

INSTALLATION AND MONITORING OF RAINGARDENS

**M. Taylor¹, R. Simcock², S. Trowsdale² and J.
Dando³**

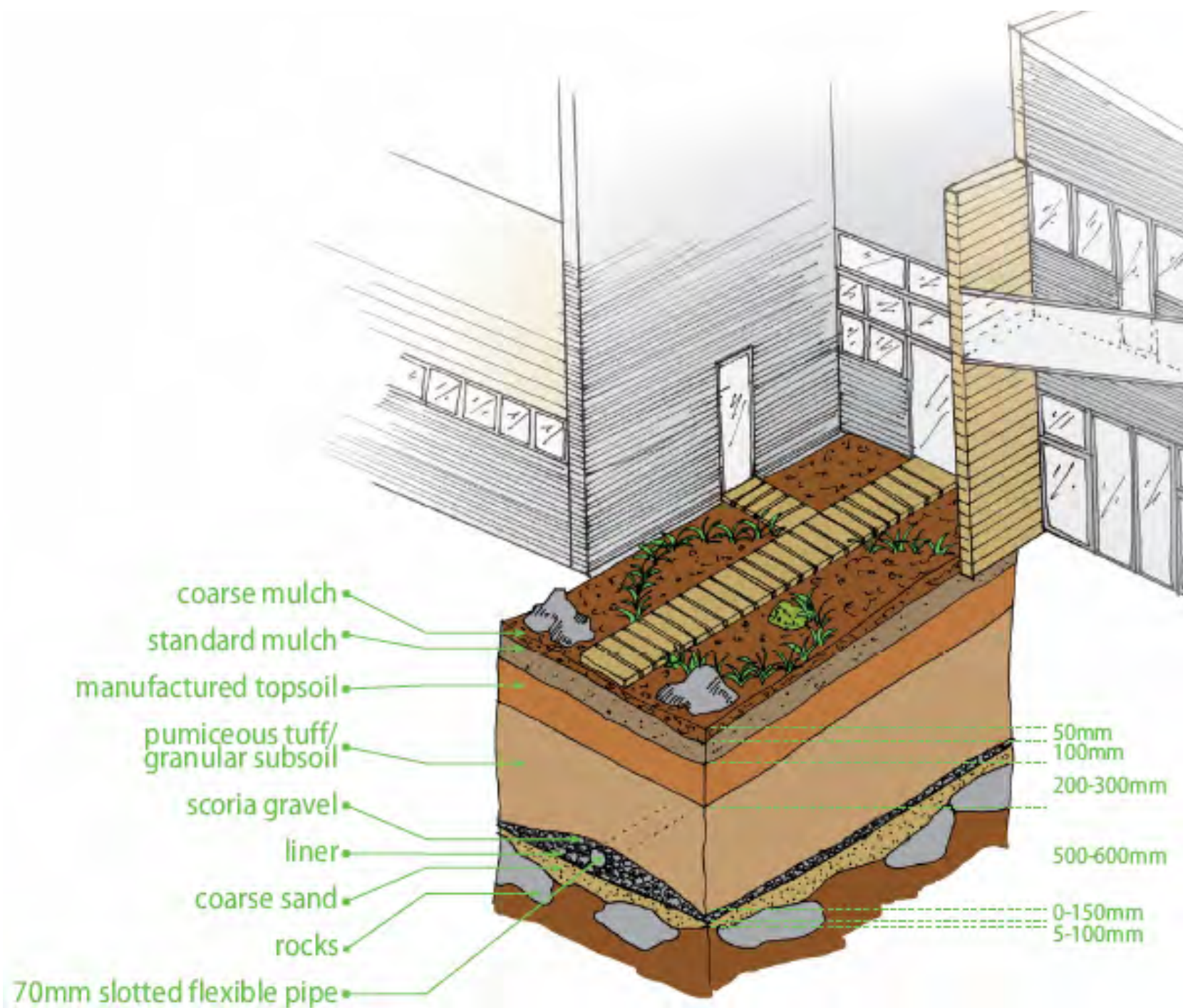
Landcare Research ¹Private Bag 3127 Hamilton,
²Private Bag 92170 Auckland, ³Private Bag 11052
Palmerston North, TaylorM@landcareresearch.co.nz

In this presentation:

- What is a raingarden?
- Why have them?
- Results of field monitoring
- Doing it wrong - Common mistakes
- Good examples

A raingarden is

- a sunken garden into which stormwater flows & temporarily ponds
- a soil plant system designed to reduce stormwater peak flows and contamination, and increase baseflow in urban streams
- increases native biodiversity by using native plants



eg. Tamaki
Raingarden



Why have them?

