Rain as a Resource -Green Infrastructure as a Storm Water Management Technique

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Table 1- Flow rate change

The above tables show a decrease in flow rate with implemented GI (green infrastructure) over a 2 year and 100 year time period using EPA calculator.

Introduction

The primary impact of urbanization to water resources is the increase in impervious surfaces from buildings, parking lots, and transportation corridors. This hardening of an urban watershed can dramatically increase runoff, creating more extreme and more frequent flood events, as well as reducing recharge to groundwater and summer base flows. Urbanization also results in an increase in the types and severity of pollutants. Green Infrastructure (G.I.) can mitigate against these impacts. Green infrastructure includes landscape features such as infiltration basins, green roofs, vegetated filter strips, etc. This research explores various GI and how they can positively impact and increase the Utah State University's campus resiliency, mitigate against climate change, and improve water quality.
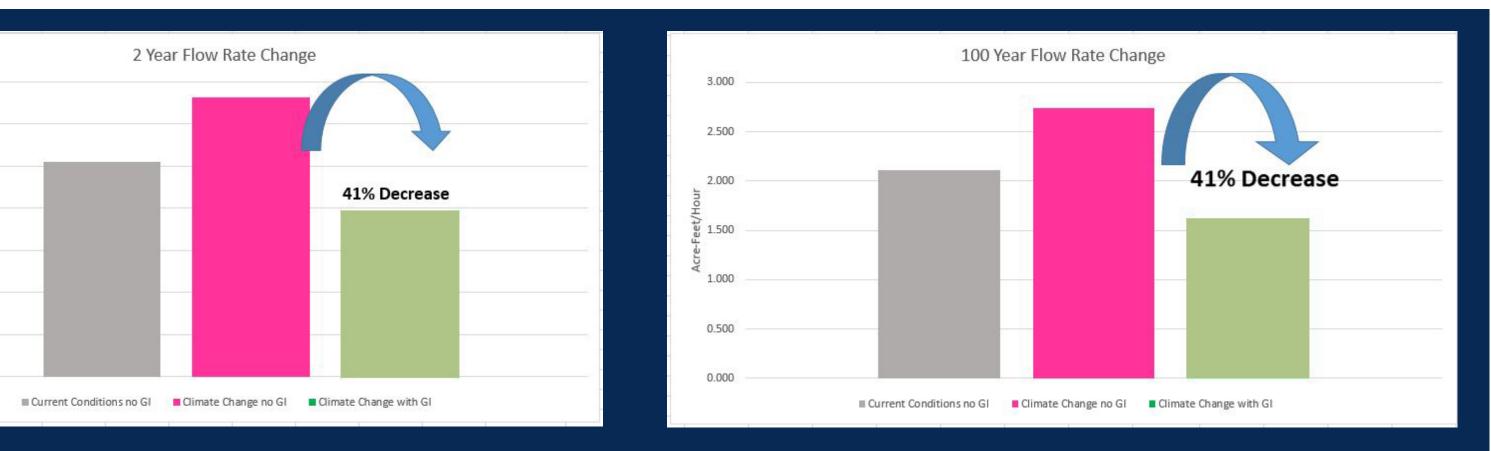
Methods

A design was developed by a multi disciplinary team in coordination with facilities to produce a design to compliment the campus master plan.

Geographical Information System programing, EPA storm water modeling, behavioral analysis, and other site analysis techniques were used before and after to verify the effectiveness of the plan.

Figure 1 – Green Roof Display

A green roof display (in construction) is the first phase in collecting quantifiable data and providing educational G.I. information regarding green roofs. Measurements will be taken using tipping buckets, thermometers, to determine effectiveness in mitigating "heat island effect" and flow rates.

Figure 2 – Perspective of USU library

The following is a perspective of the Merrill-Cazier library at Utah State University could look like with various BMPs implemented.

Results

- Reduction in impervious area by 22% or 74 acres
- Reduction in runoff rate from existing conditions by 41% in 2-year, 24 hour design
- Significant improvement in stormwater pollutant load.
- Reduction of high water use vegetation by 25%
- Increase native plant communities by 24.28 acres
- Increase green roof area by 28.52 acres

Conclusion

G.I. is effective in reducing run off rates, improving stormwater water quality, and with the incorporation of native plant use can reduce landscape water requirement and increase urban habitat.

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