

COMPARING THE OVERALL WIDTH AND WATER QUALITY OF THE RIPARIAN HABITAT BETWEEN SITES

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ABSTRACT

The streams are natural freshwater environments deposits of nutrients for many organisms. Natural environments like streams can be affected by numerous factors, as an example excessive use of soil and fertilizers. Streams can recover itself by natural remediation, such the use of vegetation like buffers in the riparian zone. The riparian zone is transitional areas between water bodies and upland communities (Décamps et. al, 2009). For this research we utilize the database of EPSCoR Streams Project, which is located in Vermont, to know if there is a relationship between the riparian zone width of some streams sites with the quantity of total suspended solids (TSS), and total phosphorus (TP) that are in the water column. The objective is to determine if there is an association between riparian zone and water quality. In the research will be using EPSCoR Streams Project database. The data used comprehended from 2008-2011 which is part of the undergraduate summer research internship. The vegetation types tell us how much TSS and TP can be removed from the wetlands (Mankin et. al, 2007). Knowing the relationship of the riparian zone width with the water quality in each stream site can help to identify some factor that can affect directly the Lake Champlain and his community in Vermont.

INTRODUCTION

- Riparian zones are transitional areas between water bodies, like streams, and edges of upland communities.
- The specific function of the riparian zone in streams is to provide a habitat for diverse organism, separation between human activities and streams, and removal of sediment, nutrient and pollutants from uplands runoff (Mankin et. al, 2007).
- For remove TSS (total suspended solids) the buffer area infiltrated and sediment large particles to decreased the concentration and mass of the TSS. The retention of TP (total phosphorus) is a function of physical trapping with the use of vegetation that uptake phosphorus (Karr & Schollosser, 1977).
- The objectives with this project is to compare the overall width and quality of the riparian habitat between sites, and see if there is a difference in the TSS and TP concentrations between sites with different riparian habitats.

METHODS

The data of all sites in VT EPSCoR Streams Project were used. (Figure 1), and The distribution by year of the data included 2009-2011. (Figure 2).

The TSS and TP of each site in Data, was compared with the width of the riparian zone in the left and right bank for each stream that appeared in the

Figure 2. Year Data Distribution.

Procedure:

