DOC and NO_3^- dynamics in suburban streams of NH

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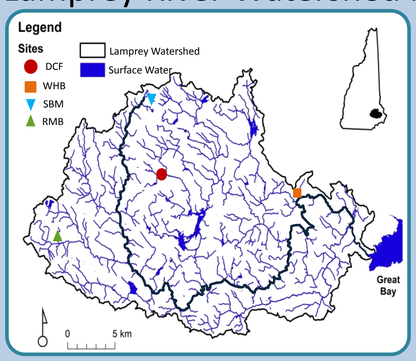
Introduction

- Carbon is a major influence in nitrogen cycling[1,2].
- Strong link between DOC and DIN but few studies have addressed this in streams[1,2,3,4].
- Tracer Additions for Spiraling Curve Characterization[5] method (TASCC) to quantify nutrient uptake.
- We focused on NO_3^- kinetics across multiple TASCC experiments at four study sites.
- **How does carbon availability relate to NO_3^- removal in streams?**

Study Site

Lamprey River Watershed in southeastern NH

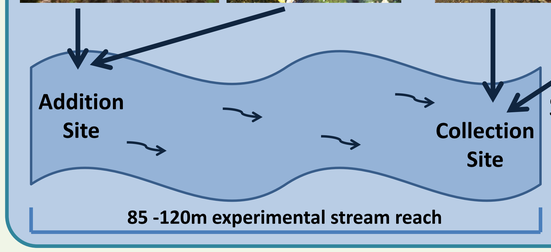


Wednesday Hill Brook (WHB)	Dowst-Cate Forest (DCF)
1st Order	2nd Order
High NO_3^- (804 µg N/L)	Low NO_3^- (55 µg N/L)
Low DOC (4.42 mg C/L)	High DOC (7.44 mg C/L)

Saddleback Mountain (SBM)	Rum Brook (RMB)
1st Order	1st Order
Low NO_3^- (1.96 µg N/L)	Low NO_3^- (63 µg N/L)
Low DOC (1.19 mg C/L)	High DOC (7.48 mg C/L)

Methods

NO_3^- TASCC additions were performed at all sites from April – October 2013 and June – August 2014.



Samples analyzed for: DOC TDN NO_3^- NH_4^+ PO_4^{3-} Cl anions and cations.

Results

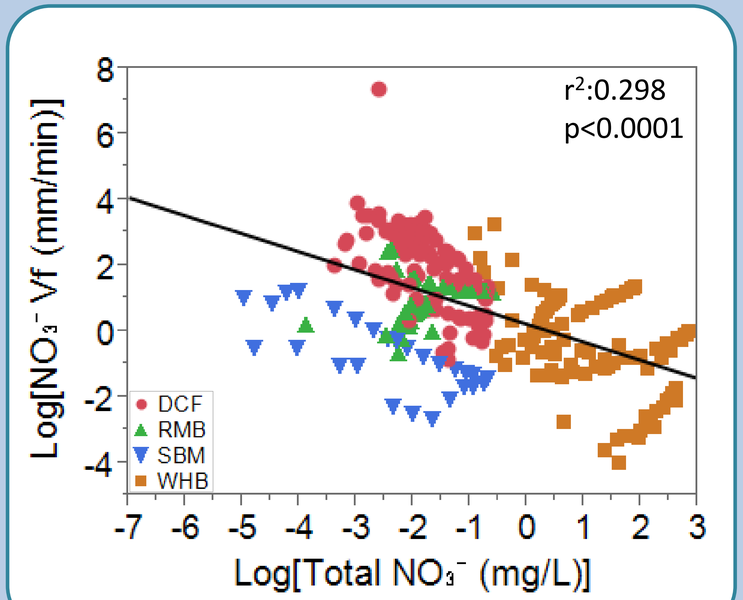


Fig.1. Log transformed experimental uptake velocities for all additions at WHB (orange squares), DCF (red circles), RMB (green triangles) and SBM (blue triangles) against each sample's respective NO_3^- concentration.

