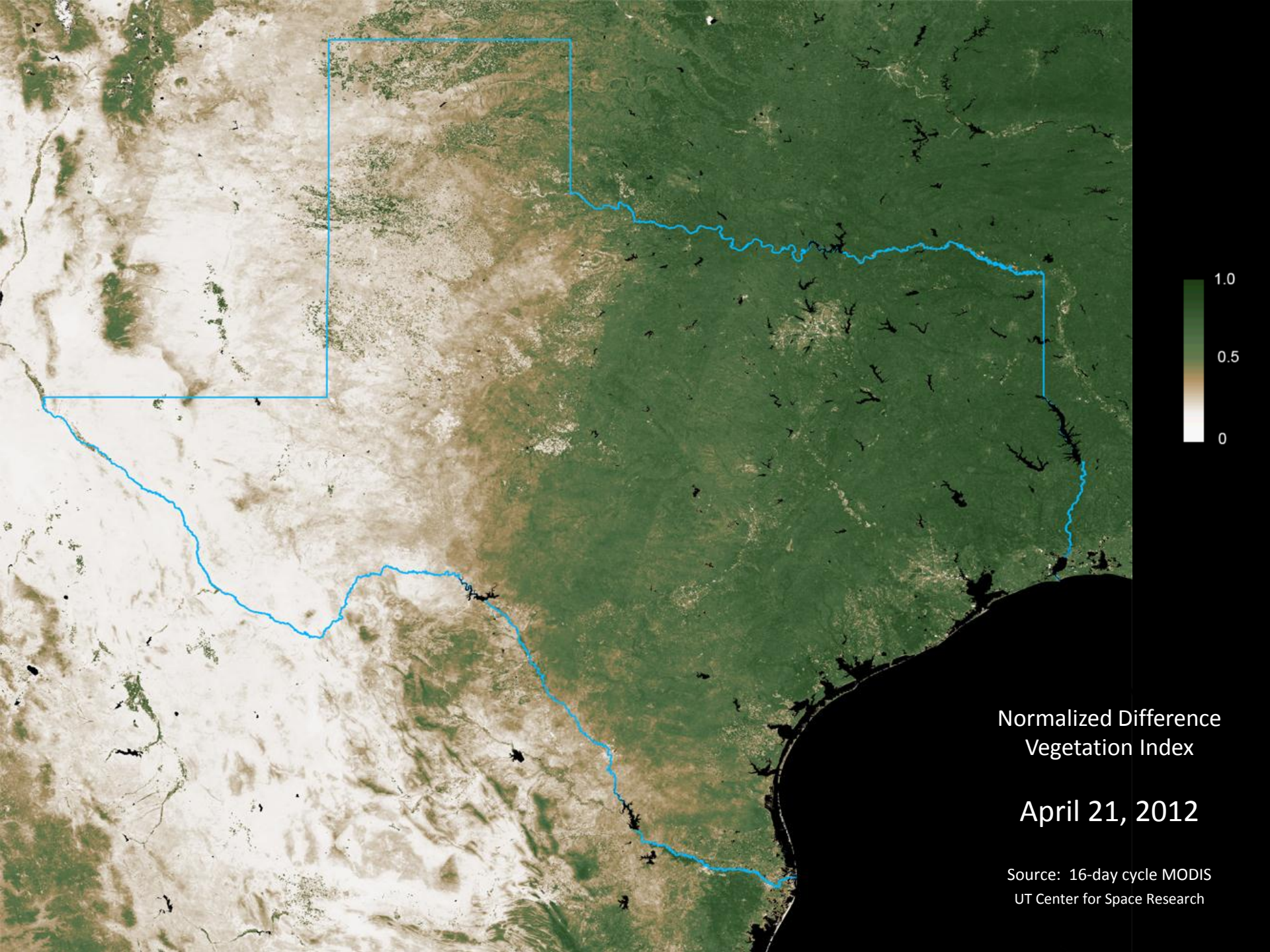
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

April 5, 2012

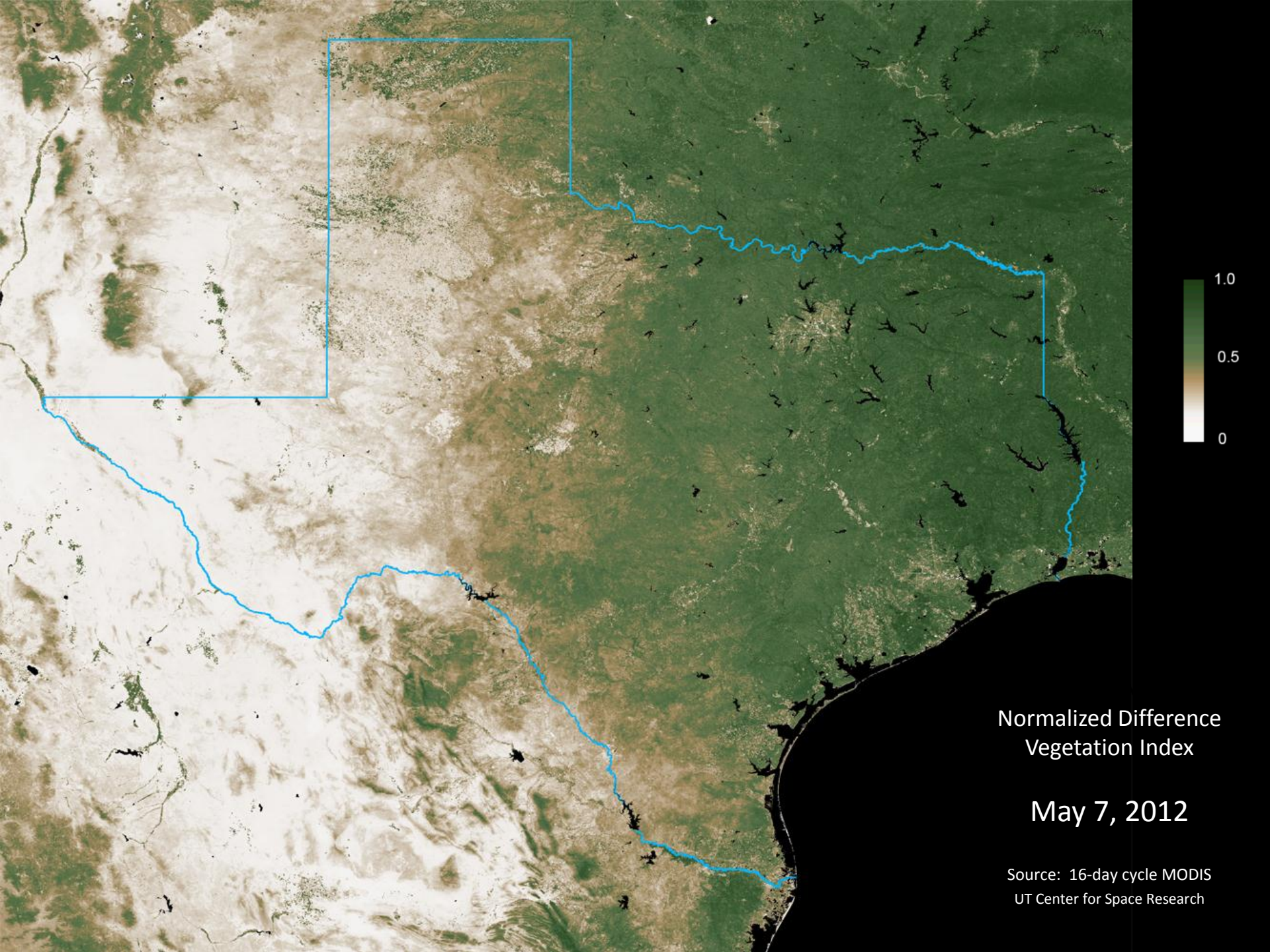
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

April 21, 2012

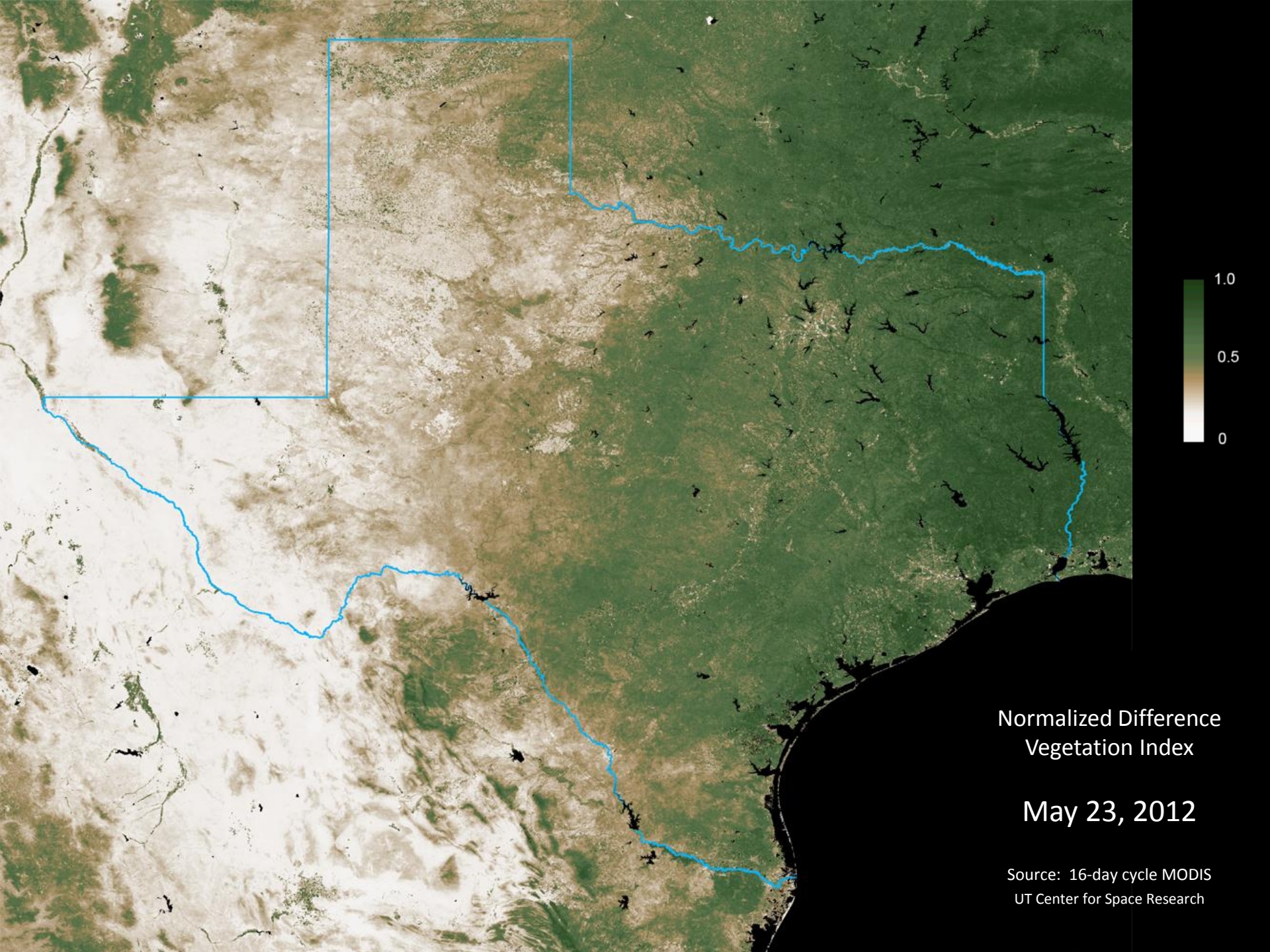
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