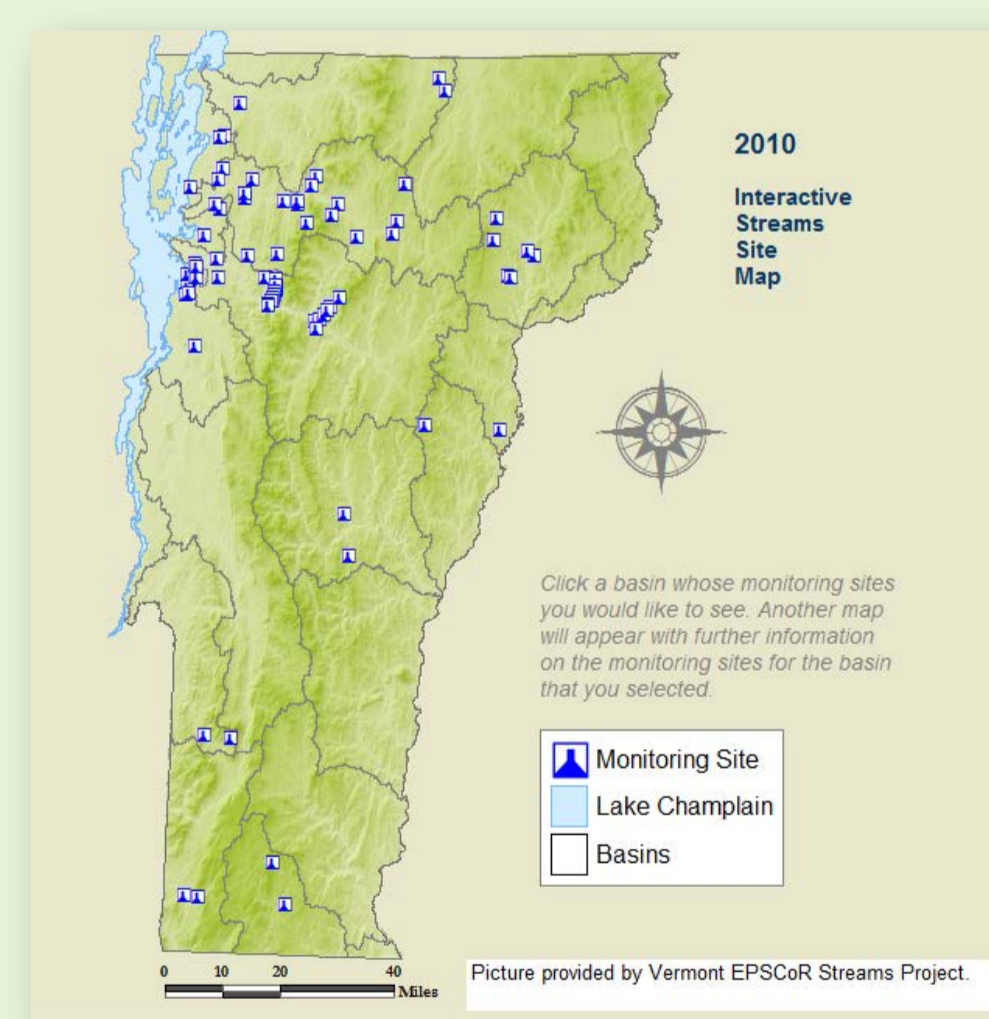
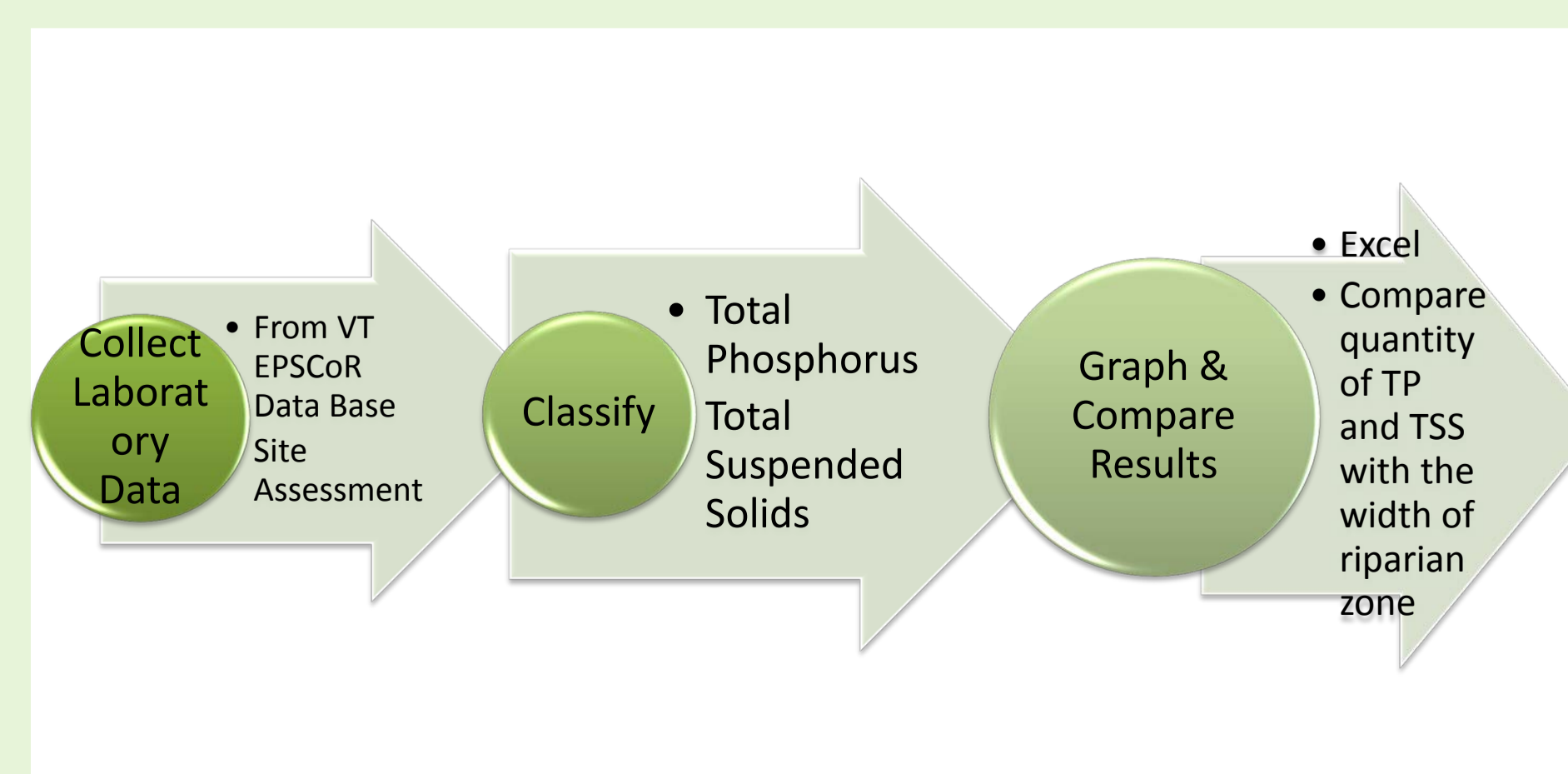


