The Effects of Land Use on Nutrient Content in the Streams of the LaMoille River Basin

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Introduction

- Does the land surrounding stream sites impact water quality?
- Nutrient Sources (Total and Dissolved N and P)
  - Agricultural
    - Manure
    - Fertilizers
    - Pesticides
  - Urban
    - Detergents
    - Pesticides
    - Waste water
    - Industrial waste
  - Forested
    - Decomposition

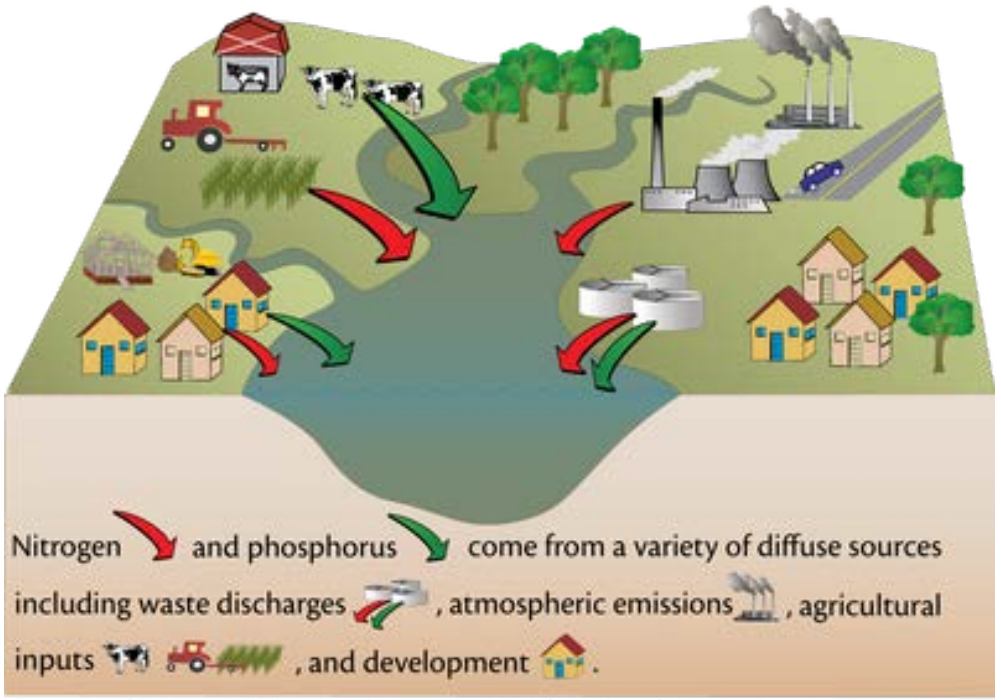

Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Environmental Science. Source: Lane, H., J.L. Woerner, W.C. Dennison, C. Neill, C. Wilson, M. Elliott, M. Shively, J. Graine, and R. Jeavons. 2007. Defending our National Treasure: Department of Defense Chesapeake Bay Restoration Partnership 1998-2004. Integration and Application Network, University of Maryland Center for Environmental Science, Cambridge MD.

http://ian.umces.edu/imagelibrary/albums/userpics/84469/normal_iil_diagram_nitrogen_phosphorus_sources_defending_our_national_treasure.png

Materials and Methods

* 19 Stream Sites in the LaMoille River Basin
* Land Usage
  * Measure land use for total catchment area all the way up stream from site
* Nutrient Content
  * 3 100mL water samples from each stream 1-3 days after storm events
  * AQ2
    * Analyze for ammonia
    * Analyze for total nitrogen and total phosphorus
    * Filter and analyze for total dissolved nitrogen and phosphorus

