1996

The relative impact of off-road motorcycles of differing sizes on rates of mechanical erosion

Joseph E. Mello
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**THE RELATIVE IMPACT OF OFF-ROAD MOTORCYCLES
OF DIFFERING SIZES ON RATES OF MECHANICAL EROSION**

A Thesis

Presented to

The Faculty of the Department of Geology

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

by

Joseph E. Mello, Jr.

May 1996

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ABSTRACT

THE RELATIVE IMPACT OF OFF-ROAD MOTORCYCLES OF DIFFERING SIZES ON RATES OF MECHANICAL EROSION

By Joseph E. Mello, Jr.

The amount of detached soil produced by off-road motorcycles of four size classes was measured under controlled conditions on two hillslopes within the Hollister Hills State Vehicular Recreation Area, California. One of the hillslopes is underlain by rocks of sedimentary origin; the other is underlain by rocks of igneous origin.

Results of the study indicate that a mid-size off-road motorcycle with an engine displacement of 250 cubic centimeters (2 cycle) displaced the largest amount of soil. Conversely, the least amount of soil was displaced by the smallest class of motorcycles used for the study (engine displacement of less than 250 cubic centimeters). The largest class of motorcycles (engine displacement of more than 250 cubic centimeters) and the other mid-size class, an engine displacement of 250 cubic centimeters (4 cycle), displaced an intermediate amount of soil.

ACKNOWLEDGEMENTS

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PURPOSE

This study was conducted to determine the relative erosional impacts of different sizes of off-highway motorcycles on the trails within the Hollister Hills State Vehicular Recreation Area. Additional information was also desired on the impact of seasonal changes on the relative amounts of mechanical erosion induced by different sizes of motorcycles (i.e., what is the erosion rate difference for the different size motorcycles during the wet and dry seasons). At the present time, a variety of motorcycle sizes are being used by the recreational riders in the park. A survey conducted in February 1990 by park personnel at the Hollister Hills State Vehicular Recreation Area indicated that motorcycles used by various riders had engine displacements which ranged from less than 100 cubic centimeters (cc) to more than 500 cc (Table 1).

TABLE 1
MOTORCYCLE USE SURVEY¹

Date	Displacement ²					
	<100	100-199	200-299	300-399	400-499	>500
2/10/90	36	27	102	37	36	62
2/11/90	61	60	135	32	35	65
2/17/90	8	9	44	7	8	21
2/18/90	15	24	125	7	21	64
2/19/90	35	24	112	0	2	58
TOTAL³	155	144	518	83	102	270
%TOTAL⁴	12.2	11.3	40.7	6.5	8.0	21.2

¹The motorcycle use survey was obtained from the park rangers at Hollister Hills State Vehicular Recreation Area who surveyed riders entering the park two consecutive weekends during the month of February 1990.

²Engine displacement of the motorcycles given in cubic centimeters.

³The total number of motorcycles with the respective engine displacement ridden at the park during the five days of the survey.

⁴The percentage of the total motorcycles ridden in the park during the survey that were of the respective size class.

INTRODUCTION

Motorcycle and other off-road vehicle use is widespread on publicly owned lands in the State of California (Sheridan, 1980). In California, as of April 1994, there were over 100,000 miles of vehicle-access-roads and trails at more than 200 sites owned and/or operated by county, state, or federal entities (California Department of Parks and Recreation, 1994). Seven off-road vehicle parks occupying a total of 71,650 acres of land are managed by the California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division (California Department of Parks and Recreation, 1994). To measure the amount of mechanical erosion produced by motorcycles of varying engine displacements, this study was conducted at the Hollister Hills State Vehicular Recreation Area (Figure 1), the third largest and fourth most utilized of the state-operated off-road vehicle parks (California Off-Highway Motor Vehicle Recreation Commission, 1992).

One of the most important and long-lasting effects of off-road vehicle use is the compaction of soil caused by the force of rolling wheels (Webb, Ragland, Godwin, and Jenkins, 1978). Soil compaction is known to be a contributing factor to accelerated soil erosion (Snyder, Frickel, Hadley, and

Miller, 1976). Additionally, wheels with excess spin, particularly during an uphill climb, tend to accelerate the detachment (and subsequent erosion) and mixing of the soil. Mixing of soil, resulting in the loss of the layered structure or profile, decreases the ability of the soil to support plants and increases the potential for erosion (Bennett, 1973). At the Hollister Hills State Vehicular Recreation Area, sediment yields of various areas within the park ranged from 0 to 6574 tons per square mile during the period July 1989 through June 1990 (Harden, 1991).

