Comanche Creek
Trout Habitat Monitoring
DRAFT Summary Report
for 2001-2004 Data

By Art Vollmer
Truchas Chapter of Trout Unlimited

INTRODUCTION

This report summarizes the results of stream geomorphologic monitoring conducted from 2001 – 2004 at nine stream channel cross sectional transects along Comanche Creek in the Valle Vidal Unit of the Carson National Forest. Monitoring was conducted using the protocol established in the *Trout Habitat Monitoring Plan for Comanche Creek.* Data from August 2001, which established baseline conditions, and September 2002 monitoring events was presented in previous reports. This report presents data from September 2004 and compares that data to previous years' data and analyzes the data for any apparent changes in several geomorphologic parameters. Monitoring data to be gathered in the future will be used assess trends that are relevant to channel evolution and recovery in Comanche Creek. The changes in Comanche Creek geomorphology are directly related to trout habitat quality.

This work is part of a larger restoration effort being conducted on the Rio Costillo watershed within the Valle Vidal funded by an EPA 319 grant administered by the New MexicoEnvironment Department. The Comanche Creek Workgroup, of which the Truchas Chapter of Trout Unlimited is a member, was formed to carry out this multiyear project. The Comanche Creek monitoring work described here was funded in part by an Embrace-A-Stream grant from Trout Unlimited to its Truchas Chapter.

The transects were grouped into three treatment areas. An unfenced control group (Group C), a fenced elk-cattle exclosure (Group A), and a fenced cattle exclosure (Group B). The primary reason behind this experimental design was to see how different grazing regimes would impact stream evolution and recovery.

MONITORING RESULTS

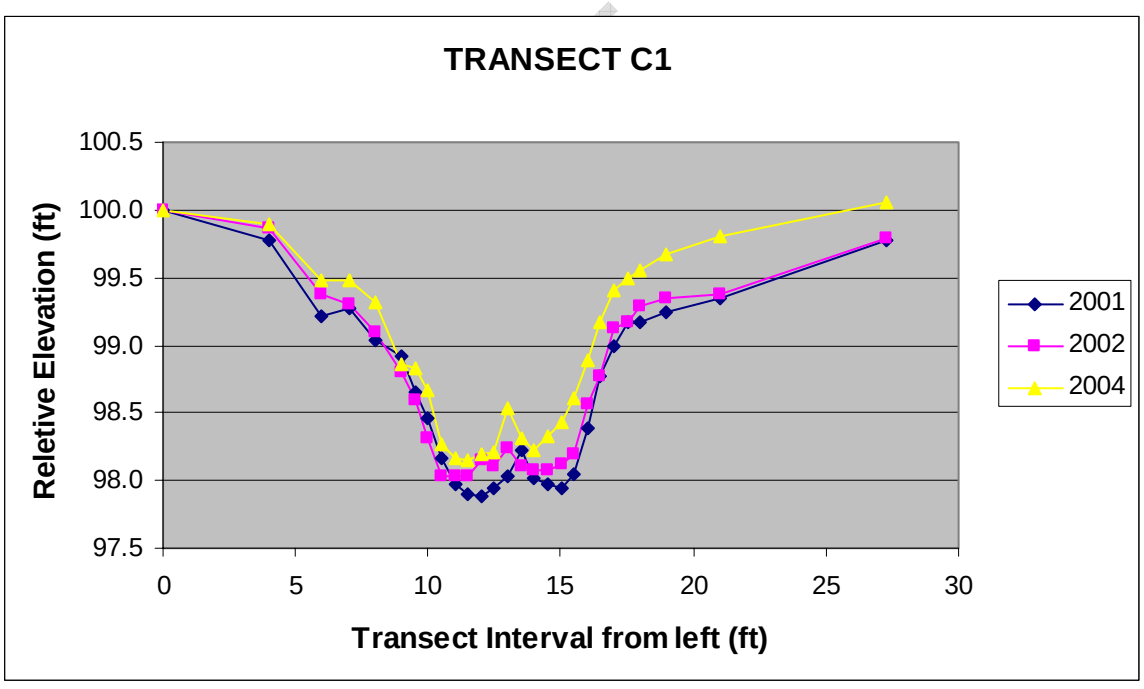
Field data sheets and photos for the 2004 monitoring event are provided in the Appendix. Field data for 2001 and 2002 were provided in previous Comanche Creek monitoring reports. Data reported on include:

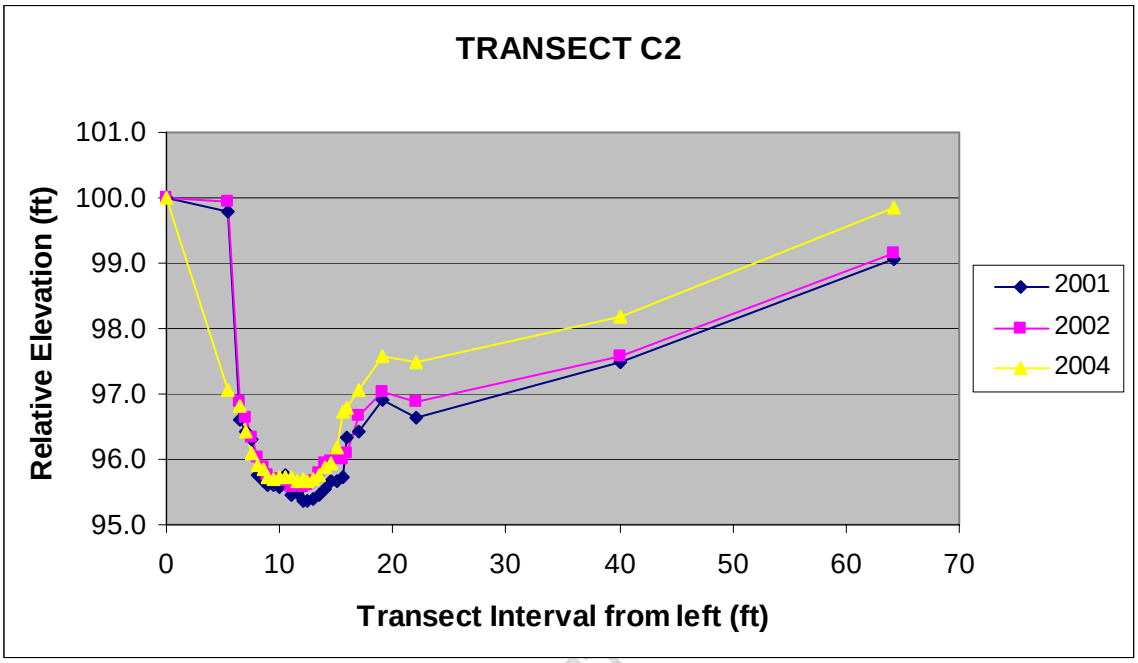
- Stream channel profiles from cross sectional transects.
- Stream bank erosion/accretion rate data from bank pin measurements.
- Stream bottom substrate data.

