Numerical summaries and raster data of vegetation indices and land surface temperature derived from remotely sensed imagery

Stuhlmacher, M.[1], Earl, S.[2], and Watkins, L.[1]

[1] School of Geographical Sciences and Urban Planning, Arizona State University, PO Box 875302, Tempe, AZ 85287-5302
[2] School of Sustainability, Arizona State University, PO Box 875502, Tempe, AZ 85287-5502

Abstract:

We present a dataset of remotely sensed variables for use by stakeholders and researchers studying Central Arizona and the Phoenix metropolitan area. The dataset contains two vegetation indices—Normalized Difference Vegetation Index (NDVI) and Soil Adjusted Vegetation Index (SAVI)—and land surface temperature (LST) from remotely sensed imagery. NDVI and SAVI are calculated from the 2010, 2013, 2015, and 2017 NAIP imagery (1m resolution, summertime data collection). LST is calculated from Landsat 5 and 8 imagery (30m resolution) from cloudless days in July and August in 1985, 1990, 1995, 2000, 2005, 2010, and 2015. All images are cropped to the CAP study area boundary. Also included are tabular summaries of the mean, median, minimum, maximum, and standard deviation of the NDVI, SAVI, and LST values for the 2011 and 2017 Phoenix Area Social Survey boundaries (45 and 12 neighborhoods, respectively).
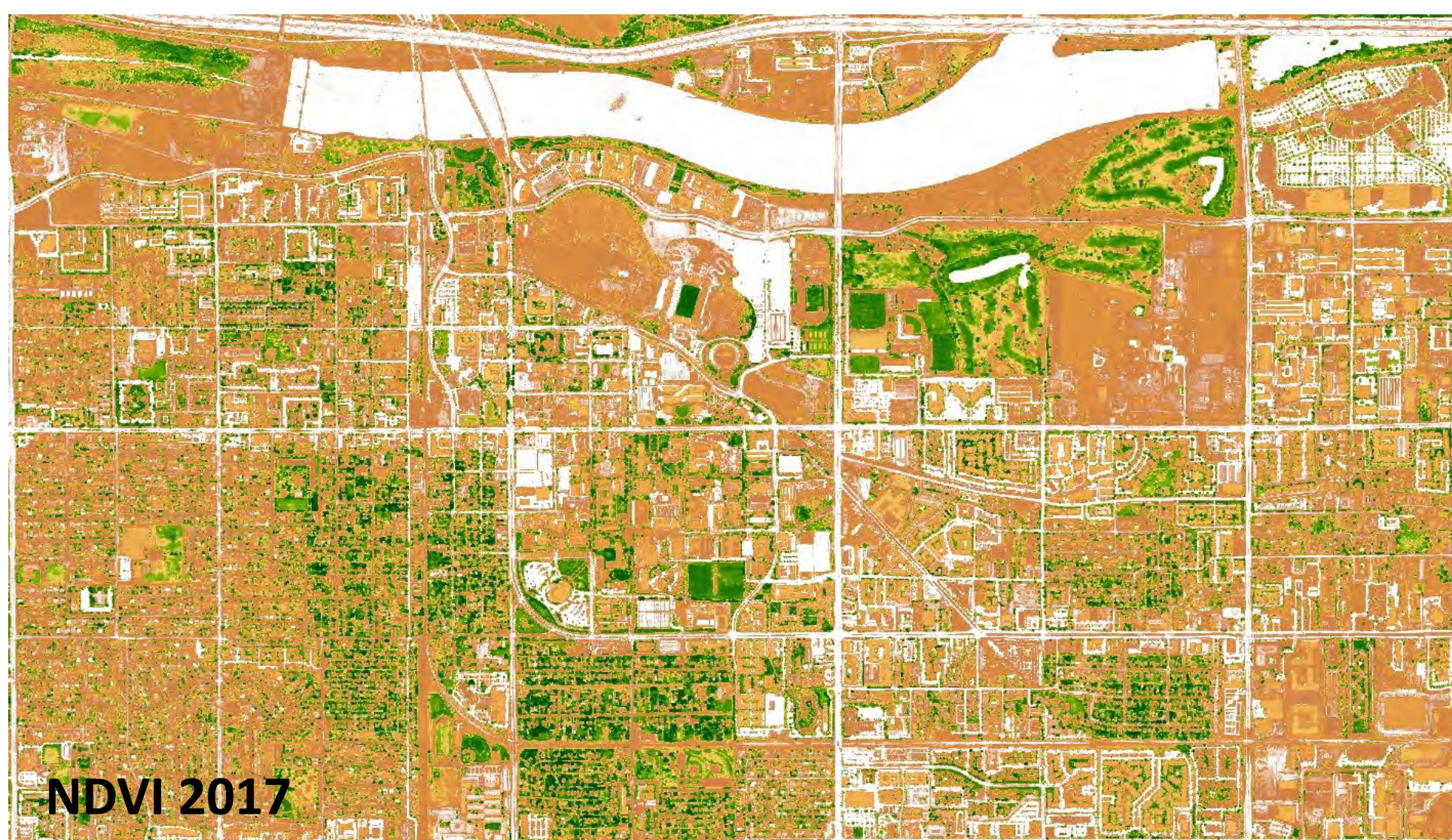
Datasets:

NDVI (Normalized Difference Vegetation Index)

NDVI is a common vegetation index created by taking the normalized difference between the red and near infrared band. It is used to measure vegetation presence and health.