Mechanical erosion produced by four sizes of motorcycles (<250 cubic centimeters (cc) of engine displacement, 250 cc of engine displacement (2 cycle), 250 cc of engine displacement (4 cycle), and >250 cc of engine displacement) was measured in two geographically separate areas (Figure 2) of soil derived from 1) sedimentary and 2) igneous rock units. Tests were conducted in May, August, November 1990, and March 1991 in the Hollister Hills State Vehicular Recreation Area within the central coast ranges of California, approximately 80 miles southeast of San Francisco (Figure 1). Tests were initiated on undisturbed ground with trails developing normal to the hillslope contours (Figures 3 and 4). Multiple motorcycles were ridden over each trail by individuals with varying

[illegible]

CONTOUR INTERVAL 2 FEET

SCALE 1 inch = 7 FEET

FIGURE 3
GRANITIC AREA
HILLSLOPE PROFILE
HOLLISTER HILLS STATE
VEHICULAR RECREATION AREA

MAY 1996

SCALE 1 inch = 16 FEET

FIGURE 4
SEDIMENTARY AREA
HILLSLOPE PROFILE
HOLLISTER HILLS STATE
VEHICULAR RECREATION AREA

MAY 1996

experience. Separate but equivalent trails were established within each soil area for each motorcycle size. Comparison of microprofiles taken across the trails before the initial tests and after each trial permitted the determination of the amount of material detached (thus defined as eroded) from the slope by the motorcycles during a designated number of runs. Baseline properties of the slopes (dimensions, profiles, aspect, vegetative cover) and the respective soils (density, unit weight, penetration resistance, infiltration rates) were established before the tests.

GEOLOGY

Information about the relative impact of different-sized motorcycles on the rates of mechanical erosion on off-highway trails is limited. In the Hollister Hills area, this question is complicated by the fact that the recreational area and its assorted trails are underlain by two different rock types and thus, by soils with very different mechanical properties. These rock types are: 1) a sedimentary sequence, primarily sandstone and shale; and 2) igneous rocks, primarily of granitic origin.

Structure

Hollister Hills State Vehicular Recreation Area is located within the Gabilan Range of the Coast Ranges in central California approximately 2.7 miles south-southwest of the Hollister Valley (Figure 1). Extensive folding and faulting of the province has created the northwest-trending ranges. In general, the Coast Ranges in central California contain sedimentary deposits of both marine (Coast Range ophiolite) and terrestrial (Great Valley sequence) origin underlain by either the Franciscan complex on the east side of the San Andreas fault or granitic rocks of the Salinian Block on the west side of the fault (Wallace, 1990).

Several strands of the San Andreas fault system bisect the study area, including the primary trace of the San Andreas fault (Rogers, 1993) (Figure 5). Other faults parallel to the San Andreas Rift Zone are located within or near the Hollister Hills State Vehicular Recreation Area property boundaries, including the Harris Ranch fault and the Bird Creek fault (Figure 5).

Steinbrugge and Zacher (1960) first recognized that aseismic slip or "creep" occurred along the San Andreas fault at the Almaden Cienega Winery, which is located approximately 2 miles southeast of the entrance to the study area. According to Schulz, Mavko, Burford, and Stuart (1982), the San Andreas fault creep has been measured at a rate of 1.3 centimeters per year (cm/yr) in the vicinity of the site (at the Almaden Cienega Winery), while the present overall rate of relative movement between the Pacific (west of the fault) and North American (east of the fault) plates is thought to be approximately 4.8 cm/yr (DeMets, Gordon, Stein, and Argus, 1987). Aseismic slip on the Calaveras fault approximately 3 miles east of the study area has also been measured at 1.3 cm/yr (Lisowski and Prescott, 1981).

Petrology

Rocks southwest of the San Andreas fault in the study area belong to the quartz diorite series of Vergeles (Ross, 1972)(Figure 5). Vergeles is a fault located northwest of the study area. The quartz diorite is described by Rogers (1993) as a commonly-foliated medium-grained hornblende quartz diorite. Soils on this unit are referred to as derived from the "granitic" area in this text.

Rocks northeast of the San Andreas fault in the study area belong to the marine sandstone member of the Purisima Formation (Figure 5). In the vicinity of the study area, the Purisima Formation is a brown and gray, medium-grained, well-sorted sandstone with gray shale and mudstone (Rogers, 1993). Soils on this unit are referred to as derived from the "sedimentary" area in this text.

PROCEDURES

This study was designed and conducted during the period 1 February 1990 to 30 June 1991. In cooperation with park personnel, two test areas were selected within the recreation area (see Figure 2 on page 4). One area is underlain by sedimentary rocks. This area is commonly referred to as the "adobe area" by park personnel because of the presence of the clay-rich soils which develop on the sedimentary rocks. The second area is underlain by granitic rocks. Each of the areas was believed to be pristine, in that no trail development had occurred on either site. It was the expectation that the slopes in these areas could be utilized by the majority of riders and would provide representative data for many of the typical slopes within the recreation area.