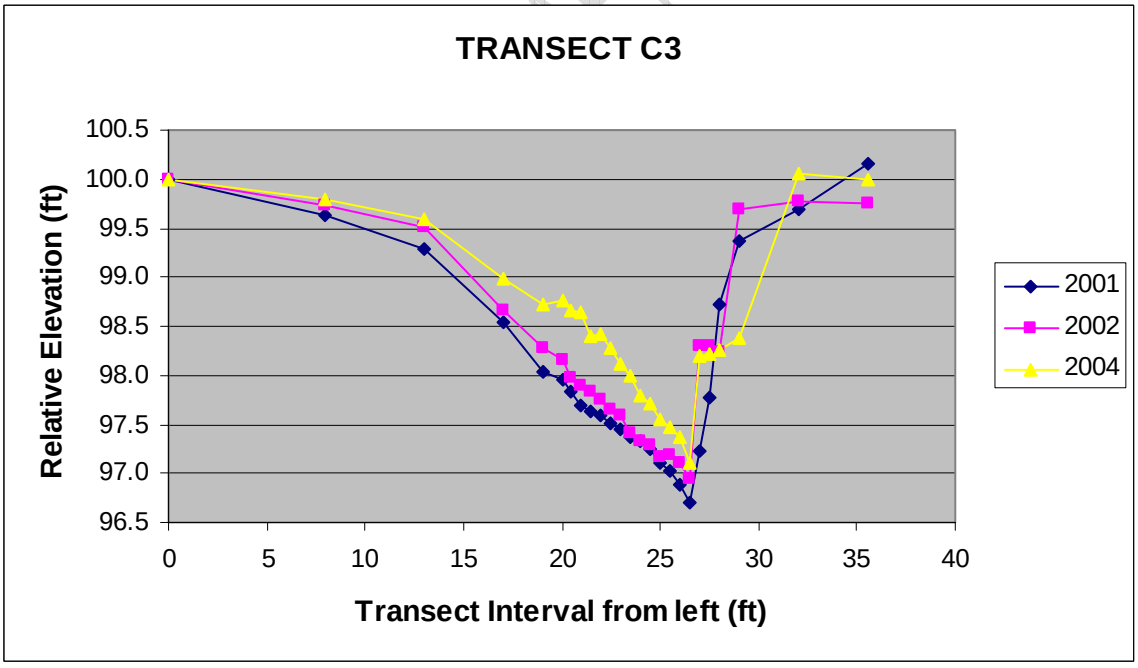
Stream Cross Sections

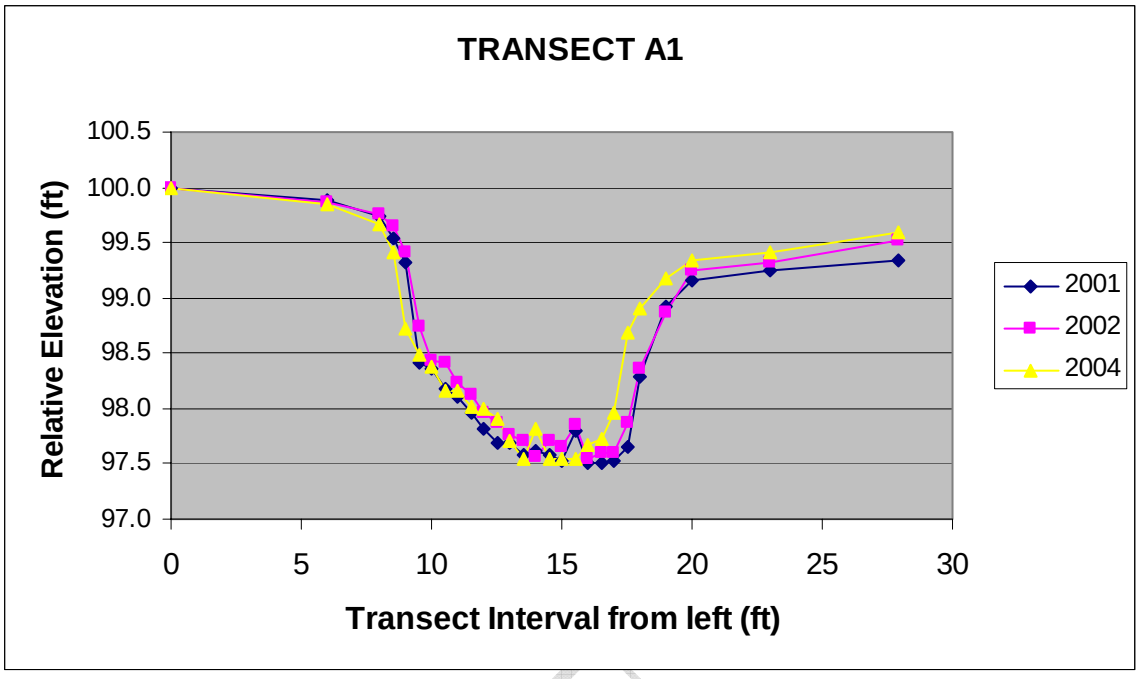
Changes in stream cross sections are the primary geomorphologic measurement used to determine if stream reaches are evolving toward a more stable form. In Comanche Creek's case, this means conversion from a Rosgen 'C' type channel to a Rosgen 'E' type, its most probable stable natural state. This means developing a lower bankful width:depth ratio and higher bankful depth compared to baseline conditions.