Results

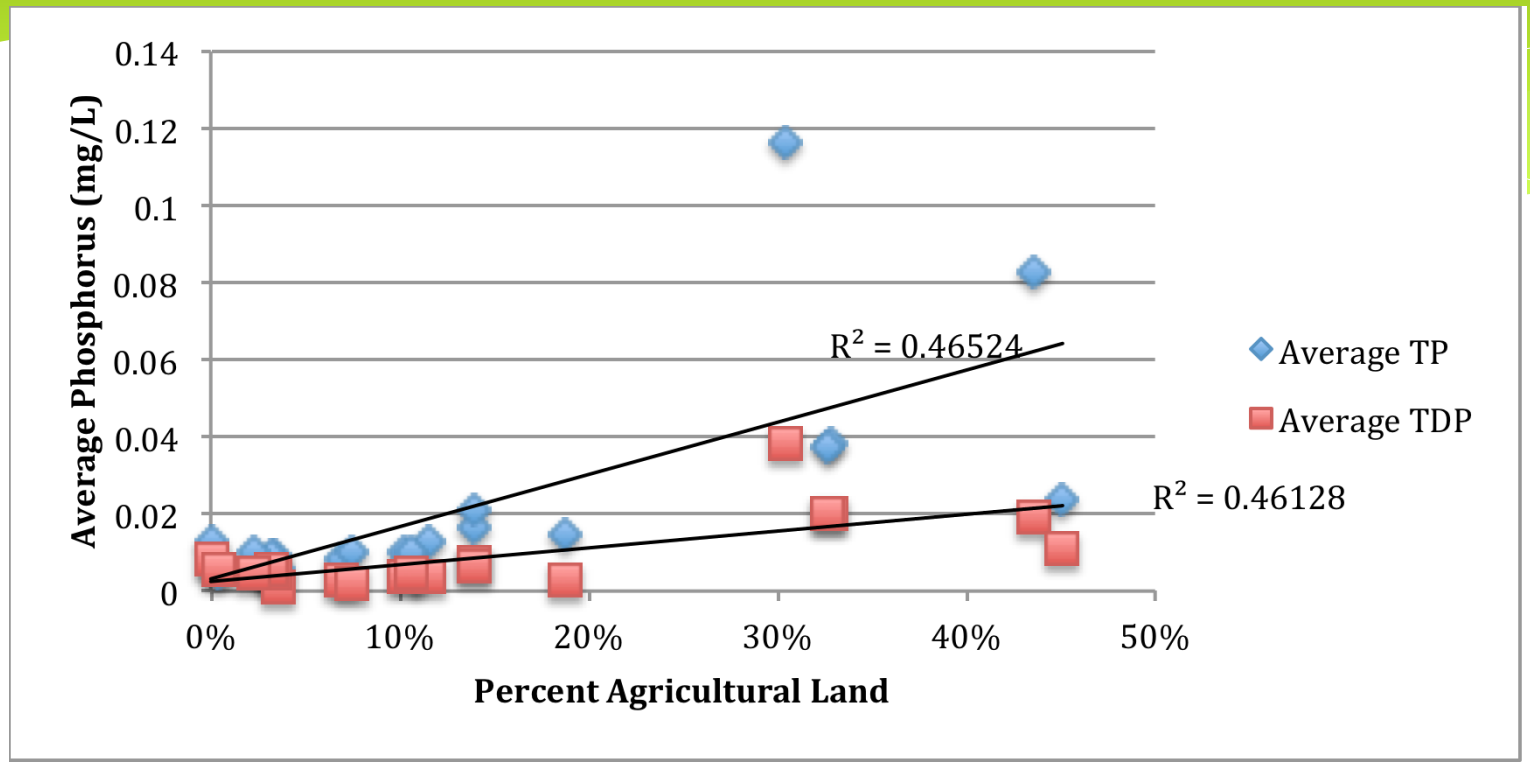

Figure 1. Correlations between the percent agricultural land and average total/total dissolved phosphorus (mg/L) at each of nineteen stream sites in the LaMoille River basin. Samples were collected June through August in 2012. The R^2 values for the total phosphorus set was 0.46524 and for the average total dissolved phosphorus, 0.46128.

