



Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

To: Little Naches Sediment Monitoring Project (SMP) Group

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Date: May 13, 2011

RE: 2010 Sediment Sampling Results from the Little Naches and South Fork Tieton Rivers

I am pleased to forward the results from this past year's sediment monitoring efforts. The samples collected from the Little Naches and South Fork Tieton watersheds have been processed, tabulated and graphed. Enclosed are the summary graphs and tables. If you have any questions about the data or results, feel free to contact me.

Again, major credit goes to the fisheries technicians from the Yakama Nation who cored the many samples from the Little Naches, and processing all of the samples this winter. Without their dedicated work, this project would not be possible. In addition, credit also goes to the U.S. Forest Service Naches Ranger District staff for their continued collection of samples from the upper South Fork Tieton River and other tributaries to the Naches drainage. The following is a summary of the results from the monitoring work.

2010 Little Naches Fine Sediment Monitoring

A total of 101 samples were collected and processed from the Little Naches drainage this past year (9 reaches). The reach on Pyramid Creek was not sampled this past year due to road access difficulties (end of road decommissioned and culvert crossing removed). Other methods will be explored to access and sample this site next year. In addition, one riffle on Bear Creek Reach 2 and a partial riffle on Bear Creek Reach 1 were missed by the new field crew. With this year's monitoring work, the data set for the Little Naches drainage now covers a time period of 26 years for the two historical reaches, and 19 years for the expanded sampling area that includes several tributary streams.

Results from the 2010 monitoring are displayed in the attached tables and graphs. The average percent fine sediment less than 0.85mm for the entire Little Naches drainage has gone up from the previous year (cumulative average of 11.13% for 2010 compared to 9.30 % for 2009). The overall average fine sediment found in spawning substrate is still relatively low and should lessen mortality on incubating eggs and alevins.

Overall average fine sediment levels for the past 19 years in the Little Naches were plotted to evaluate trends (see Figures 1 and 2). Fine sediment conditions observed in the Little Naches drainage had been declining the past few years. This year however, the overall average sediment level increased slightly, but is still similar to conditions found from 2003-2007. It is not surprising that fine sediment conditions have been fairly low and stable as little anthropogenic disturbance has been taking place in the drainage other than recreational activities. Future monitoring will be needed to determine if a new upward trend in fine sediment conditions is starting to occur.

At the reach scale, several of the sampling reaches had somewhat higher fine sediment rates than those found in 2009 (see Figures 3 and 4, Table 1). Three of the sampling reaches had greater than a 2.0% point increase in average fines compared to the previous year (Little Naches Reach 1, Little Naches Reach 2, and South Fork Reach 1). Active bank erosion was observable adjacent to Little Naches Reach 2 on the right bank above the bridge and also in upper portions of Little Naches Reach 1. An ATV trail also runs next to the eroding right bank on Reach 2. Some beaver activity is also taking place above Reach 2. The South Fork Reach has been experiencing channel shifting and splitting in the last couple years that could be influencing sediment levels. Four other sampling reaches had slightly higher average sediment rates (Bear Creek Reaches 1 and 2, Little Naches Reach 4 and North Fork Reach 2). These reaches have also had channel shifting, as well as some log jam formation. The remaining two reaches were nearly the same as the previous year (Little Naches Reach 3 and North Fork Reach 1).

Variability within sampling reaches was generally greater in 2010 compared to 2009. Six of the reaches had a higher standard deviation, two reaches had a similar standard deviation, and one reach had a lower standard deviation, than in 2009. In some reaches, channel conditions have changed substantially over the last couple years that could be causing more variability (e.g. Little Naches Reach 4, Little Naches Reach 3, Little Naches Reach 1-Riffle 3). In addition, the new field crew may need more training to ensure that samples are more consistently taken.

2010 South Fork Tieton Sediment Monitoring

One reach on the South Fork Tieton River (in the vicinity of Minnie Meadows) was sampled again this past season by the U.S. Forest Service. This marks 12 years that the USFS has been sampling this area. This stream reach typically receives considerable bull trout spawning activity and the sampling provides additional information on their spawning conditions. Average fine sediment levels in this reach increased to 13.6% in 2010 (see Figure 8 and Table 1). If fine sediment conditions continue to trend upward, further investigation may be needed to identify sediment sources and abate them.

Summary

The overall average fine sediment level in the Little Naches this past season was somewhat higher than last year (Figure 1 and 2). Overall average fine sediment in 2010 for all the samples in the Little Naches was 11.13%. While the sediment rate is elevated, it still represents favorable conditions for egg and alevin survival.

The results of the USFS sampling in the South Fork Tieton River were also higher than the previous year. Reach average fines in the South Fork increased to 13.6% in 2010. If conditions continue rising, more effort may be needed to curb sediment delivery.

Overall Watershed Fine Sediment Trends (Little Naches River 1992-2010)

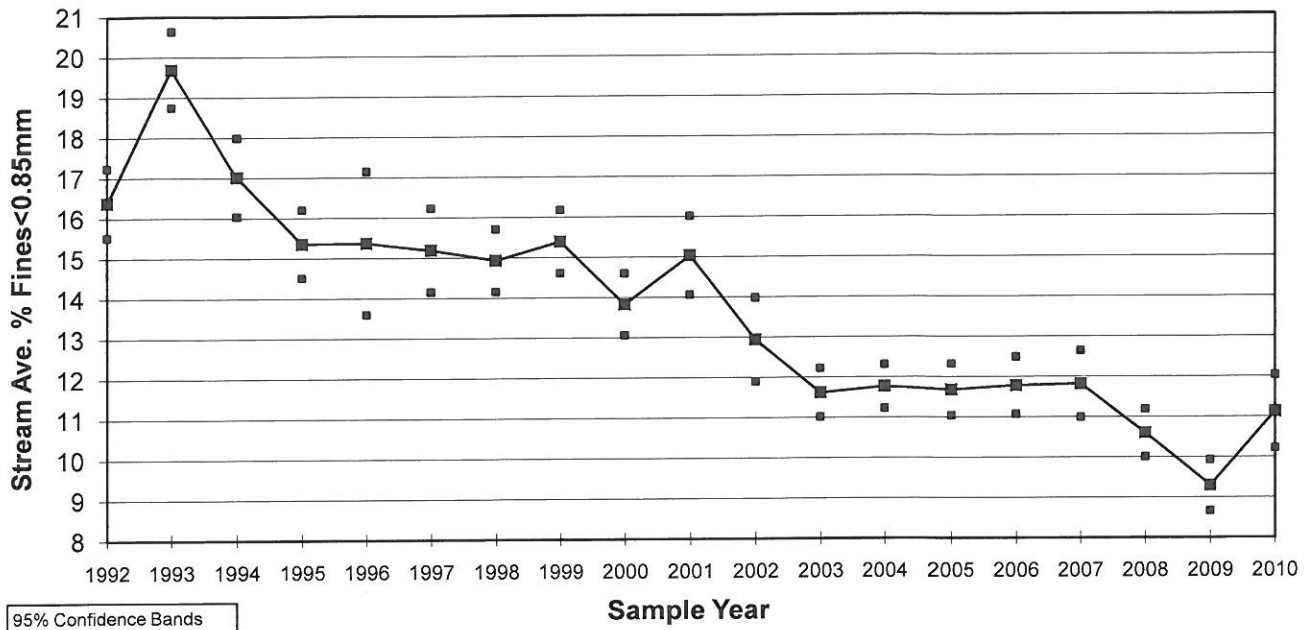


Figure 1

Overall Watershed Fine Sediment Trends (Little Naches River 1992-2010)