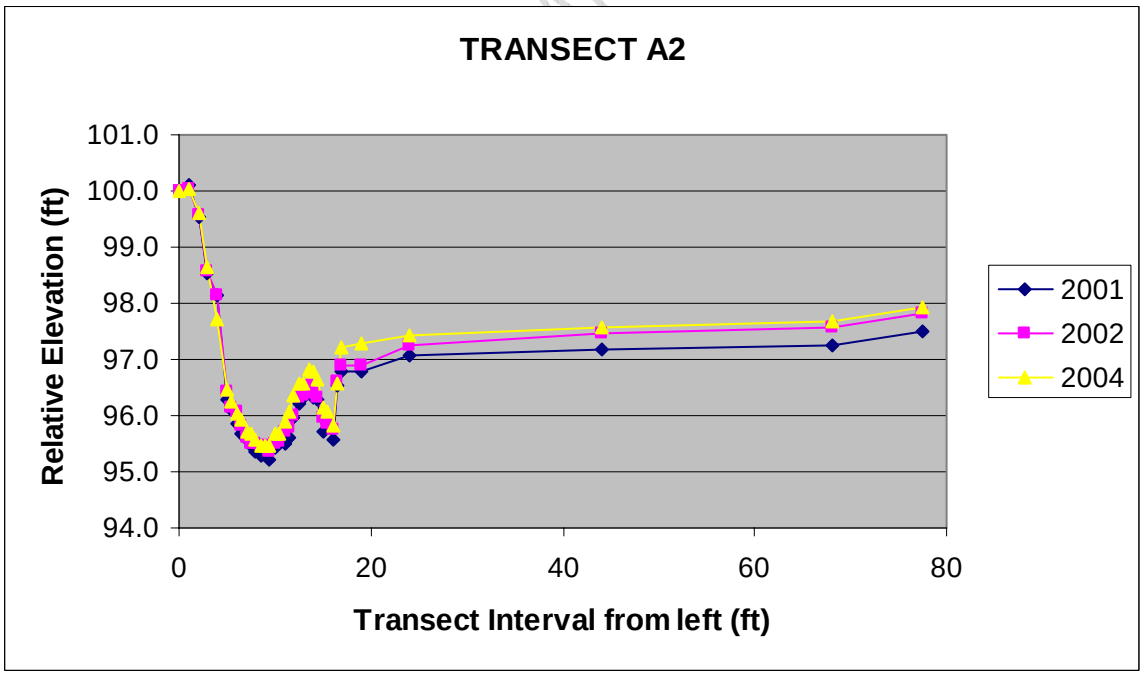
The control site appears to show some significant sloughing of the steep, raw cutbanks in cross sections C2 (left bank) and C3 (right bank). Cross sections B3 and A3 show bank sloughing to a lesser degree. Cross sections B1 and C3 show significant channel narrowing and possibly the beginning of a new bankfull bench on the right for C3. Cross section B1 also appears to have deepened significantly. While there is some apparent accretion in cross sections C1 and C2, this may be measurement error due to problems associated with maintaining a level measurement line. This would explain why the right endpoints for 2004 are several inches higher than previous years. It is unlikely these endpoints could have received significant sediment deposits during the low flows of recent drought years.