May 7, 2012

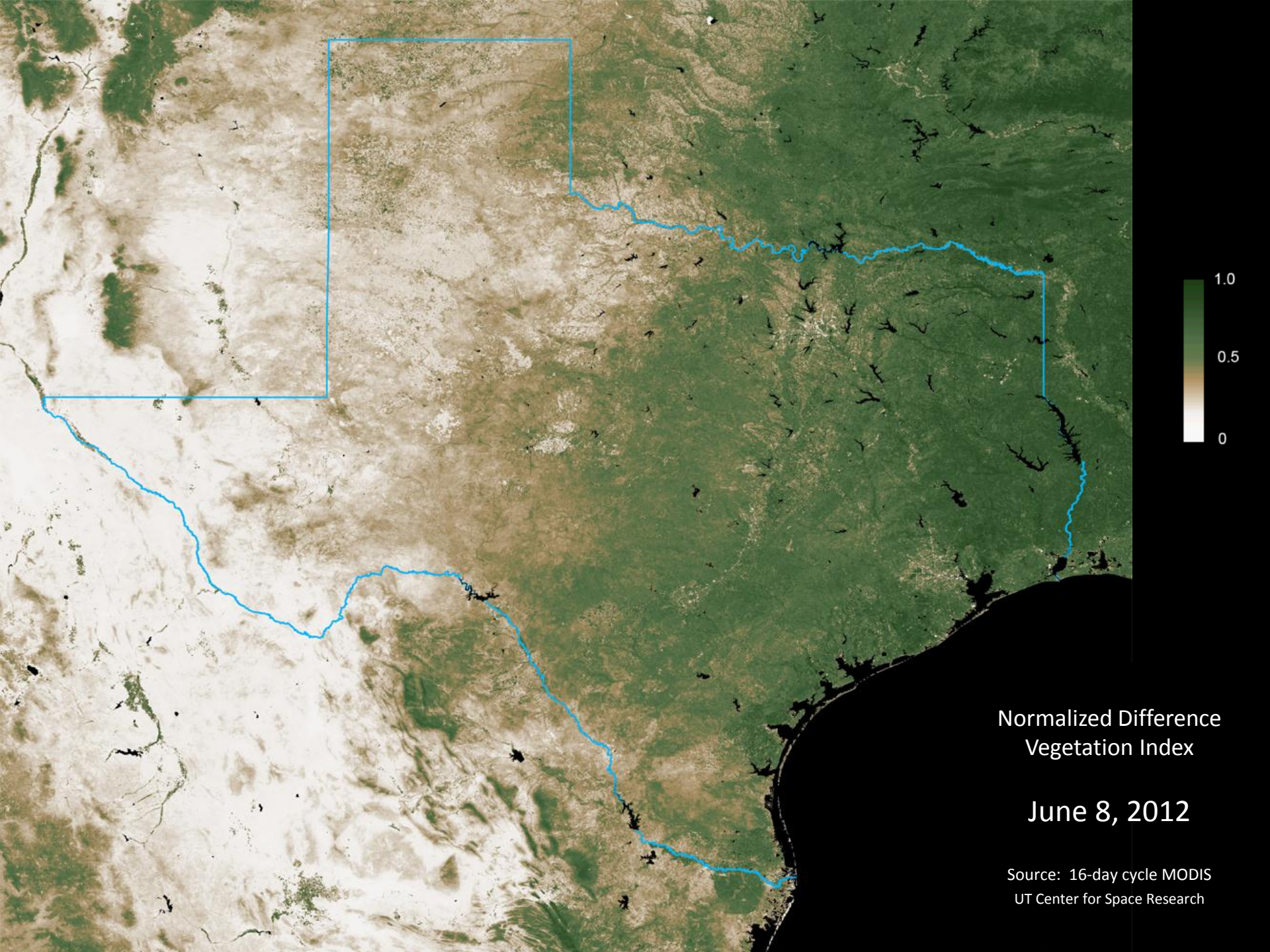
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

May 23, 2012

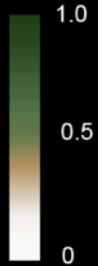
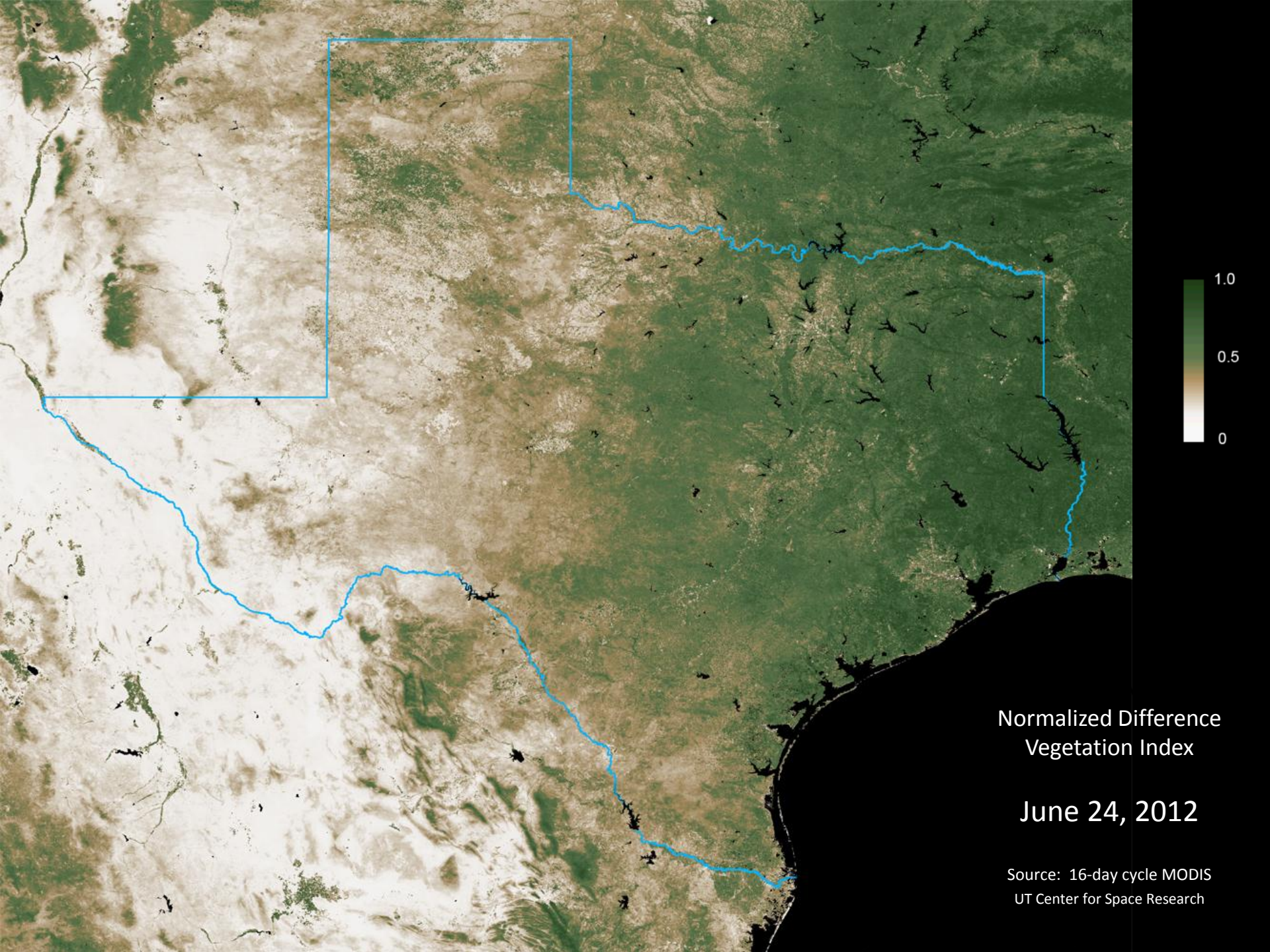
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

June 8, 2012

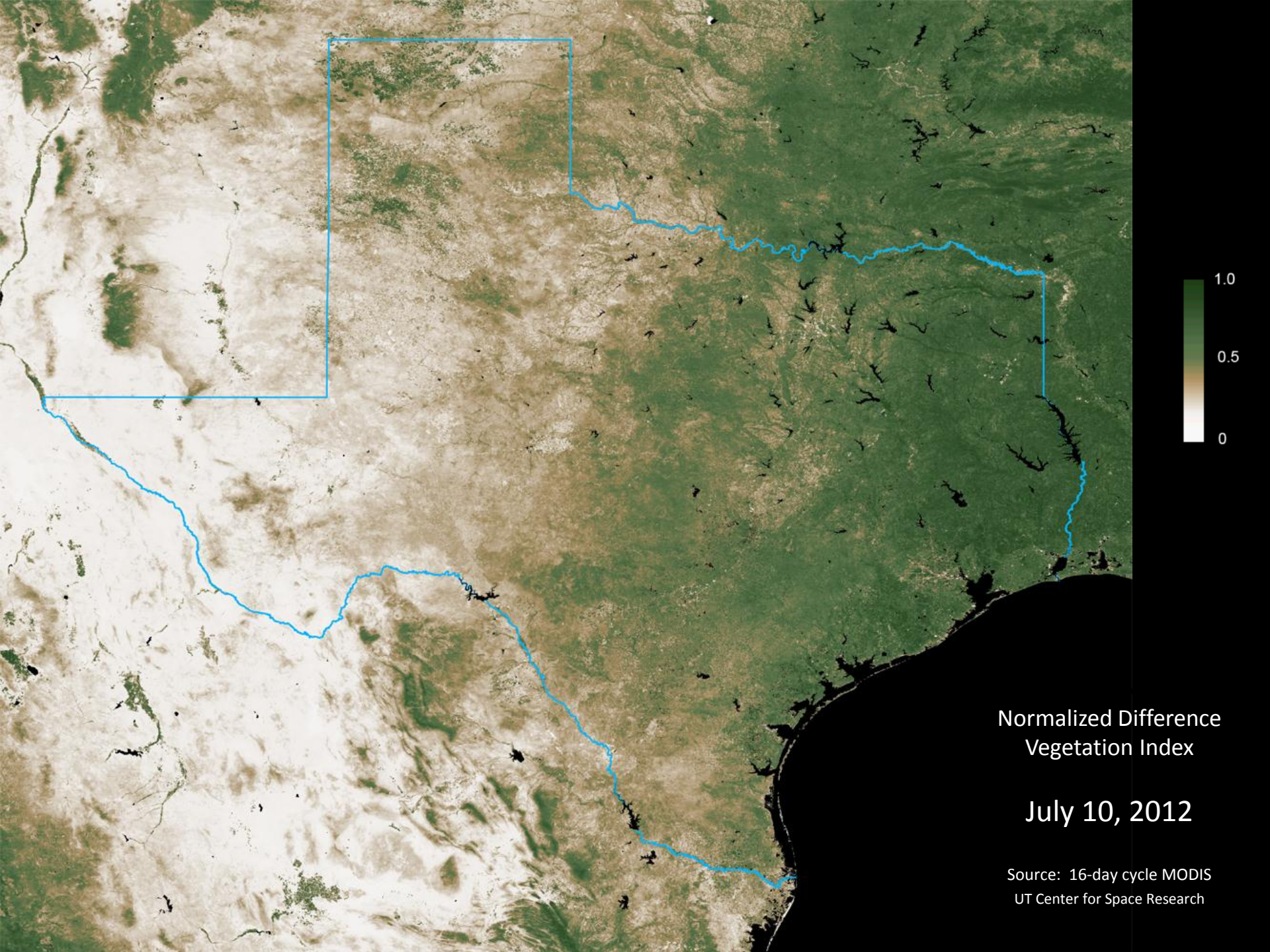
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

