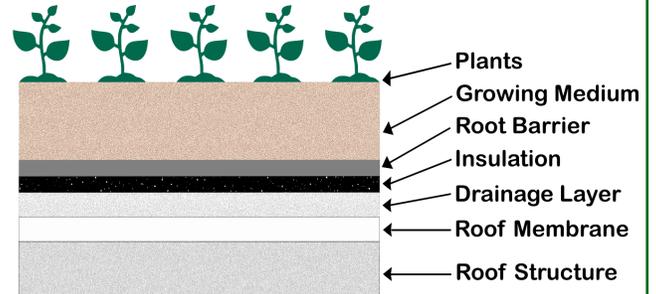


Green Roof Technologies

This flyer is one in a series about green roofs, developed by an Ohio University green roof committee. Our new Schoonover green roof, designed for research, uses much of the technology described here.

Design

- The roof must hold the weight of saturated soil which varies with soil depth, composition and plant choice.
- Underlying layers must protect the roof from root penetration and support drainage.
- Irrigation systems can improve plant growth.
- Sensors are selected based on research or other goals.



Sharing &
Communications



Data Programs



Computers



Dataloggers



Sensors



Green Roof
Conditions

A flowchart showing a monitoring process on a green roof.

Water Quality and Movement

Green Roofs reduce and improve stormwater runoff.

How much water is entering the green roof?

- Rain gauges on a flat, bare surface monitor precipitation rates.
- Moisture sensors in the soil measure saturation.

How much water is leaving the green roof?

- Flow meters in spouts or drains measure runoff volume and flow rate.

What properties do we observe in the water?

- Temperature, conductivity, nutrient levels, pH, and contaminants are measured using sensors and chemistry tests.

How do measurements compare to non-vegetated sections?

- The same measurements are taken in an unplanted part of the rooftop.

Heat and Radiation

Green Roofs lower temperatures and protect the roof through shading and evapotranspiration. Radiation (UV and heat) degrades roofing materials.

How is energy exchange with the surrounding environment measured?

- Radiometers quantify radiant energy inputs and outputs.
- Small data loggers measure temperature, heat stress, and relative humidity.
- Soil probes measure temperature within and on top of the growing medium.

How do measurements compare to non-vegetated sections?

- The same measurements are taken in an unplanted part of the rooftop.

Other Research Technologies

How do we assess the green roof habitat?

- Field sampling of micro– and macroinvertebrates are aided by pit traps and magnifying loupes.
- Cameras can be used to monitor visits by pollinators, birds, and bats.
- Genetic analyses characterize the composition of the microbial community that promotes healthy ecosystem functioning.

How is air quality measured?

- Air quality sensors quantify the particulate matter in the air at regular intervals.
- Soil analyses can indicate changes in air quality when dry deposition of air pollutants occurs.

How is green roof data shared with the community?

- Data can be recorded and shared in real-time on a website linked to the monitoring equipment. Our data and design details can be accessed by visiting our [website](#) (address below).

Schoonover Green Roof Monitoring Equipment



Water flumes direct runoff from each plot and hold sensors to measure water flow and water quality.



Air quality sensors (left) stationed on the walls above the green roof.

Photos: Maddy Salyer



The weather station records relative humidity, temperature, and precipitation.

Energy exchange is measured over vegetated and bare sections of the roof with net radiometers.

Photo: Kim Thompson

For more information, please visit:

www.ohio.edu/sustainability/schoonover-green-roof-project



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