

# EXTREME HEAT MAP TOOL



## HOW TO USE THE EXTREME HEAT MAP TOOL

The interactive [Extreme Heat Map Tool](#) is intended for community use. The data is part of the regional [Climate Vulnerability Assessment](#) project for the Twin Cities metro area.

The Extreme Heat Map Tool shows the Land Surface Temperature data for the Twin Cities metro area. Communities may use this tool to determine which areas within their community are most susceptible to extreme heat. We hope that this tool will help cities prioritize policy and implementation strategies (for instance, targeted tree planting or design improvements that may mitigate risks associated with extreme heat).

The Extreme Heat ([Land Surface Temperature](#) for 7/22/2016) data is the foundational data layer in this tool. The satellite-derived data comes from Landsat 8 Thermal Infrared Sensor (TIRS) imagery taken during a heatwave in July of 2016. The data shows a snapshot of the metro area land surface temperature during an extreme heat event.

The tool is useful in demonstrating the difference in land surface temperature across the metro region due to the existing built and natural environment, a product of land use, site design, and land cover. By changing our built and natural environments through policies, implementation, and sensible site design, we can reduce this extreme heat effect and thereby improve public health and livability.

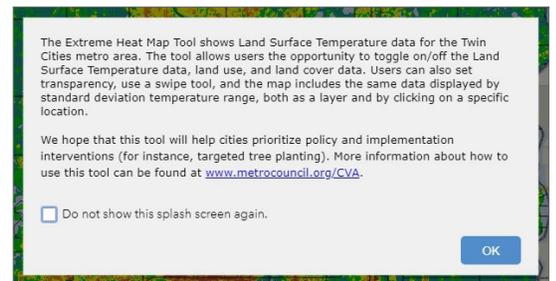
The tool also includes the following data that can assist in identifying land uses and land cover types that either exacerbate or mitigate the extreme heat effect:

1. [Generalized Land Use 2016](#)
2. [Twin Cities Metropolitan Area 1-Meter Tree Canopy Classification](#) (2015)

## TOOL FEATURES & FUNCTIONS

### Splash Page

The small text box that appears when opening the map explains the data and functions of the map and where to find more information. Click 'OK' to close the Splash Page or click 'Do not show this splash page again' and 'OK' if you want to ensure that this pop-up does not come up again when the page is refreshed.



### Zoom

The zoom-in/zoom-out buttons provide the larger/smaller view of the map based on the center point of the page.



TIP: You can also use your mouse scroll wheel (if applicable) for the same purpose.

### Default Extent

Clicking on this button brings you back to the default map extent which is a zoomed-out view of the map.

TIP: If you are analyzing a zoomed-in area, it sometimes helps to go to the default extent before zooming-in to a new area.

### My Location

Clicking this button references your location in the map with a blue dot. You may need to have your device's location services turned on to use this function.

### Find Address or Place

You can use this function to find a specific location on the map using a street address, intersection, or city name. As you type into this field, you will notice pre-populated options appear below that you may choose.

## About

By clicking this button, located below the address field, you can find out more information about the tool, its uses, and where to find more information

## Layer List

The layer list includes a list of layers that make up the Extreme Heat Tool. All layers are clipped to the Twin Cities seven-county metropolitan area. The list includes the following:

Layer Name	Description
Municipal Boundaries	Municipal Boundaries consists of cities, townships, and unorganized territories boundaries.
Reference Layers	Reference Layers consist of the <a href="#">Metropolitan Council Basemap</a> .
2016 Land Use	<a href="#">Generalized Land Use 2016</a> consists of land use data interpreted from 2016 air photos, with additional assistance from county parcel data and assessor's information, field checks, and community review.
TCMA Urban Tree Canopy	<a href="#">TCMA Urban Tree Canopy</a> data was created using high-resolution leaf-on imagery (2015), spring leaf-off imagery (2011- 2014), and remote sensing data to create 12 land cover classes.
Land Surface Temperature 7/22/16 (degrees F) <ul style="list-style-type: none"><li>• Mapped by Standard Deviation</li><li>• Mapped by Temperature Range</li></ul>	<a href="#">The Land Surface Temperature for Climate Vulnerability Analysis</a> data is derived from a satellite image to show the land surface temperature during a heatwave on July 22, 2016. The data layers are displayed in standard deviation and by temperature range.

The default layers that appear when you open the tool are Municipal Boundaries and the Land Surface Temperature 7/22/16 (degrees F) Mapped by Standard Deviation. This default setting allows the user to clearly see the gradations between the hotter and cooler areas of the Twin Cities metro area.

## Legend

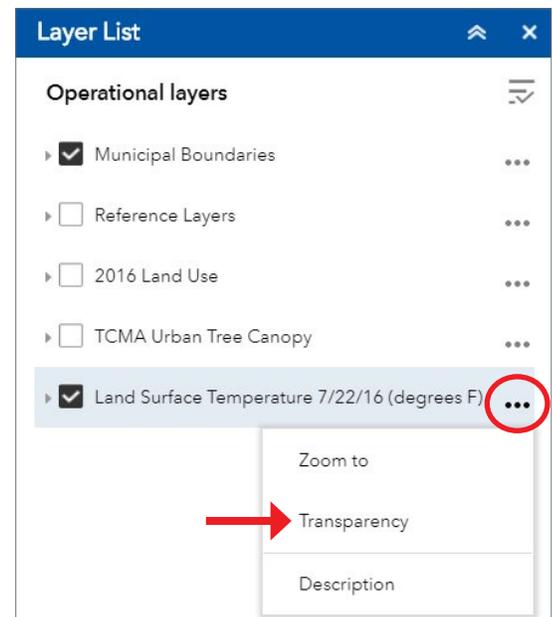
Layers chosen from the layer list will show in the legend.

