

The Impact of Climate Change on Prairie Potholes Activity 3: Landsat Activity

Region: Prairie Grasslands

Grade Level(s): Intended for Middle School, but can be adapted to other grade levels

Time Required: Two 45-minute class periods (90 minutes)

What can students learn and do with Landsat Satellite Images?

Since 1972, satellites have been circling the earth taking specialized photographs called Landsat images. These digital images of the earth's surface allow people to analyze the impact of events on our landscape, whether they are man made or natural. Analysis of these images can be as informal as two people looking at several images side by side, or as formal as integrating the images into a Geographic Information Systems (GIS) computer model for in-depth scientific analysis. All of this information is revolutionizing the way we understand, manage, and protect our natural resources and plan for the future. For this reason, analyzing satellite images of the Earth from space is rapidly becoming an important and valuable skill in a multitude of workforce areas. According to the U.S. Department of Labor, jobs using geospatial technologies are among the fastest-growing in the country. About 20 NASA's Earth-observing satellites now monitor changes in land, water, ice, air, and life at regional, continental, and global scales, providing a new and powerful perspective on our planet.

Students in Grades 6-10 can get an introduction to interpreting Landsat satellite images through the classroom activity, Quantifying Changes in the Land Over Time at this URL: http://landsat.gsfc.nasa.gov/education/resources/Landsat_QuantifyChanges.pdf This activity uses Landsat images of Phoenix, AZ.

Students learning about climate change in the Desert Arid ecoregion should work with Landsat images of Lake Meade in Arizona found below.

Preparation:

Teachers do not have to be experts in satellite imagery to conduct this activity with students, whether with image of Phoenix or of the Desert Arid ecoregion. But before teaching the activity it is advisable for teachers to develop a basic level of understanding and familiarity by reviewing the Landsat activity mentioned above, Quantifying Changes in the Land Over Time. Be sure to review the sections of the Quantifying Changes activity, "What you need to know about Landsat Satellites for this Activity," and, "About Color in Landsat Images."

To learn more about Landsat education resources, go to this URL:
<http://landsat.gsfc.nasa.gov/education>

About the Desert Arid Satellite Image Pair:

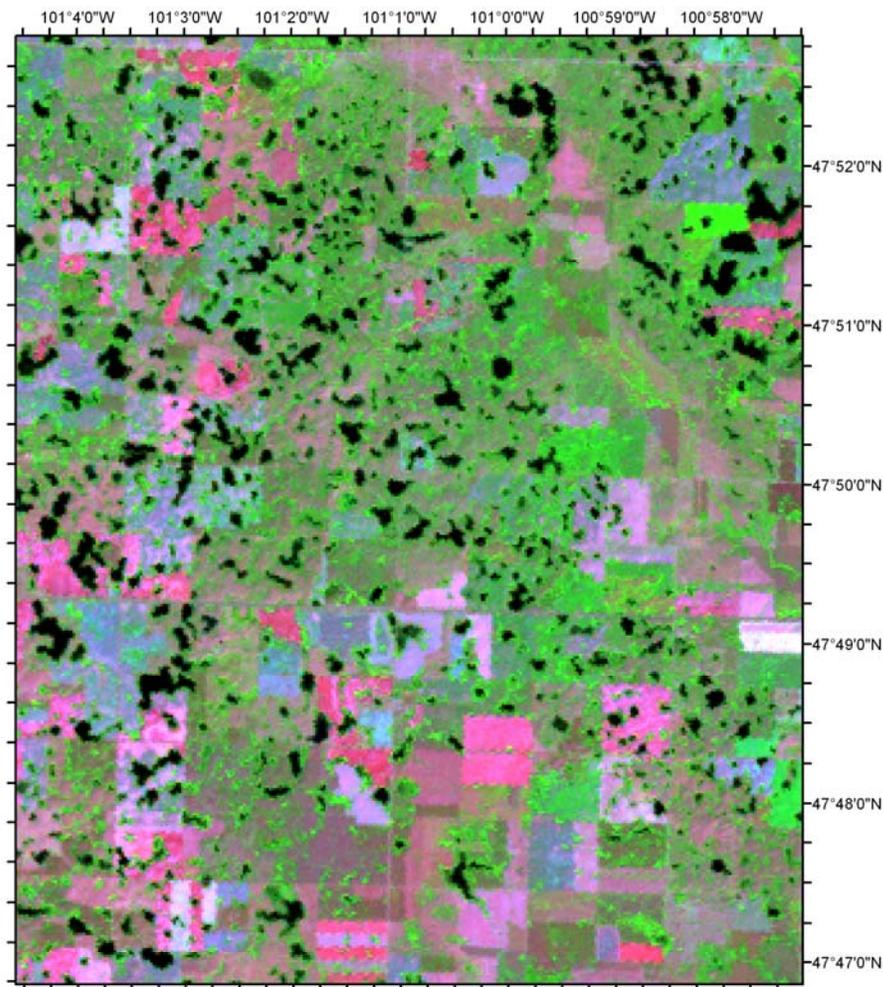
This pair of satellite images shows Lake Meade, NV on two dates about three years apart: April 19, 2003 and May 3, 2000. Water appears dark blue in the images; the dry landscape is in shades of brown, tan, and gray; and vegetation is red. Comparing the images to one another, one can see a dramatic reduction in water levels of the reservoir from 2000 to 2003. Lake Meade has been drying up.