Results

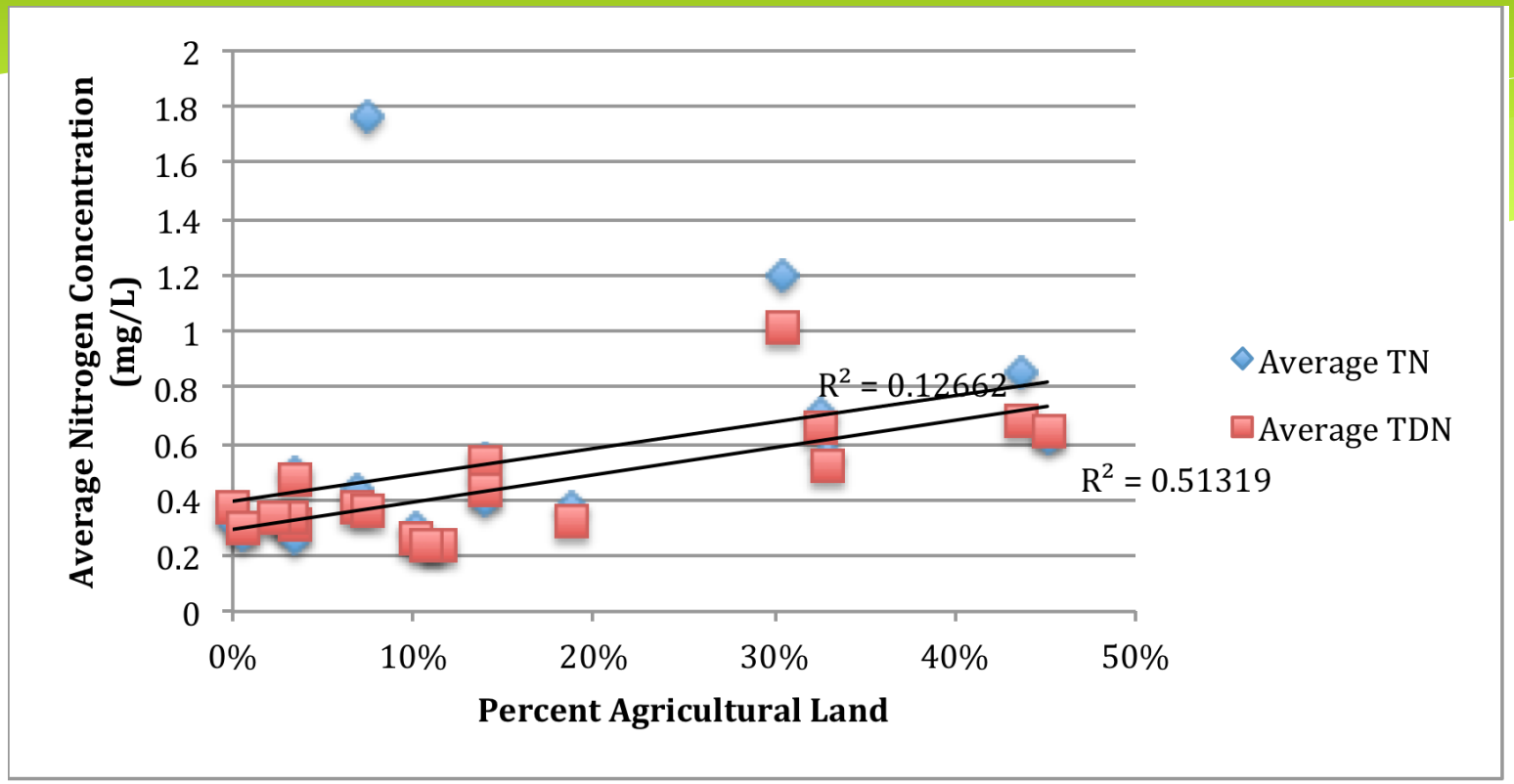

Figure 2. Correlations between the percent agricultural land and average total/total dissolved nitrogen (mg/L) at each of nineteen stream sites in the LaMoille River basin. Samples were collected June through August in 2012. The R^2 values for the total nitrogen set was 0..12662 and for the average total dissolved nitrogen 0.51319.