- Stormwater presents a major disposal issue
- Urban development increases impervious surfaces, reduces infiltration and soils water storage capacity



Raingardens provide

- temporary surface storage
- extended detention within pore space
- removal of pollutants



Paul Mathews Rd, North Shore

Construction

- usually at least 1-1.4 m deep
- additional 150 to 250 mm of freeboard for ponding
- soil materials and mulch
- Under drainage gravel and/or sand
- designed for location

- Events greater than the design storm event usually enter the bypass



Excess water entering the bypass. Note the contractors forgot to install the top rung of the ladder



Choose Substrates with

- minimum infiltration and permeability (50mm h⁻¹)
- high pollutant sorption capacities
- mulches that do not float

Vegetation should

- maximise evapotranspiration
- Improve filtering
- protect the soil surface
- accumulate contaminants
- survive inundation
- minimise weed maintenance/ low maintenance
- have aesthetic value
- be cost effective
- contribution to biodiversity

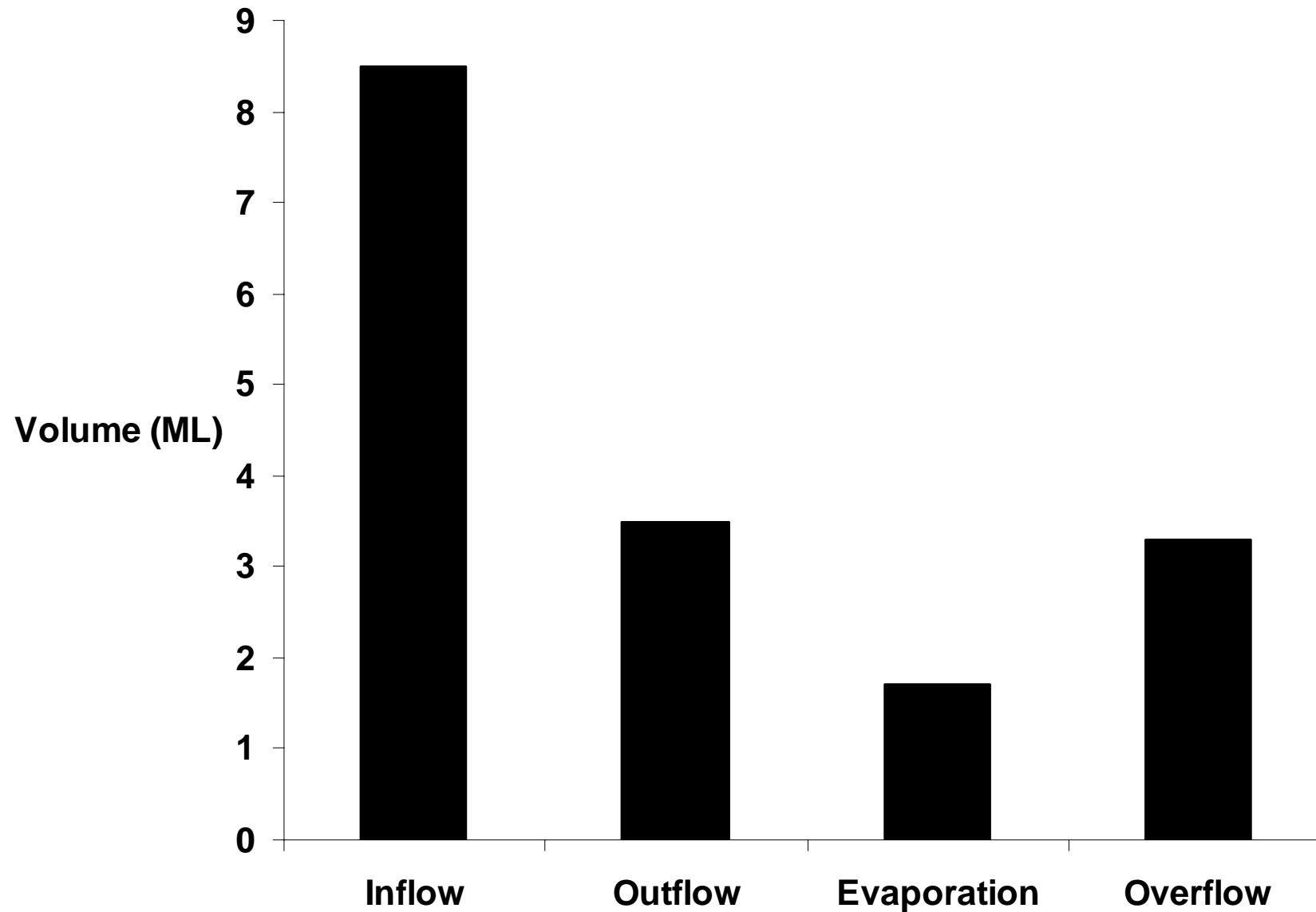
Paul Mathews Rd

- 260m²
- Plants & substrates \$43400
- Piping \$91000
- General construction \$42000