June 24, 2012

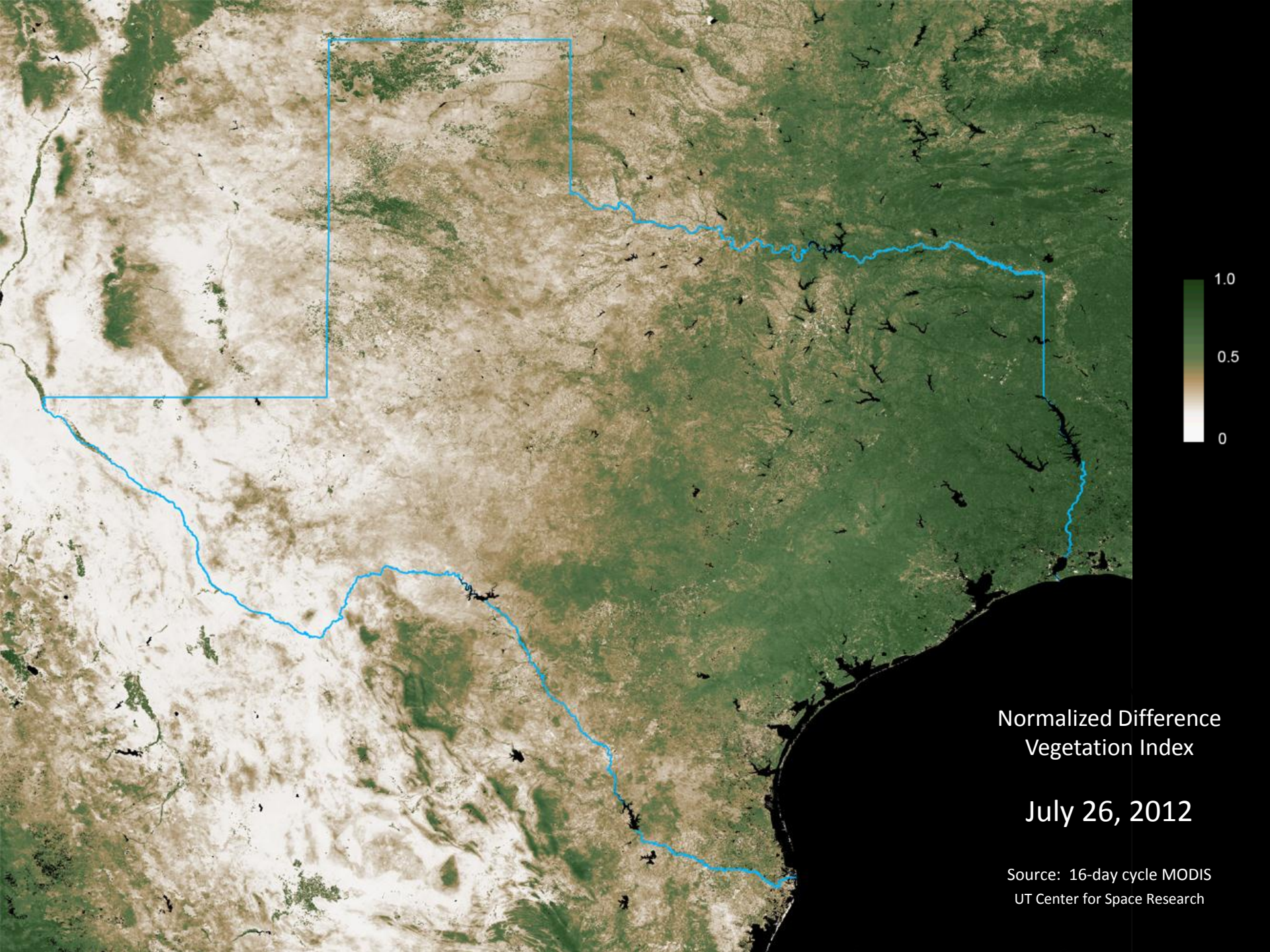
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

July 10, 2012

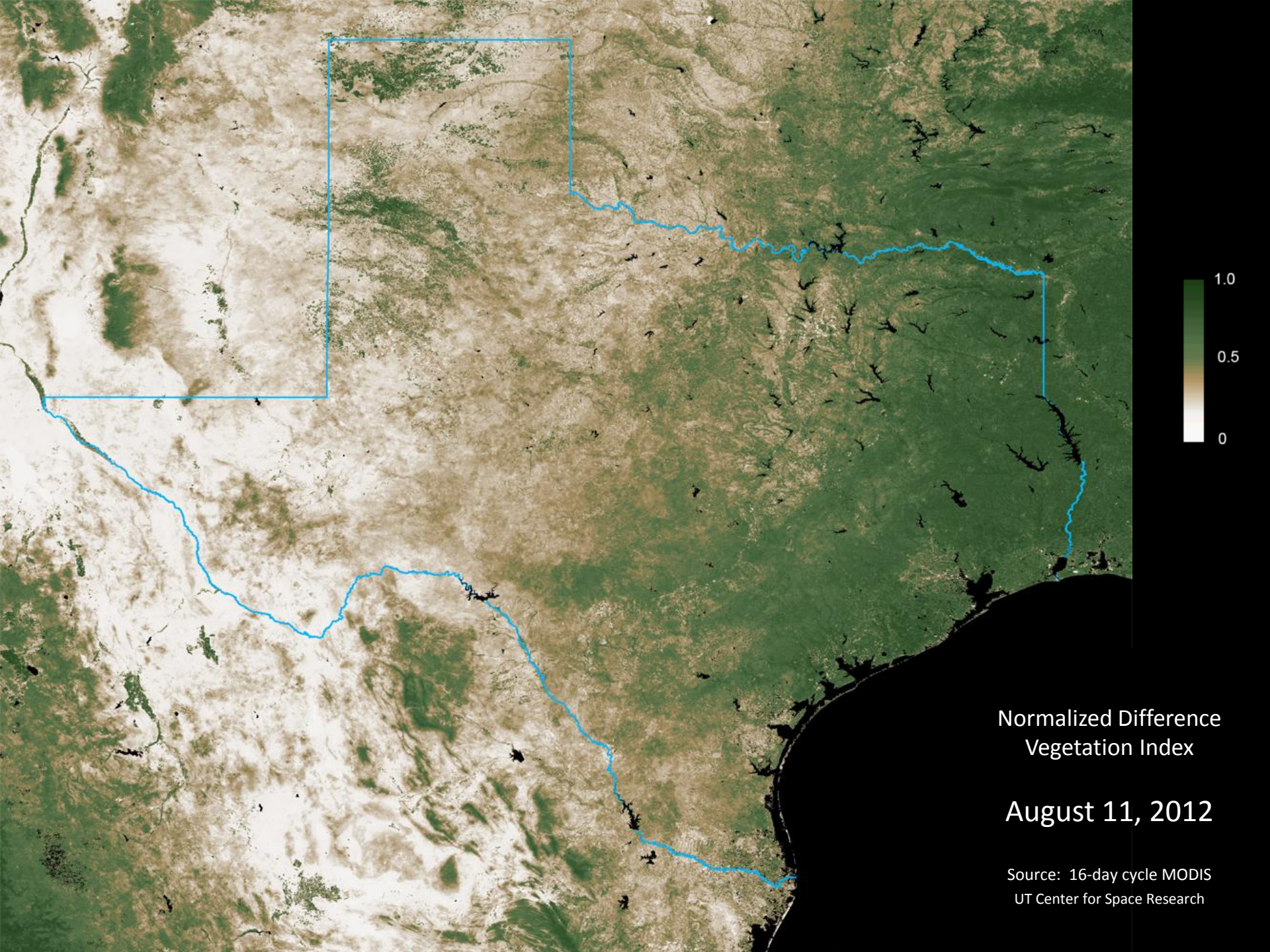
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

July 26, 2012

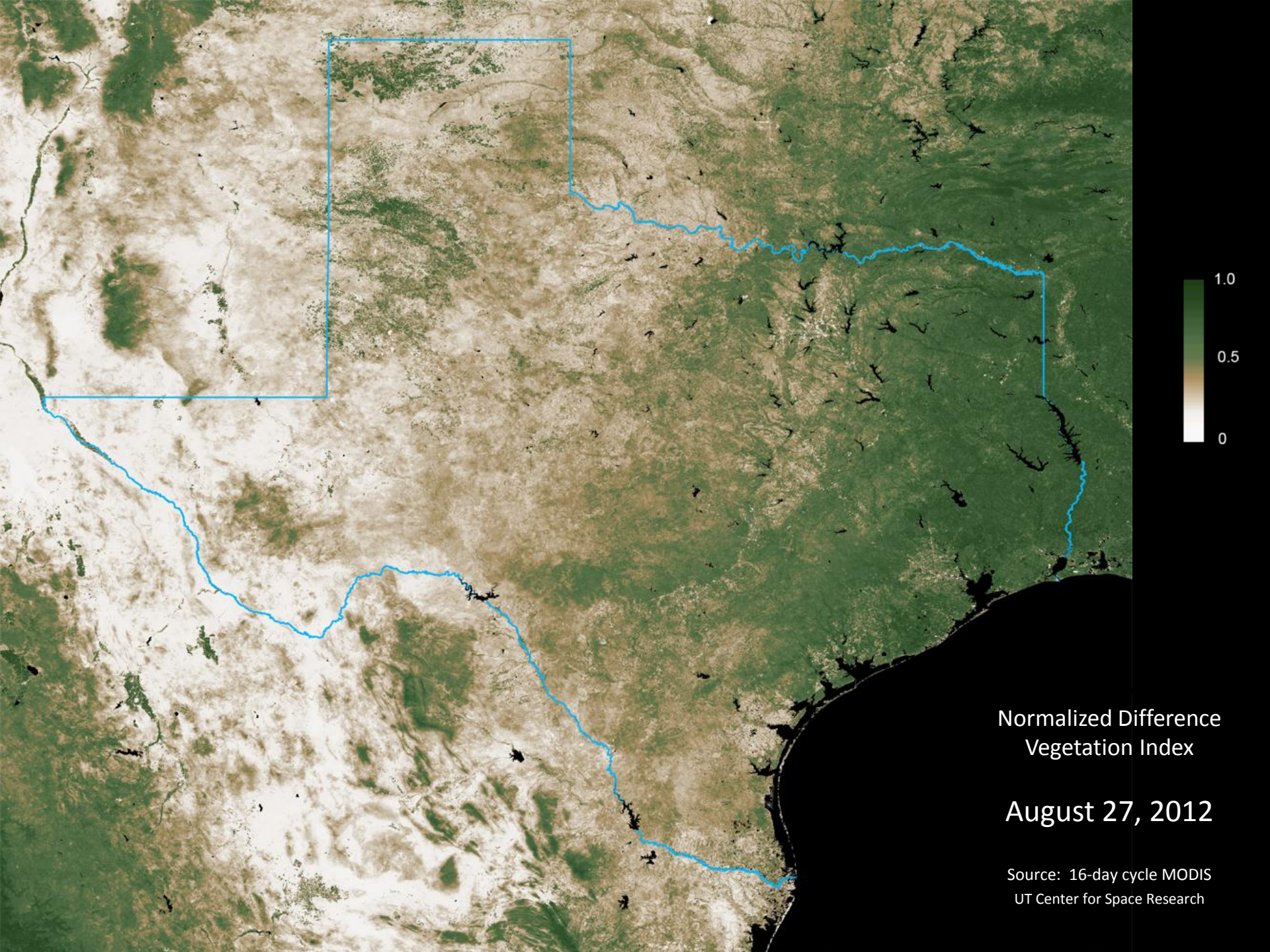
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