Figure 1. Streams Site Map

RESULTS

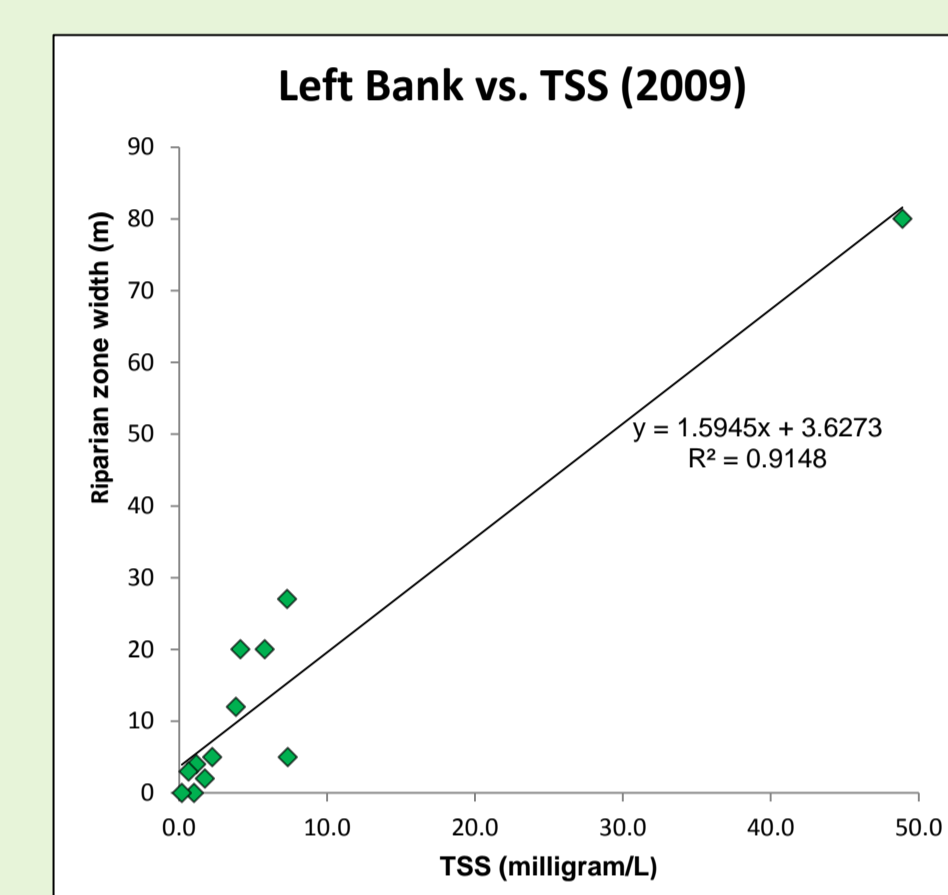


Figure 4. Left Bank relationship. The width of the riparian zone and the quantity of TSS. $R^2=0.9148$, $y=1.5945x+3.6273$, positive relationship.