Results

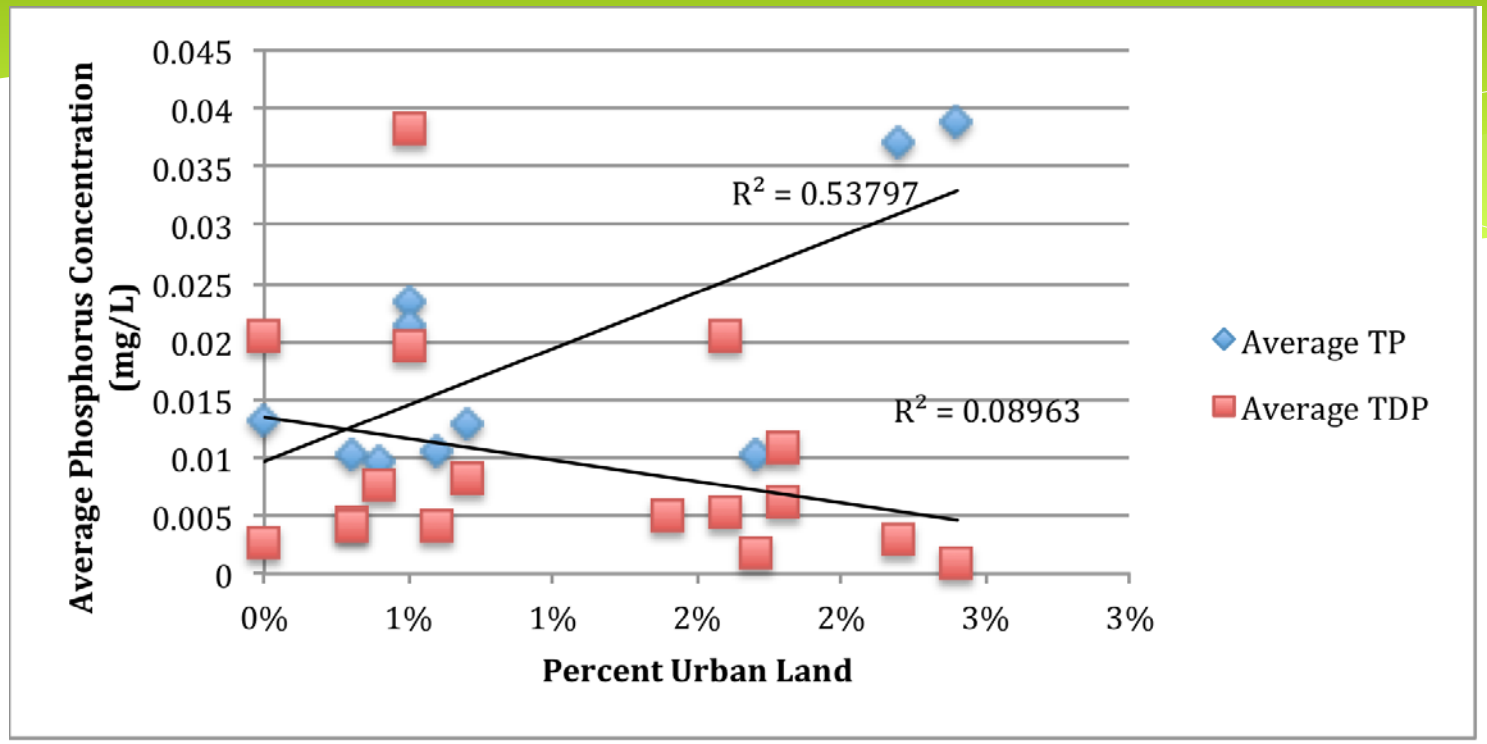

Figure 3. Relationship between the percent urban land and average total/total dissolved phosphorus (mg/L) at each of nineteen stream sites in the LaMoille River basin. Samples were collected June through August in 2012. Two outlier sites were removed from this chart. The R^2 values for the total phosphorus set was 0.53797 and for the average total dissolved phosphorus, 0.08963.