August 11, 2012

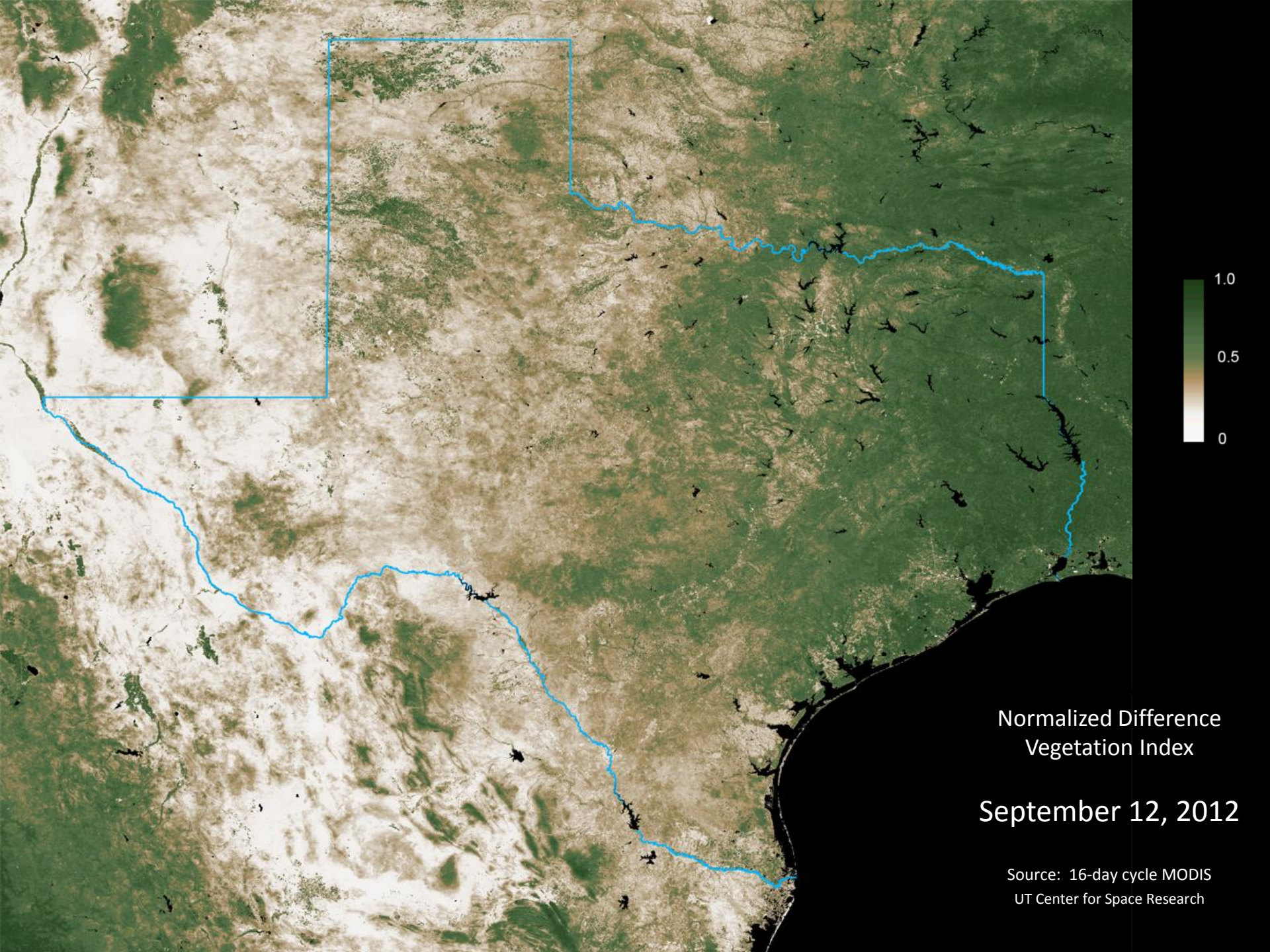
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

August 27, 2012

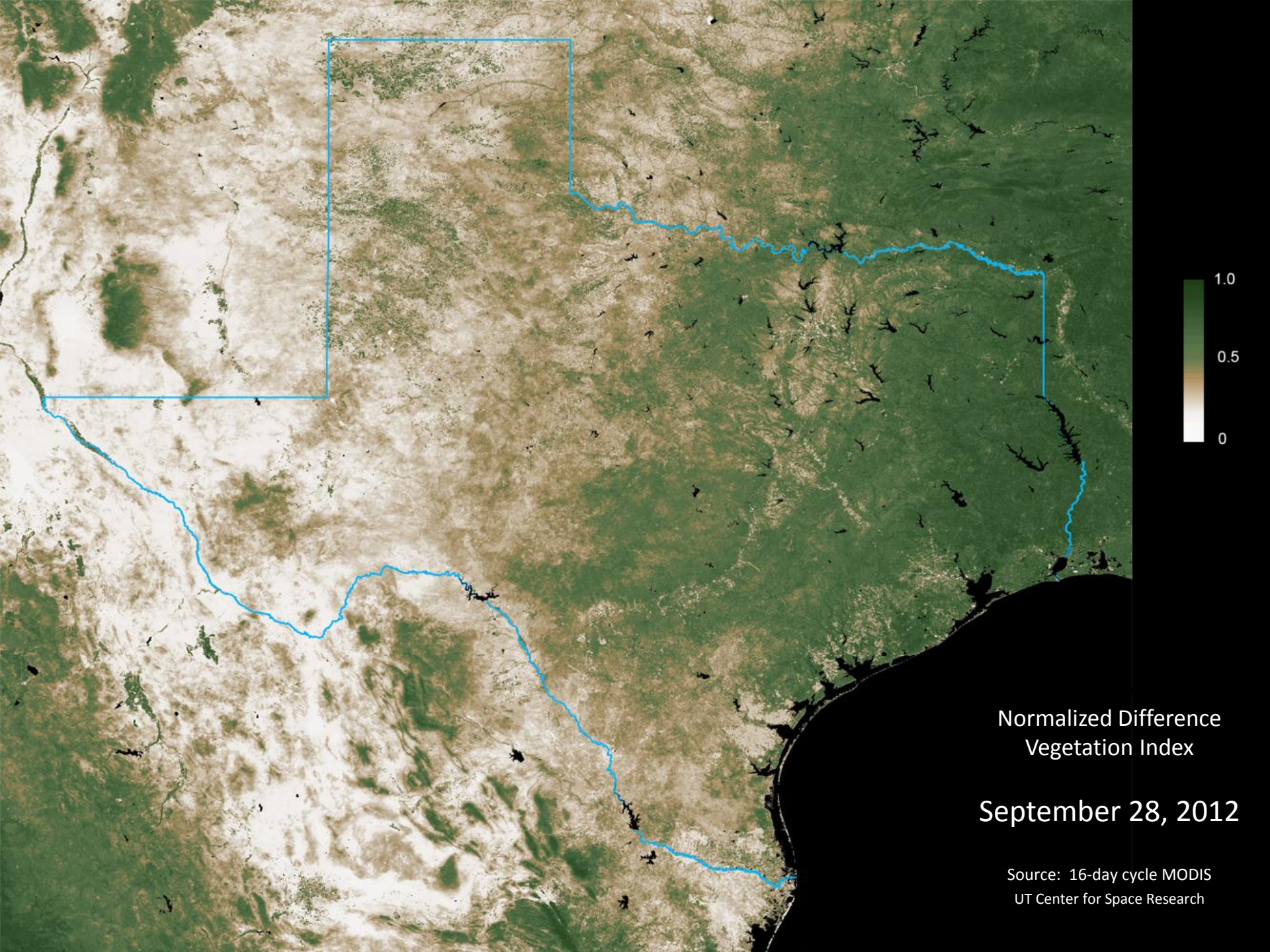
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

September 12, 2012

Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

September 28, 2012

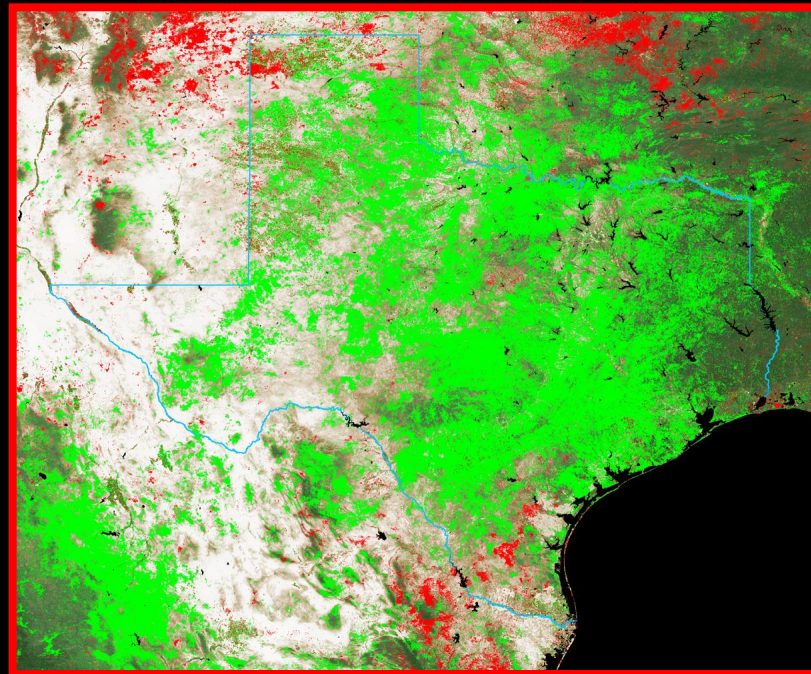
Source: 16-day cycle MODIS
UT Center for Space Research

