stream restoration projects
Angela Gardner

Top Goals of Restoration

Stabilizing Stream Banks
Developing and enhancing riparian zones
Creating/improving instream habitat
Aquatic organism passage

Nutrient cycling is important to a healthy ecosystem’s overall health and function. It is a dynamic process in a constant state of flux.
differences in reach scale nitrogen uptake between restored and degraded reaches in low-order urban streams

**Hypothesis 1:** restored reaches greater capacity for nutrient retention compared to un-restored streams in the same watershed.

**Hypothesis 2:** Timescale required for reestablishment of nutrient retention can be short and impacted by restoration design strategy.
of NO$_3$ and PO$_4$ with a salt solution for several hours.

Important to control whatever variables you can:

- Site Selection !!
- Flow conditions
- Injection time – diurnal fluctuations
- Disruption to the stream bed/banks
- Proper mixing

\[ A = \text{stream cross-sectional area} \]
\[ A_s = \text{Storage zone cross-sectional area} \]
\[ \alpha = \text{stream/storage zone exchange coefficient} \]
$\text{uptake across 72 culture, urban and reference streams}$

$\text{uptake rate (flux) increased with concentration but efficiency (Vf) increased}$

$\text{restored urban streams = similar patterns at these [NO}_3^-\text{]}$
Seasonal Nitrate Uptake

Age of restoration may have an effect (Muddy Creek, 2011). However, Muddy Creek also had lowest $[\text{NO}_3^-]$

Understanding restored urban stream ecosystems

Influence of carbon and seasonality

Influence of restoration age

Relationship between denitrification, flux rates and graphs of $V_f$

Thank You to:

The Brains:
- Dr. Greg Jennings
- Dr. Sara McMillan
- Dr. François Birgand
- Alea Tuttle

The Brawn
- Wesley Kimbrell
- Bre Long
- Emily Darr