Using a mask to define flooded areas in Cedar Rapids, Iowa

Remote sensing data is used to monitor and assess food damage. It has been used to increase the efficiency of food monitoring as well as food management. Flooded areas need to be isolated. Using the mask tool a food layer can be created based on values.

Cedar River is the second largest city in Iowa. In September 2016 Cedar River was hit by a food caused by the remains of the Pacific Hurricane Paine. The river crested at 23 feet on Tuesday, September 27 causing the evacuation of over 5,000 people. The governor of Iowa is calling for a state of emergency and wants to know the number of acres of flooded land. He has asked the Cedar Rapids GIS department for a quick estimate.

Build skills in these areas

- Isolate flood areas based on pixel values
- Present both a qualitative and a quantitative presentation of the flooded area
- Isolate specific areas to evaluate

What you need

- Account required
- Estimated time: 30 minutes – 1 hour

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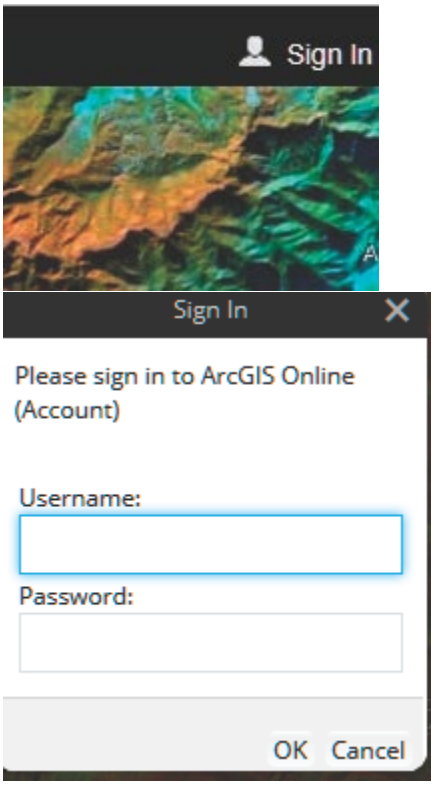
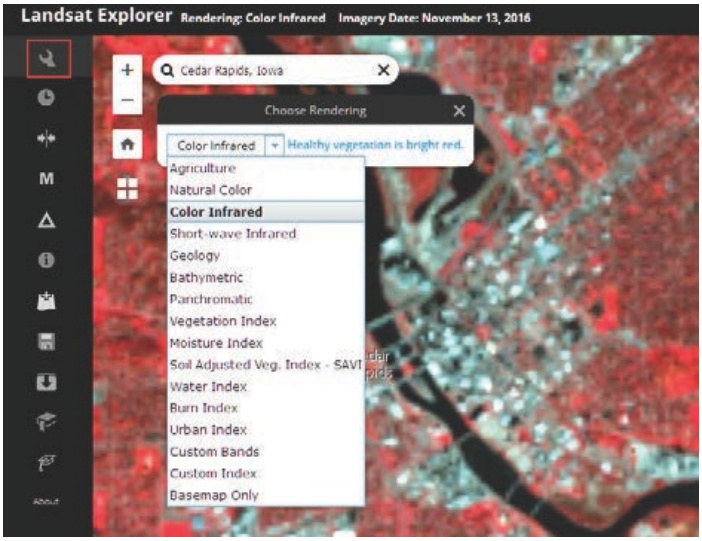
1. Identifying Cedar Rapids Iowa

1. Go to Landsat Explorer.
2. Click Sign in and sign in to your organizational account.



3. Search for Cedar Rapids, Iowa in the search tab. This will take you to Cedar Rapids.

4. Go to the Rendered icon on the left panel and change the band combination to Color Infrared to show healthy vegetation as bright as red.



Examine the image remembering that bright red is healthy vegetation.