Satellite Monitoring of Changing Vegetation Conditions in 2011 and 2012

Gordon Wells

with Teresa Howard, Larry Teng and Solar Smith

Center for Space Research
The University of Texas at Austin

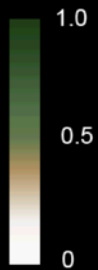
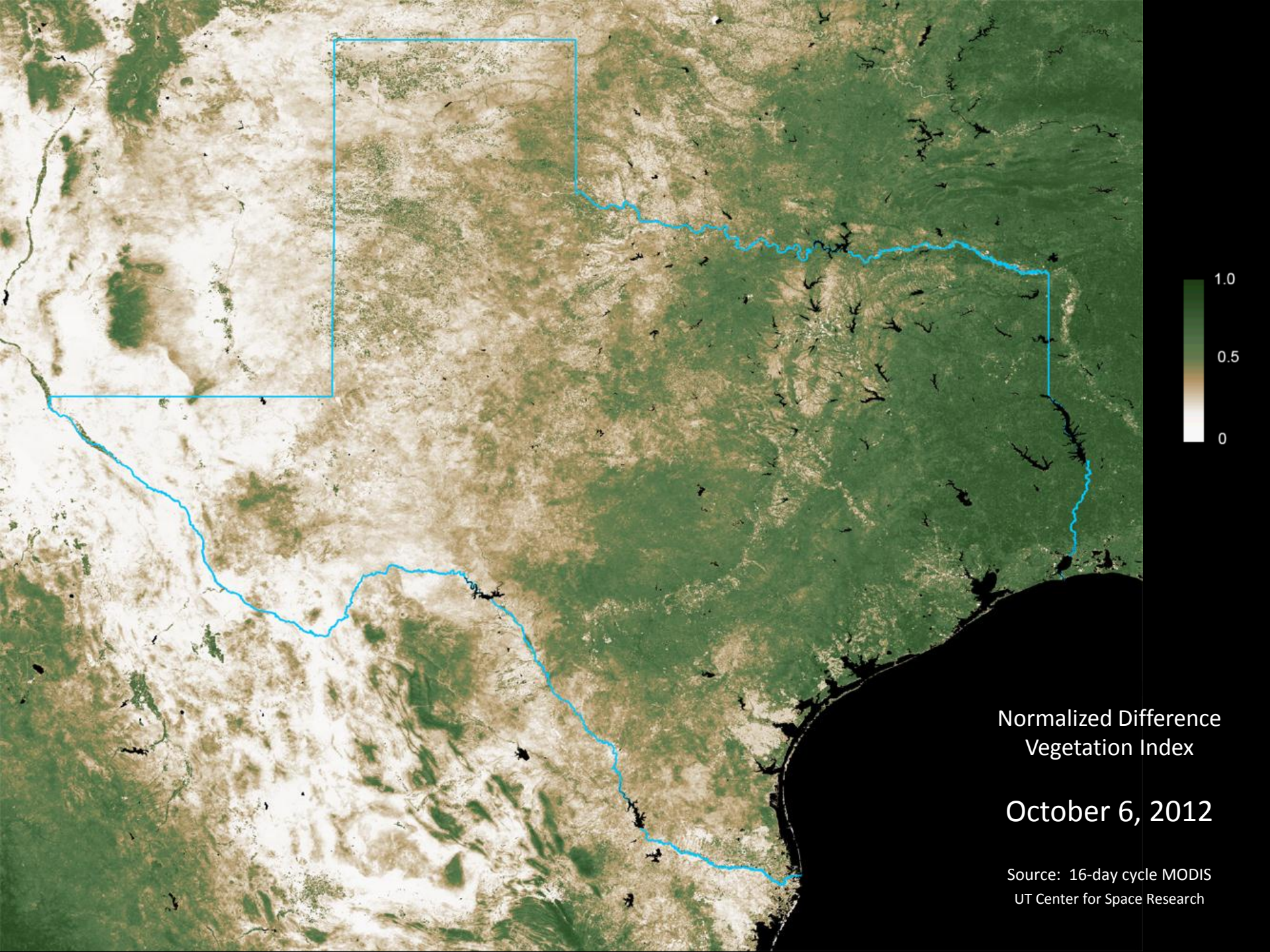


Second Water Forum: “Texas Drought and Beyond”

Center for Integrated Earth System Science, The University of Texas at Austin

October 22, 2012

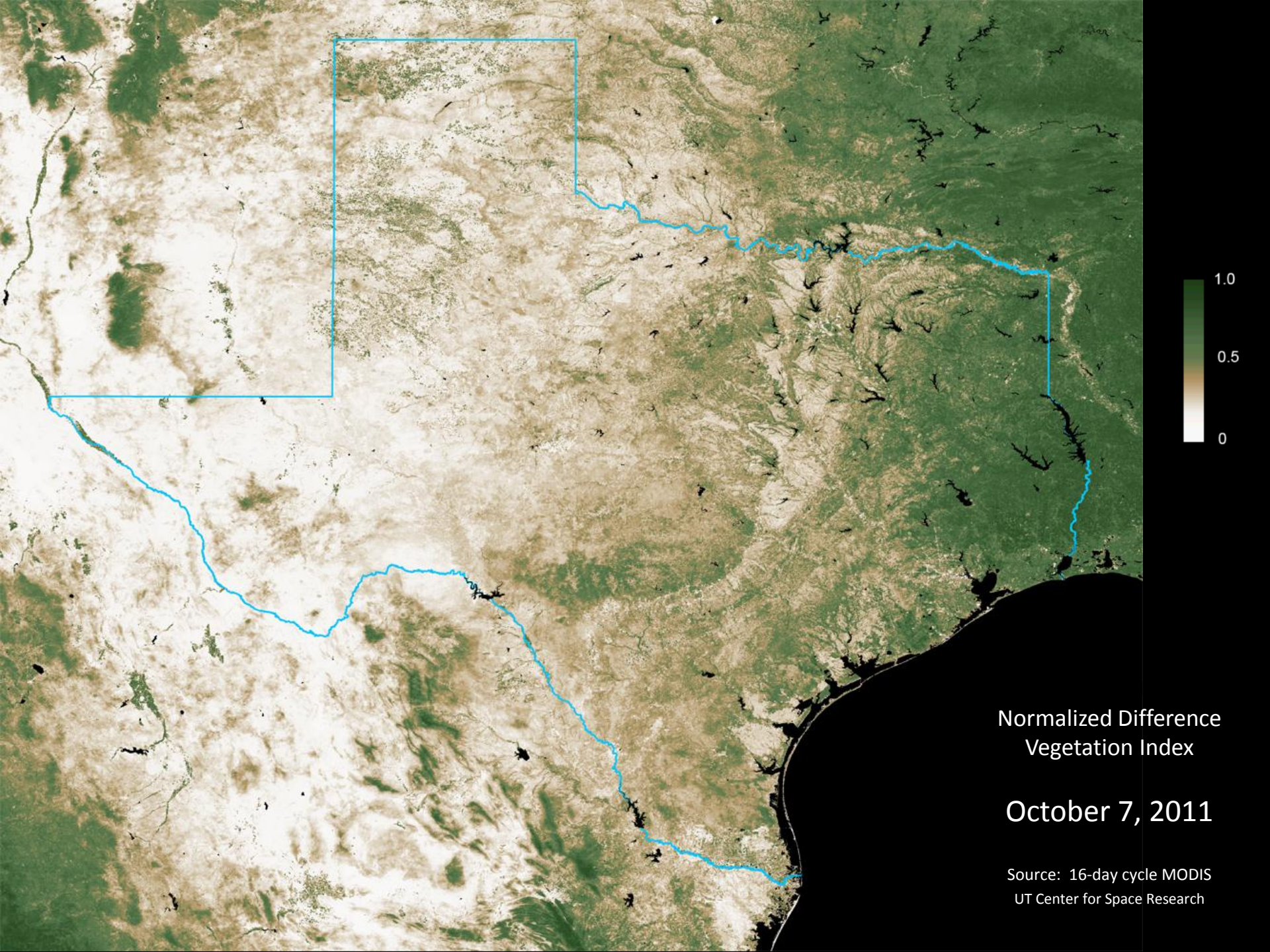
Interannual Comparisons



Normalized Difference
Vegetation Index

October 6, 2012

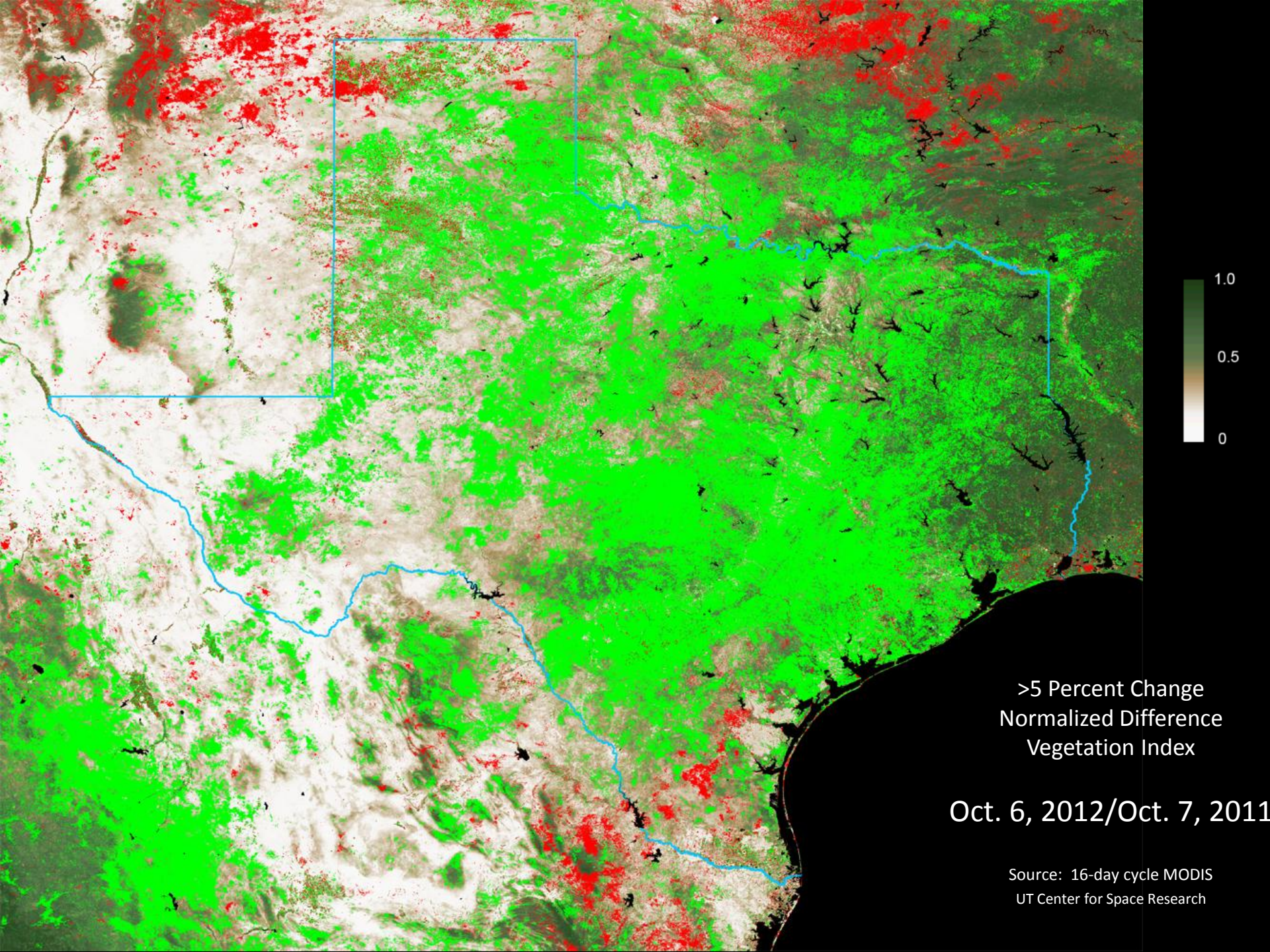
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