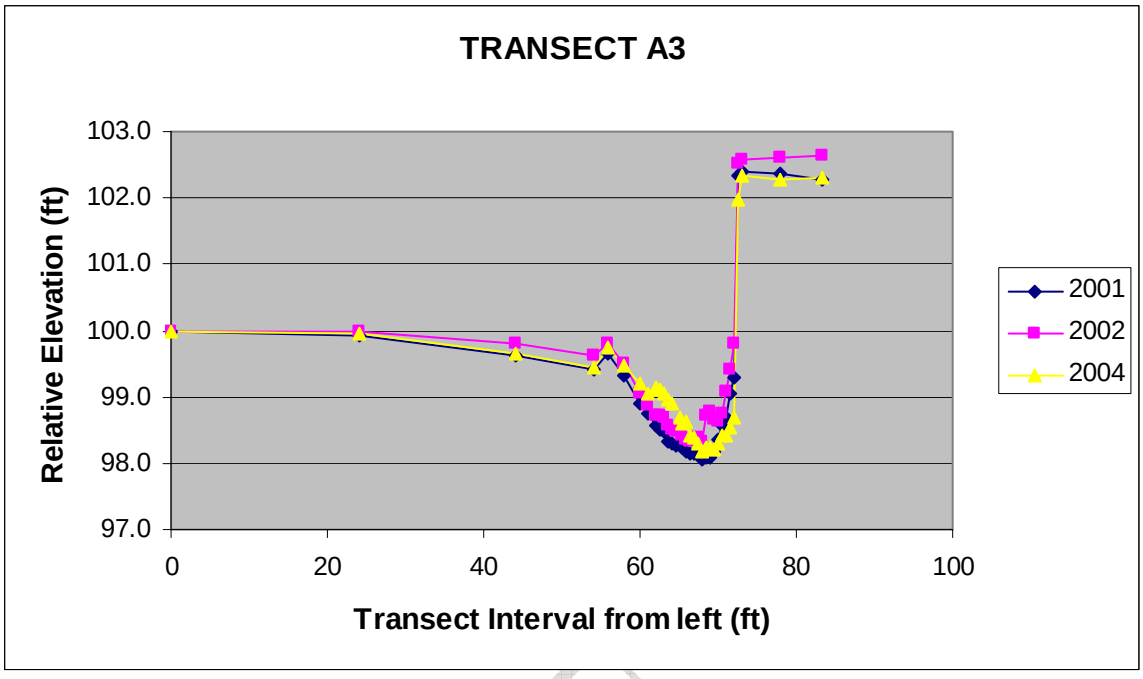


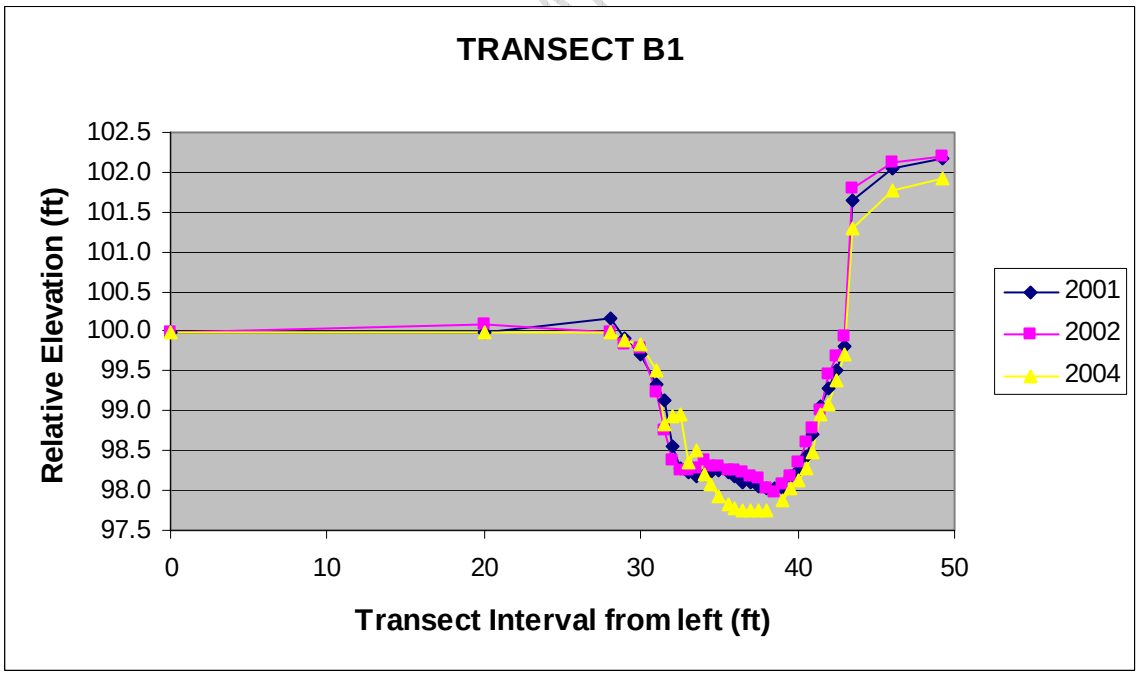

TRANSECT C2
Relative Elevation (ft)
101.0
100.0
99.0
98.0
97.0
96.0
95.0
0
10
20
30
40
50
60
70
Transect Interval from left (ft)
2001
2002
2004

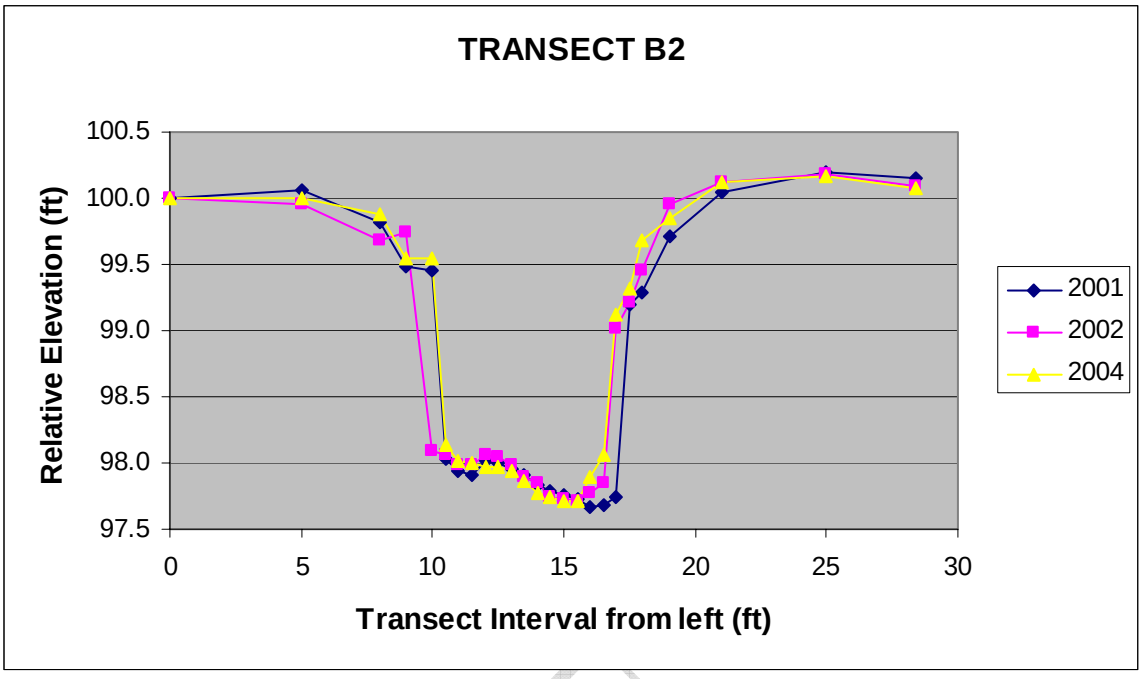

TRANSECT C3
Relative Elevation (ft)
100.5
100.0
99.5
99.0
98.5
98.0
97.5
97.0
96.5
0
5
10
15
20
25
30
35
40
Transect Interval from left (ft)
2001
2002
2004

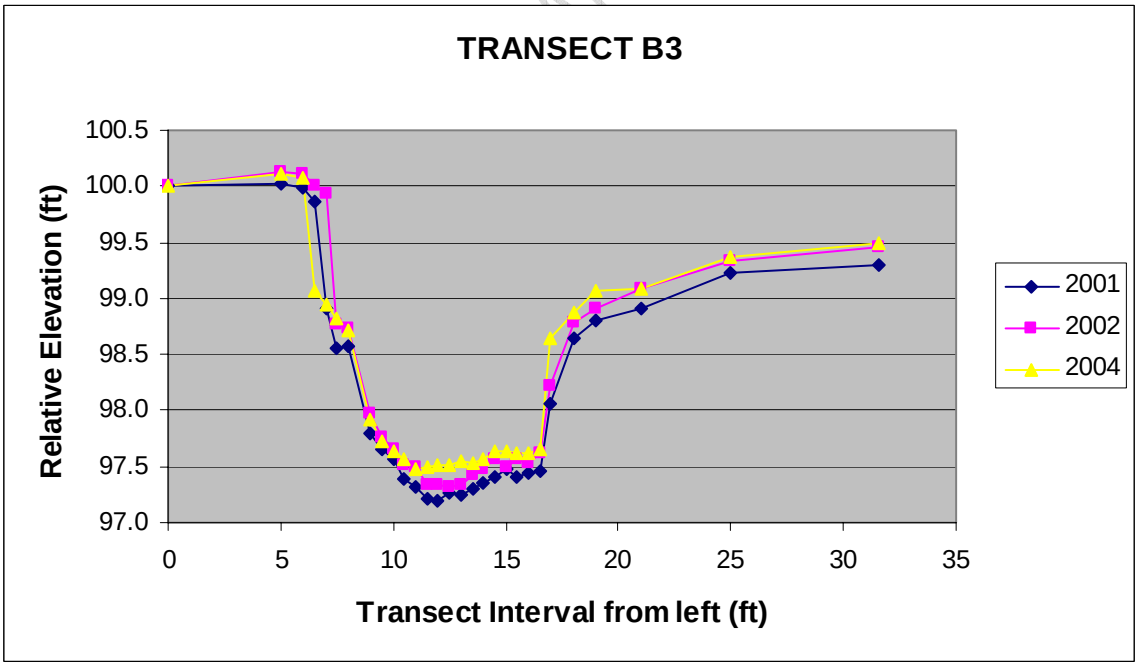

TRANSECT A1
Relative Elevation (ft)
100.5
100.0
99.5
99.0
98.5
98.0
97.5
97.0
0
5
10
15
20
25
30
Transect Interval from left (ft)
2001
2002
2004


