

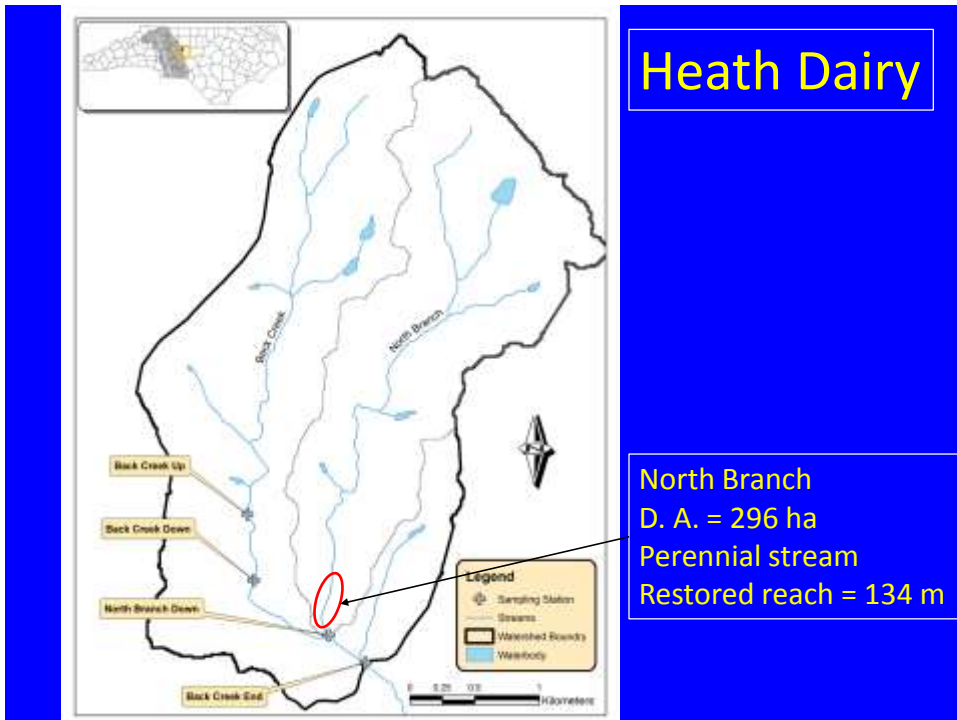
# Effect of Stream Restoration on the Water Quality of a North Carolina Stream

Dan Line  
NCSU BAE Department

Funded by: NC DWQ 319 grant & NC DMS

## Stream Restoration

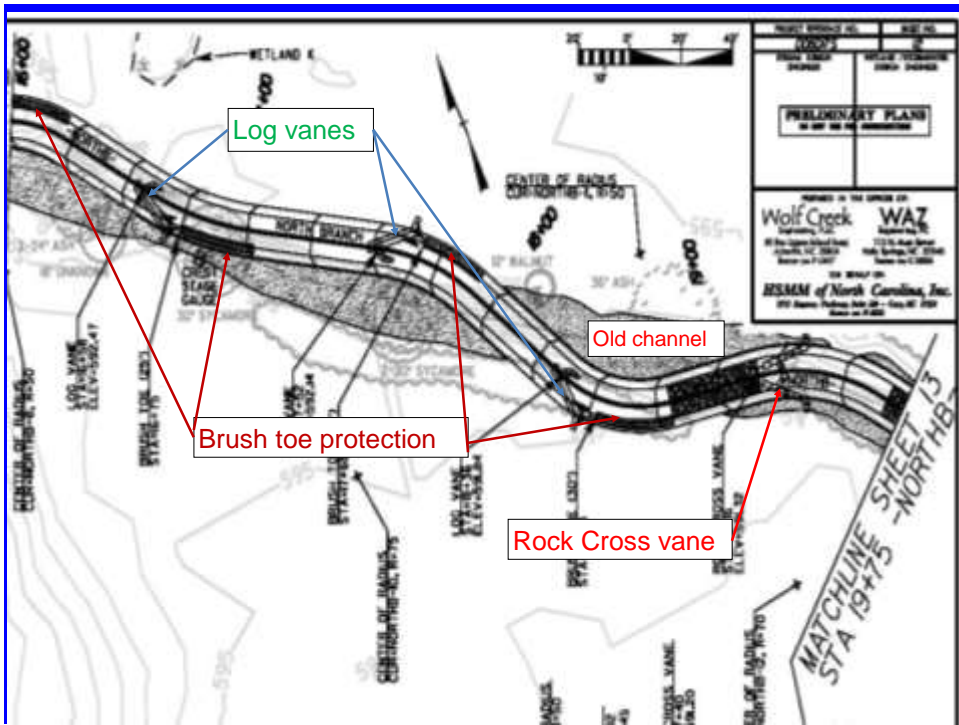
- Extensive use
  - Many miles of stream restored
- Monitoring
  - Mitigation type: nearly all streams
  - Research type: few studies