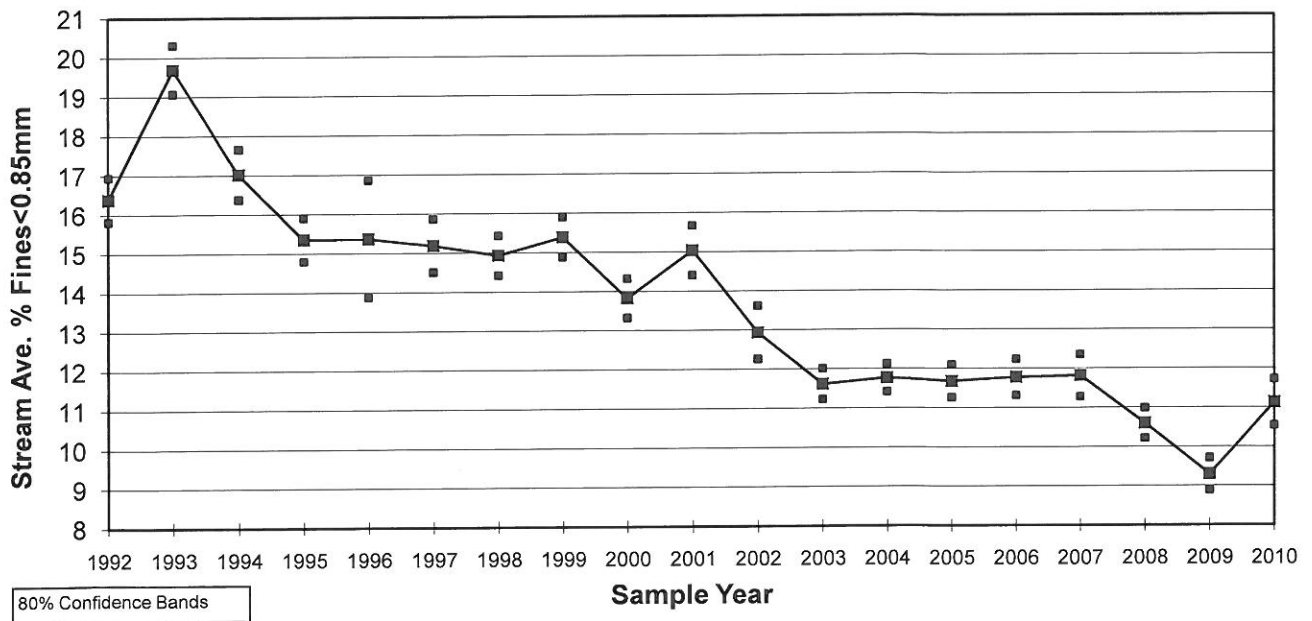


Figure 2

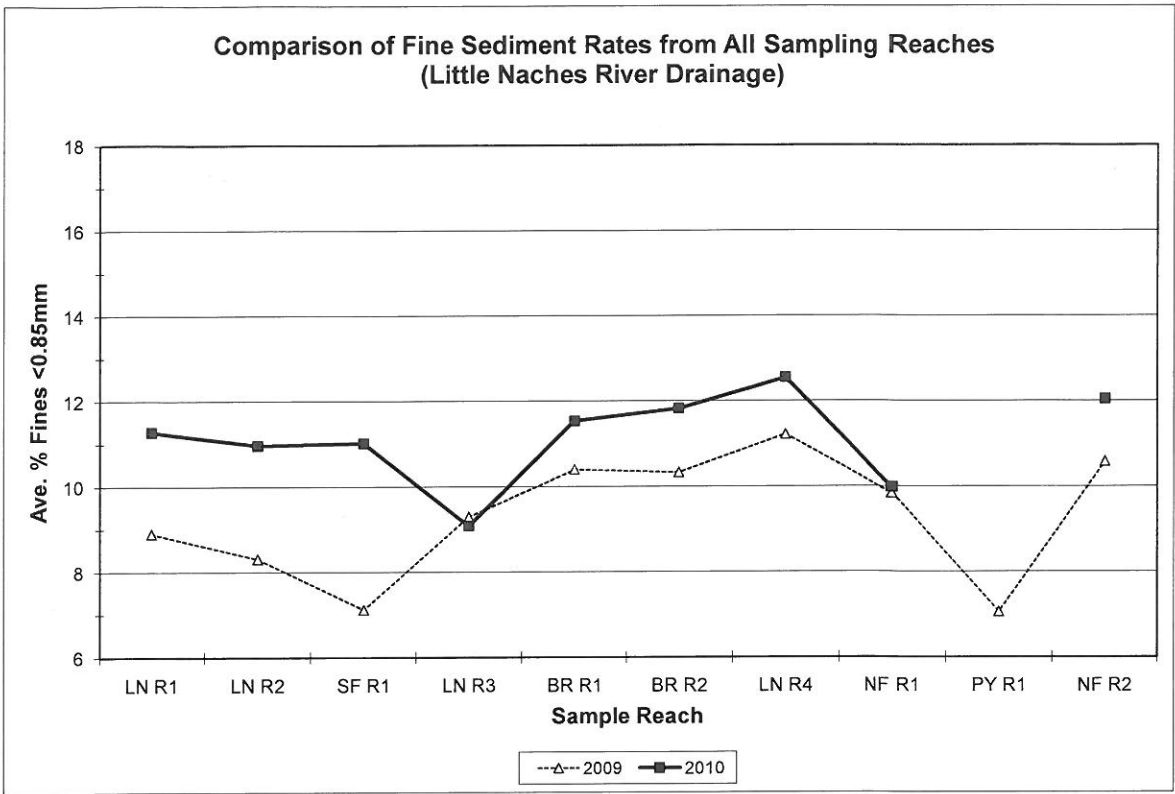


Figure 3

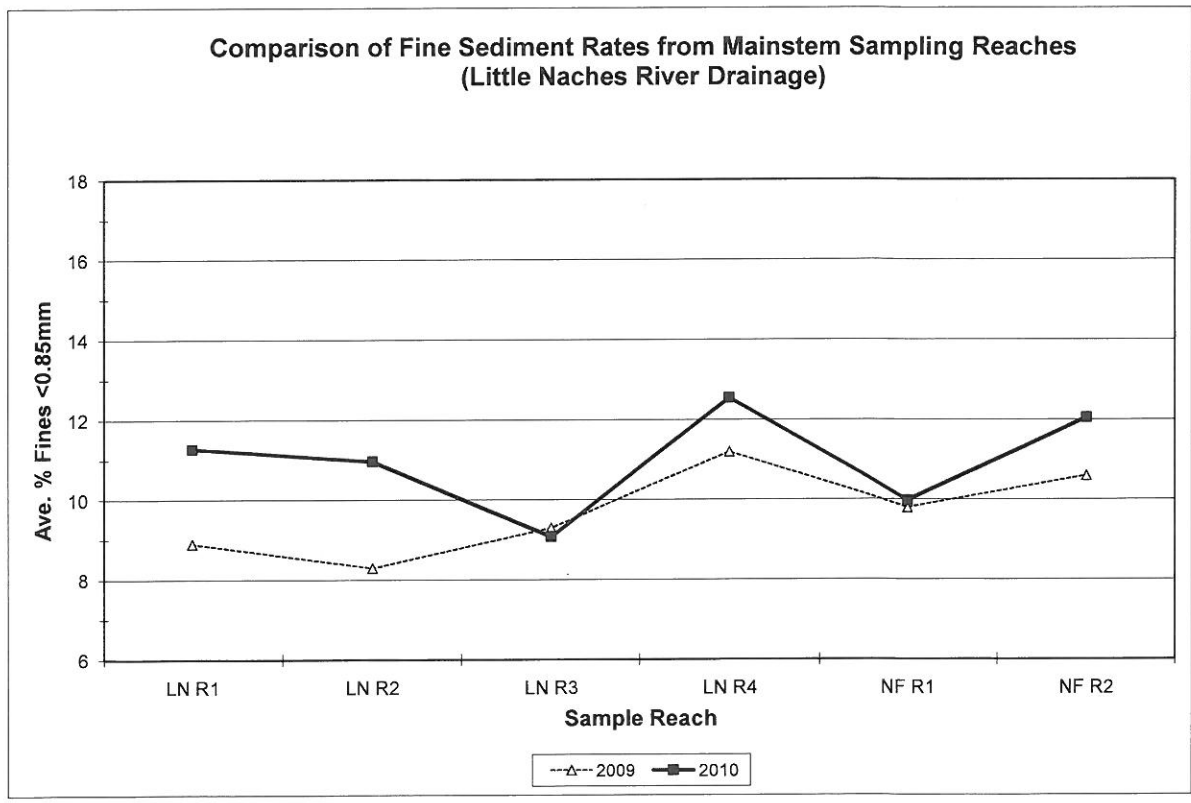


Figure 4

TABLE 1

**Fine Sediment Levels in Spawning Gravels 1992-2010
(McNiel Sampling)
Little Naches River System
(<0.85mm)**

SAMPLE SITE

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Little Naches #1-1	11.5	14.8	10.5	11.2	16.1	11.4	17.6	14.4	11.3	16.5	15.3	13.3	11.3	11.4	7.2	8.7	10.9	6.8	10.2
Little Naches #1-2	12.1	18.3	12.4	15.1	14.1	18.9	16.7	19.4	22.4	13.9	12.7	15.9	13.7	13.6	8.5	10.1	7.3	5.1	4.8
Little Naches #1-3	11.1	24.7	16.6	11.6	22.3		19.9	14.6	14.6		29.6	11.3	12.8	14.1	17.2	8.5	13.5	14.8	18.9
Reach 1 Avg.	11.6	19.8	13.2	12.6	17.5	15.2	18.1	16.1	16.1	15.2	19.2	13.2	12.6	13.0	9.7	9.1	10.5	8.9	11.3
Little Naches #2-1	12.3	18.9	15.7	17.8	15.1	14.1	13.0	13.9	13.2	16.3	17.1	9.3	9.7	6.1	13.3	9.7	10.0	8.5	10.5
Little Naches #2-2	16.9	18.3	13.8	14.7	17.8	18.2	12.7	13.8	13.7	12.8	11.5	14.7	9.8	9.7	12.3	8.9	13.4	9.3	12.6
Little Naches #2-3	16.9	17.8	18.8	20.3	18.6	13.0	16.2	15.1	15.3	20.8	9.9	8.3	8.9	8.6	11.1	9.6	7.9	7.1	9.8
Reach 2 Avg.	15.4	18.3	16.1	17.6	17.0	14.8	14.0	14.2	14.4	16.6	12.8	10.8	9.5	8.1	12.2	9.4	10.4	8.3	11.0
S.F. Lit Naches #1-1	24.1	18.7	10.7	15.4	9.2		6.4	17.2	15.3	20.3	14.0	11.9	10.5	10.1	13.7	12.9	11.0	6.4	8.6
S.F. Lit Naches #1-2	18.1	13.4	14.5	8.3	8.0		17.2	13.3	8.7	14.6	14.0	11.1	10.6	10.2	9.6	16.5	10.0	7.2	8.6
S.F. Lit Naches #1-3	17.5	22.2	13.6	10.7	7.7		14.1	11.2	14.1	15.5	11.3	9.8	10.3	10.8	10.0	13.2	6.0	7.7	15.9
Reach 1 Avg.	19.9	18.1	12.9	11.5	8.2		11.6	13.9	12.7	16.8	13.1	11.9	10.5	10.4	11.1	14.2	9.0	7.1	11.0
Little Naches #3-1	20.6	24.5	19.1	14.7	21.4	14.6	12.9	14.0	11.7	12.4	9.9	12.3	16.4	12.6	9.8	9.5	7.2	3.9	12.0
Little Naches #3-2	20.4	25.1	19.7	17.5	5.7	9.0	13.1	23.3	19.1	17.7	21.9	13.1	15.2	12.1	12.4	11.6	13.0	9.5	4.1
Little Naches #3-3	13.8	17.6	17.7	14.5	33.9	17.4	17.1	15.0	13.6	14.8	12.4	13.5	12.9	10.3	12.6	12.4	13.2	14.5	
Reach 3 Avg.	18.3	22.4	18.8	15.6	20.3	13.6	14.4	17.4	14.8	15.0	14.7	13.0	14.8	11.7	11.6	11.2	11.1	9.3	9.1
Bear Creek #1-1	17.2	18.0	15.6	15.0	11.3	10.7	16.3	15.0	10.9	15.1	14.8	15.3	15.6	16.5	8.0	10.9	8.0	8.3	8.9
Bear Creek #1-2	15.5	21.5	16.8	17.8	9.7	12.5	14.9	19.1	12.0	10.3	11.6	8.5	11.3	7.2	8.5	10.1	8.2	10.7	13.4