TRANSECT A2
Relative Elevation (ft)
101.0
100.0
99.0
98.0
97.0
96.0
95.0
94.0
0
20
40
60
80
Transect Interval from left (ft)
2001
2002
2004


TRANSECT A3
Relative Elevation (ft)
103.0
102.0
101.0
100.0
99.0
98.0
97.0
0
20
40
60
80
100
Transect Interval from left (ft)
2001
2002
2004


TRANSECT B1
Relative Elevation (ft)
102.5
102.0
101.5
101.0
100.5
100.0
99.5
99.0
98.5
98.0
97.5
0
10
20
30
40
50
Transect Interval from left (ft)
2001
2002
2004


TRANSECT B2
Relative Elevation (ft)
100.5
100.0
99.5
99.0
98.5
98.0
97.5
0
5
10
15
20
25
30
Transect Interval from left (ft)
2001
2002
2004

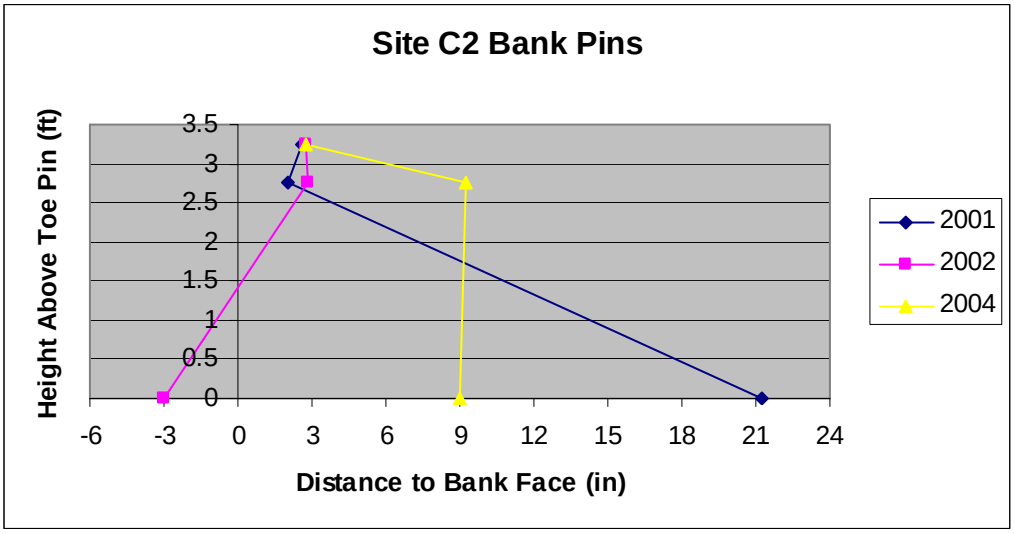

TRANSECT B3
Relative Elevation (ft)
100.5
100.0
99.5
99.0
98.5
98.0
97.5
97.0
0
5
10
15
20
25
30
35
Transect Interval from left (ft)
2001
2002
2004

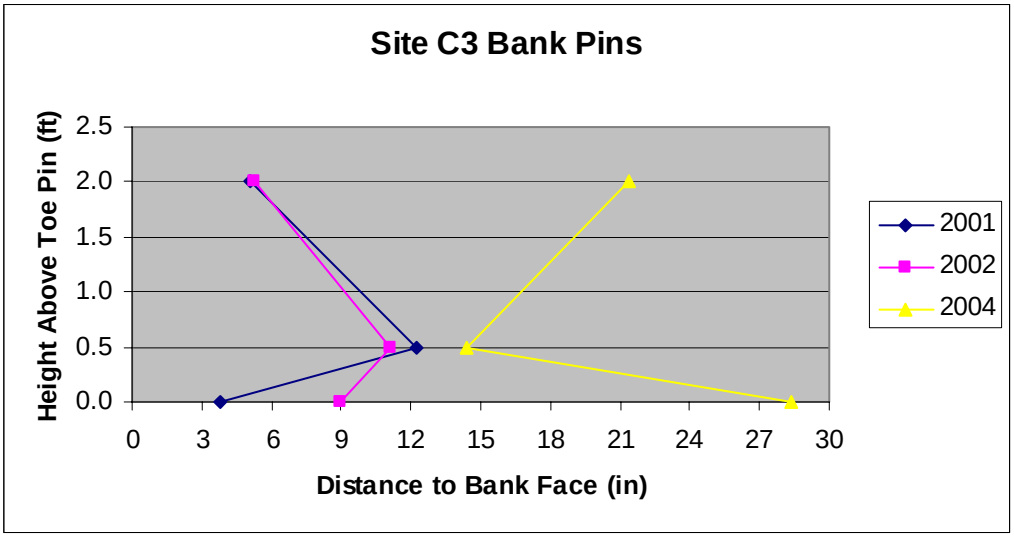
Stream Bank Erosion

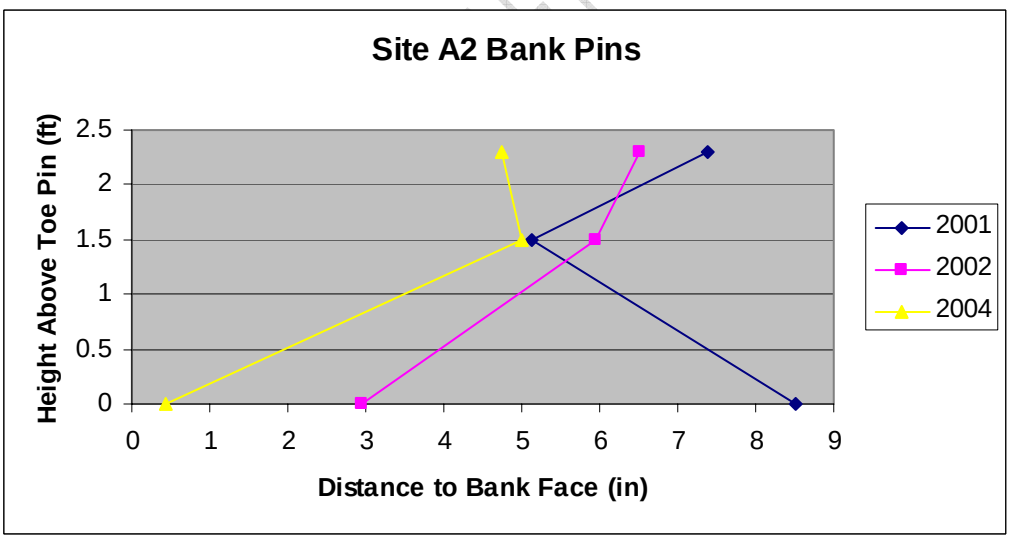
Stream bank pin measurements provide another means of assessing whether stream changes are resulting in stream bank building due to accretion or deposition of sediments or bank erosion due to loss of material. Banks pins data are also more useful than cross section data in showing whether undercutting of the bank is occurring.