Site Selection

Prior to selecting the study locations, Dr. John Williams and I were escorted by park personnel to several potential study areas in each of the different geologic regimes. Areas were inspected for physical attributes including the following: slope (minor incline), soil type, vegetative cover, lack of vehicle use, and rideability. Within the granitic area, there are few motorcycle trails;

the majority of the ground surface is covered with brushy vegetation and trees. Most of the area underlain by sedimentary rocks is covered with various grasses; the majority of the sedimentary area has been used by off-road vehicles. Based on the results of the visual survey and discussions with park personnel, the two areas shown on Figure 2 on page 4 were selected to conduct the tests.

Soil in the granitic area is covered with oak-chaparral vegetation, which generally inhibits off-road vehicle use. The study area selected within the granitic area was covered with chaparral prior to trail preparation (Figure 6). Based on the type of vegetation covering the granitic study area and discussions with park personnel, it is highly unlikely that this study site was ever utilized by off-road vehicles prior to the conduct of this study.

Because the majority of the area underlain by sedimentary rocks is covered with grasses (which do not inhibit off-road vehicle traffic), most areas within the sedimentary unit have been used by off-road vehicles. While park personnel suggested that most areas underlain by sedimentary rocks have been used by off-road vehicles, they could not recall whether the selected area within the sedimentary unit (Figure 7) had ever been utilized by off-

road vehicles. Other areas within the sedimentary area checked during the site inspection had been utilized by off-road vehicles.

Figure 6. Photograph showing the study area underlain by the granitic unit after burning of the chaparral but prior to clearing of the cinder and trail preparation.

Trail Preparation

After the two study areas had been selected, personnel of the park and San Jose State University prepared the areas for motorcycle use. In the granitic area, brush was burned and then removed by hand. After removal of the burned vegetation, soil was exposed without cover. Care was

exercised to limit the disturbance of topsoil prior to the first test. In the sedimentary area, the grasses do not inhibit off-road vehicle usage. Vegetation was, therefore, left intact until the first test.

Figure 7. Photograph showing the study area underlain by the sedimentary unit prior to the first trial.

On each of the slopes four parallel trails, each approximately 6 feet wide and perpendicular to the hillslope contours, were delineated with colored tape to provide restricted pathways for the motorcycles. Variability of the trail sites in initial vegetative cover, inclination, and underlying materials was minimized. Each trail was

designated for a particular motorcycle size, specifically: less than 250 cc; 250 cc with a 4-stroke engine; 250 cc with a 2-stroke engine; and greater than 250 cc. These four groups of motorcycle sizes are representative of the sizes currently being used within the recreational area and those which will be used in the foreseeable future (Table 1).

Microprofiles across the trails parallel to topographic contours were established near the base of the slope, at mid-slope, and near the crest of the slope. These microprofiles were measured using a soil erosion bridge (Figure 8). This is an accepted method by which detailed profiles can be established and subsequent changes detected (Anders and Leatherman, 1987).

Specific procedures utilized to implement the soil erosion bridge were modified from the procedures outlined in two United States Department of Agriculture, Forest Service (USFS) internal memoranda (USFS, 1988; 1989). These procedures included:

- Emplacing three equally spaced reference stakes (Figure 9) per trail on each side of the trail. The same reference stakes were used throughout the study. Where adjacent trails in the granitic area

were close, a single reference stake was used for both trails.

Figure 8. Photograph showing the soil erosion bridge utilized to measure the amount of detached soil within the trails.

- After emplacement of the reference stakes, a metal rod with an attachment sleeve was inserted on top of the reference stakes on either side of the trail (Figure 10).

Figure 9. Photograph showing the reference stake used for Profile 2 of Lanes 3 and 4 within the granitic study area.

- An aluminum "bridge" with holes drilled every three inches was then attached to the metal rods with clamps (Figures 10 and 11). The bridge was checked for evenness with a carpenter's level each time it was attached to the metal rods.

Figure 10. Photograph showing the procedure used for obtaining measurements of the trail with a copper rod.

- Measurements were obtained by inserting a copper rod into the drill holes along the soil bridge (Figure 10). The copper rod was allowed to just touch the ground surface so that detached soil would not be excluded from the measurement. The distance from the top of the soil bridge to the top of soil was then measured (Figure 11).

Figure 11. Photograph showing the procedure for the measurement of distance from the top of the soil bridge to the soil.

- A point outside the trail area adjacent to each respective reference stake was established as a reference point for elevation. It was assumed that the reference point elevation would not vary significantly during the test period.

Slope Characteristics

Characteristics of each slope were measured, including their profiles (Figures 3 and 4) geologic composition (granitic or sedimentary), infiltration rates (Table 2), and

surface resistance to penetration (Table 3), prior to beginning the tests. Infiltration rates and resistance to penetration were measured prior to the onset of testing and after the first trial (175 passes) on each hillslope. The infiltration rates were measured four days prior to the first test (Pre-test) and nine days after the first test (Post-test).