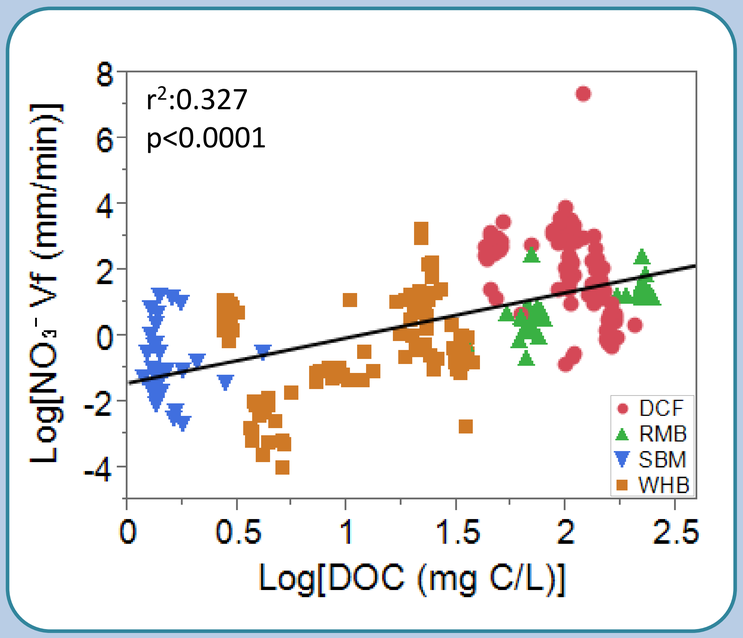


Fig.2. Log transformed experimental uptake velocities for all additions at WHB (orange squares), DCF (red circles), RMB (green triangles) and SBM (blue triangles) against each sample's respective DOC concentration.

Results Cont.

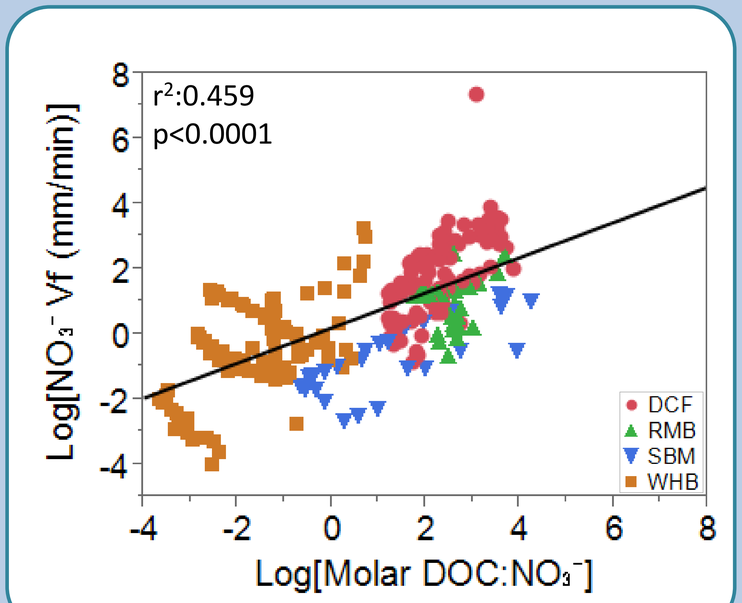


Fig.3. Log transformed experimental uptake velocities for all additions at WHB (orange squares), DCF (red circles), RMB (green triangles) and SBM (blue triangles) against each sample's respective molar DOC:NO_3^-.

Conclusions

- High NO_3^- streams remove less NO_3^- at higher concentrations[6] (Fig 1).
- Streams with high DOC show the greatest NO_3^- removal (Fig 2 and 3).
- Streams with little human development (DCF and RMB) presented the greatest NO_3^- removal.
- More developed (WHB) and steeper slope sites (SBM) presented the least NO_3^- removal.

Acknowledgements and References

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[1]Bernhardt et al. 2002, [2]Taylor and Townsend 2010, [3]Richey et al. 1985, [3]Bernhardt and McDowell 2008, [5]Covino et al. 2010 , [6]Mulholland et al. 2008