

## Introduction

This study undertakes a multi-scale investigation of predicted Land Surface Temperature (LST) at the regional and county levels in the Miami Metropolitan Statistical Area (MSA) using MODIS on the Aqua and Terra satellites. The study objectives are to: (1) predict LST for the years 2025, 2035, 2045, and 2055; (2) investigate how changing the amount of NDVI affects LST values; (3) analyze future predictions of LULC and examine patterns of expected change in built areas; and (4) determine future trends in population within the study area.

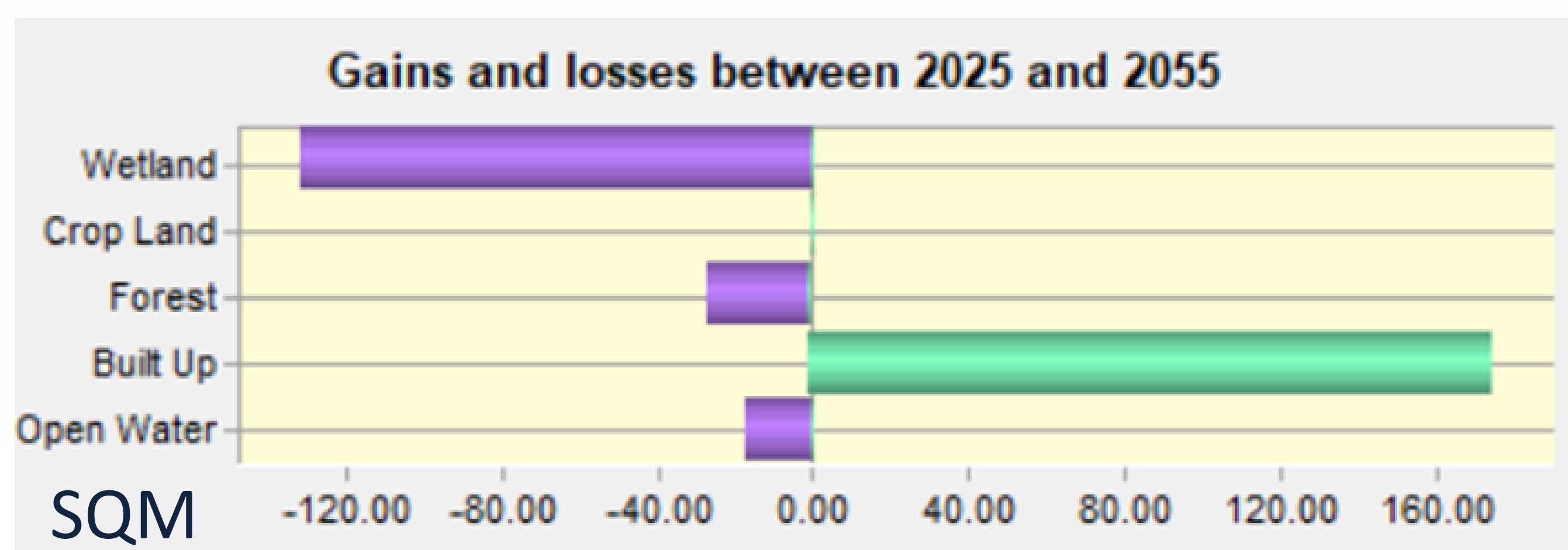
## Methods

**Study Area:** Miami Metropolitan Statistical Area including Palm Beach, Broward, and Miami-Dade Counties.

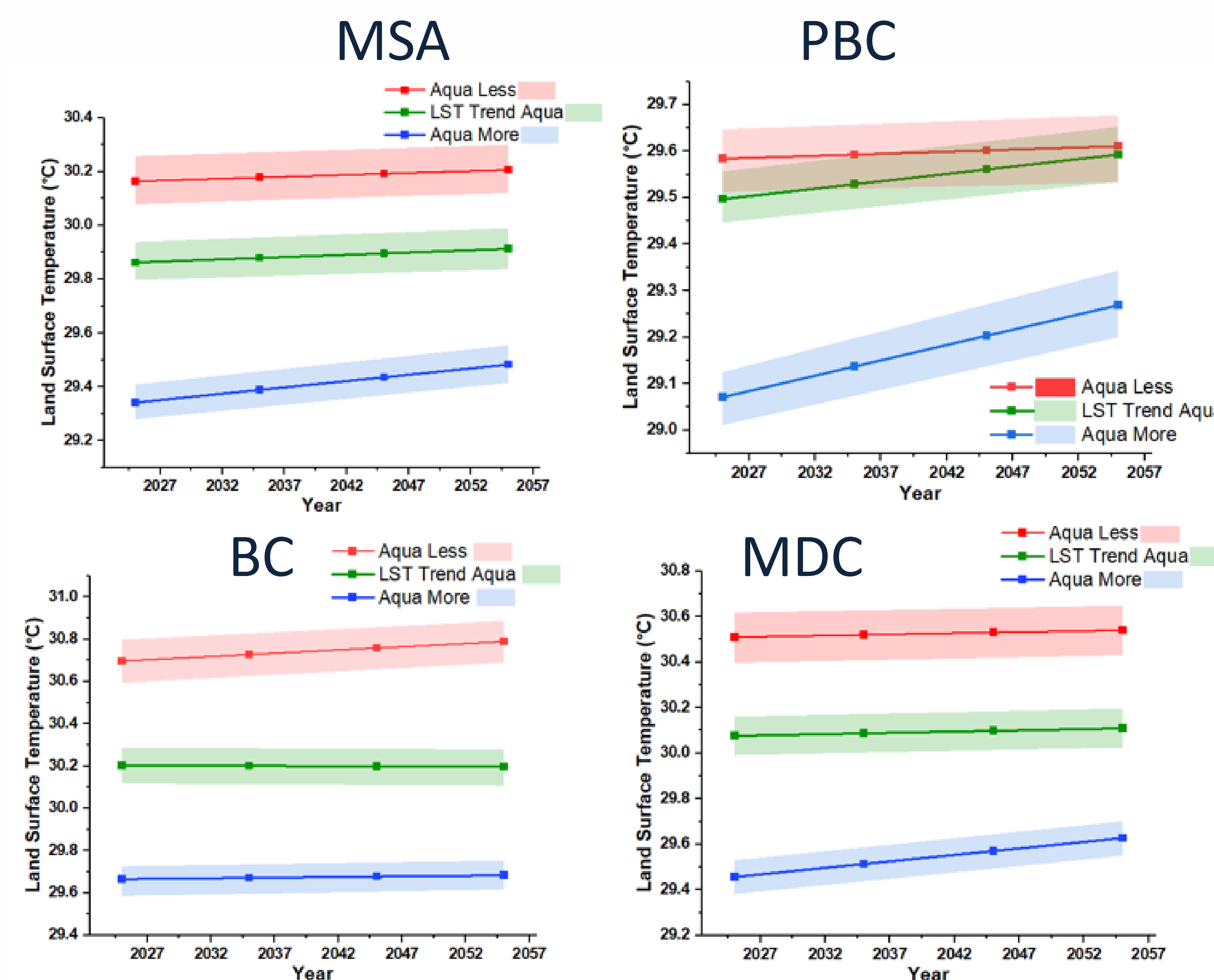
**Data Used:** Terra and Aqua daily Land Surface Temperature (LST) and emissivity (MOD11A1) collected through Google Earth Engine (GEE); NDBI, NDVI, Modified Normalized Difference Water Index (MNDWI), and Air Temperature; and LULC and population density.