October 7, 2011

Source: 16-day cycle MODIS
UT Center for Space Research



>5 Percent Change
Normalized Difference
Vegetation Index

Oct. 6, 2012/Oct. 7, 2011

Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

October 6, 2012

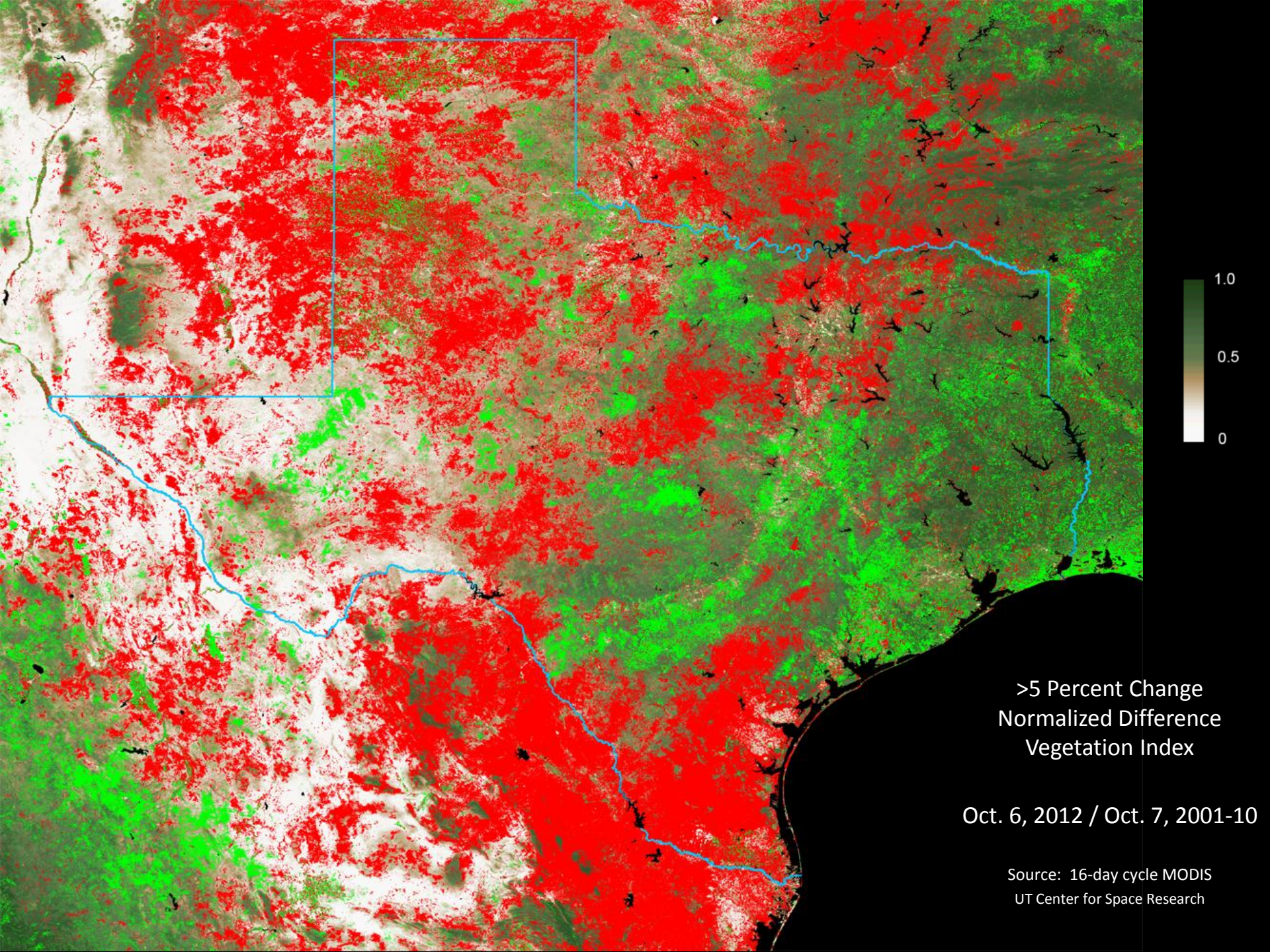
Source: 16-day cycle MODIS
UT Center for Space Research



Normalized Difference
Vegetation Index

October 7, 2001-10

Source: 16-day cycle MODIS
UT Center for Space Research



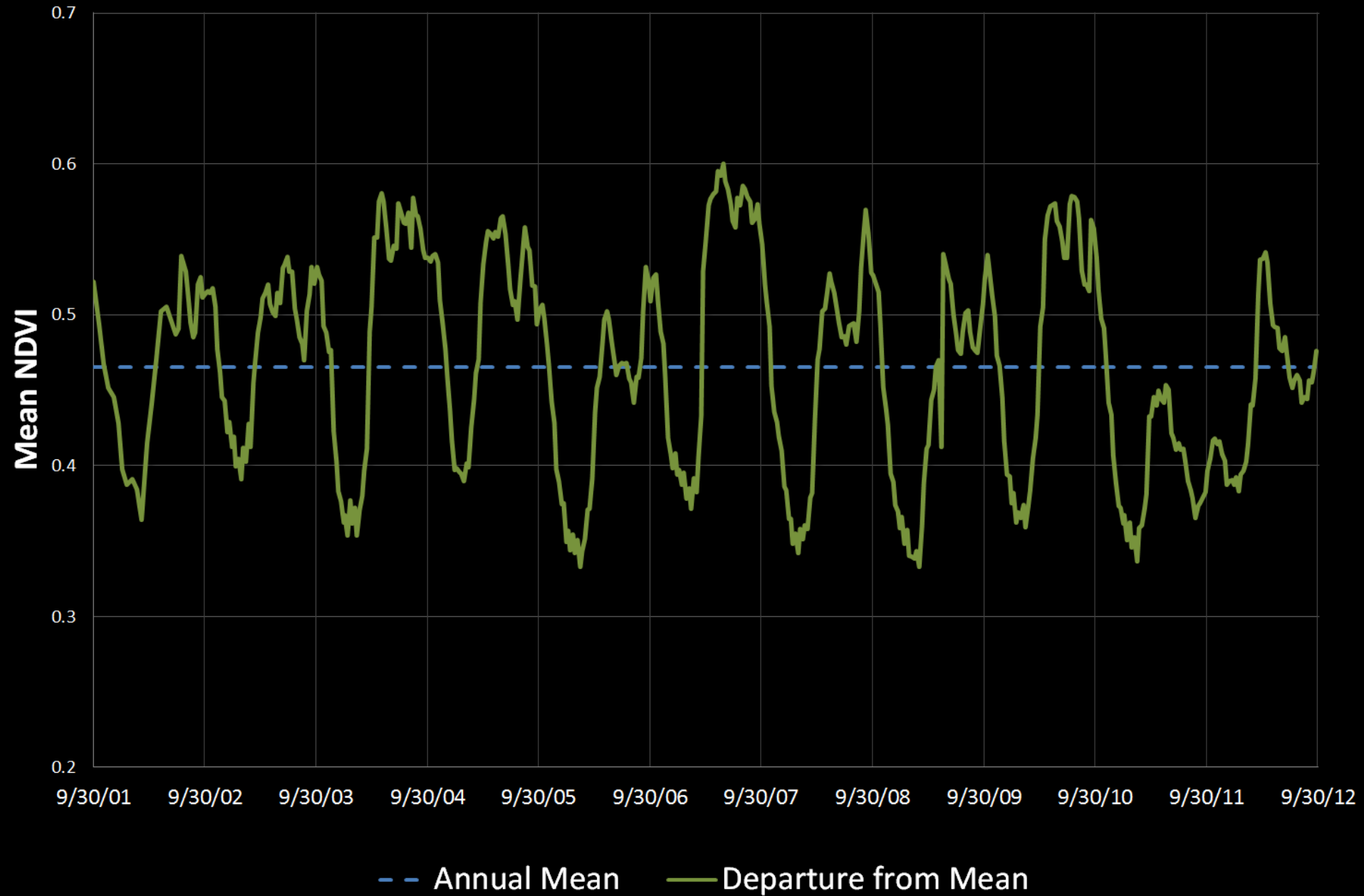
>5 Percent Change
Normalized Difference
Vegetation Index