After the trails were prepared and the baseline stakes were set, the slopes were surveyed with an electronic distance meter. Selected locations along the trails were measured for distance and elevation relative to the respective base of the hillslope. Profiles (contour maps) of the hillslopes were prepared based on the data obtained during the survey (Figures 3 and 4).

To measure the impact of motorcycles on the infiltration rate and capacity of the soil, an infiltration test was conducted prior to the study. Infiltration is defined as the flow of water downward from the land surface into and through the upper layers of the soil (Fetter, 1980). Infiltration capacity is defined as the maximum rate at which infiltration can occur under specific conditions of soil moisture (Fetter, 1980). For a given soil, the infiltration capacity is a function of the water content.

TABLE 2				
INFILTRATION RATES ¹				
TIME ²	SEDIMENTARY (PRE-TEST)	SEDIMENTARY (POST-TEST)	GRANITIC (PRE-TEST)	GRANITIC (POST-TEST)
10	16.4 ³	10.0	98.1	23.9
20	7.85	3.79	78.5	11.0
30	7.19	2.09	70.6	9.03
40	5.23	1.64	63.4	8.63
50	3.92	1.57	58.2	8.37
60	3.27		55.6	
70			54.9	
80			54.9	
90			54.6	
100			53.0	
¹ Infiltration rates were obtained from Lane 2 of each hillslope between Profiles 1 (top) and 2 (middle). ² Time is measured in minutes after the beginning of the infiltration test. ³ Infiltration rates are presented as centimeters of infiltration per hour.				

TABLE 3
PENETRATION DATA

DATA POINTS	SEDIMENTARY UNIT		GRANITIC UNIT	
	(PRE-TEST)	(POST-TEST)	(PRE-TEST)	(POST-TEST)
1	514 ²	735	68/437/451 ³	547/430
2	620	710	52/313/324	479/307
3	370/579	547	104/333/341	677/521
4	340	496	93/373/377	602/546
5	464	740	108/220/235	503/347
6	478	723	112/240/271	720/409
7	430	577	165/369/369	459/332
8	482	603	41/217/295	549/409
9	591	765	23/227/571	484/447
10	301/459	692		495/724
11	260	752		616/517
12	378	607		641/498
13	401	804		493/447
14	397	876		561/515
15	389	716		543/364
16	284/456	651		696/540
17	334	641		

¹Data points were located at various places on pristine hillslopes and on the trails after the first test.

²Penetration is presented in pounds per square inch.

³Penetration data were obtained at the ground surface, 6 inches below the ground surface, and 12 inches below the ground surface. When only one number is given, penetration at 6 inches was refusal. When two numbers are given, penetration at 12 inches was refusal.

A double ring infiltrometer test designed in general accordance with the American Society for Testing and Materials (ASTM) standard *Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometers* (serial designation D 3385-75) was used to conduct the infiltration test. The double ring infiltrometer is used to prevent divergent flow in layered soils by providing an outer water barrier to encourage only vertical flow in the inner ring (ASTM, 1990). The following procedures were utilized during the infiltration test in general accordance with the ASTM standard (1990):

- Two open cylinders, one inside the other, were driven into the soil.
- The annulus between the two cylinders was partially filled and maintained at a constant level throughout the test.
- The inner cylinder was then filled with water to a certain level; water was measured and added to the inner cylinder intermittently during the test.
- At the end of 10 minutes, and each successive 10 minute interval thereafter, the inner ring was

filled to the original level. The amount of water utilized over the respective 10 minute period was recorded and tabulated.

- The test was terminated when the infiltration rate began to stabilize.
- After the impact of motorcycles, the infiltration rate decreased over 50 percent in the sedimentary area and over 80 percent in the granitic area (Table 2).

Penetration tests were also conducted with a penetrometer prior to and after the initial trial in each area to measure the impact of motorcycle usage on the resistance to penetration of the soil. The penetration tests were conducted at selected locations on the slopes within the two study areas. The penetrometer was pushed into the ground and measurements of the amount of force applied to the penetrometer (in pounds per square inch) were obtained at the surface, at 0.5 foot below the ground surface, and at 1.0 foot below the ground surface. Resistance to penetration, particularly after the first trial, prohibited obtaining measurements at the 0.5 and 1.0 foot intervals at some locations. After the first trial,

the resistance to penetration increased by approximately 65 percent at the ground surface in the sedimentary area and by approximately 565 percent at the ground surface and 50 percent at 0.5 foot below grade in the granitic area (Table 3).

SOIL DETACHMENT DATA COLLECTION

Prior to the onset of the test, four data collection dates were scheduled during the period 1 February 1990 through 30 June 1991. The dates 5 May, 18 August, 3 November 1990, and 2 February 1991 were chosen because they would typically occur during different weather periods affecting the recreation area. These different dates traditionally would have provided an opportunity to analyze the influence of the soil moisture content on the relative amounts of mechanical erosion (tire generated) by different sized motorcycles on the trails. Because of the continuing drought that central California had been experiencing during the test period, however, the variation in soil moisture content on the dates was not significant. In an attempt to provide more variability in soil moisture, the trial date initially set for 2 February 1991 was postponed until March 1991 in anticipation of storms forecasted for later during the month of February. Unusually heavy rains preceding the trial in March 1991 were too late to be helpful in terms of providing the desired soil moisture variability during these tests and made the trails impassable. The study was discontinued after the failed March 1991 attempt.