**Method:** Artificial Neural Network (ANN) to forecast predicted LST for the years 2025, 2035, 2045, and 2055.

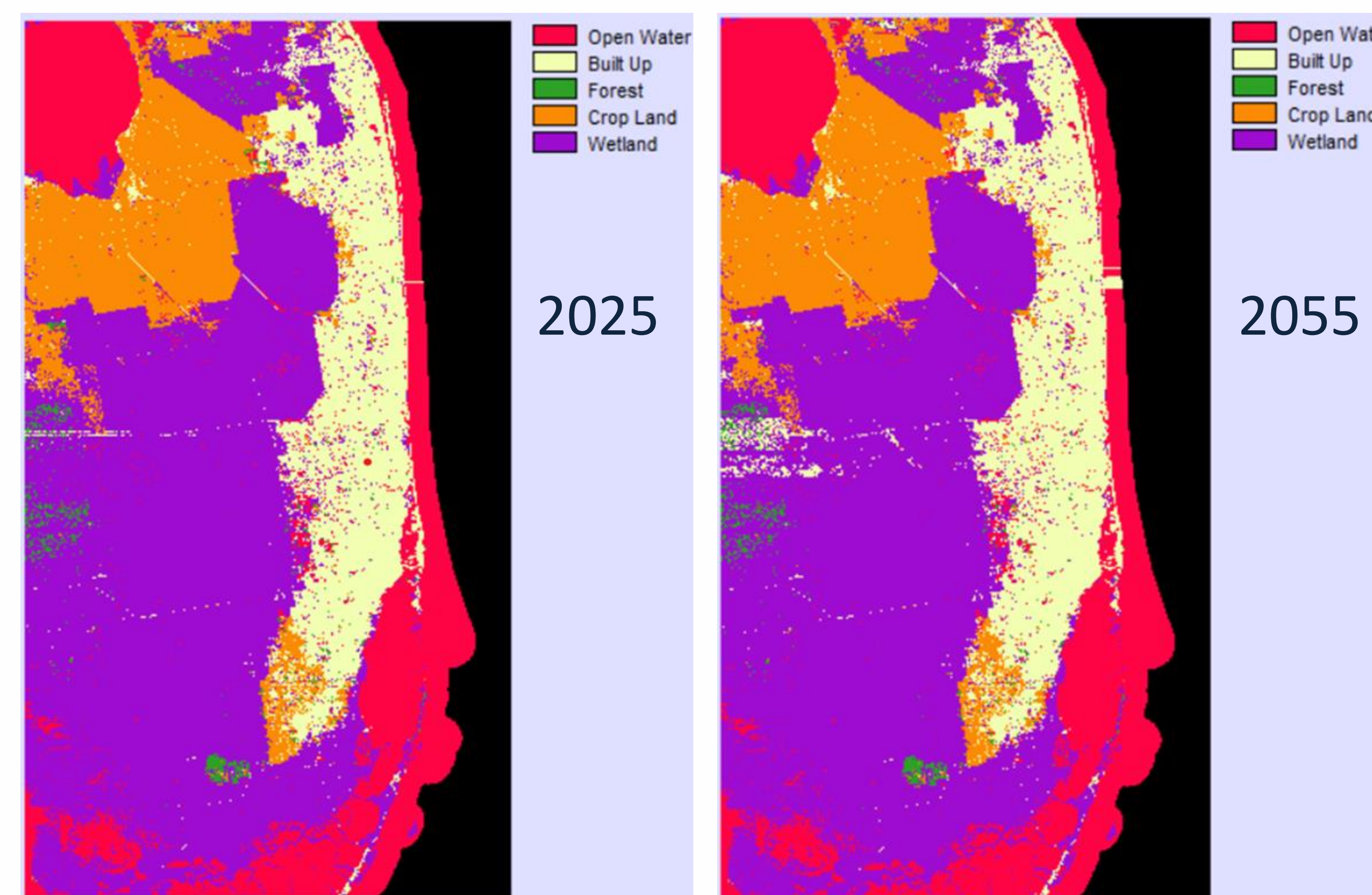
Scenarios showing the impact of changes in NDVI as a potential mitigation tool for LST.



LULC was reclassified into five different classes: Open Water, Built Up, Forest, Cropland, and Wetland. The LULC predictions used TerrSet Geospatial Monitoring and Modeling software on the Land Change Modeler.