Bear Creek #1-3	16.3	19.5	15.2	14.6	11.5	11.3	14.1	13.8	16.7	18.0	9.5	9.2	9.7	13.2	9.7	13.9	12.2	12.2	13.0
Reach 1 Avg.	16.3	19.7	15.9	15.8	10.9	11.6	15.1	16.0	13.2	14.5	12.0	11.0	12.2	12.3	8.7	11.7	9.5	10.4	11.5
Bear Creek #2-1	15.8	19.0	15.2	13.6		14.7	12.0	10.2	11.7	14.2	14.7	7.1	12.6	12.0	9.5	9.9	10.4	10.7	
Bear Creek #2-2	14.7	16.7	14.8	16.2		18.6	17.7	14.8	10.6	16.2	13.5	14.1	13.3	17.1	14.5	11.0	12.2	11.6	9.1
Bear Creek #2-3	20.1	24.9	22.4	21.6		18.5	13.4	16.5	11.6	13.9	11.6	15.9	15.0	15.4	12.7	17.2	17.7	15.6	14.5
Reach 2 Avg.	16.9	20.2	17.5	17.1		17.3	14.6	13.8	11.3	14.8	13.3	12.4	13.6	14.8	12.2	12.7	13.4	10.3	11.8
Little Naches #4-1	13.9	17.7	14.6	14.3	8.8	13.7	11.0	12.4	10.5	11.1	13.6	13.0	15.5	14.2	8.0	12.4	9.6	15.6	10.6
Little Naches #4-2	16.1	15.5	20.4	14.9	23.3	14.2	11.2	9.5	6.5	10.0	10.9	9.9	10.2	10.1	20.3	4.9	6.4	8.6	18.3
Little Naches #4-3	10.6	19.2	17.1	19.2	8.0	11.6	6.9	11.6	8.3	14.1	3.8	11.0	8.3	9.9	12.9	8.7	13.7	9.5	8.8
Reach 4 Avg.	13.5	17.5	17.4	16.2	13.5	13.2	9.7	11.2	8.4	11.3	9.4	11.3	11.3	11.4	13.7	9.0	9.9	11.2	12.6
N.F. Lit Naches #1-1	19.0	21.1	15.5	21.2	11.5	19.1	18.3	16.6	17.5	12.0	8.1	8.7	10.4	8.2	14.1	13.4	13.6	8.1	7.2
N.F. Lit Naches #1-2	19.0	21.0	24.8	15.8	17.5	13.8	17.7	21.9	23.1	25.2	8.7	14.5	9.4	11.2	9.4	12.9	10.4	12.8	12.0
N.F. Lit Naches #1-3	13.1	16.1	13.8	13.5	15.5	14.3	17.2	15.5	13.4	9.2	10.9	10.3	13.4	15.6	13.4	19.1	10.9	8.6	10.8
Reach 1 Avg.	17.0	19.4	17.4	16.8	14.4	15.7	17.7	18.0	18.0	15.5	9.3	11.2	11.1	11.7	12.3	15.1	11.6	9.8	10.0
Pyramid Cr. #1-1	14.6	21.7	18.1	16.5	14.7	12.8	14.4	13.8	11.0	15.2	11.0	9.8	11.1	14.1	15.0	9.5	11.6	7.8	
Pyramid Cr. #1-2		15.3	14.0	14.0		14.1	12.7	20.3	13.9	13.6	9.1	12.9	9.7	10.3	14.3	15.6	7.9	5.7	
Pyramid Cr. #1-3	18.2	24.2	21.8	14.1		31.9	21.5	15.9	16.0	16.3	15.4	10.6	14.2	14.3	12.7	18.8	7.8	7.7	
Reach 1 Avg.	16.4	20.4	18.0	14.9	14.7	18.5	15.7	16.7	13.6	14.9	11.8	11.1	11.6	12.9	14.0	14.6	9.1	7.1	
N.F. Lit Naches #2-1	15.5	23.2	23.0	21.8		17.0	18.5	17.6	14.0	10.5	11.7	11.0	12.4	13.8	8.8	10.2	13.2	7.5	11.1
N.F. Lit Naches #2-2	18.3	14.6	13.0	10.2	21.0	16.2	18.1	12.6	14.6	25.6	20.7	12.3	6.7	8.0	8.9	11.5	9.9	12.4	12.9
N.F. Lit Naches #2-3	17.6	25.9	32.5	14.6	14.1	17.0	19.2	19.7	20.3	10.1	9.2	9.6	12.7	9.7	17.9	11.5	11.1	11.9	12.1
Reach 2 Avg.	17.1	21.2	23.7	15.5	17.0	16.7	18.6	16.7	15.9	15.4	13.9	10.9	10.6	10.5	11.9	11.1	11.4	10.6	12.1