Each of the tests was conducted in the following manner:

- Riders participating in the tests belonged to the Hollister Hills Off-Road Association, an organized group of riders who work with the park personnel for the improvement of the sport and the facilities at the park. The membership of the Association is variable in terms of age, riding experience, sex, weight, brand of motorcycle, type of motorcycle tire, etc. For the purpose of these tests, it is believed that this variation of factors among these riders simulates the variability present in the collective general ridership within the recreational area. Thus, the impact on trail development by these riders forecasts the impact of the recreational area's general ridership.
- Prior to any riding on the trails on a trial day, and prior to the onset of the study, baseline profiles for each of the trails were measured using the soil bridge at the base, mid-slope, and crest of the trail, using reference metal stakes

which remained in the hillslope for the duration of the study.

- The trial areas were marked and secured by fencing and flagging to prevent unauthorized riding on the test surfaces (Figure 12).

Figure 12. Photograph showing the granitic study area with fencing and flagging, which were installed to prevent motorcycle usage during the periods between tests.

- On each of the trails, riders rode upslope only (Figure 13). It is believed that the greatest amount of soil erosion occurs during upslope

riding resulting from the acceleration required to maneuver upslope. The riders returned to the test trail entrance by a secondary trail. On each trail after 25, 75, and 175 (combined total) motorcycle passes over the trail, the microprofile was remeasured. To insure that the correct number of passes were made on each trail for each trial, a specific member of the survey team was designated to count the number of passes on each trail.

- The data from the various profiles were entered into a computer via spreadsheet. Microprofiles were developed, and the differences between successive profiles were determined.
- Through computer manipulations, the changes in profile geometry were determined. Estimates of the volume of materials detached from the ground surface, and thus positioned to be easily removed by slope wash and rainfall activity, were established.

Figure 13. Photograph showing a motorcyclist riding upslope during one of the trials in the sedimentary area.

RESULTS

Utilizing the procedures described, 246 microprofiles were recorded during the study: 138 microprofiles were measured in the sedimentary area and 112 microprofiles were measured in the igneous area. Approximately 7,000 individual data points were recorded and analyzed for this study. For example, at the microprofile nearest the base of the slope (Profile 3) of Lane 1 in the sedimentary area, measurements were obtained on 13 occasions (including the baseline measurement), each representing a single microprofile measurement, from up to 25 locations along the microprofile. A total of 317 data points were recorded at this profile. (Each lane had 3 microprofile locations. There were a total of 24 microprofile locations between the sedimentary and granitic areas.) A tabulation of the displacements from the original baseline for each run measured at each microprofile is included in Appendix A.

Data points for each specified distance from the reference stake (i.e., the same map position along the microprofile) were compared for each set of passes on the hillslope. The lowest data point (i.e., the location of the lowest surface for a given map position), representing the greatest amount of detached soil, was utilized for the total

displacement along each microprofile. The graphical representations of the greatest amount of detached soil for each microprofile are included on Figures 14 through 21 and in Appendix B.

Most of the data points indicating surface location were located within 0.3 feet of the original baseline surface. This was consistent with observations made in the field. Some of the data points plotted above the original baseline. These data points record accumulations of detached soil. Within the sedimentary unit, the microprofile nearest the base of the slope (Profile 3) typically exhibited the least amount of detached soil (Figures 14 through 17). This is not believed to be the area of the least detachment, but is believed to be instead the result of accumulation of sediments near the base of the hillslope. Visual observations made during the test indicated that the lower portion of the slope should have the greatest soil detachment; riders generally accelerate a greater amount at the base of the hillslope to begin their ascent than to continue their ascent at midslope. Additionally, excessive wheel spin producing a spray of soil behind the vehicle, also known as "rooster tails," is more common lower on the slope than higher.