Oct. 6, 2012 / Oct. 7, 2001-10

Source: 16-day cycle MODIS
UT Center for Space Research

State NDVI Statistics

Texas Mean NDVI for Water Years 2002 - 2012





Parmer

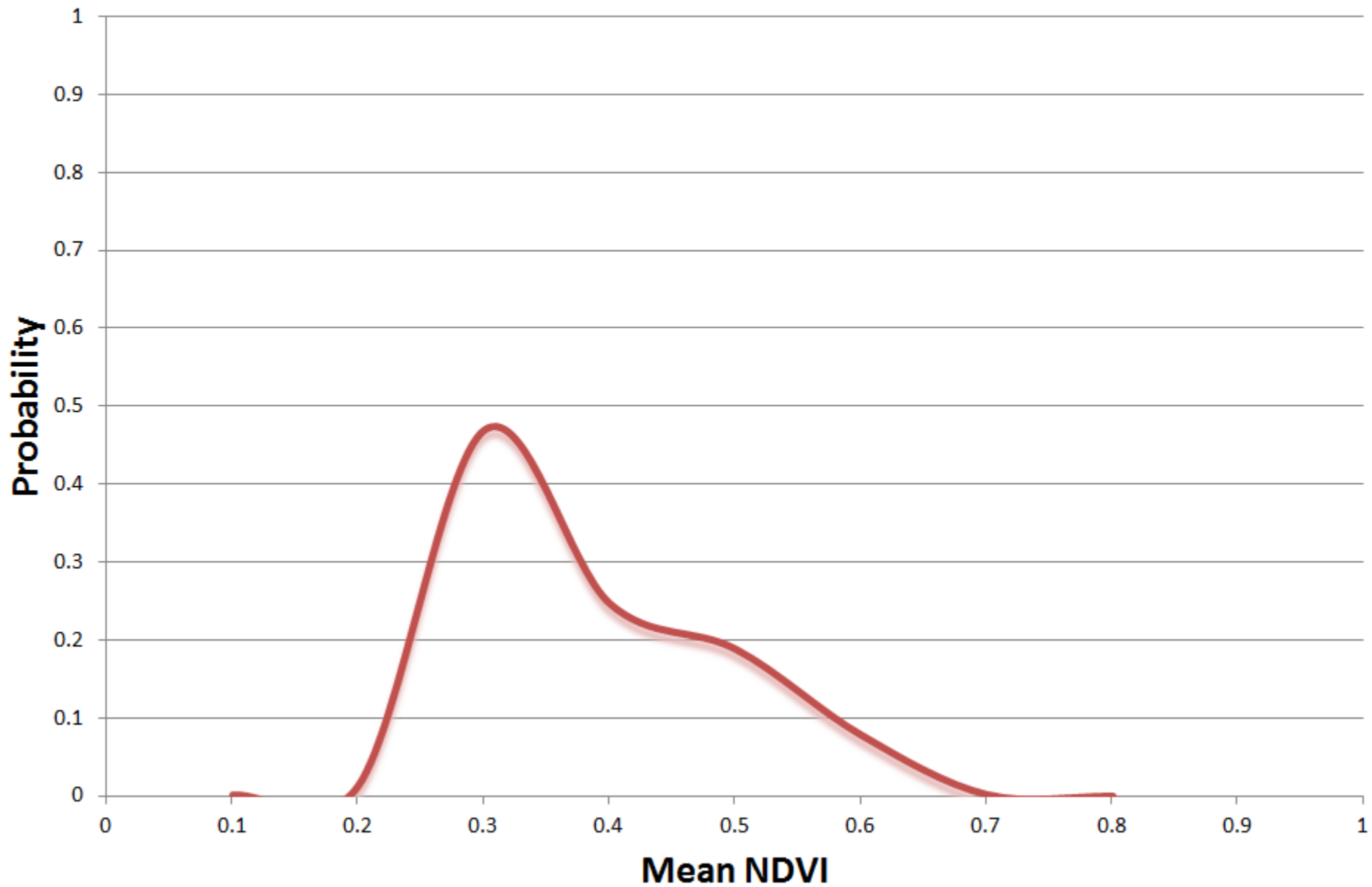
Castro

Bailey

Agriculture Mask for NDVI

Mean NDVI Probability Distribution for Hale County

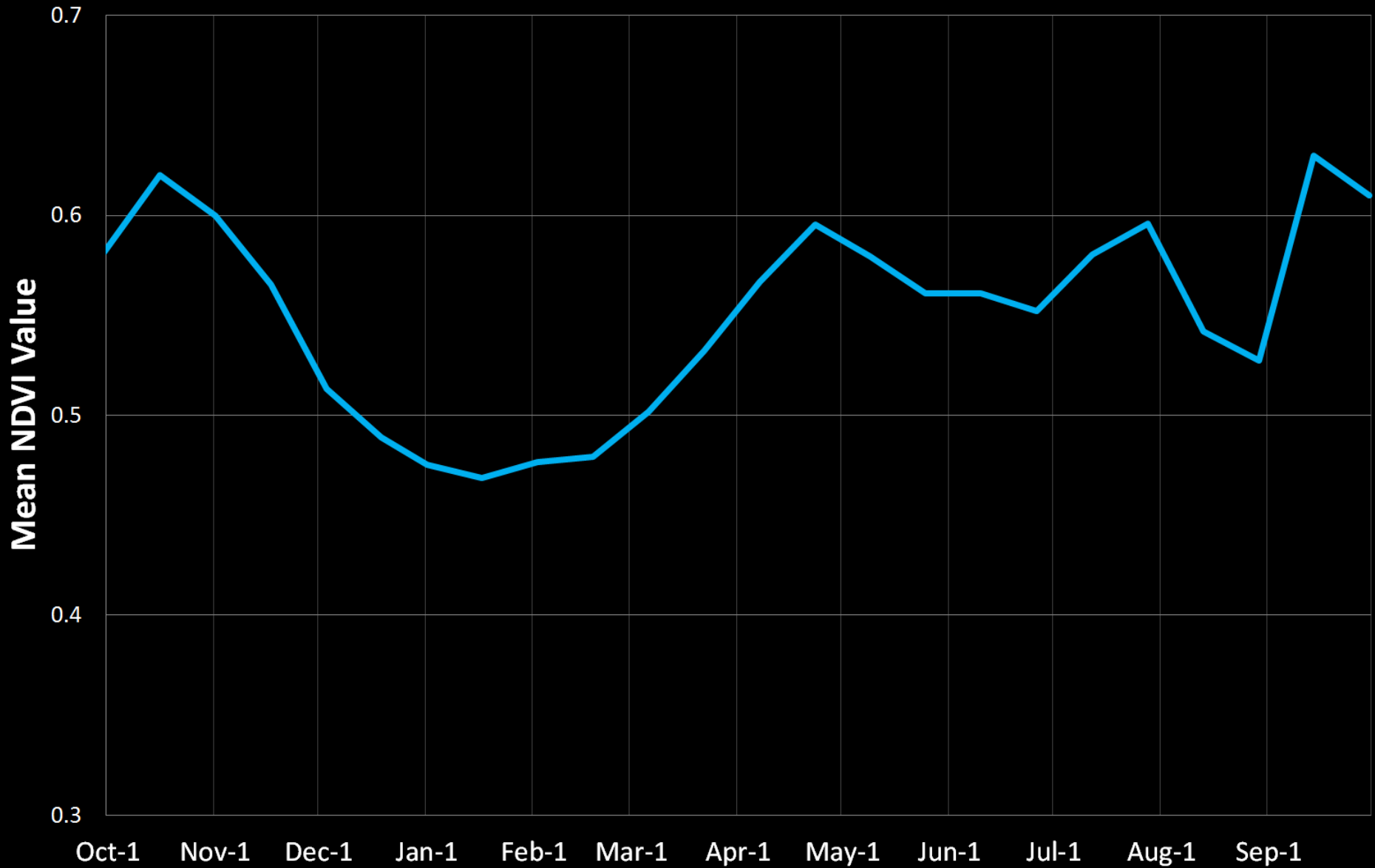
Jan 2001 - Jul 2012



County NDVI Statistics

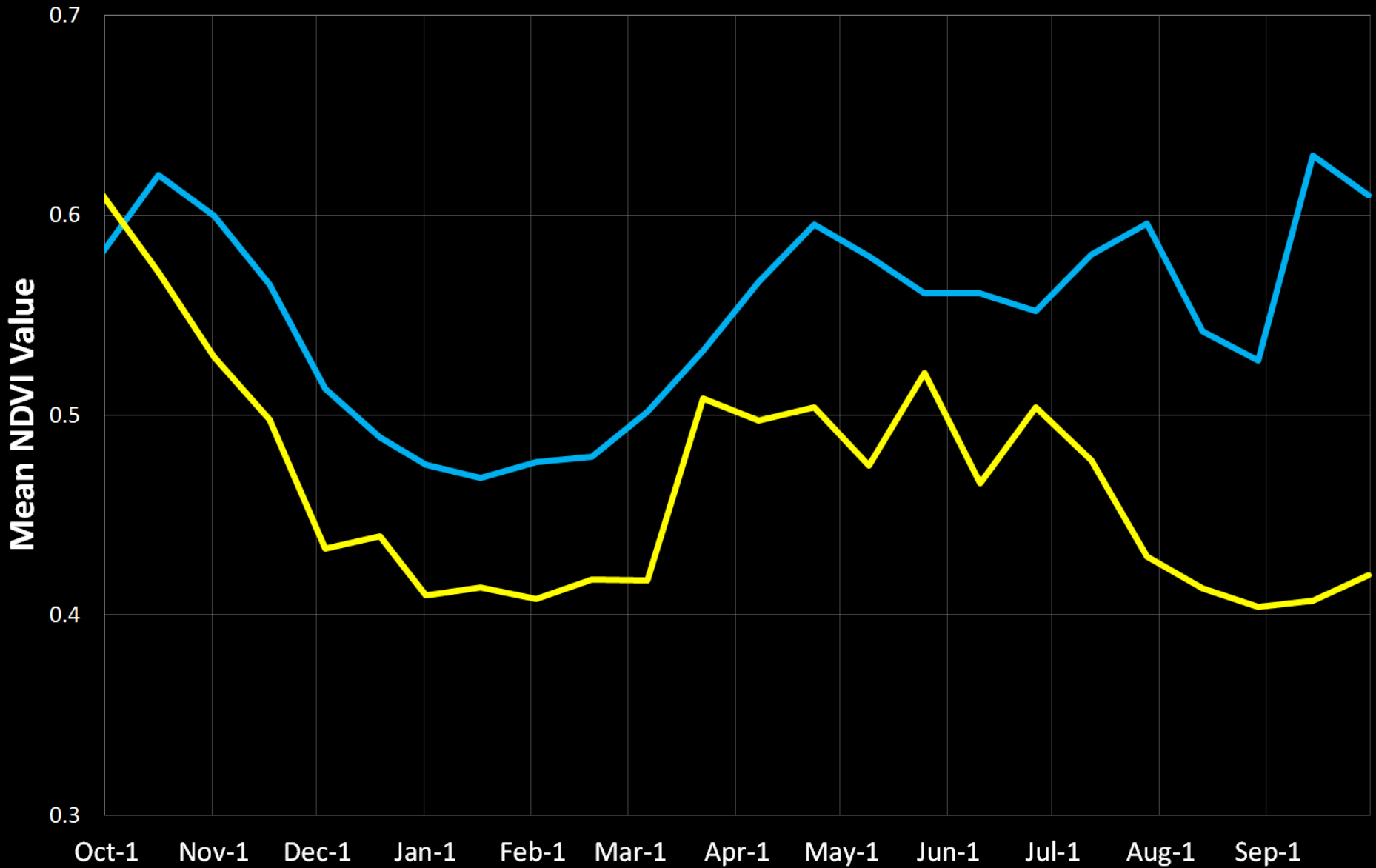
Vegetation Vigor in Travis County

— Water Year 2010



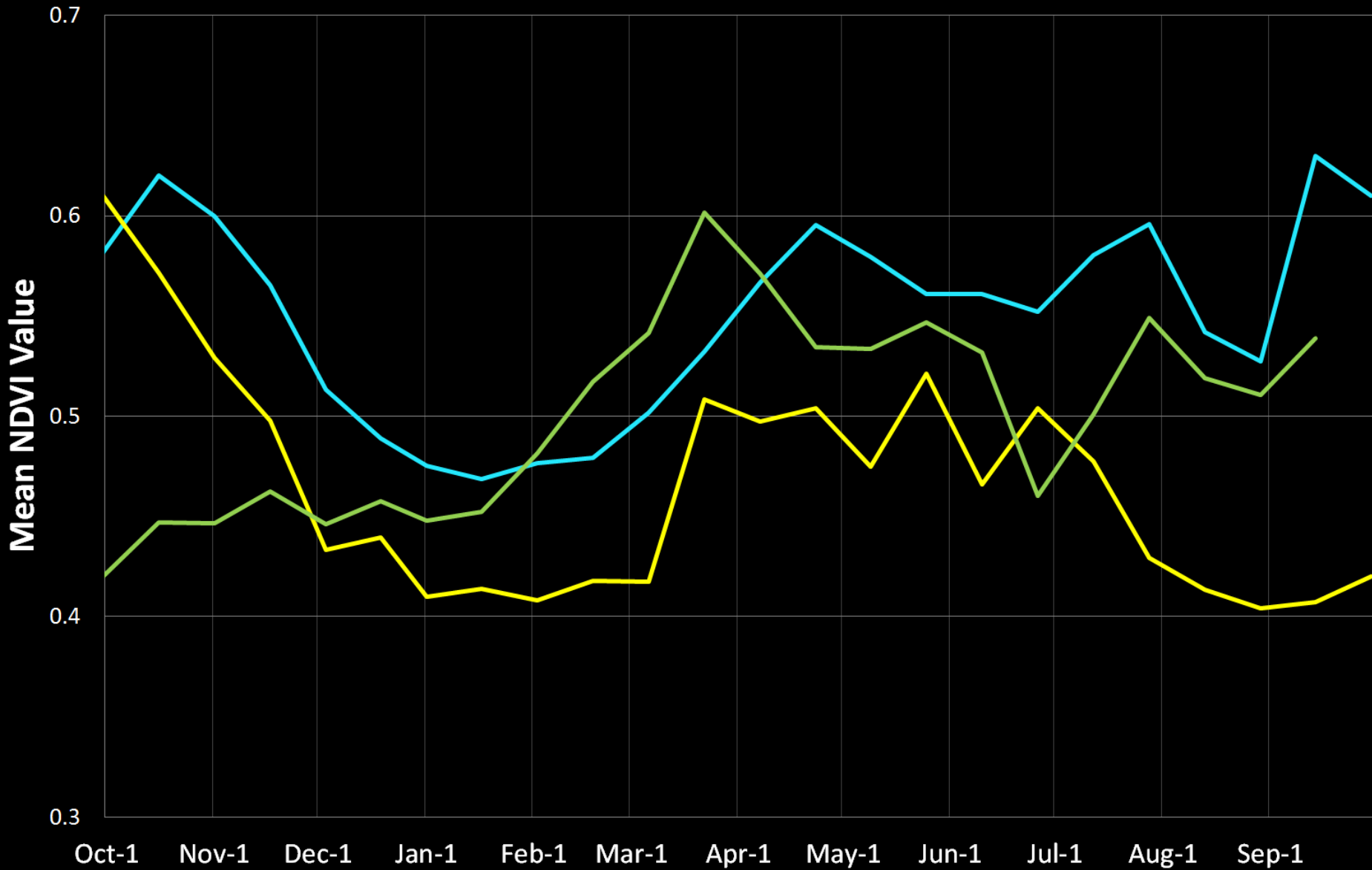
Vegetation Vigor in Travis County

— Water Year 2010 — Water Year 2011



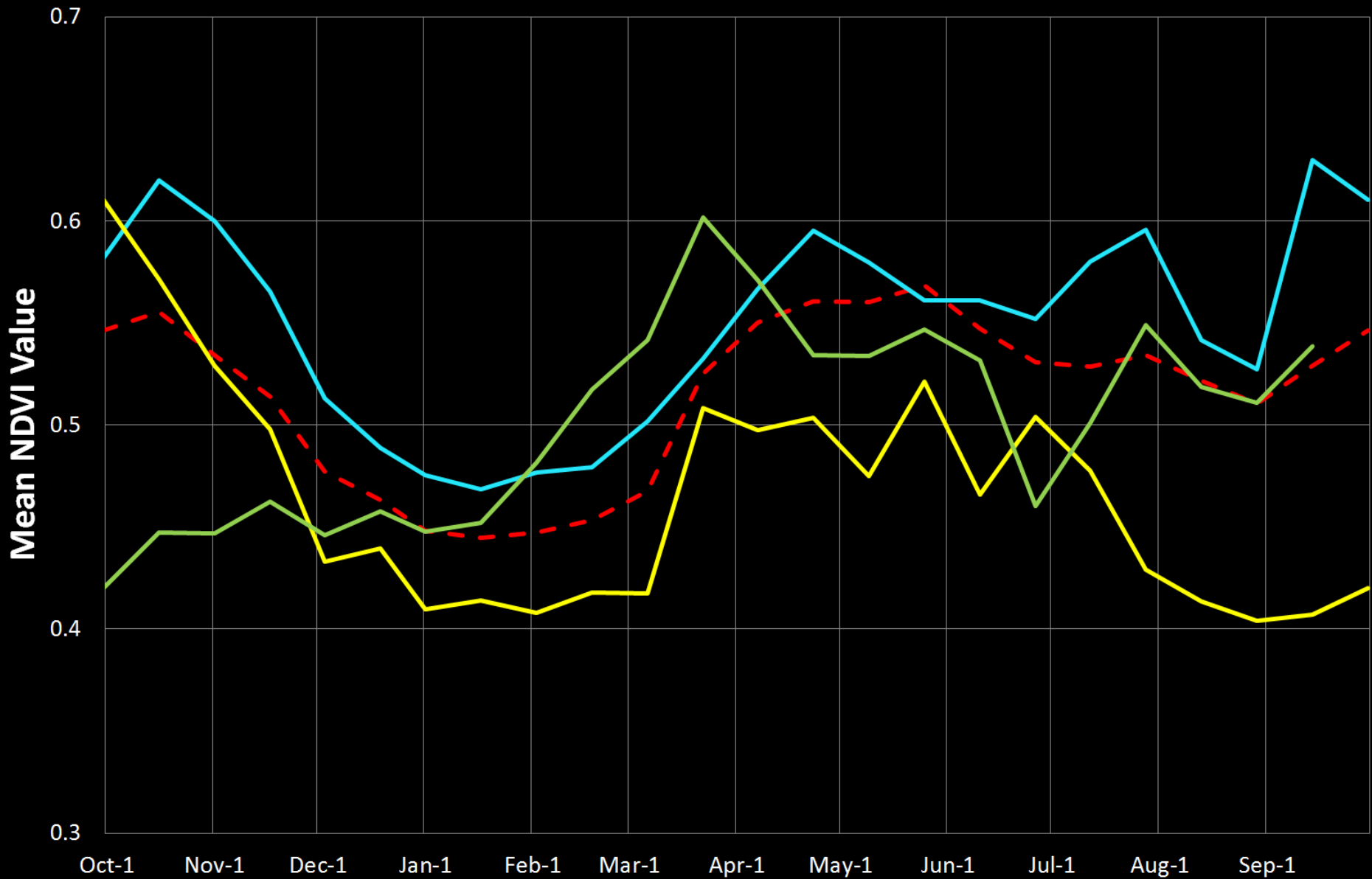
