

## Project B2-1: Effects of Green Infrastructure on Urban Systems

### PROJECT OUTPUTS

The project will result in information that enables better implementation of GI at either local, lot or city-scale.

We have also an emergent citizen science aspect of our project where folks can take pictures of GI and observe how water presence changes over time. While our citizen science program is not yet active, we have some tests being developed for this upcoming spring (2017).

This project is also linked with two other UWIN projects focused around flood hydrology and urban floodplains. Click on the links below to learn more about these research projects:

- [B2-2a: Flood Hydrology and Rainfall Frequency](#)
- [B2-2b: Hydrology and Hydraulics of Urban Floodplains](#)



Pictured above: example of citizen science observational data.

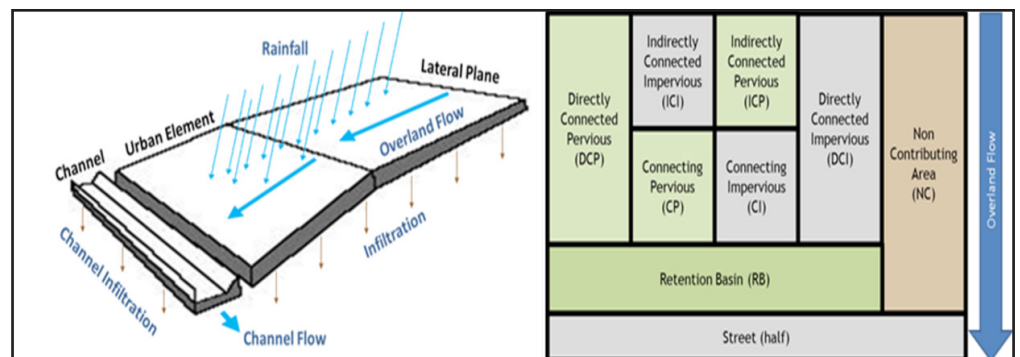
**W**ater sustainability and protection from flood hazards are key challenges in sustaining urban areas in a changing world. One solution that has been offered for both of these challenges is the implementation of a low-impact-development practice called green infrastructure (GI).

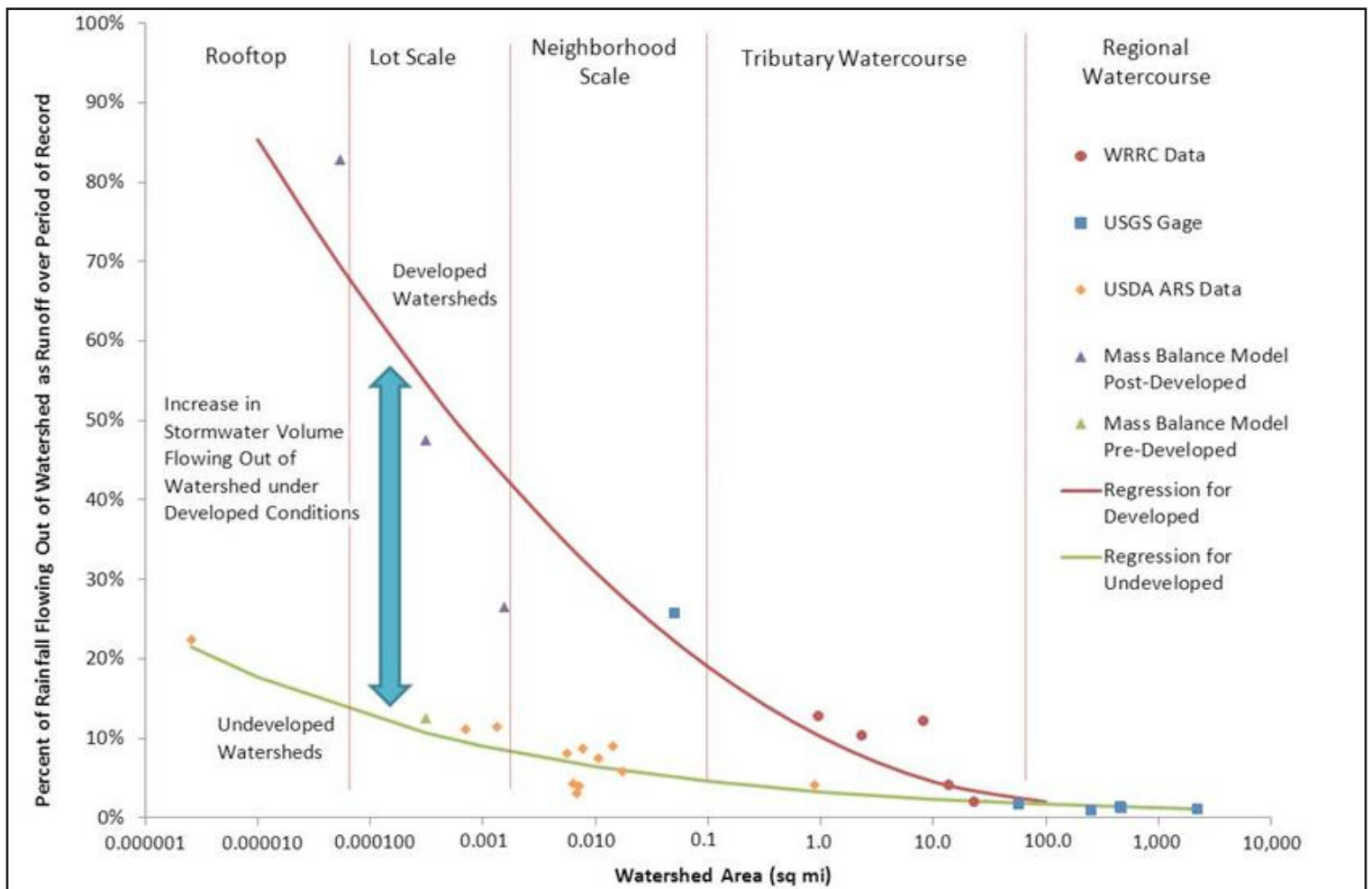
Green infrastructure can take the form of small or large detention basins that capture and infiltrate storm water. GI can also take the form of green roofs, pervious surfaces, and other mechanisms to divert and infiltrate water in urban environments.



Specifically, our team is conducting both observational sciences and modelling to quantify the impact of GI on runoff quantity and quality in urban environments. We are working with collaborators to then further understand how GI can influence flood response in urban environments and determine what level of hazard can be prevented through the use of GI.

These studies involve water quantity and quality observations in select cities to understand the observed impact of GI. We are monitoring streamflow, nutrient export, and other water contaminants. Furthermore, we are also continuing the development and implementation of modelling tools to pursue investigations into which strategies of GI implementation would be most effective at meeting societal goals.





## MODELING TOOLS

We are adapting an existing modelling tool, Kineros2, to simulate urban environments. Kineros2 was originally developed to represent the hydrology of arid and semi-arid hillslopes. The structure of Kineros2 thus depends on representing hillslopes that contribute to a drainage network.

This structure is similar to the problem in urban environments where buildings and parking lots drain to a street network that functions like a channel. Therefore, we are modifying KINEROS2 to represent urban elements like roofs, parking lots, driveways and streets to capture the rainfall runoff processes in urban environments. This modelling work will then be linked to larger scale models representing stream and river networks in cities.

## PROJECT KEYWORDS

- Green Infrastructure
- Urban Environment
- Citizen Science
- Decision-making
- Runoff quality and quantity

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