--■-- Profile 1 --+-- Profile 2 --*-- Profile 3

FIGURE 14
 SOIL DISPLACEMENT IN
 SEDIMENTARY AREA - LANE 1
 HOLLISTER HILLS STATE
 VEHICULAR RECREATION AREA

MAY 1996

—■— Profile 1 —+— Profile 2 —*— Profile 3

FIGURE 15
SOIL DISPLACEMENT IN
SEDIMENTARY AREA - LANE 2
HOLLISTER HILLS STATE
VEHICULAR RECREATION AREA

MAY 1996

—■— Profile 1 —+— Profile 2 —*— Profile 3

FIGURE 16
 SOIL DISPLACEMENT IN
 SEDIMENTARY AREA - LANE 3
 HOLLISTER HILLS STATE
 VEHICULAR RECREATION AREA
 MAY 1996

The measurements within the granitic unit did not exhibit any discernible pattern of soil accumulation with relation to the location of the microprofile on the hillslope. In Lane 1 of the granitic area, the greatest detachment of soil was at Profile 2 (the middle of the slope; Figure 18) while in Lane 2 the greatest detachment was at Profile 1 (the top of the slope; Figure 19), and in Lanes 3 and 4, the greatest detachment was at Profile (the bottom of the slope; Figures 20 and 21). It is believed that there was not the accumulation of soil at the lowest profile in the granitic area such as occurred at the sedimentary study area because of the grade of the slope; the sedimentary trial area had a steeper slope than the granitic area (see Figure 3 and 4 on pages 5 and 6, respectively), thereby creating a condition where downward movement of the detached soil was more likely.

—■— Profile 1 —+— Profile 2 —*— Profile 3

FIGURE 19
SOIL DISPLACEMENT IN
GRANITIC AREA - LANE 2
HOLLISTER HILLS STATE
VEHICULAR RECREATION AREA

MAY 1996

—■— Profile 1 —+— Profile 2 —*— Profile 3

FIGURE 20
SOIL DISPLACEMENT IN
GRANITIC AREA -- LANE 3
HOLLISTER HILLS STATE
VEHICULAR RECREATION AREA

MAY 1996

The total displacements for each microprofile (i.e., the sum of the greatest displacement at each data point along the microprofile) were multiplied by 0.25 foot/foot to give the total volume of soil detached per foot of trail for that microprofile. The 0.25 foot is the spacing between individual data points as measured along the soil bridge (0.25 foot intervals, or every 3 inches). The volumes for the three microprofiles located in each lane were averaged to obtain the average amount of soil displacement for the entire lane. This figure was then divided by the average width of the lane to obtain the average amount of detached soil per square foot of trail. The following amounts of detached soil were obtained for each rock-type:

Granitic Soils

- >250 cc = 0.455 cubic foot of detached soil per linear foot of trail (ft^3/ft) and 0.0674 cubic foot of detached soil per square foot of trail (ft^3/ft^2);
- 250 cc 2-stroke = 0.575 ft^3/ft and 0.0885 ft^3/ft^2 ;

- 250 cc 4-stroke = $0.167 \text{ ft}^3/\text{ft}$ and $0.0278 \text{ ft}^3/\text{ft}^2$;
and
- <250 cc = $0.365 \text{ ft}^3/\text{ft}$ and $0.0600 \text{ ft}^3/\text{ft}^2$;

Sedimentary Soils

- >250 cc = $0.57 \text{ ft}^3/\text{ft}$ and $0.0876 \text{ ft}^3/\text{ft}^2$;
- 250 cc 2-stroke = $1.05 \text{ ft}^3/\text{ft}$ $0.150 \text{ ft}^3/\text{ft}^2$;
- 250 cc 4-stroke = $0.563 \text{ ft}^3/\text{ft}$ and $0.0834 \text{ ft}^3/\text{ft}^2$;
and
- <250 cc = $0.44 \text{ ft}^3/\text{ft}$ and $0.066 \text{ ft}^3/\text{ft}^2$.

CONCLUSIONS

On both the sedimentary and igneous type soils, the 250 cc 2-stroke motorcycles displaced a larger amount of soil than any of the other motorcycle sizes. The smallest motorcycles (<250 cc) caused the least amount of soil displacement in the sedimentary units and the next smallest amount of soil displacement in the igneous-derived soils. Based on the collective results of the soil displacements, the 250 cc 2-stroke motorcycles detach the greatest amount of soil and the smaller motorcycles (<250 cc) detach the least amount of soil. The other two sizes of motorcycles, >250 cc and 250 cc 4-stroke, detach an intermediate amount of soil. As all values for volume of material detached are based upon averages, the absolute values may change from site to site but the relative ranking of motorcycle size impact should remain the same. Based on the results of the study, soil type does not appear to affect the relative soil displacement rates of the motorcycles of differing sizes.

These data indicate that the amount of detached soil is related to the motorcycle size. Additional study of the mechanical characteristics of individual sizes of motorcycles and style of riding would probably provide additional information on rates of mechanical erosion.