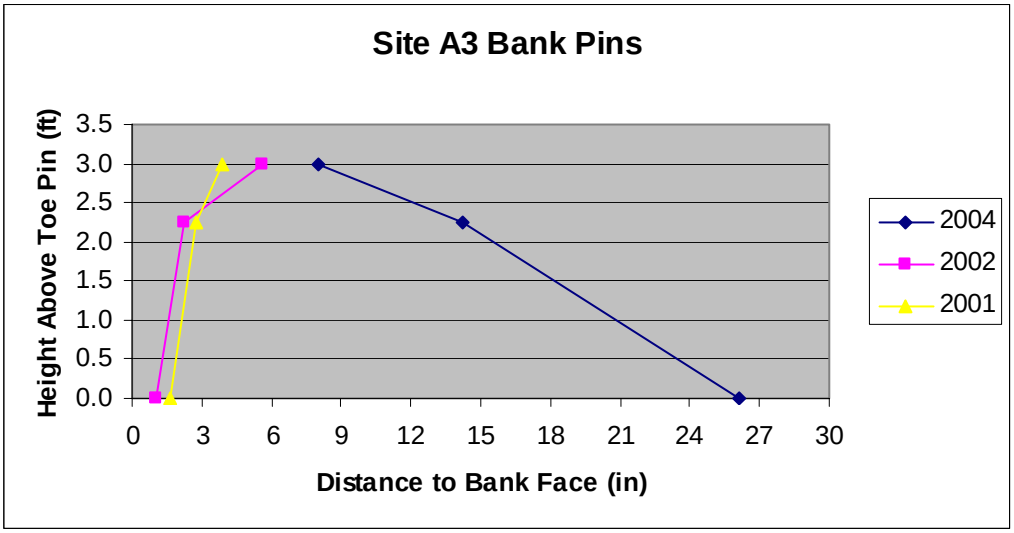
The A2 and A3 banks show significant accretion which is most likely due to sloughing of the upper bank rather than sediment deposition. Similar action is taking place at the B1 and B3 banks. At B1, the bank is sagging down on the upper pin but has yet the fall onto the lower pins. At B3, the upper bank has sloughed off and covered the lower pins, which could not be located. The C3 bank shows significant erosion taking place along the raw cutbank at this location.

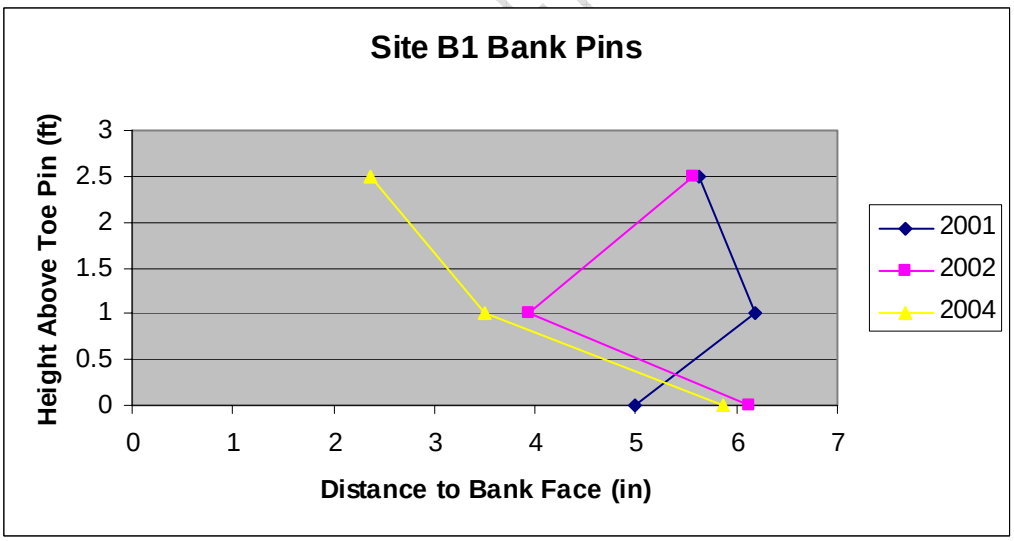
The bank pin erosion/accretion data showed a high degree of variability between years. While this makes it virtually impossible to identify trends in bank morphology, it is not unexpected considering the young and unstable banks of this recovering stream.

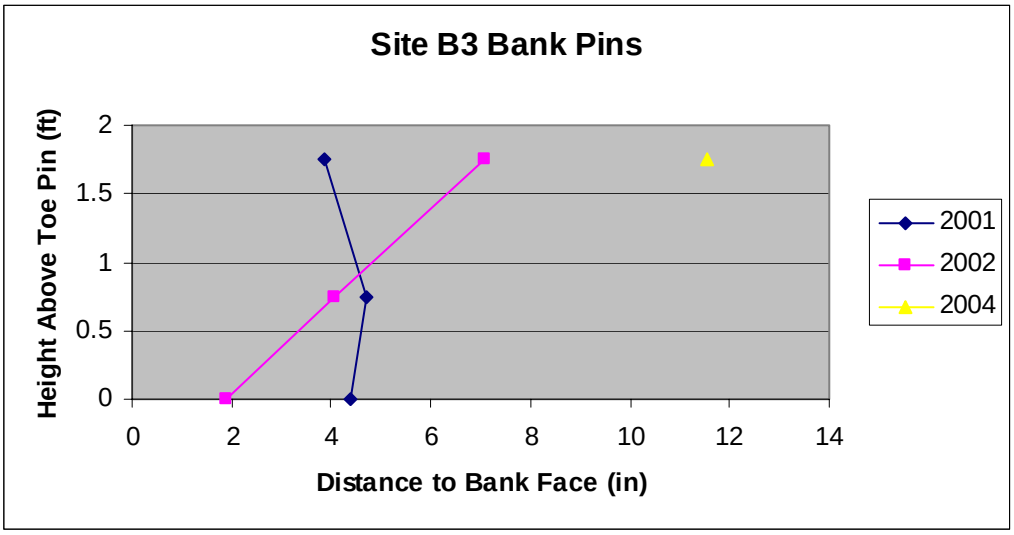



Site C3 Bank Pins
Height Above Toe Pin (ft)
2.5
2.0
1.5
1.0
0.5
0.0
0
3
6
9
12
15
18
21
24
27
30
Distance to Bank Face (in)
2001
2002
2004