Imagery Source: NAIP
Spatial Resolution: 1m
Years: 2010, 2013, 2015 & 2017 (summer)

NDVI 2017

Data, methodology & documentation for the four sets of imagery are available tinyurl.com/yfc52poq or via this QR code:
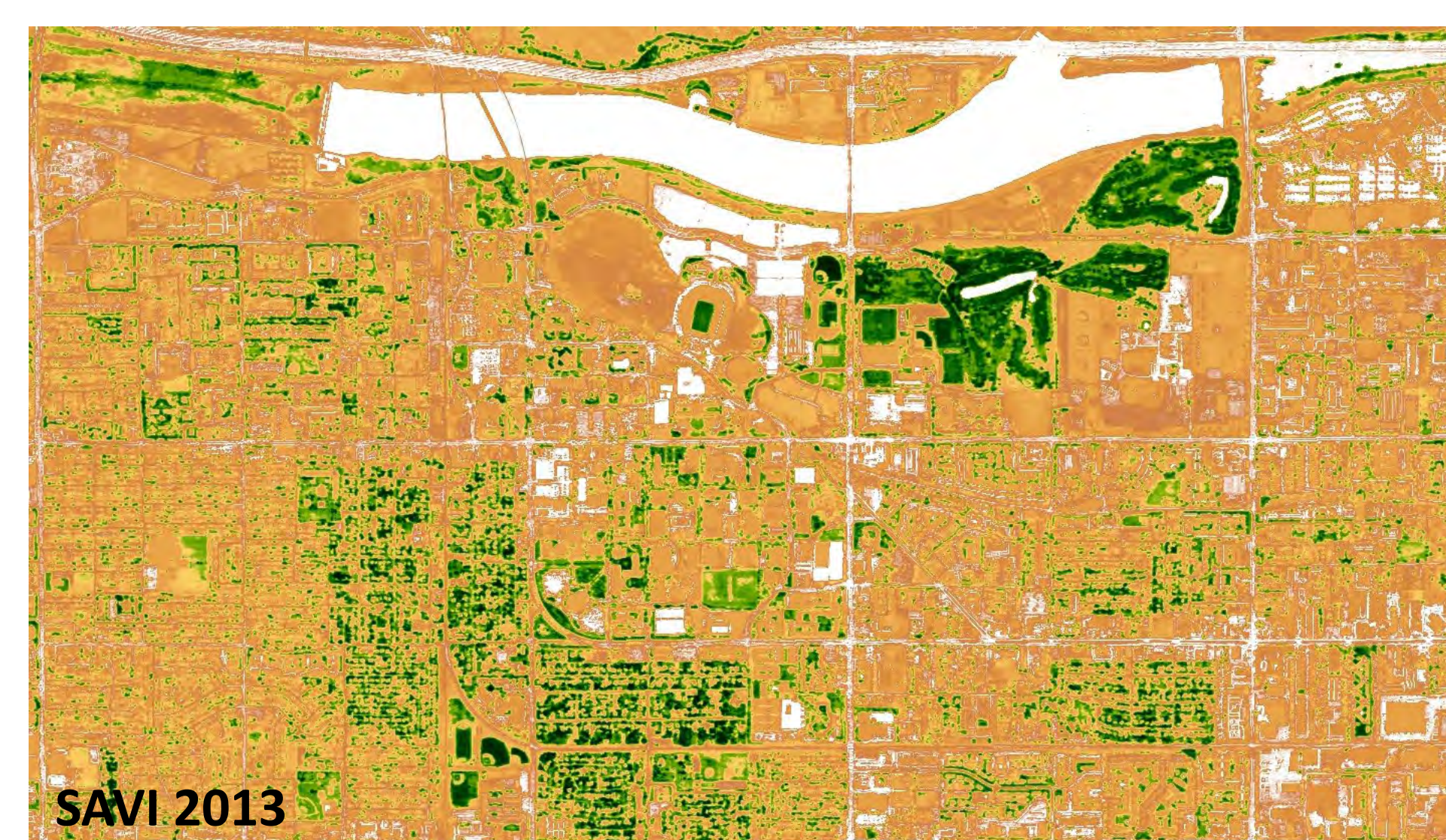
SAVI (Soil Adjusted Vegetation Index)

SAVI is a vegetation index that uses a similar method to NDVI but corrects for the influence of soils. It is used to measure vegetation presence and health and is especially appropriate for use in desert areas.