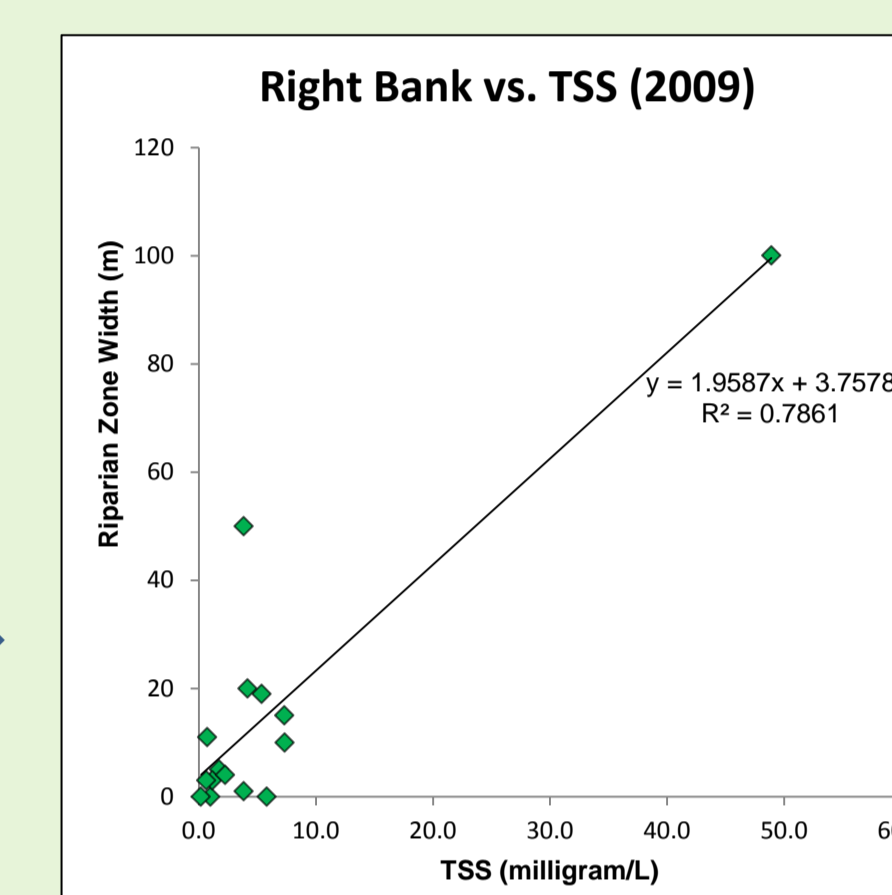


Figure 5. Right Bank relationship. The width of the riparian zone and the quantity of TSS. $R^2=0.7861$, $y=1.9587x+3.7578$, positive relationship.