Site A2 Bank Pins
Height Above Toe Pin (ft)
2.5
2
1.5
1
0.5
0
0
1
2
3
4
5
6
7
8
9
Distance to Bank Face (in)
2001
2002
2004


Site A3 Bank Pins
Height Above Toe Pin (ft)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
3
6
9
12
15
18
21
24
27
30
Distance to Bank Face (in)
2004
2002
2001


Site B1 Bank Pins
Height Above Toe Pin (ft)
3
2.5
2
1.5
1
0.5
0
0
1
2
3
4
5
6
7
Distance to Bank Face (in)
2001
2002
2004

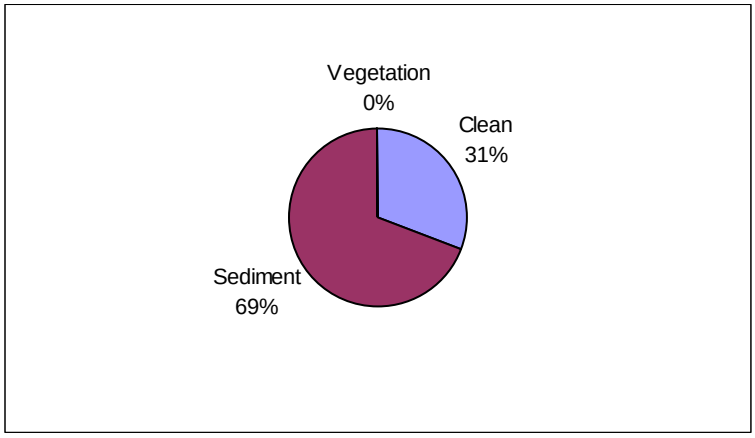


Stream Bottom Substrate

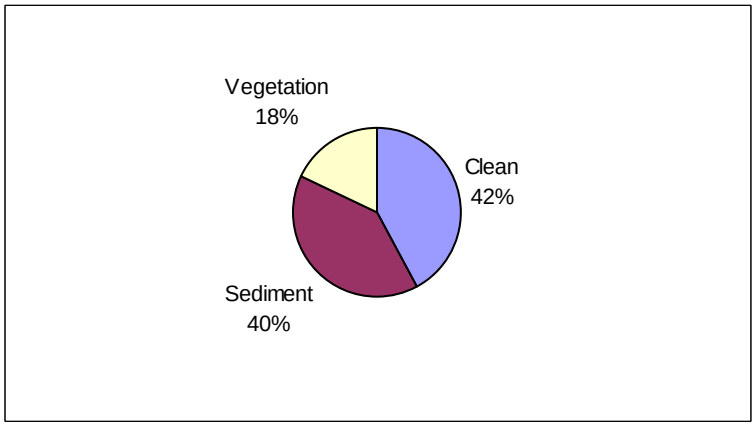
Stream bottom substrate data is primarily used to show changes in sediment deposition in the stream. In addition, sediment buildup and vegetation establishment along the bank edges could indicate that the stream is narrowing and that a new bankfull bench is beginning to form.

Unlike the bank pin measurements, the stream bottom substrate a somewhat consist trend across most locations. While none of the six stream bottom transects showed any vegetation in 2001, five transects had at least one data point with vegetation by 2004. This is most apparent when all data are combined for a particular reach of stream. This seems to indicate that the edges of the stream bottom are being colonized by plants, which could aid in bank stabilization. Changes in the percentage of clean- versus sediment-covered points did not showed any particular trend.

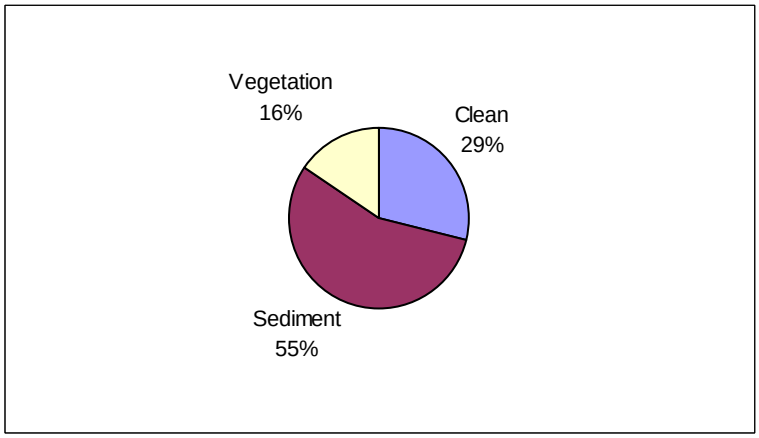
Combined Substrate Data for All 'C' Transects