Imagery Source: NAIP
Spatial Resolution: 1m
Years: 2010, 2013, 2015 & 2017 (summer)

SAVI 2013

Data, methodology & documentation for the four sets of imagery are available tinyurl.com/yff2bz97 or via this QR code:
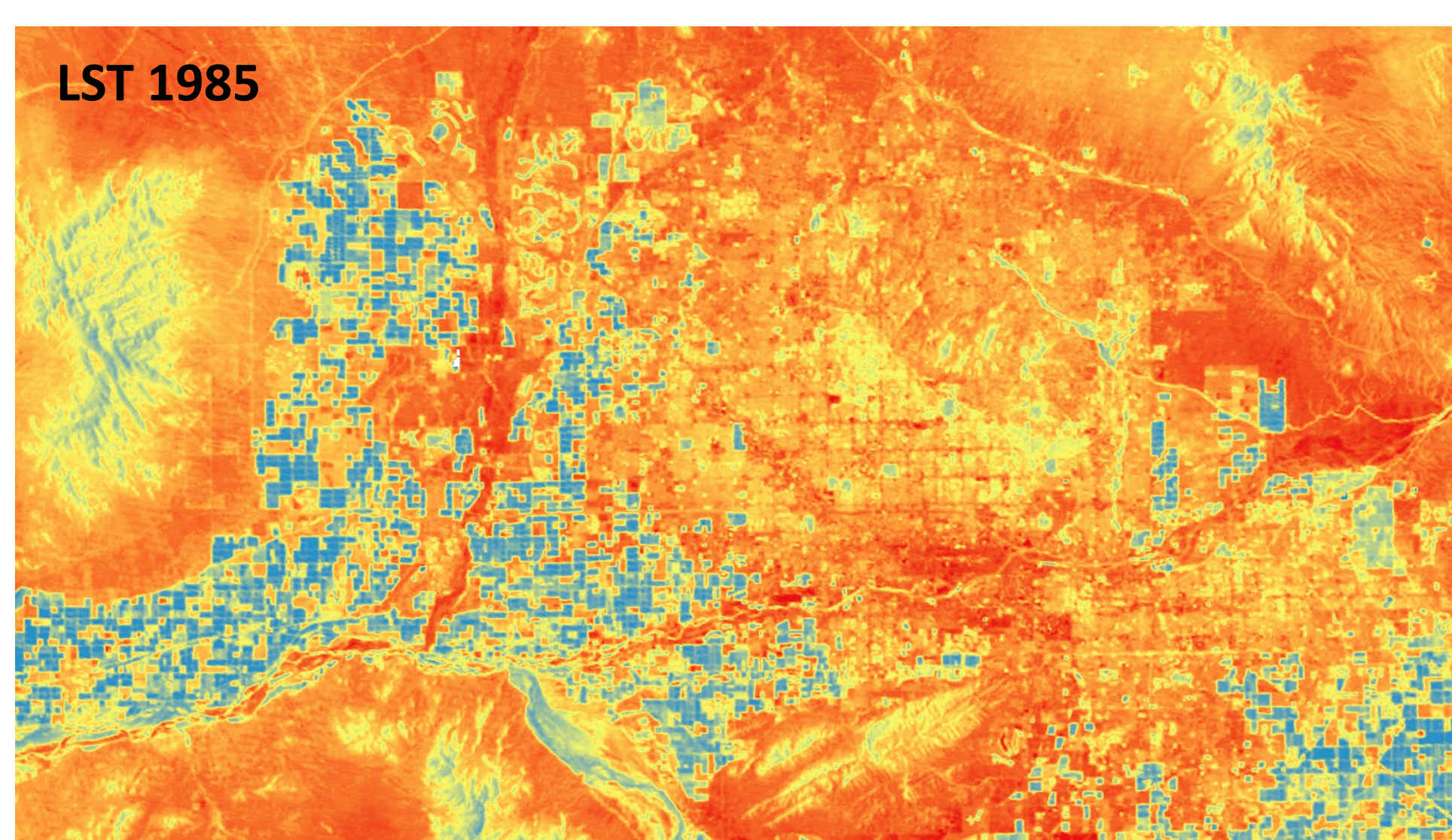
LST (Land Surface Temperature)

LST is derived from the thermal band of Landsat satellites to produce a temperature measure of the ground at the time the satellite passed over. LST is correlated with air temperature and used as a proxy climate variable.

