

# Effects of climatic factors on green roof evapotranspiration via different vegetation

Toby Brotherton<sup>1</sup>, Westminster College

Research Mentors: Steve Burian<sup>2</sup>, Youcan Feng<sup>3</sup>, Thomas Walsh<sup>4</sup>, University of Utah



What climatic factors create the most variation in evapotranspiration (ET) rates of green roofs with *Sedum* species, *Poa pratensis*, or no vegetation (i.e. control)?

How is ET of vegetation types impacted by high temperatures and/or low humidity, and to what extent?

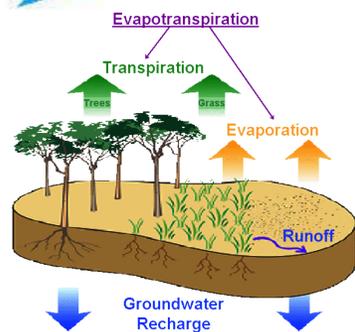


Figure 1. Basic diagram showing the ET process (Source: bionews-tx.com).

Figure 2. A weighing lysimeter on a green roof in the UK similar to those used in the study. Weighing lysimeters consist of a plant bed on a scale. (Source: fondriest.com)



## Research Methodology

Three weighing lysimeters are used to measure ET after point of soil saturation. The lysimeters are vegetated with *Sedum* species, *Poa pratensis*, or no vegetation (i.e. control).

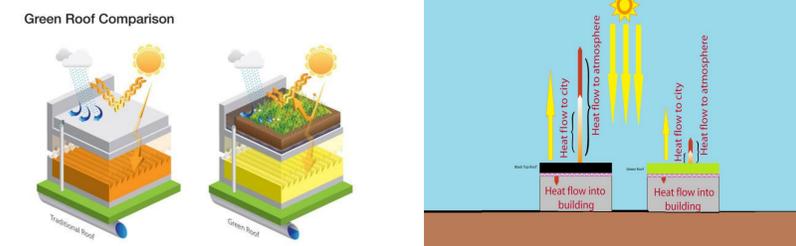
Changes in the differences between ET rates for each given day will be compared with climatic data for the respective day



Figure 3. Three lysimeters used on Marriott Library green roof. From left to right: bluegrass, sedums, non-vegetated.

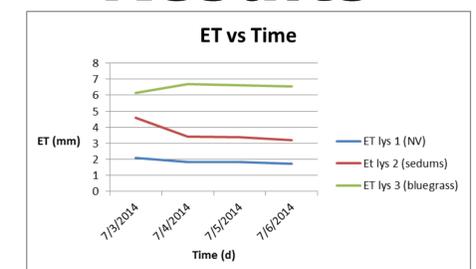
## Impacts

In order to implement green roofs most efficiently and best utilize their benefits, it is important to understand the water retention properties of the plant species on the roofs and how these species react to different climates.



Figures 4, 5. Schematics detailing some of the benefits of green roofs. (Source: greenroofguide.co.uk)

## Results



- Temperature has most effect on ET, with relative humidity being the second most important factor.
- More data is needed to examine effects of soil moisture and compare differences in ET between species.

## IFELLOWS UNDERGRADUATE RESEARCH PROGRAM



1tab0531@westminstercollege.edu  
 2steve.burian@utah.edu  
 3youcan.feng@utah.edu  
 4thomas.walsh@utah.edu



<http://iutahepscor.org>