REFERENCES CITED

- American Society for Testing and Materials, 1990, Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrimeters (serial designation D 3385-75), 6 p.
- Anders, F.J., and Leatherman, S.P., 1987, Disturbance of beach sediment by off-road vehicles: Environment, Geology, Water, and Science, v. 9, no. 3, p. 183-189.
- Bennett, S., 1973, A trail rider's guide to the environment: The American Motorcycle Association, 60 p.
- California Department of State Parks and Recreation, Division of Off-Highway Motor Vehicle Recreation, 1994, A 1993-1994 report, off-highway vehicle (OHV) recreation's \$3 billion economic impact in California & a profile of OHV users: a family affair, 26 p.
- California, Off-Highway Motor Vehicle Recreation Commission, 1992, Biennial report on the status of OHV recreation in California, 1989-90 and 1990-91, 136 p.
- DeMets, C., Gordon, R.G., Stein, S., and Argus, D.F., 1987, A revised estimate of Pacific-North American motion and implications for western North American plate boundary zone tectonics: Geophysical Research Letters, v. 14, no. 9, p. 911-914.
- Fetter, C.W. Jr., 1980, Applied Hydrogeology. Columbus, Ohio: Charles E. Merrill Publishing Company, 488 p.
- Harden, D.R., 1991, Sediment basin studies 1990, Hollister Hills State Vehicular Recreation Area, unpublished report, p. 2.
- Lisowski, M., and Prescott, W.H., 1981, Short-range distance measurements along the San Andreas fault system in central California, 1975 to 1979: Seismological Society of America Bulletin, v. 71, no. 5, p. 1607-1624.
- Rogers, T.H., 1993, Geology of the Hollister and San Felipe quadrangles, San Benito, Santa Clara, and Monterey Counties, California: California Department of Conservation, Division of Mines and Geology Open-File Report 93-01, 26 p.

- Ross, D.C., 1972, Geologic map of the pre-Cenozoic basement rocks, Gabilan Range, Monterey and San Benito Counties: United States Geological Survey Miscellaneous Field Studies Map MF 357.
- Schulz, S.S., Mavko, G.M., Burford, R.O., and Stuart, W.D., 1982, Long-term fault creep observations in central California: Journal of Geophysical Research, v. 87, no. B8, p. 6977-6982.
- Sheridan, D., 1980, Off-road vehicles on public lands. Council on Environmental Quality, Washington, D.C., 84 p.
- Snyder, C.T., Frickel, D.G., Hadley, R.F., and Miller, R.F., 1976, Effects of off-road vehicle use on the hydrology and landscape of central and southern California: United States Geological Survey Water Resources Investigation 76-99, 30 p.
- Steinbrugge, K.V., and Zacher, E.G., 1960, Creep on the San Andreas fault (California)-fault creep and property damage: Seismological Society of America Bulletin, v. 50, no. 3, p. 389-396.
- United States Forest Service, 1988. Internal memorandum. 17 October 1988. Monitoring on-site soil loss from ORV trails (Bikes & ATV's).
- _____, 1989. Internal memorandum. 27 December 1989. Monitoring soil disturbance on bike trails, Rowher Flat ORV area.
- Wallace, R.E., ed., 1990, The San Andreas fault system, California: United States Geological Survey Professional Paper 1515, 283 p.
- Webb, R.H., Ragland, H.C., Godwin, W.H., and Jenkins, D., 1978, Environmental effects of soil property changes with off-road vehicle use: Environmental Management, v. 2, no. 3, 219-233.

APPENDIX A - SOIL DISPLACEMENT TABLES

X VALUE	May 90 ->				August 90 ->				November 90 ->				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	
3	-0.0164	0.01312		0.0656	-0.0328	0.00328	0.01312						-0.0164
6	-0.0328	-0.02296	-0.01968	0.03936	-0.05248	-0.02296	-0.03936						-0.0328
9	-0.02624	-0.00984	-0.00984	0.0656	-0.02952	-0.00328	-0.02952						-0.05248
12	-0.0164	-0.00984	-0.00984	0.07544	-0.01668	0.01668	-0.00328						-0.02952
15	-0.00328	-0.00864	-0.00328	0.0656	-0.01668	0.01668	-0.00328						-0.01668
18	0.00984	-0.03608	-0.00656	0.07216	-0.0164	0.02624	-0.01968						-0.03608
21	-0.01968	-0.00656	-0.00984	0.07672	-0.00656	0.0492	-0.00984						-0.01968
24	0.00984	-0.05904	-0.00984	0.082	-0.00864	0.00328	-0.00328						-0.05904
27	0.01968	0.00328	-0.00656	0.07672	-0.00328	0	0.00328						-0.00656
30	0.00328	0.00656	-0.01968	0.082	-0.0164	-0.00328	-0.01968						-0.01968
33	0.02952	0	-0.01312	0.06888	-0.02952	-0.00864	-0.01312						-0.04592
36	0.01312	-0.01968	-0.00656	0.07672	-0.00656	-0.00328	0	0.00328	-0.04592	0.00328	-0.0328		-0.0328
39	0.00656	0.00656	-0.01968	0.07544	0	-0.00656	-0.00656						-0.06232
42	-0.00328	-0.00656	-0.0328	0.06528	-0.00328	0	-0.01312						-0.05576
45	0.02624	0.00328	-0.0492	0.05248	-0.01312	-0.02296	-0.0328						-0.05248
48	0.00984	0	-0.0328	0.0656	-0.01312	-0.04264	-0.03608						-0.05904
51	-0.00656	-0.0164	-0.06232	0.02624	-0.04264	-0.05248	-0.0656						-0.09184
54	-0.01312	-0.01312	-0.07544	0.00984	-0.04264	-0.06232	-0.06232						-0.09184
57	-0.02296	-0.03936	-0.06232	0.00984	-0.05248	-0.0328	-0.05904						-0.10168
60	0.00656	-0.00864	-0.01312	0.00984	-0.01668	-0.03608	-0.082						-0.08528
63	0.01968	0.01312	-0.00656	0.06888	-0.02296	-0.0164	-0.04592						-0.04592
66	0.02624	0.02952	-0.00984	0.0656	0.00328	-0.00328	0	0.0656	-0.02624				-0.02624
69	0.03608	0.01968	0.01968	0.06232	-0.01312	-0.0164	-7.1E-20	0.06888	-0.02952				-0.02952
72	0.03608	0.02952	-0.01312	0.09184	-0.02296	0	0.01968	0.09184	-0.00984				-0.02296
75	0	0.00656	-0.02952	0.082	0.0328	0.02296	0.00656	0.04264	-0.04264				-0.04264
78	0.05576	0.07544	-0.00984	0.10496	0.02952	0.01312	0.02624	0.09512	-0.01312				-0.01312
81	0.02624	0.03936	-0.01312	0.12136	0.03608	0.01968	0.01312	0.09512	0				-0.01312
84	0.01968	0.0328	-0.00328		0.04592	0.0164		0.1148	0.0328				-0.00328
	amount of displacement from the original baseline (ft)				GRANITE LANE 1 PROFILE 1 (Top of Slope)				Bike size = >250cc				TOTAL
													-1.16768