Results

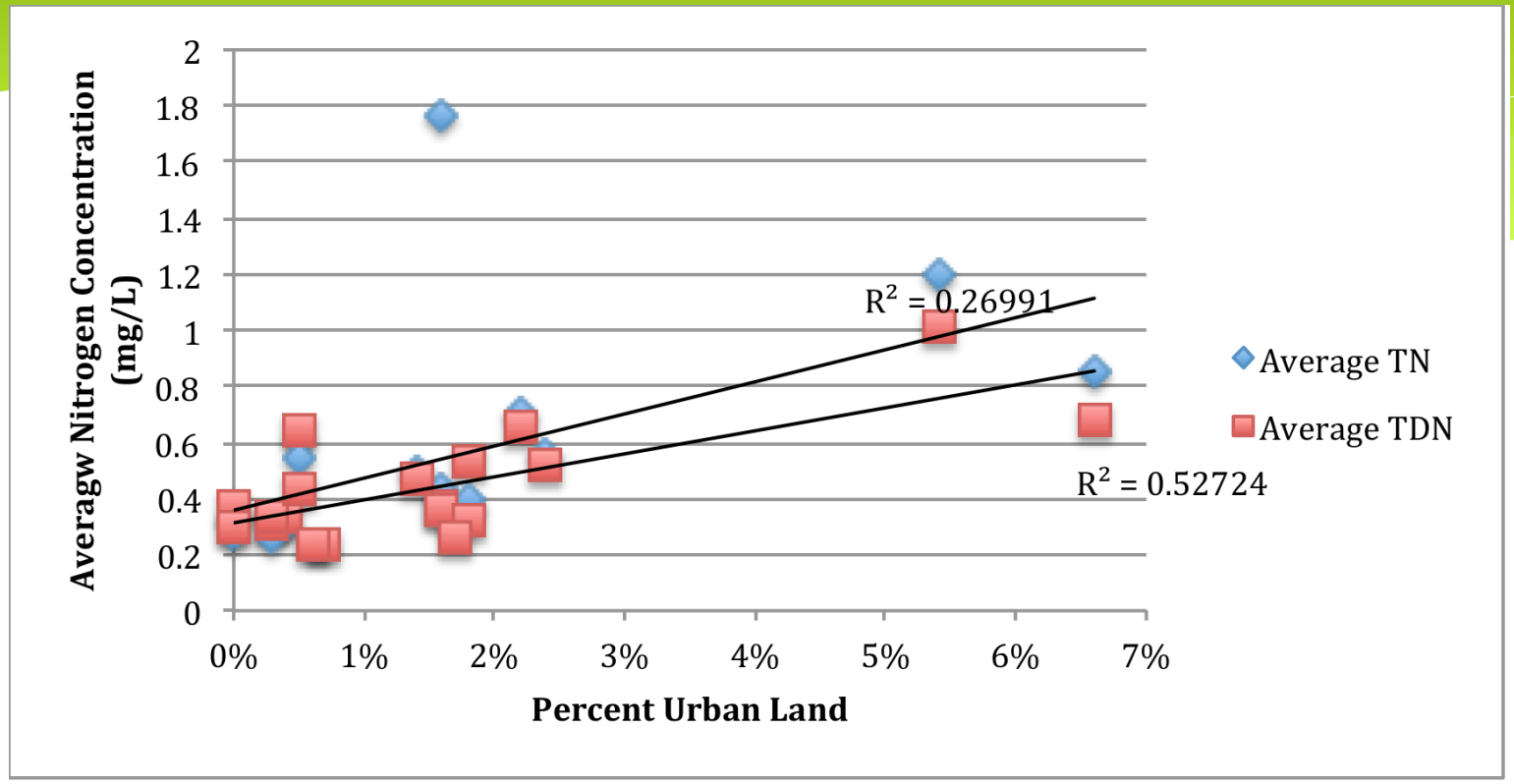

Figure 4. Relationship between the percent urban land and average total/total dissolved nitrogen (mg/L) at each of nineteen stream sites in the LaMoille River basin. Samples were collected June through August in 2012. The R^2 values for the total nitrogen set was 0.26991 and for the average total dissolved nitrogen 0.52724.