Other Tributaries and Streams

South Fork Tieton #1-1								9.3	16.2	14.9	18.6	13.6	12.8	13.0	17.2			10.8	11.9	13.6
South Fork Tieton #1-2								7.7	10.4	9.1	18.3	14.8	13.5	12.6	12.4	12.1		12.4	13.7	16.5
South Fork Tieton #1-3								9.7	12.2	14.7	15.0	11.6	10.8	13.3	12.0			10.3	9.6	10.7
Reach 1 Avg.								8.9	12.9	12.9	17.3	13.3	12.4	13.0	13.8	12.1		11.2	11.9	13.6

TABLE 2

Fine Sediment Levels in Spawning Gravels 1992-2010
(McNiel Sampling)
Little Naches River System
(<1.00mm)

SAMPLE SITE

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Little Naches #1-1	12.8	17.0	12.5	12.5	17.6	13.1	18.9	15.9	12.7	17.9	16.5	14.6	12.6	12.6	8.0	10.1	12.2	9.2	11.0
Little Naches #1-2	13.3		14.2	16.2	16.2	21.5	18.4	21.5	24.9	15.7	14.0	17.7	15.5	15.5	9.8	11.8	8.6	5.8	5.6
Little Naches #1-3	13.4	25.7	18.2	12.2	23.4		20.9	15.8	16.5		31.0	12.5	14.7	16.1	18.9	10.0	14.9	15.5	19.7
Reach 1 Avg.	13.2	21.3	14.9	13.6	19.0	17.3	19.4	17.7	18.0	16.8	20.5	14.6	14.3	14.8	10.9	10.6	11.9	10.2	12.1
Little Naches #2-1	13.6	20.6	16.6	19.3	16.4	15.3	13.5	15.2	14.7	18.3	17.4	10.6	10.3	7.0	14.8	10.2	11.4	9.5	11.7
Little Naches #2-2	20.1	19.9	16.5	16.7	20.1	19.8	13.4	15.3	15.3	14.1	12.5	16.4	11.0	11.0	14.2	10.4	14.5	10.1	15.7
Little Naches #2-3	19.0	18.3	20.5	21.5	20.4	14.1	16.9	16.4	17.1	22.8	11.9	9.4	9.9	9.6	11.8	11.0	8.3	8.5	10.9
Reach 2 Avg.	17.6	19.6	17.9	19.2	18.8	16.1	14.6	15.6	16.2	18.4	13.9	12.1	10.4	9.2	13.6	10.5	11.4	9.4	12.7
S.F. Lit Naches #1-1	25.5	20.2	11.8	17.0	9.7		6.4	18.5	16.5	22.0	15.3	17.1	11.7	10.8	14.9	13.9	12.4	7.0	10.3
S.F. Lit Naches #1-2	19.9	13.9	16.2	10.2	9.1		17.2	16.3	9.6	15.9	15.6	12.4	11.9	11.4	10.5	17.9	11.1	8.3	10.7
S.F. Lit Naches #1-3	18.9	22.8	15.1	11.8	8.9		14.1	12.3	15.2	16.7	12.5	11.0	11.8	11.8	10.9	14.1	7.0	8.4	18.6
Reach 1 Avg.	21.4	18.9	14.3	13.0	9.2		12.6	15.7	13.8	18.2	14.5	13.5	11.8	11.3	12.1	15.3	10.1	7.9	13.2
Little Naches #3-1	22.5	26.2	20.9	15.9	22.1	16.8	14.4	15.1	12.7	13.4	10.8	14.0	18.7	14.2	11.0	10.5	7.8	4.4	13.0
Little Naches #3-2	21.6	25.6	20.9	18.7	6.1	9.4	13.5	24.5	20.5	19.0	23.1	14.7	16.2	12.7	13.0	12.4	14.1	10.2	5.1
Little Naches #3-3	17.7	20.5	18.6	15.8	34.6	20.0	18.3	16.5	14.7	16.1	14.3	14.4	14.4	12.5	13.9	13.3	14.8	15.4	13.6
Reach 3 Avg.	20.6	24.1	20.2	16.8	20.9	15.3	15.4	18.7	16.0	16.2	16.1	14.3	16.4	13.1	12.6	12.1	12.2	10.0	10.3
Bear Creek #1-1	18.9	18.9	16.7	16.3	12.6	11.7	17.8	16.0	11.6	17.4	17.4	17.3	17.8	18.9	8.4	12.0	8.9	9.1	10.6
Bear Creek #1-2	16.9	22.7	18.0	18.7	13.6	13.6	16.1	20.9	13.4	11.2	12.7	9.3	12.3	8.2	9.1	11.1	8.8	11.9	15.1
Bear Creek #1-3	18.1	21.5	16.9	15.7	14.4	12.9	15.0	15.1	18.9	20.5	10.7	10.3	11.0	14.8	11.0	16.1	13.5	13.9	15.9
Reach 1 Avg.	18.0	21.0	17.2	16.9	13.7	12.8	16.3	17.3	14.7	16.3	13.6	12.3	13.7	14.0	9.5	13.1	10.4	11.6	13.5
Bear Creek #2-1	17.2	21.2	16.1	14.6		16.2	13.0	11.0	13.1	15.7	15.6	8.1	13.9	13.5	10.6	11.1	11.5	9.7	10.5
Bear Creek #2-2	16.4	18.5	15.9	17.4		19.7	18.5	16.6	11.8	17.3	14.7	15.3	14.7	18.6	16.0	11.8	13.6	12.1	16.5
Bear Creek #2-3	21.9	27.1	23.8	23.1		20.9	15.0	17.7	13.0	15.5	13.4	17.6	17.4	16.9	13.8	18.2	18.9	13.6	14.2
Reach 2 Avg.	18.5	22.2	18.6	18.4		18.9	15.7	15.1	12.6	16.1	14.6	13.6	15.3	16.3	13.5	13.7	14.7	11.8	13.5
Little Naches #4-1	15.1	17.9	15.7	15.5	10.0	14.8	12.7	13.4	11.9	12.4	15.1	14.3	17.2	15.6	8.6	12.9	10.6	16.3	14.2
Little Naches #4-2	16.9	15.7	21.4	16.0	24.9	16.2	11.7	10.3	6.8	12.1	11.1	11.0	11.6	11.5	23.9	5.5	7.2	10.2	19.2
Little Naches #4-3	11.7	20.4	17.9	20.7	11.0	12.1	7.8	12.3	9.1	14.8	4.0	11.8	9.7	10.7	13.8	10.0	15.2	11.6	10.2
Reach 4 Avg.	14.6	18.0	18.3	17.4	15.2	14.4	10.7	12.0	9.3	12.8	10.1	12.4	12.8	12.6	15.4	9.8	11.0	12.7	14.5
N.F. Lit Naches #1-1	20.4	22.3	18.9	22.3	15.1	21.4	20.1	20.6	20.1	14.3	9.7	10.5	12.9	9.2	15.5	14.8	15.0	8.7	8.2
N.F. Lit Naches #1-2	20.5	21.9	27.2	16.6	18.9	14.5	19.4	22.8	26.4	26.6	9.3	15.9	10.6	12.8	11.2	14.1	11.7	14.5	14.0
N.F. Lit Naches #1-3	14.2	16.4	14.4	15.1	17.9	16.0	18.0	16.4	14.5	10.0	11.8	11.4	15.3	16.9	15.2	20.8	11.9	9.1	11.9
Reach 1 Avg.	18.4	20.2	19.5	18.0	17.0	17.3	19.2	19.9	20.3	17.0	10.2	12.6	12.9	13.0	14.0	16.6	12.9	10.8	11.4
Pyramid Cr. #1-1	15.4	23.2	20.0	17.9	16.5	14.4	15.5	14.5	11.9	15.9	12.2	11.1	12.6	16.1	18.1	10.8	12.7	8.7	
Pyramid Cr. #1-2		17.0	15.5	15.5		15.1	13.9	21.9	15.3	15.0	10.4	14.9	10.6	11.3	15.1	17.0	8.7	6.5	
Pyramid Cr. #1-3	19.7	25.3	22.6	15.0		33.9	26.6	16.9	17.0	17.5	16.7	12.2	15.9	15.8	13.9	21.2	8.5	8.7	
Reach 1 Avg.	17.6	21.9	19.4	16.1	16.5	20.0	17.9	17.8	14.7	16.0	13.1	12.7	13.0	14.4	15.7	16.3	10.0	8.0	
N.F. Lit Naches #2-1	16.1	24.2	25.4	22.8		18.8	19.7	18.8	14.9	11.8	13.6	13.2	14.4	15.4	10.1	11.6	15.2	8.9	12.9
N.F. Lit Naches #2-2	19.3	15.5	14.1	11.1	22.4	18.1	19.0	13.4	16.3	26.4	22.4	13.8	7.6	8.9	10.5	12.8	11.4	13.5	14.4
N.F. Lit Naches #2-3	20.7	27.9	33.6	16.4	15.2	18.4	20.4	21.7	21.2	11.6	10.4	10.8	14.1	11.0	18.6	12.6	12.4	13.9	16.2
Reach 2 Avg.	18.7	22.5	25.3	16.8	18.3	18.4	19.7	18.0	17.1	16.6	15.5	12.6	12.0	11.8	13.1	12.3	13.0	12.1	14.5