Above graphs showing the LST in Aqua MODIS satellite



Contact info:  
Alanna Shapiro  
[alannashapir2021@fau.edu](mailto:alannashapir2021@fau.edu)

## Results

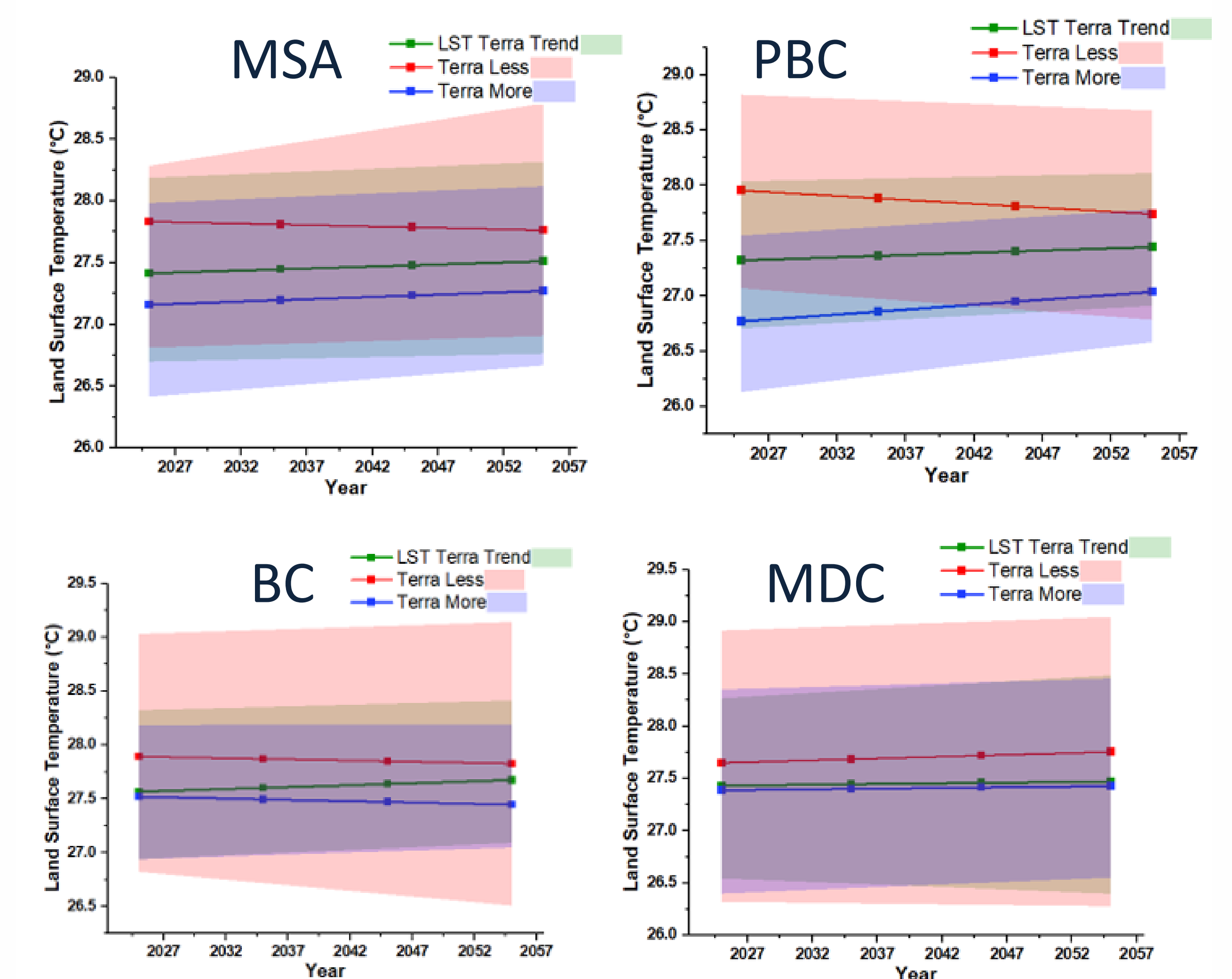
NDVI change scenarios result in Land Surface Temperature (LST) changing. A 20 percent increase in NDVI results in predicted LST falling by a full degree suggesting that adding greenery can be an effective mitigation measure.

Between 2025 and 2055, predicted development increases in western wetlands areas as well as eastern coastal areas. Built-up land is predicted to increase by over 170 SQM. Wetlands decrease by over 120 SQM, forest lands by 30 SQM, and open water by 20 SQM.

Future topics:

Investigate why large differences exist between Aqua and Terra satellites.

Add health issues into the predictions and predict incidence rates.



Above graphs showing the LST in Terra MODIS satellite