## FINAL RESTORATION PLAN HEATH DAIRY ROAD RESTORATION SITE RANDOLPH COUNTY, NORTH CAROLINA

Prepared for:  
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT  
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<http://deq.nc.gov/about/divisions/mitigation-services/dms-projects>





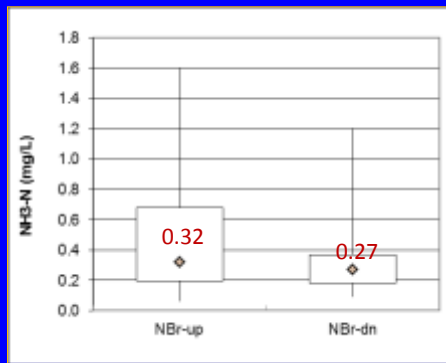
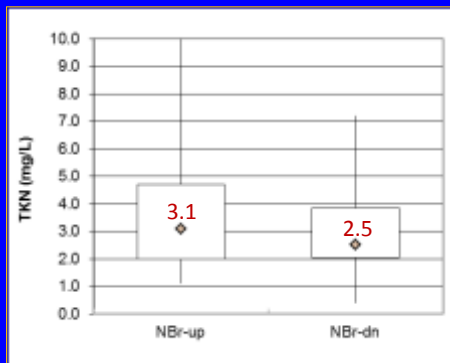




## WQ Monitoring

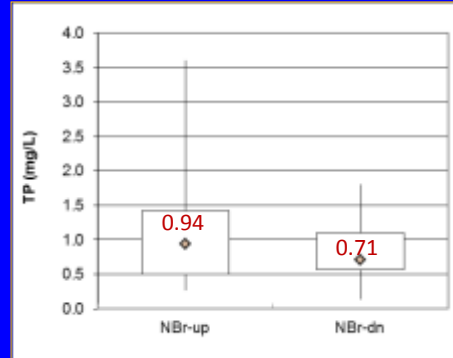
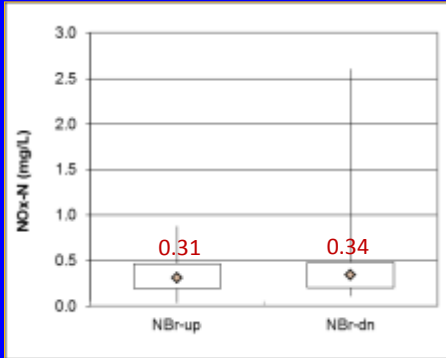
- Rainfall
  - Recording 8 in. gage
- Discharge
  - Integrated Doppler flowmeter on sampler
  - Manual discharge measurements (growing and dormant vegetation)
- Water Quality
  - Flow-proportional storm sampling (TKN,  $\text{NH}_3\text{-N}$ ,  $\text{NO}_x\text{-N}$ , TP, TSS)
  - Quarterly grab sampling

## Storm Sample Results



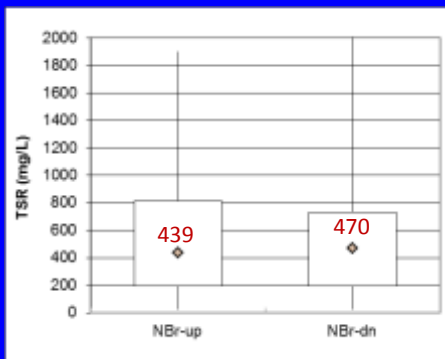
Number of samples = 35

## Storm Sample Results



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Number of samples = 35



## Load/Export Rates

Site	Rain	Q	TKN	NH <sub>3</sub> -N	NO <sub>x</sub> -N	TP	TSS
	mm/yr	mm/yr	----- kg/ha yr -----				
NBr-up	1180	270	11.7	1.32	0.74	3.44	1922
NBr-dn	1180	274	11.6	1.07	0.92	3.28	2120
		ns	ns	-19	+24	ns	ns

ns= not significantly different per paired t test

Duration of monitoring: 1.57 yr  
 Bankfull Q exceeded: 5 times  
 Daily mean Q= 1540 L/min or 0.91 cfs

## Load Rates (w/o Bankfull Q)

Site	Q	TKN	NH <sub>3</sub> -N	NO <sub>x</sub> -N	TP	TSS
	m <sup>3</sup> /wk	----- kg/wk -----				
NBr-up	7780	31.6	4.2	2.4	9.3	4760
NBr-dn	7940	30.3	3.3	3.0	8.7	4853
		4.1	-21	+25	ns	ns

ns= not significantly different per paired t test

## Summary/Conclusion

- Monitoring up/downstream of 134 m long restored section of North Branch
  - No change in TKN, TP, TN, and TSS
  - NH<sub>3</sub>-N decrease 19%; NO<sub>x</sub>-N increased 24%
- No effect on TN, TP, and TSS loads in stream

## Questions?

Transactions of the ASABE 58(6): 1547-1557