Other Tributaries and Streams

South Fork Tieton #1-1								10.3	17.4	16.6	20.3	16.0	14.2	13.5	18.5		12.8	13.7	17.3
South Fork Tieton #1-2								8.2	11.5	10.5	21.2	15.8	17.1	14.8	13.6	14.6	13.6	15.5	18.8
South Fork Tieton #1-3								11.0	13.7	16.6	16.2	13.1	12.5	16.1	14.2		11.9	13.2	11.8
Reach 1 Avg.								9.8	14.2	14.6	19.2	15.0	14.6	14.8	15.4	14.6	12.8	14.2	15.9

Fine Sediment Trends (<0.85mm) for All Tributaries in the Little Naches River Drainage from 1992-2010

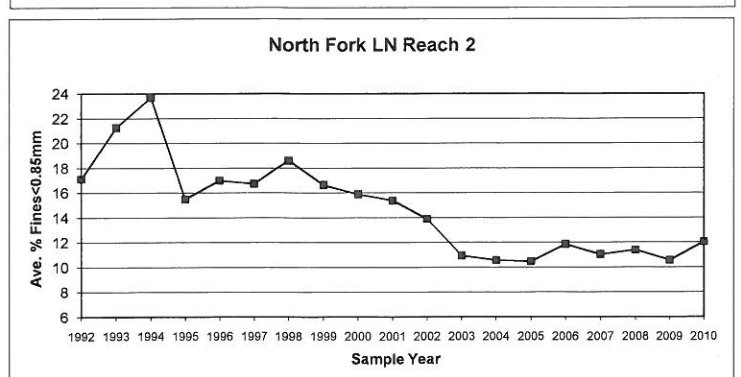
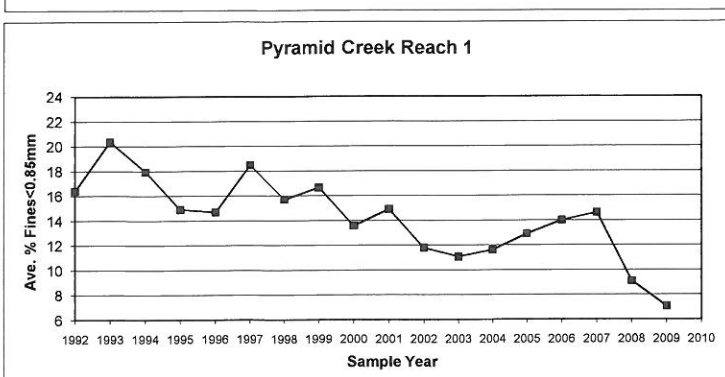
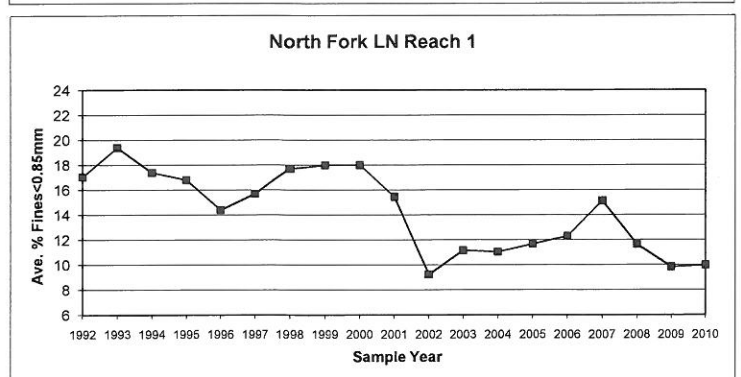
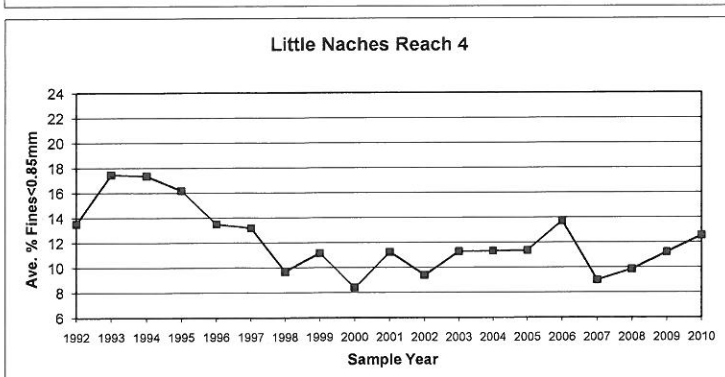
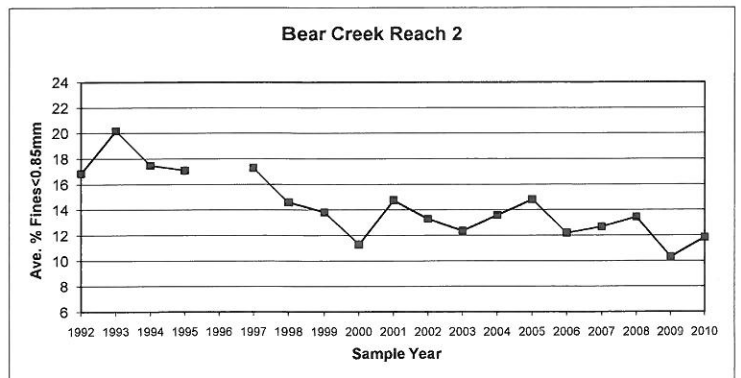
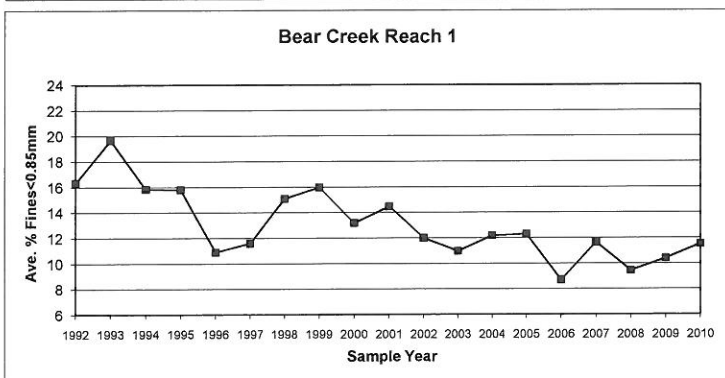
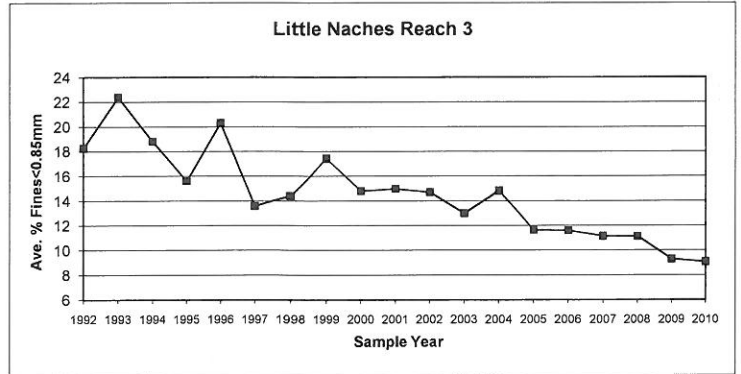
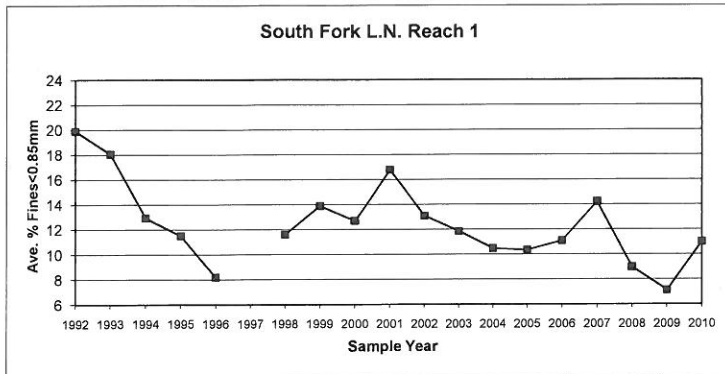
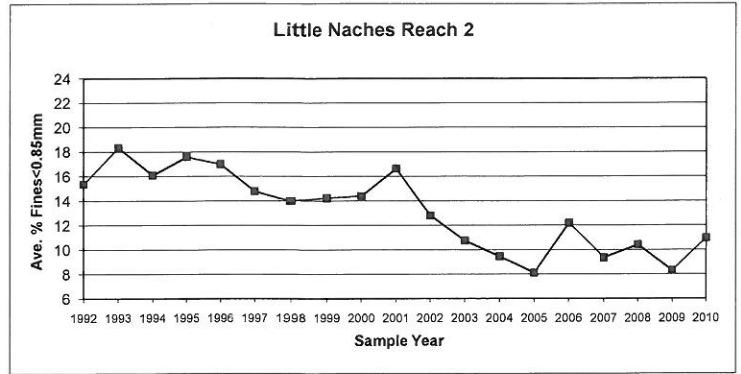
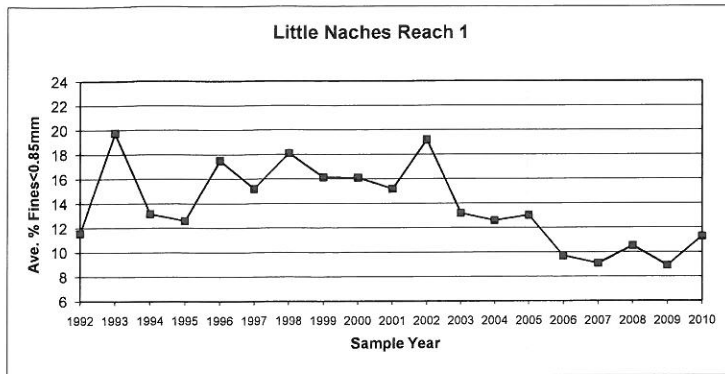