The loss of water in Lake Meade matters a great deal because it is the largest reservoir in the United States and provides Colorado River water to places as far away as San Diego, California. Countless households and farms depend on this water for survival. Not only the Lake Meade area but the American Southwest region has been experiencing a long-term severe drought, affecting not only human lives but also those of many plants and animals such as the Devil's Hole pupfish, *Cyprinidon diabolis*.

Procedures/Instructional Strategies:

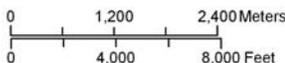
Using the classroom activity, Quantifying Changes in the Land Over Time, students will be able to quantify how much of the Lake Meade water surface has been lost to drought from 2000 to 2003.

To learn more about these images and the satellites, visit NASA's Earth Observatory Web site, at: <http://earthobservatory.nasa.gov/IOTD/view.php?id=3556>

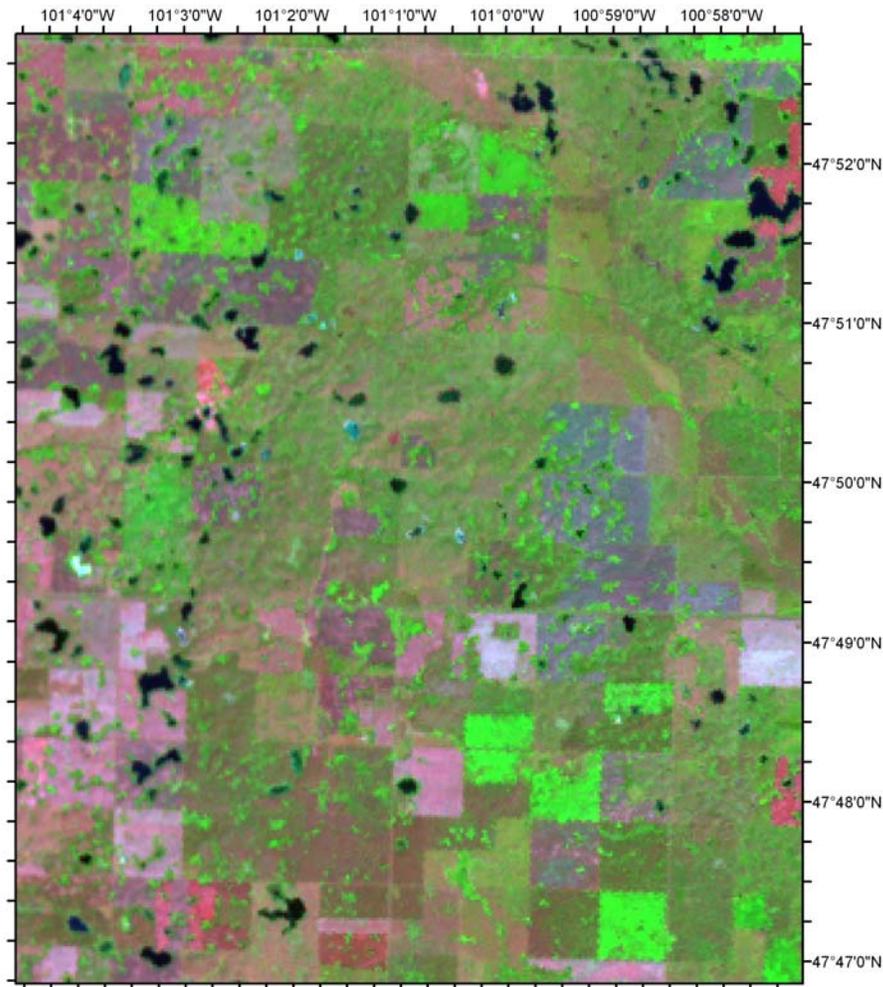


Landsat TM 5, 1997-Aug-22

Band combination:
Band 7 - red,
Band 4 - green,
Band 3 - blue

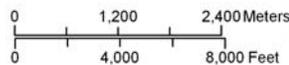


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Landsat TM 5, 2007-Aug-25

Band combination:
Band 7 - red,
Band 4 - green,
Band 3 - blue



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