Results

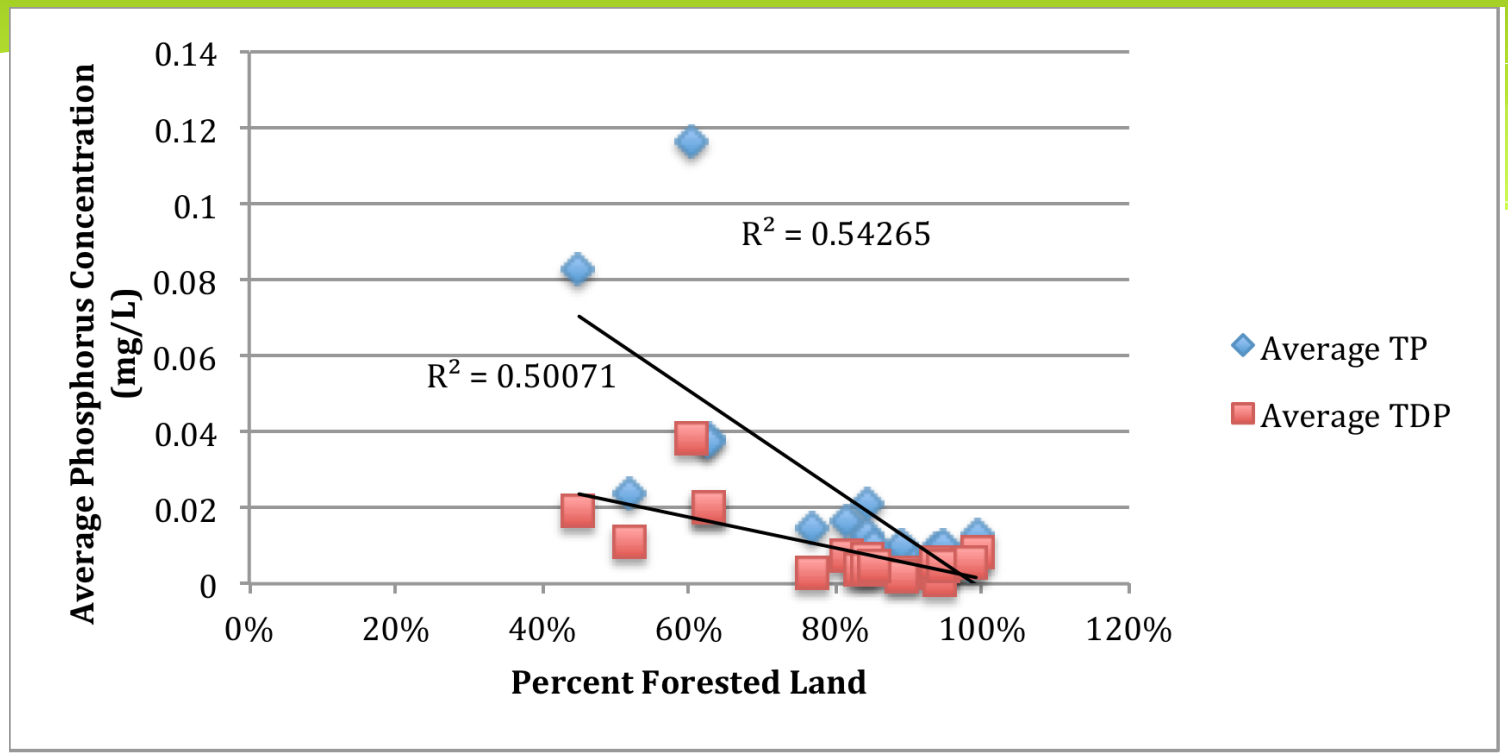

Figure 5. Relationship between the percent forested land and average total/total dissolved phosphorus (mg/L) at each of nineteen stream sites in the LaMoille River basin. Samples were collected June through August in 2012. The R^2 values for the total phosphorus set was 0.54265 and for the average total dissolved phosphorus, 0.50071.