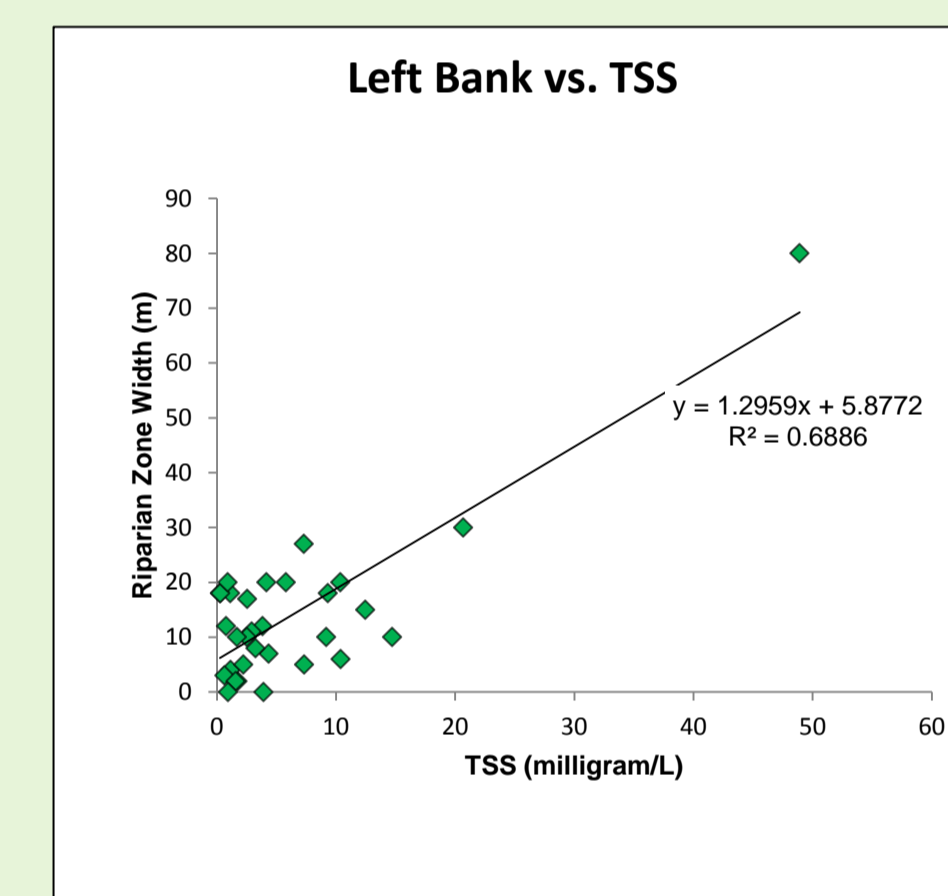


Figure 6. All TSS data compared with the left banks. $R^2=0.6886$, $y=1.2959x+5.8772$, positive relationship.