Vegetation Vigor in Travis County

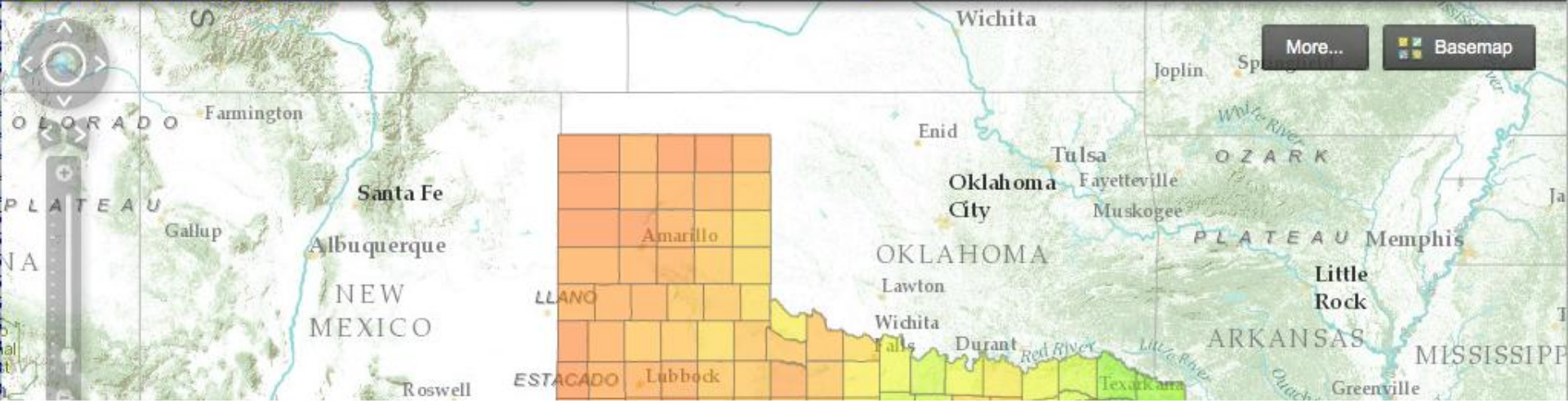
— Water Year 2010 — Water Year 2011 — Water Year 2012



Vegetation Vigor in Travis County

11 Year Average Water Year 2010 Water Year 2011 Water Year 2012



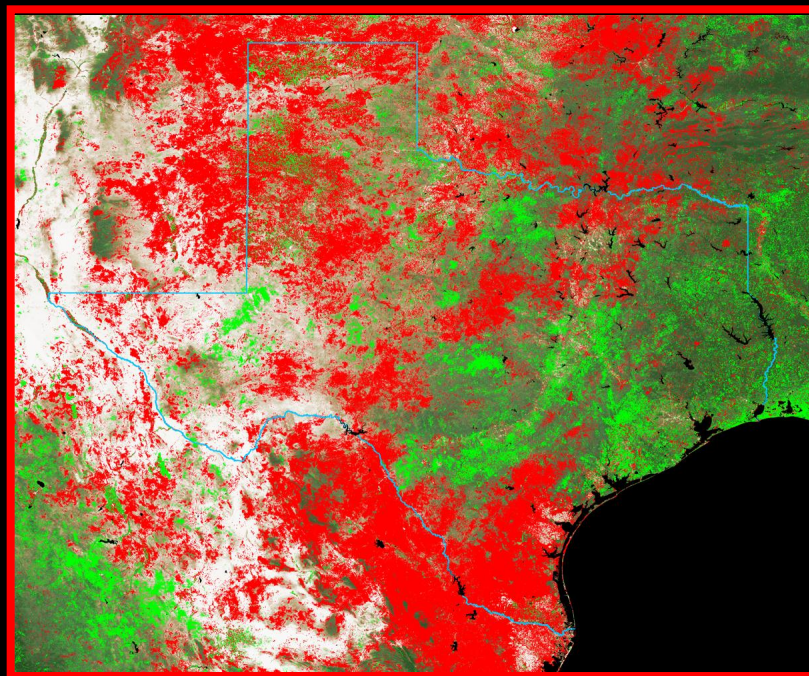


<http://magic.csr.utexas.edu/ndvi/flexviewer/>



Questions

- What emphasis should be placed on vegetation indices as a measure of local, regional and statewide drought conditions?
- What comparative data sets should be added to the Texas MODIS NDVI Viewer?



Contacts:

Gordon Wells
gwells@csr.utexas.edu

Teresa Howard
howard@csr.utexas.edu



<http://magic.csr.utexas.edu>