2001

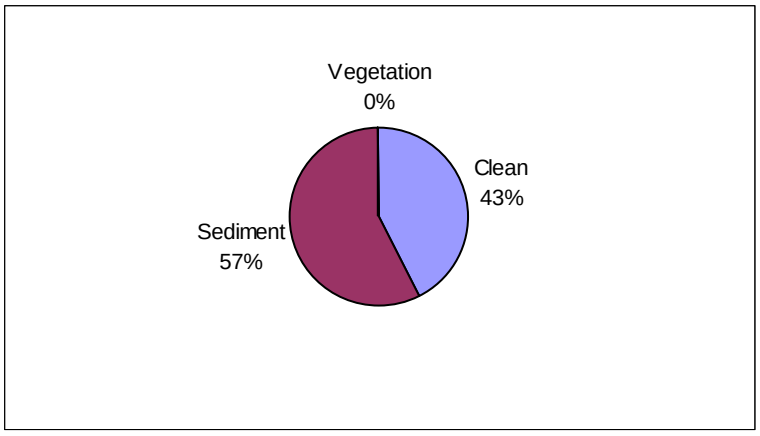


2002

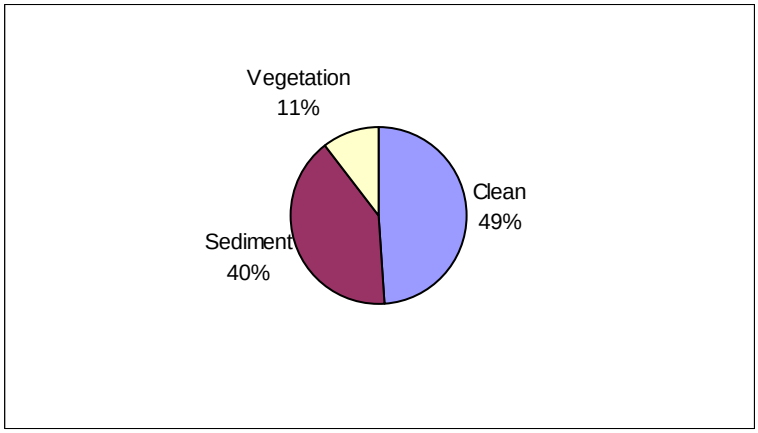


2004

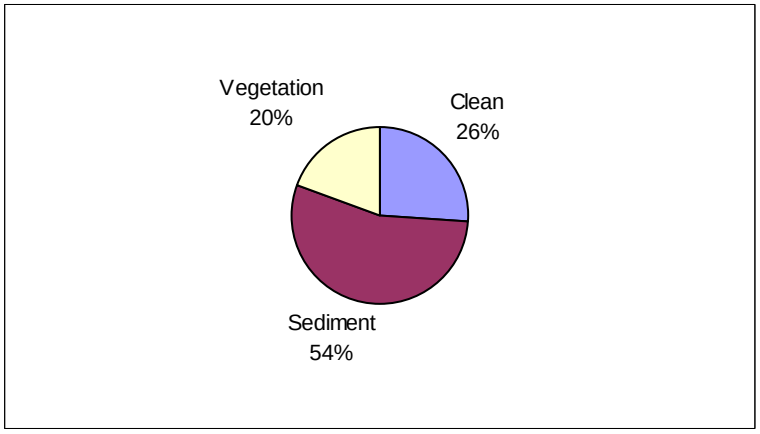
Combined Substrate Data for All 'A' Transects



2001

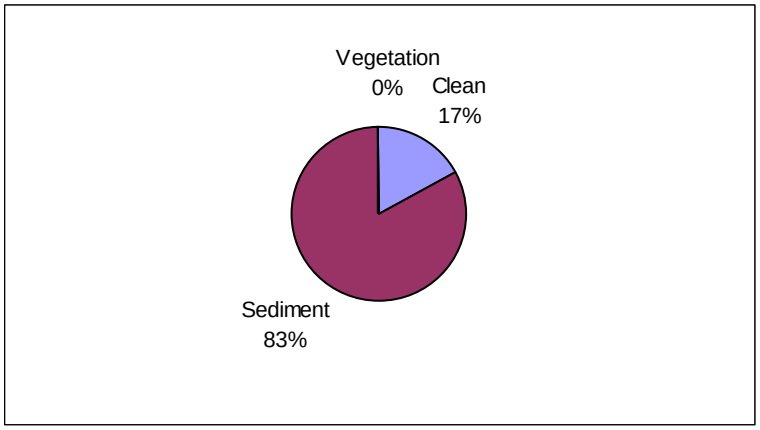


2002

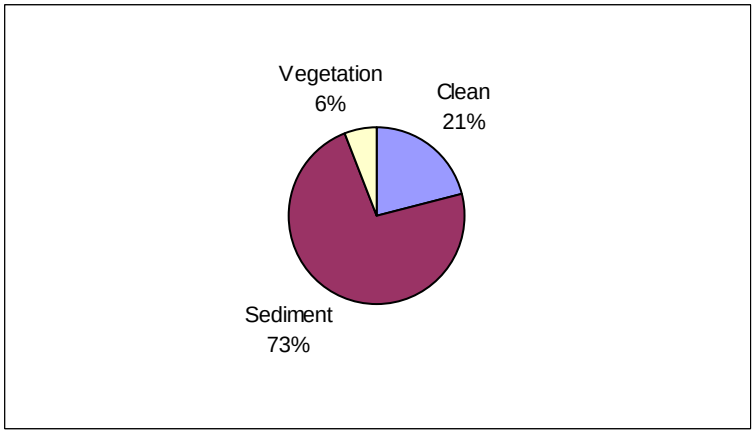


2004

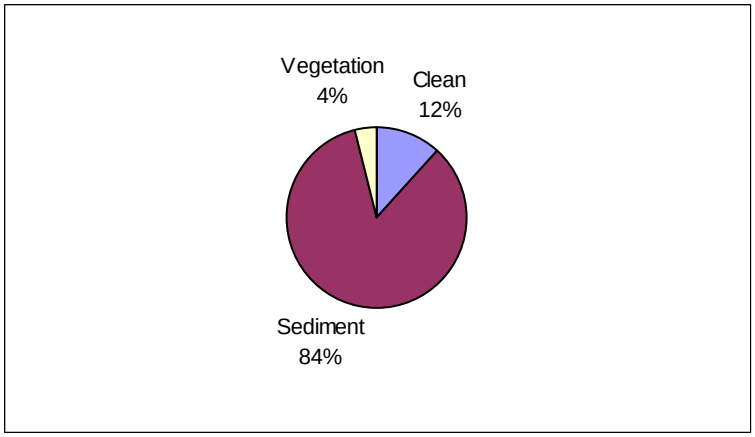
Combined Substrate Data for All 'B' Transects



2001



2002



2004

SUMMARY

While some areas monitored along Comanche Creek showed signs of change during three years since the baseline data was gathered, it is too soon to tell if the changes identified are indicative of a long-term trend. The period covered by this report was characterized by drought in northern New Mexico. While late spring moisture in 2004 produced a decent, but short, spring runoff, flows in Comanche Creek could generally be classified as well below normal. The drought significantly impacted to study's ability to assess whether the changes noted are the result of sustainable stream evolution towards a more stable natural form or just ephemeral changes that will be wiped out by high flows in wet years or intense localized thunderstorms.

Above normal moisture during the winter and spring of 2005 may help provide an answer. If the drought had continued, it might be expected that new vegetation appearing along the stream edges would help hold and trap sediments, leading to new bankfull benches and reduction of sediment load in the stream. However, if the high runoff encountered during the spring of 2005 washes away the plants foothold, major changes to the stream geomorphology could be expected.