Results

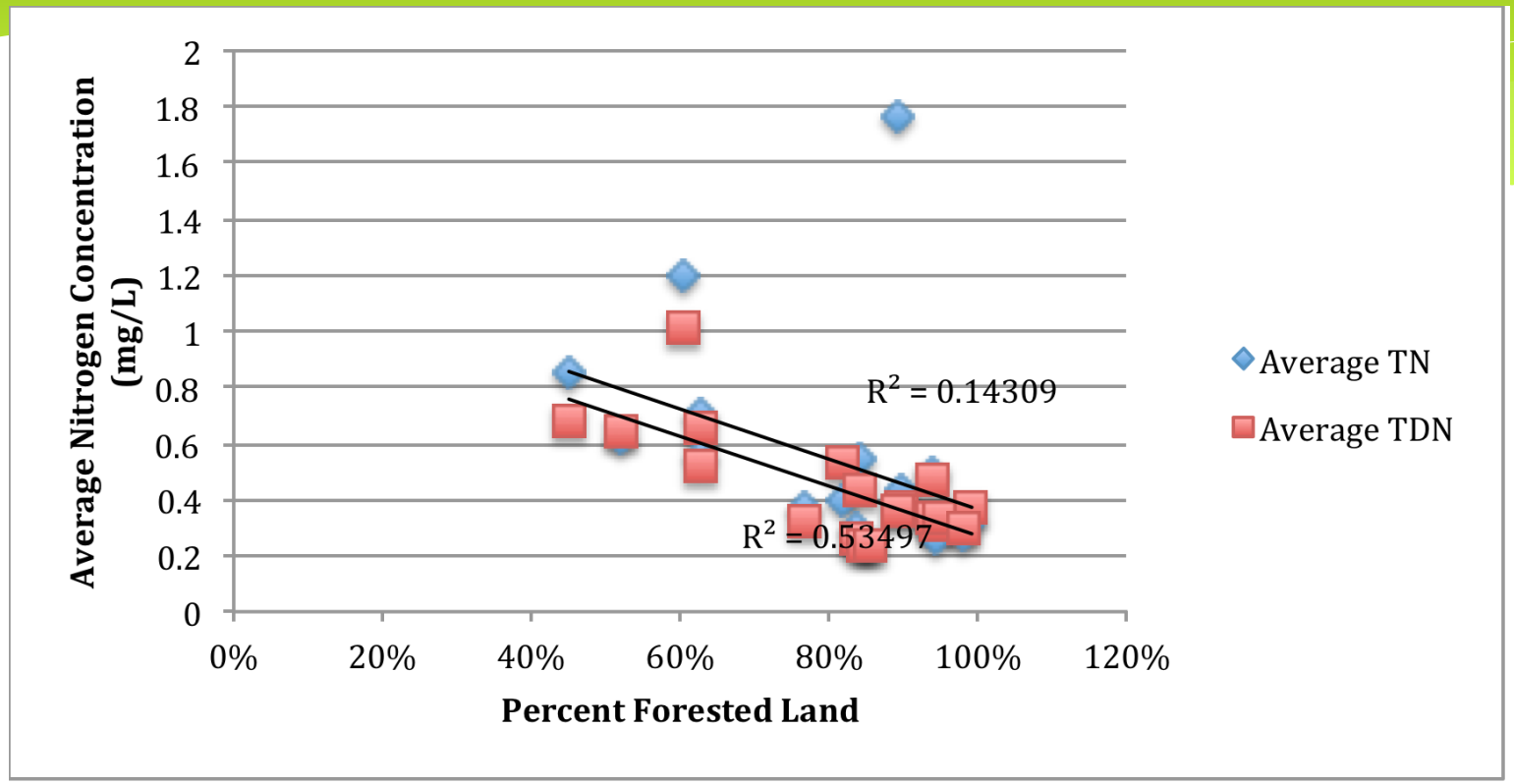

Figure 6. Relationship between the percent forested land and average total/total dissolved nitrogen (mg/L) at each of nineteen stream sites in the LaMoille River basin. Samples were collected June through August in 2012. The R^2 values for the total nitrogen set was 0.14309 and for the average total dissolved nitrogen 0.53497.

Conclusions

* Land use impacts the nutrient content in streams
  * Agricultural
  * Urban
  * Forested
* Climate Change
* Follow up
  * Compare nutrient levels before and after storms

Special Thanks

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References

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Questions?