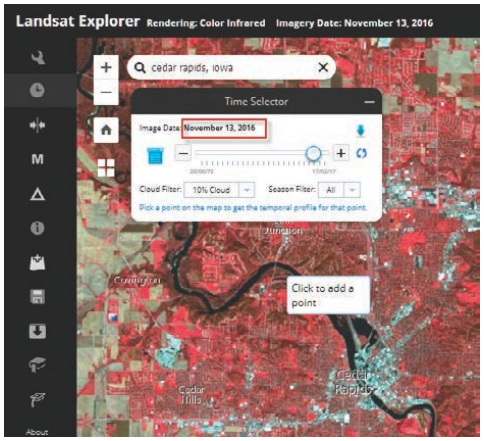
Q1 Does the city of Cedar Rapids lie on both sides of the Cedar Rapid River?

Remember the gray to bluish gray section of the image is developed land. Notice the bridges going across the river.

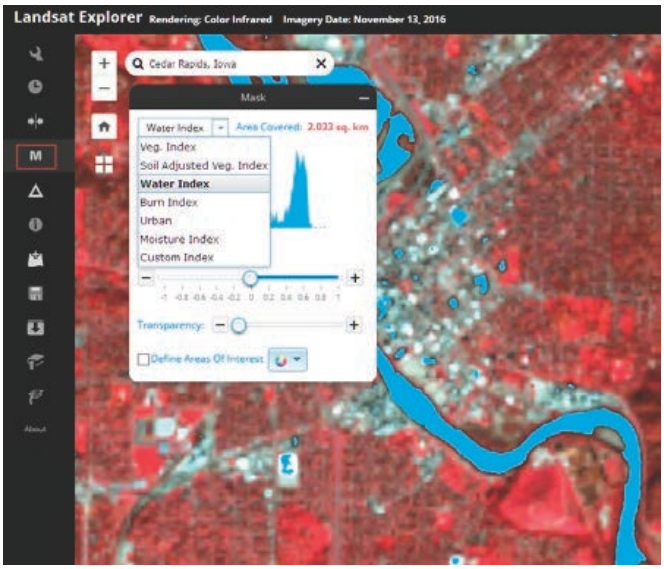
Q2 What do you think the very bright sections of red are?

2. Using a mask to calculate flooded area of Cedar River

1. Use the time slider to select the date November 13, 2016.



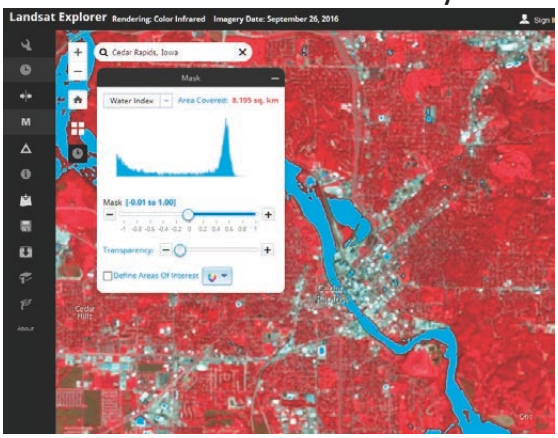
2. Click the Mask icon on the left panel and select the water index.
3. Move the mask slider to about 0 to 1 to isolate the water. The slider isolates pixels with similar spectral reflectance values.
4. Record the Area Covered.



5. Click Mask again to close mask.
6. Select the time slider on the side panel and select the date September 26, 2016, which was at the height of the flood.

7. Select mask again with the water index and the same values.

8. Record the area covered by the mask.



9. Compare the amount of water at the height of the flood (September 26) and on a non-flood day (November 13, 2016).

Note: The Area Decrease/Increase numbers will depend entirely on your view extent, how zoomed in you are, and how big your browser window is.

3. Isolating the city of Cedar Rapids

In this next section, you will repeat the above process concentrating on just the city limits of Cedar Rapids.

1. Click Masks.
2. Click Define Areas of Interest.
3. Click to start drawing and digitize around the Cedar Rapids area.
4. Double click to end the polygon.
5. Click Apply.
6. Change the Mask to be 0.00 to 1.00.

7. Record the Area Covered.

Q3 How much land was flooded in the designated area?