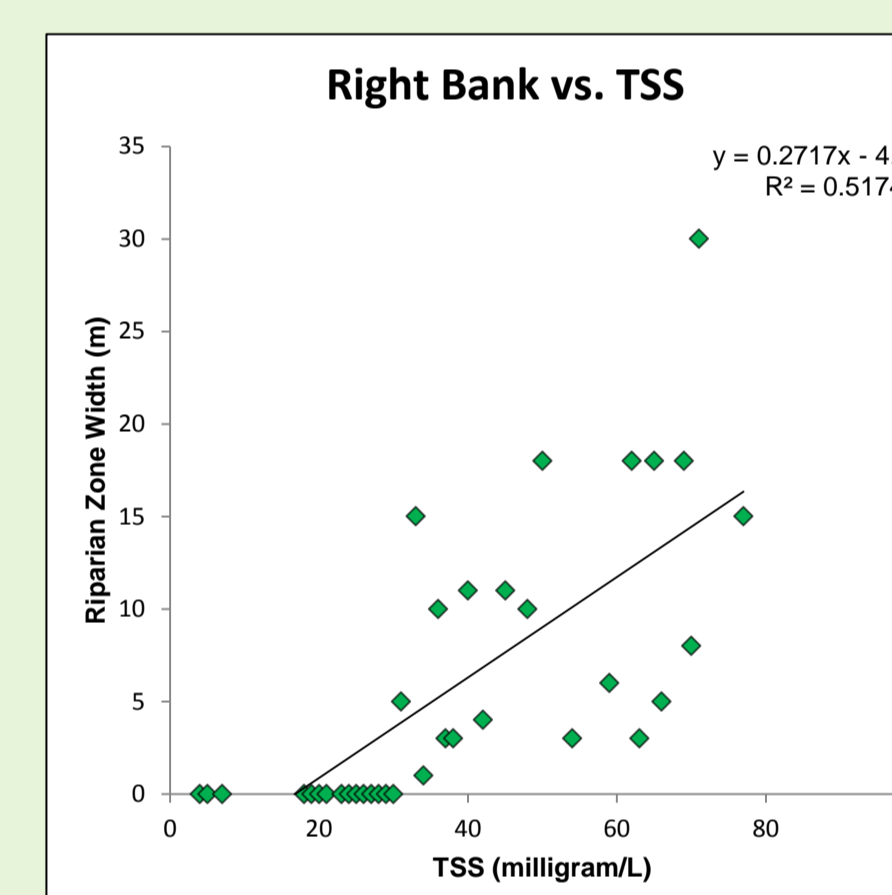


Figure 7. All TSS data compared with the right banks. $R^2=0.5174$, $y=0.2117x-4.5619$, positive relationship.

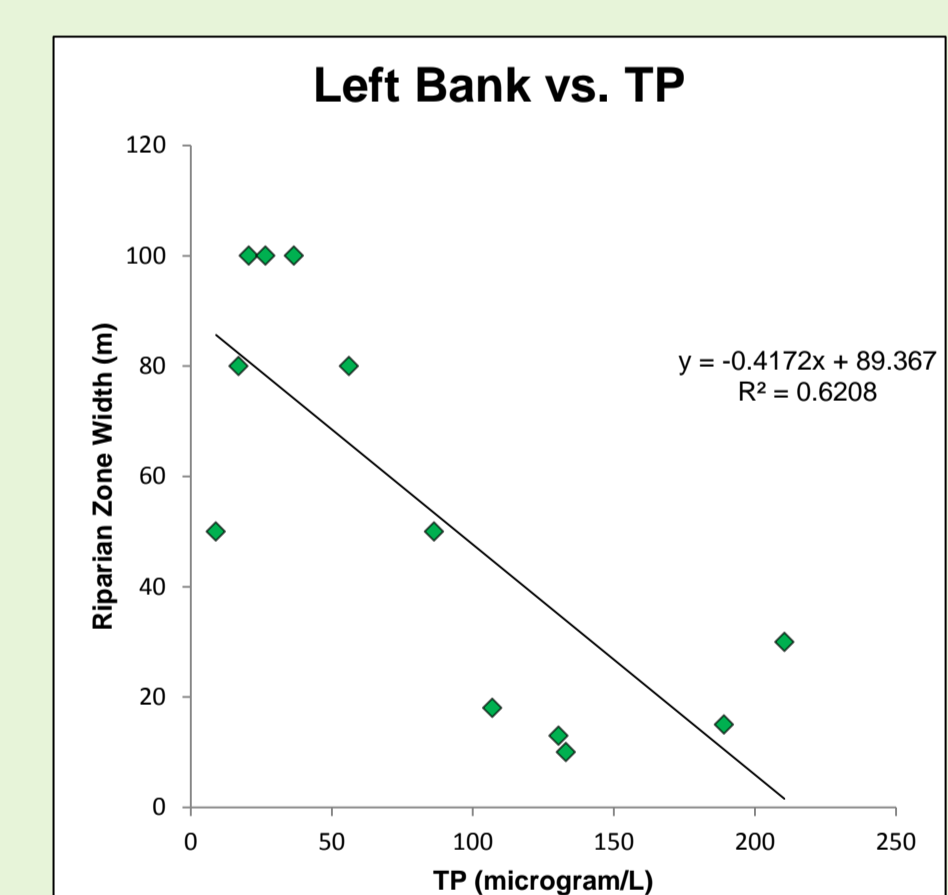


Figure 8. All TP data compared with the left banks. $R^2=0.6208$, $y=-0.4172x+89.367$, negative relationship.