Figure 5

Fine Sediment Trends at Historic Monitoring Sites in the Little Naches River Drainage from 1985-2010

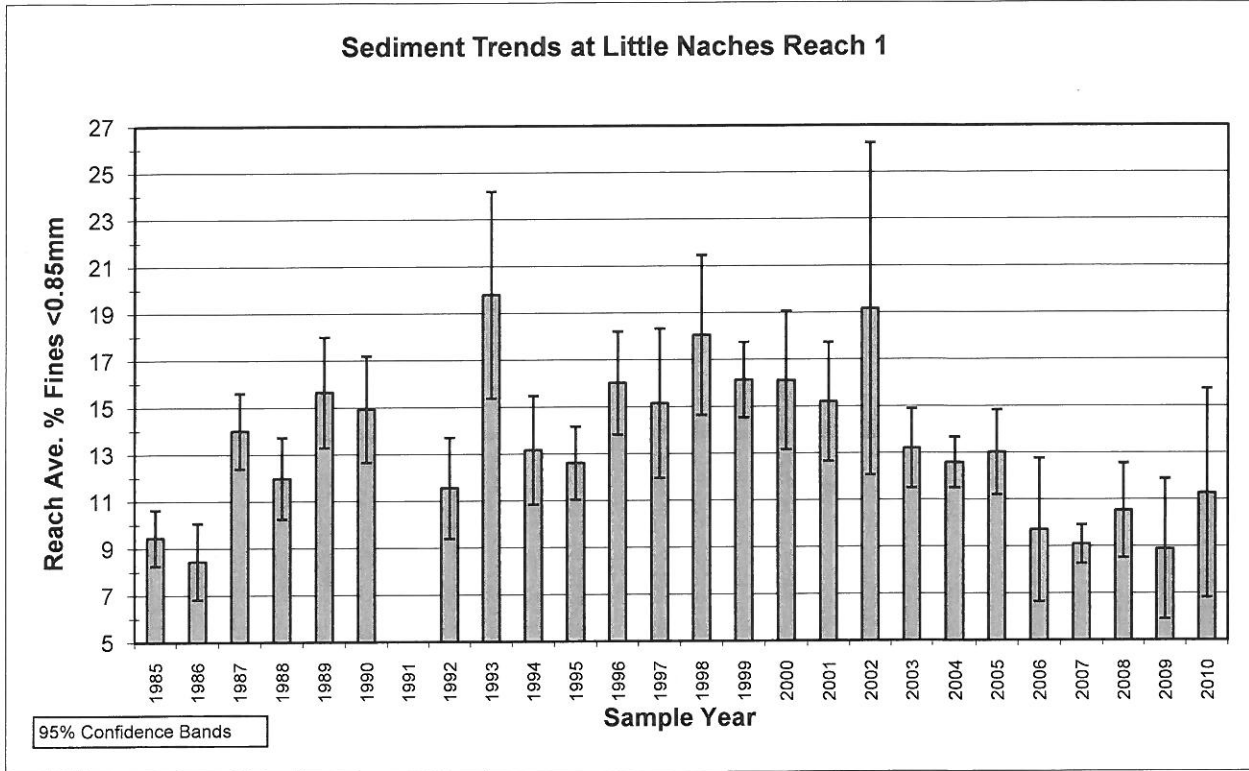


Figure 6

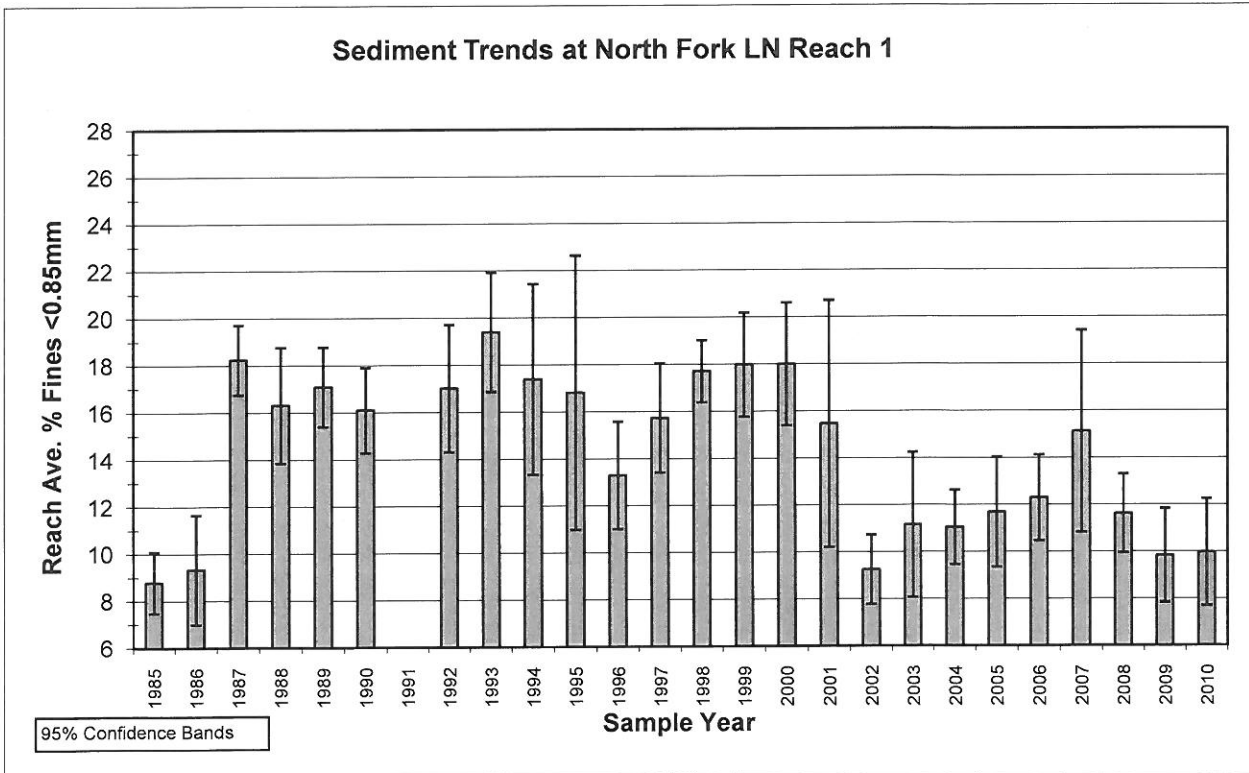
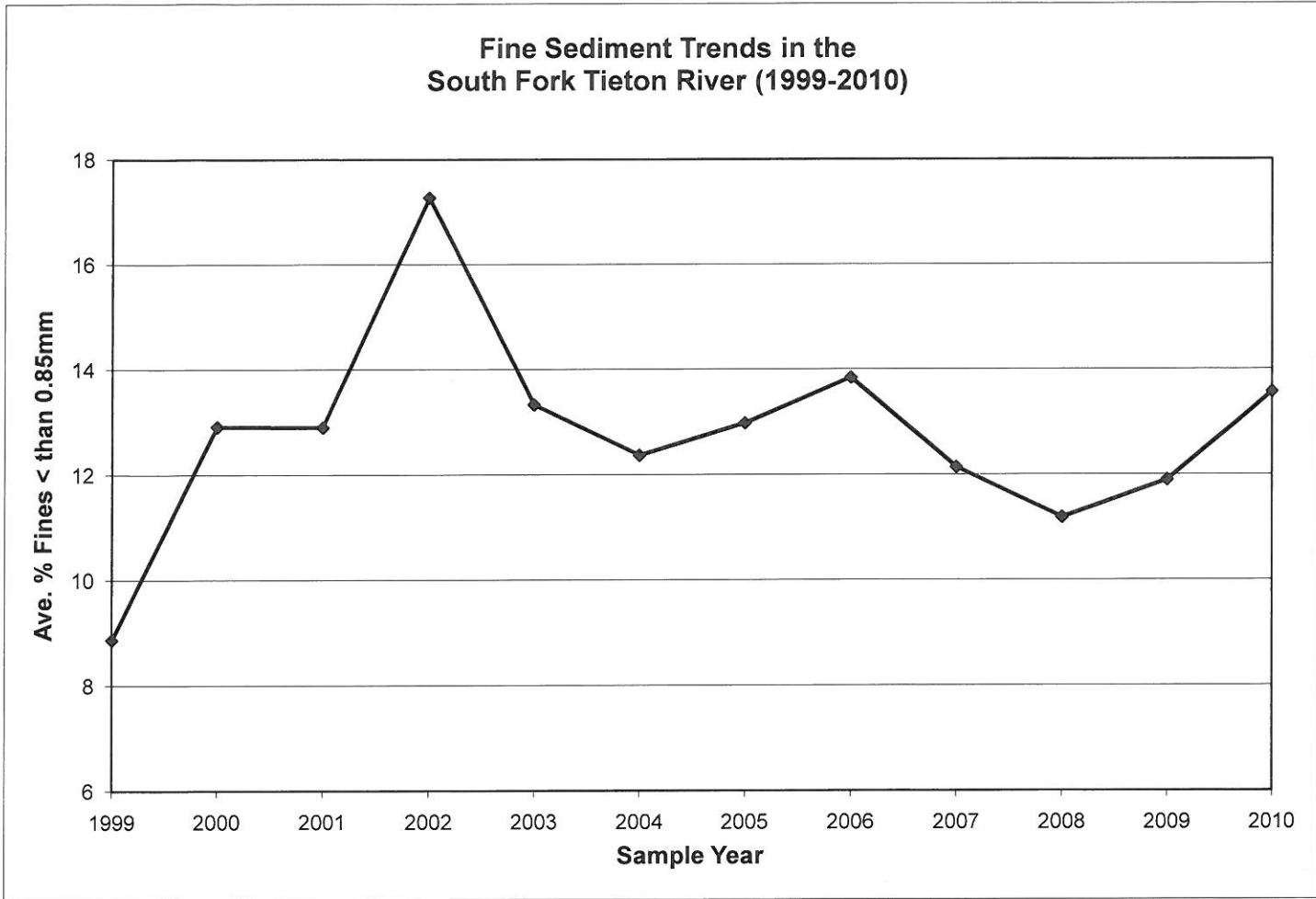