Imagery Source: Landsat 5 & 8
Spatial Resolution: 30m
**Years:** 1985, 1990, 1995, 2000, 2005, 2010 & 2015 (summer)

LST 1985

Data, methodology & documentation are available at tinyurl.com/ygucuzle or via this QR code:

Numerical Summaries

Tabular summaries of the mean, median, minimum, maximum, and standard deviation of the NDVI, SAVI, and LST values for the 2011 and 2017 Phoenix Area Social Survey (PASS) boundaries.

CAP Boundary
2011 PASS Neighborhoods & Census Block Groups
2017 PASS Neighborhoods
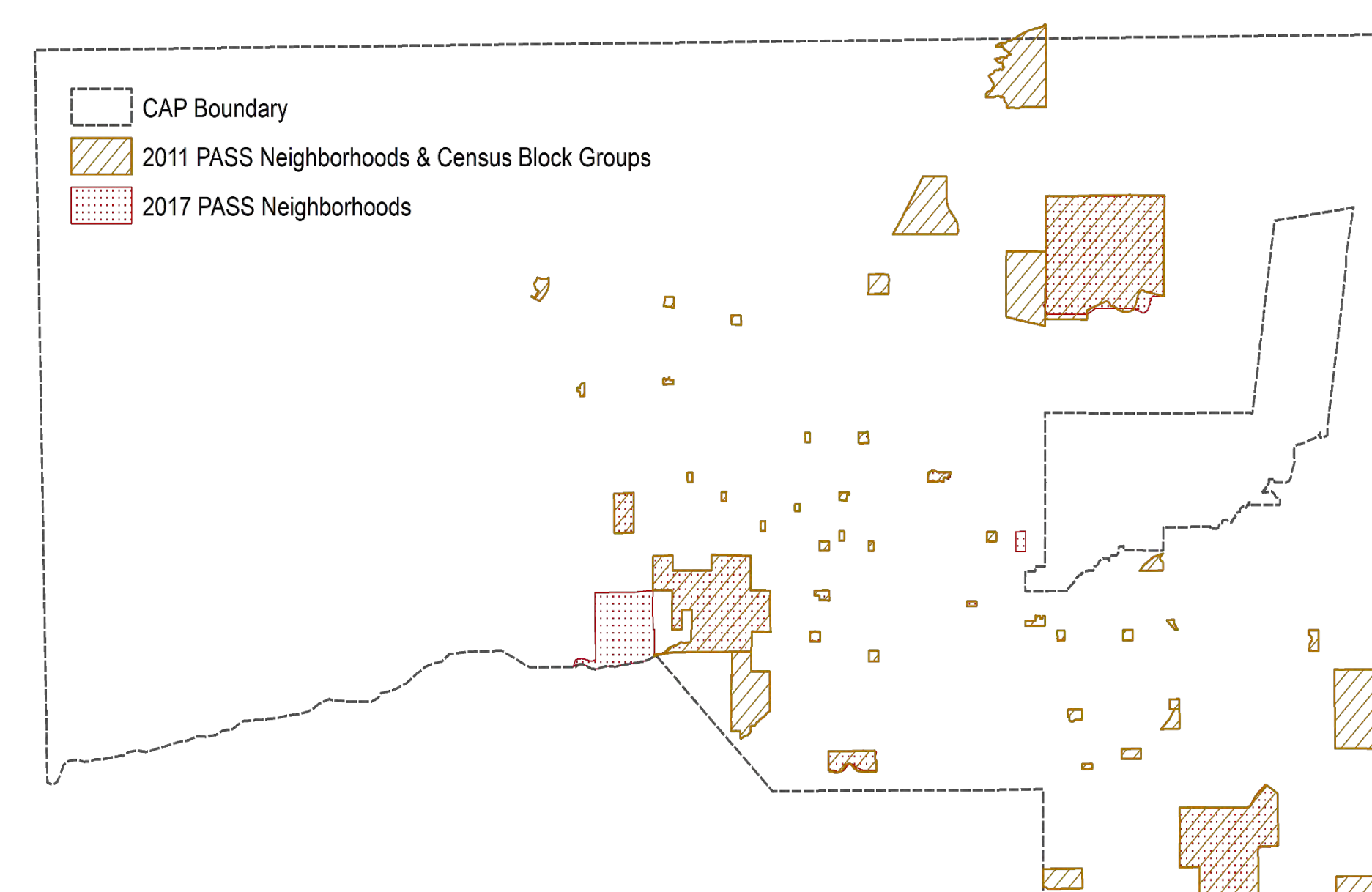
Data, methodology & documentation are available at tinyurl.com/ydq4chk or via this QR code:

Methods

All imagery was processed in Google Earth Engine. NDVI and SAVI are computed using National Agriculture Imagery Program (NAIP). Land surface temperature (in Celsius) was calculated from the USGS provisional surface temperature product which is derived from Landsat 5 & 8 imagery. Tabular data was processed using R. Java Script and R source code are available, along with complete documentation via the LTER data portal links above.

Acknowledgements