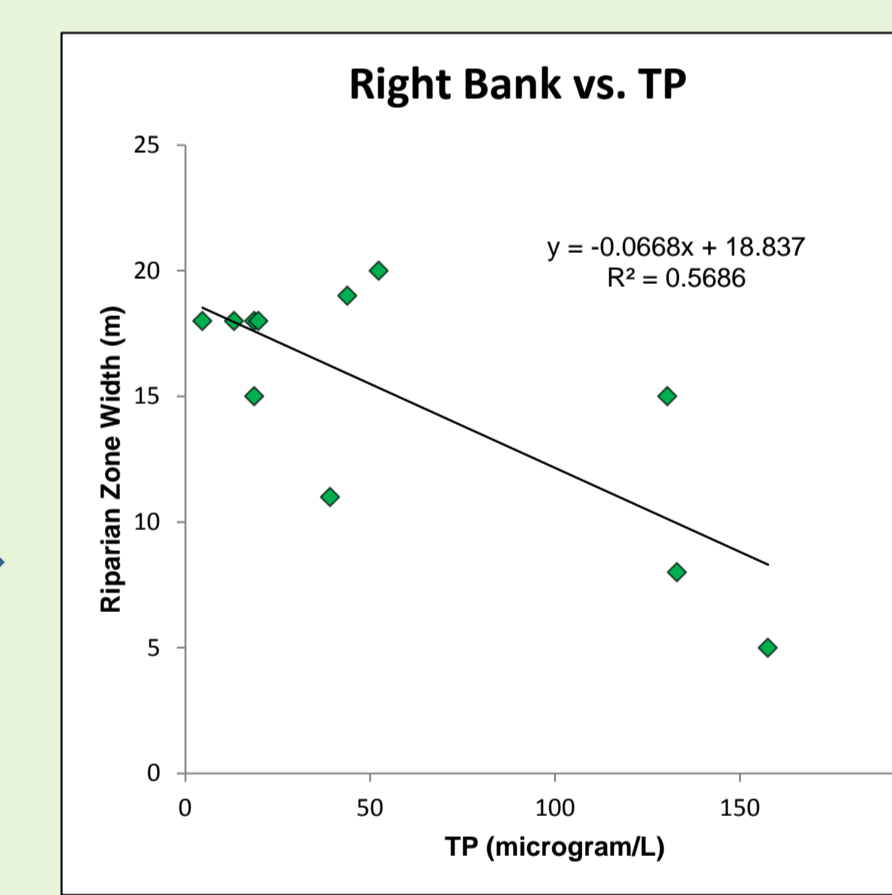


Figure 9. All TP data compared with the right banks. $R^2=0.5686$, $y=-0.0668x+18.837$, negative relationship.

DISCUSSION

In the **Figures 4 and 5** we can see the relationship between the left and right bank with the quantity of TSS. Is notable that both regression models for the left and right bank has a positive slope. In **Figures 4 and 5** the riparian zone width increase in response to the increase in TSS. Is more notable the increasing in the left bank.

The differences between the banks can be noticed in the quantity of sediments. The left bank has more TSS in comparison with the right bank, because the right bank tends to be more highest than the left bank. It cause more TSS in the left bank. In streams has been observed large reductions in the nitrate, suspended solids, and phosphorus concentrations as water flows through riparian zones (Likens et. al, 1977).

In the **Figures 6 and 7** its remarkable that the graphics have positive relationship. Shows that the TSS increase in response to the increase of riparian zone width. The **Figures 8 and 9** have negative relationship. It tell us that the TP increase with the decreasing of riparian zone width. Is logical the relationship because the largest riparian zone have, in the mostly cases, more vegetation.

The results demonstrate that riparian zones play an important role in the quantity of TSS and TP that arrive to the stream. In the TSS analysis the riparian zone erodes substantial quantities of sediments, as well with the TP that is removed by the vegetation action.

CONCLUSIONS

- A large riparian zone width can determine the levels of TSS and TP that arrive in the stream.
- The data of Streams Project reflects that the largest riparian zone has the highest levels of TSS in the right and left bank. At the same time the lowest levels of TP in both banks.
- The relationship between the width of the riparian zone and quantities of TSS and TP, are logical because the highest concentration of vegetation can absorb more TP and TSS.
- The TSS is proportional with the width of the riparian zone in both banks, but the concentrations of TP are inverse to the width of riparian zone.
- The data of 2009 was used to compared the banks, and the data of 2011 do not appeared because there are no sufficient data for the measured of the riparian habitat.

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