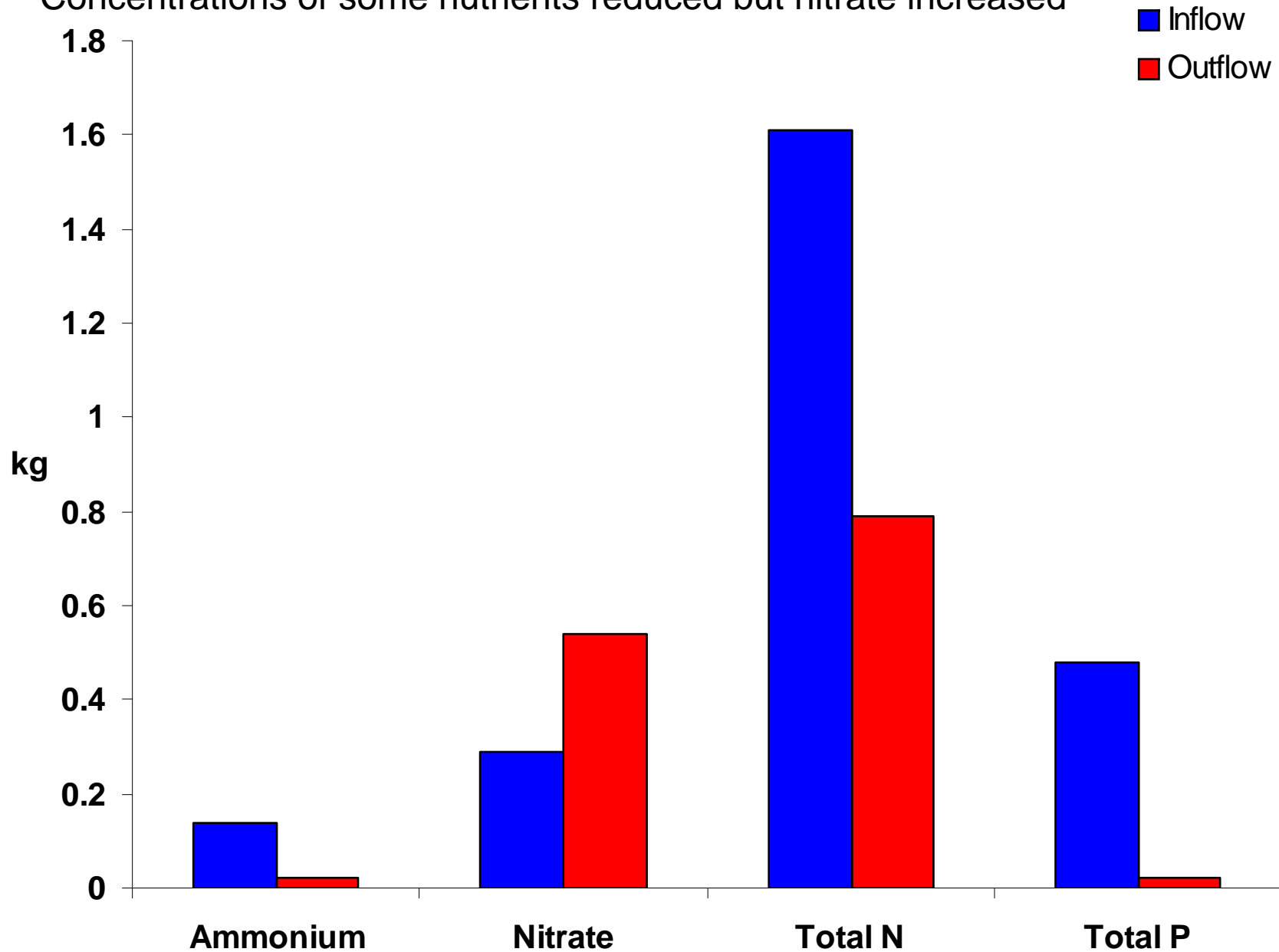
Monitoring – Average of 5 events

Volume of runoff reduced



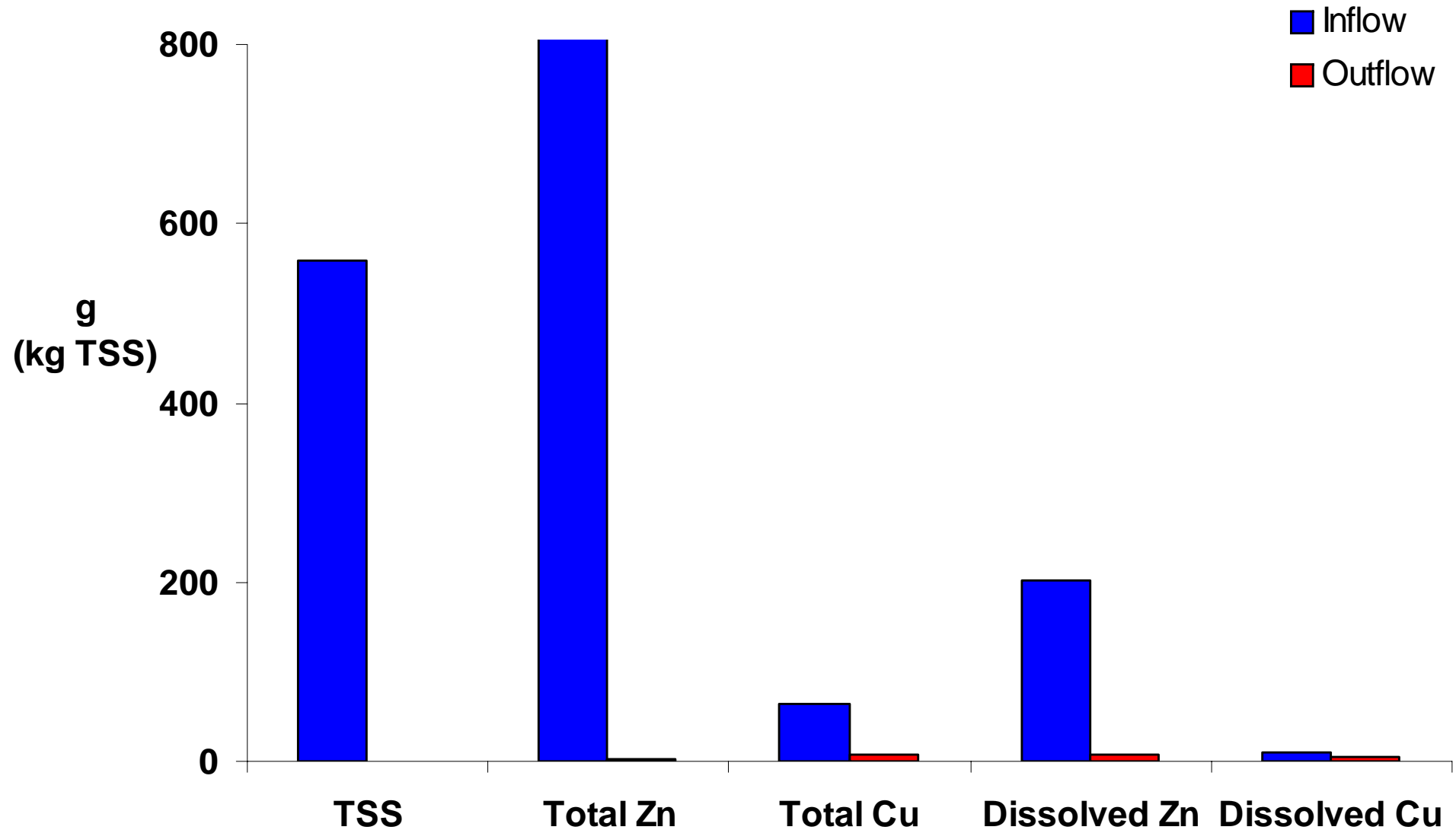
Monitoring – Average of 5 events

Concentrations of some nutrients reduced but nitrate increased

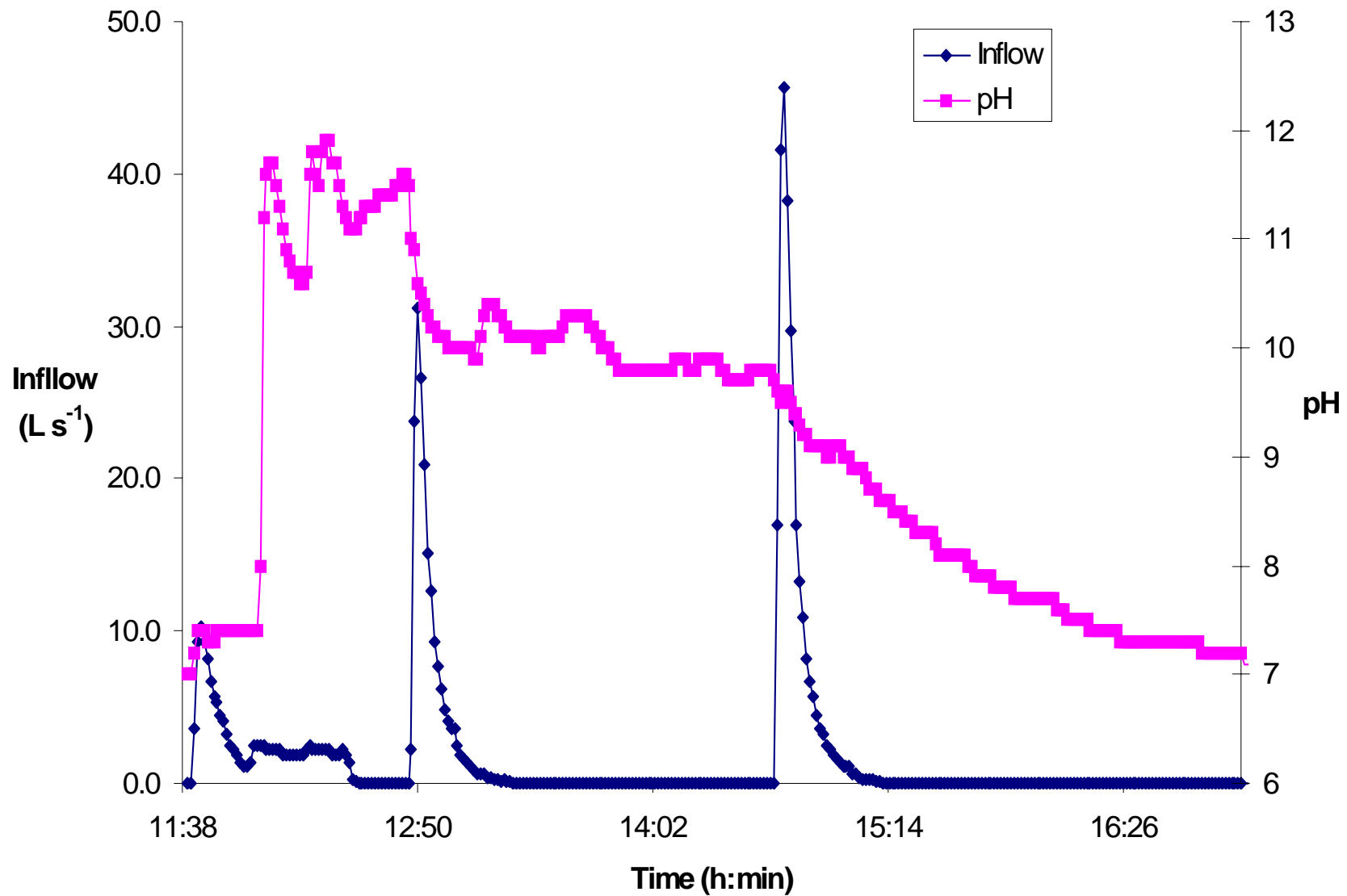


Monitoring – Average of 5 events

Concentrations of sediment (TSS) and metals (zinc & copper) reduced



Rain & Pollution Event 11 August 2006 (probably industrial detergent)



Outflow remains constant at 0.5 L s⁻¹ and pH 7.6

Doing it Wrong

- Compress your raingarden like it was a road



Wash cement into your raingarden



- Plant when the soil is saturated





- Forget to cut entry channels in the curbing

Overfill your raingarden (water flows uphill)





Use fresh (still hot, composting)
garden mix as your substrate



Use mulch that floats



Good Examples



Subsoil with adequate permeability, high pH & phosphate retention



Check infiltration of the limiting layer or horizon



Don't compact your topsoil – no traffic



Disperse the inflow to reduce erosion



Choose the right plants; drought tolerant but copes with being inundated with water; dense ground cover, eg. *Carex* and flax



Mulch that doesn't float



Raingardens can work even on a slope



Conclusions

- Supervise installation closely
- Raingardens
 - Reduce flow volume and flow peak
 - Retard flow
 - Reduce concentrations of sediment, metals and some nutrients
 - But nitrate concentration can be increased