## Transparency

One good way to assess what may be exacerbating or mitigating extreme heat is through use of the transparency setting. You can set transparency with any layer in the Layer List by clicking the three dots to the right of the layer. You can set transparency from 0% to 100%.

For instance, if you would like to see which types of land covers increase heat in certain areas, you may wish to first view the Land Surface Temperature by Temperature Range by turning on that layer, then turn on and set the TCMA Urban Tree Canopy layer transparency to 50%. This allows the user to see what types of land cover are causing an increase in temperature. By increasing the transparency to 60% and switching to the Land Surface Temperature Mapped by Standard Deviation, you can see, with clear delineations, what type of land covers increase the surface temperature in given areas.

You can enhance your assessment by combining use of setting the transparency with the Swipe Tool and use of the two different basemaps.

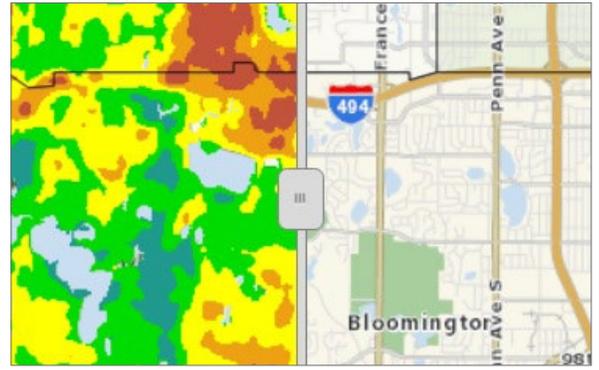


The screenshot shows the 'Layer List' panel with a list of layers. The 'Land Surface Temperature 7/22/16 (degrees F)' layer is selected and highlighted. A red circle highlights the three dots menu icon to the right of this layer. A red arrow points to the 'Transparency' option in the dropdown menu that appears.

## Swipe Tool

The Swipe Tool is good for comparing layers in quick succession, especially if using the transparency setting becomes visually challenging due to the sheer number of colors on display. For instance, a user may wish to turn on the Land Surface Temperature Mapped by Standard Deviation layer, along with the 2016 Land Use data layer. The display map will show the 2016 Land Use layer in full because it is on top of the temperature layer within the Layer List.

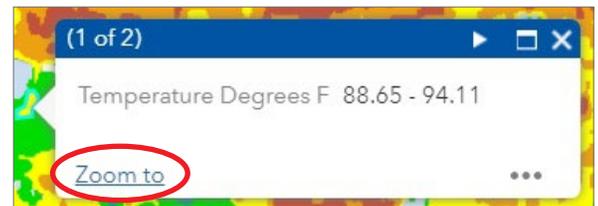
To use the Swipe Tool, click on the Swipe Tool button (3rd button from the left), in the top right corner of the map. Since the 2016 Land Use data layer is currently on top of the temperature layer, you will choose 2016 Land Use as the layer you want to swipe to reveal the temperature layer underneath.



In this example, you can see how different land uses may increase or decrease the surface temperature. To increase your understanding of the relationship between land use, extreme heat, and the built and natural environment, you may wish to set the temperature transparency to 50% and change the basemap to Imagery. You will still be able to swipe across to see how land use affects heat, but you will also be able to see the imagery of the physical and natural environment through the temperature layer.

## Surface Temperature Range by Location

To see the land surface temperature standard deviation range at any location, click on the map to find the standard deviation temperature range for each location. You can then click 'Zoom To' to zoom into that location. You may wish to have a look at the Imagery basemap or TCMA Urban Tree Canopy layer to see what site features may be causing the temperature range.



## Basemap Gallery

In combination with the two functions highlighted above, it is advisable to change basemaps using the Basemap Gallery button, from the Metropolitan Council basemap to the Imagery basemap. This button is found in the upper right portion of the map, to the right of the Swipe Tool.

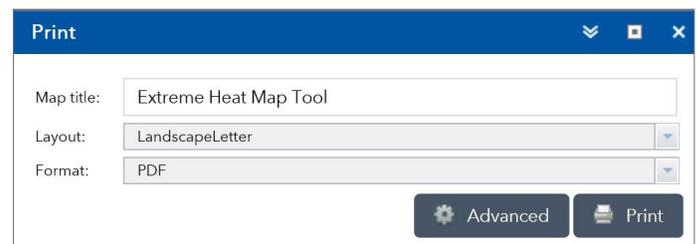
In some instances, it may be advisable to use one basemap over another. The Imagery base map is great to use when you have set transparency and wish to see through the temperature layer, for instance, to the physical and natural environment beneath.



## Print

By clicking this button, located next to the About button, the default settings appear for printing.

Click Print.



After the map is generated, click the title of the map in the list to open it (and download/save if desired).

Clear the print list when done making the maps you want.



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