Figure 7



NOTE: 2007 Year Data only contains data collected from 1 Riffle

Figure 8

LITTLE NACHES SEDIMENT MONITORING PROJECT
2010 RAW DATA

STREAM NAME	SAMPLE LOCATION			MILLILITERS DISPLACED											
	RCH	RIF	SAM	>75.0	>26.5	>13.5	>9.5	>6.73	>3.35	>1.70	>1.00	>0.85	>.425	>.212	<.212
LITTLE NACHES	1	1	1	0	1060	270	140	240	30	130	390	0	0	420	41
LITTLE NACHES	1	1	2	1390	1600	330	180	190	320	200	70	30	80	40	57
LITTLE NACHES	1	1	3	0	1100	450	160	170	330	150	90	40	70	40	115
LITTLE NACHES	1	1	4	0	350	390	160	130	220	190	120	20	90	60	54
LITTLE NACHES	1	2	1	810	1500	500	170	320	390	400	130	30	80	70	80
LITTLE NACHES	1	2	2	0	1730	450	160	180	190	240	70	20	30	20	49
LITTLE NACHES	1	2	3	1150	700	500	280	440	990	620	330	50	140	80	115
LITTLE NACHES	1	2	4	1670	720	570	290	300	520	430	320	40	80	80	88
LITTLE NACHES	1	3	1	0	790	1330	250	410	290	190	120	40	200	200	130
LITTLE NACHES	1	3	2	580	1230	460	370	510	340	140	120	40	350	270	350
LITTLE NACHES	1	3	3	0	420	940	380	300	380	150	60	30	260	110	250
LITTLE NACHES	1	3	4	0	1050	1080	230	280	380	290	100	30	390	140	480
LITTLE NACHES	2	1	1	0	620	640	230	210	540	410	330	20	110	70	170
LITTLE NACHES	2	1	2	1290	500	460	220	230	370	310	240	50	160	50	110
LITTLE NACHES	2	1	3	1030	1330	720	310	500	900	210	100	40	230	100	120
LITTLE NACHES	2	1	4	0	620	440	150	170	270	260	210	50	150	80	170
LITTLE NACHES	2	2	1	0	1110	690	230	290	440	400	190	90	250	60	140
LITTLE NACHES	2	2	2	0	930	600	330	130	280	280	180	50	160	90	125
LITTLE NACHES	2	2	3	0	400	280	520	250	190	320	210	180	160	40	190
LITTLE NACHES	2	2	4	210	1220	760	250	220	390	130	210	70	210	140	160
LITTLE NACHES	2	3	1	0	1480	710	250	240	370	230	90	40	50	30	110
LITTLE NACHES	2	3	2	330	800	640	210	230	270	180	90	30	60	40	110
LITTLE NACHES	2	3	3	0	900	700	270	280	390	230	110	40	100	50	120
LITTLE NACHES	2	3	4	0	1280	640	250	220	300	220	250	40	100	500	115
SOUTH FORK L.N.	1	1	1	0	1880	320	120	130	220	230	60	100	150	70	130
SOUTH FORK L.N.	1	1	2	0	1500	460	220	310	540	520	250	70	170	70	105
SOUTH FORK L.N.	1	1	3	1800	300	410	190	190	310	300	150	40	90	40	160
SOUTH FORK L.N.	1	1	4	0	1400	520	180	190	310	290	140	40	90	50	150
SOUTH FORK L.N.	1	2	1	940	1430	580	190	280	440	350	250	50	210	50	110
SOUTH FORK L.N.	1	2	2	0	1520	580	270	280	300	200	50	140	100	70	110
SOUTH FORK L.N.	1	2	3	880	1130	660	270	260	380	300	190	100	200	90	210
SOUTH FORK L.N.	1	2	4	1420	1070	580	240	330	580	460	370	80	230	100	130
SOUTH FORK L.N.	1	3	1	960	620	500	190	200	370	470	310	90	240	100	170
SOUTH FORK L.N.	1	3	2	840	1190	380	180	230	320	350	310	120	340	120	230
SOUTH FORK L.N.	1	3	3	320	360	410	150	160	420	530	480	170	500	210	280
SOUTH FORK L.N.	1	3	4	350	950	450	190	230	980	630	390	90	270	120	180
LITTLE NACHES	3	1	1	270	630	140	180	230	210	340	170	30	150	50	80
LITTLE NACHES	3	1	2	0	520	680	220	300	260	220	100	10	130	140	105
LITTLE NACHES	3	1	3	0	810	780	190	190	240	180	130	20	90	30	160
LITTLE NACHES	3	1	4	0	780	580	190	180	330	320	130	40	150	50	180
LITTLE NACHES	3	2	1	1160	1970	690	330	520	890	460	130	70	30	20	70
LITTLE NACHES	3	2	2	0	1420	380	220	350	560	550	110	30	100	50	70
LITTLE NACHES	3	2	3	1630	1080	640	290	420	660	500	130	30	100	40	60
LITTLE NACHES	3	2	4	560	1680	530	420	300	590	110	70	70	70	60	100
LITTLE NACHES***	3	3	1												
LITTLE NACHES	3	3	2	760	450	490	340	350	470	370	190	50	250	160	195
LITTLE NACHES	3	3	3	590	1090	360	130	250	350	500	270	100	140	60	80
LITTLE NACHES	3	3	4	1460	300	400	180	230	400	350	170	60	290	130	135
BEAR CREEK	1	1	1	1160	660	580	270	300	380	250	120	40	160	100	60
BEAR CREEK	1	1	2	1510	1190	580	230	320	480	460	170	70	120	180	160
BEAR CREEK	1	1	3	400	1480	680	300	450	960	600	410	170	200	180	170
BEAR CREEK	1	1	4	0	1040	610	270	270	450	300	160	50	190	110	75
BEAR CREEK	1	2	1	400	230	500	200	240	320	200	130	50	240	50	80
BEAR CREEK	1	2	2	0	1220	620	200	120	350	270	190	60	150	80	120
BEAR CREEK	1	2	3	590	790	740	240	250	470	490	380	50	280	100	235
BEAR CREEK	1	2	4	0	300	570	270	290	260	250	50	50	150	80	160
BEAR CREEK~~~~	1	3	1												
BEAR CREEK~~~~	1	3	2												
BEAR CREEK	1	3	3	0	1220	500	190	260	500	460	260	190	280	100	150
BEAR CREEK	1	3	4	0	1400	300	670	170	300	240	140	50	160	140	190
BEAR CREEK~~~~	2	1	1												
BEAR CREEK~~~~	2	1	2												
BEAR CREEK~~~~	2	1	3												
BEAR CREEK~~~~	2	1	4												
BEAR CREEK	2	2	1	1250	890	500	190	210	500	370	160	30	170	110	120
BEAR CREEK	2	2	2	0	1570	510	250	230	380	320	210	50	160	80	120
BEAR CREEK	2	2	3	480	930	670	340	420	660	670	270	70	140	40	110
BEAR CREEK	2	2	4	0	250	480	230	240	280	190	110	40	60	60	135
BEAR CREEK	2	3	1	0	1020	500	210	270	500	450	360	40	370	140	230
BEAR CREEK	2	3	2	220	960	420	210	210	330	290	170	40	160	170	165
BEAR CREEK	2	3	3	620	840	570	270	240	440	210	130	70	130	60	100
BEAR CREEK	2	3	4	0	870	480	220	230	410	450	340	140	330	90	220
LITTLE NACHES	4	1	1	0	1060	660	220	250	420	540	230	50	50	40	140
LITTLE NACHES	4	1	2	1910	600	380	250	340	480	650	380	80	210	100	235
LITTLE NACHES	4	1	3	340	800	520	230	250	440	490	370	230	250	70	160
LITTLE NACHES	4	1	4	200	450	640	190	200	220	190	50	170	150	70	180
LITTLE NACHES	4	2	1	270	1320	660	320	350	640	390	150	30	210	100	170
LITTLE NACHES	4	2	2	1540	400	960	390	370	420	340	140	40	350	240	350
LITTLE NACHES	4	2	3	100	300	810	390	370	570	330	150	30	210	140	510
LITTLE NACHES	4	2	4	0	530	640	260	290	430	340	80	50	220	200	395
LITTLE NACHES	4	3	1	600	980	490	190	200	330	320	110	30	80	30	125
LITTLE NACHES	4	3	2	1760	510	870	420	550	780	710	380	90	310	100	270
LITTLE NACHES	4	3	3	190	600	470	200	210	310	220	270	60	150	40	140
LITTLE NACHES	4	3	4	240	830	480	250	280	470	420	200	50	120	40	75
NORTH FORK	1	1	1	700	1220	630	200	210	440	420	210	30	100	40	120

TOTAL DISPLA	%<PARTICLE SIZE %<1.00	%<.85	AVE. OF RIFFLE %<1.00	%<.85	AVE. OF REACH %<1.00	%<.85
2721	16.94	16.94	10.97	10.15	12.09	11.28
4487	4.61	3.94				
2715	9.76	8.29				
1784	12.56	11.43				
4480	5.80	5.13	5.59	4.84		
3139	3.79	3.15				
5395	7.14	6.21				
5108	5.64	4.86				
3950	14.43	13.42	19.71	18.85		
4760	21.22	20.38				
3280	19.82	18.90				
4450	23.37	22.70				
3350	11.04	10.45	11.65	10.52	12.73	10.97
3990	9.27	8.02				
5590	8.77	8.05				
2570	17.51	15.56				
3890	13.88	11.57	15.69	12.63		
3155	13.47	11.89				
2740	20.80	14.23				
3970	14.61	12.85				
3600	6.39	5.28	10.85	9.76		
2990	8.03	7.02				
3190	9.72	8.46				
3915	19.28	18.26				
3410	13.20	10.26	10.29	8.59	13.20	11.02
4215	9.85	8.19				
3980	8.29	7.29				
3360	9.82	8.63				