X VALUE	May 90 ->				August 90 ->				November 90 ->				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	50 RUNS	BASELINE	25 RUNS	50 RUNS	50 RUNS	
3	0.10496	-0.08856	-0.02624										-0.08856
6	0.08528	0.01968	0.02624										0
9	0.09512	0.03936	0.0164										-0.02952
12	-0.00856	-0.08528	-0.11152	-0.0856	-0.02952	-0.0164	-0.0328	-0.00856	-0.03608		-0.05576		-0.11152
15	0.05904	0.00984	-0.00856	0.00328	-0.02624	-0.00856	-0.03608	-0.08528	-0.11152	25 RUNS	0		-0.03608
18	-0.05576	-0.12792	-0.11152	-0.0328	-0.08528	-0.08528	-0.08528	-0.08528	-0.11152	25 RUNS	-0.07216		-0.12792
21	0.03608	-0.10168	-0.082	0.02952	-0.0328	-0.00328	-0.0656	-0.00328	-0.0656		-0.02952		-0.10168
24	-0.01312	-0.10496	-0.12792	0.01968	-0.0328	-0.01312	-0.08528	-0.01312	-0.08528		-0.05576		-0.12792
27	0.01312	-0.1148	-0.17384	-0.00856	-0.0492	-0.08232	-0.10824	-0.08232	-0.10824		-0.05576		-0.17384
30	0.03936	-0.1312	-0.16072	-0.02952	-0.04592	-0.0328	-0.0984	-0.0328	-0.0984		-0.05576		-0.16072
33	0.02952	-0.0984	-0.15088	0.01312	-0.02952	-0.0164	-0.07216	-0.0164	-0.07216	DATA	-0.03936		-0.15088
36	-0.01312	-0.12464	-0.19352	-0.04264	-0.07872	-0.05248	-0.12792	-0.05248	-0.12792		-0.07216		-0.19352
39	0.07872	-0.09184	-0.1476	0.00856	-0.02624	-0.00984	-0.07544	-0.00984	-0.07544	WERE NOT	-0.07216		-0.1476
42	-0.01968	-0.11152	-0.15416	0.00328	-0.02952	-0.01312	-0.0984	-0.01312	-0.0984		-0.05576		-0.15416
45	-0.0328	-0.14432	-0.17056	-0.0656	-0.09184	-0.07872	-0.15088	-0.07872	-0.15088	WRITTEN	-0.08528		-0.17056
48	-0.03936	-0.09184	-0.19024	-0.05248	-0.11808	-0.07544	-0.14432	-0.07544	-0.14432		-0.08888		-0.19024
51	-0.01312	-0.1148	-0.19024	-0.07544	-0.07872	-0.05248	-0.13448	-0.05248	-0.13448	CORRECTLY	-0.09184		-0.19024
54	-0.02296	-0.10496	-0.15088	-0.04264	-0.07216	-0.02952	-0.09512	-0.02952	-0.09512		-0.0492		-0.15088
57	0.00984	-0.10168	-0.1804	-0.03608	-0.0656	-0.03608	-0.12136	-0.03608	-0.12136		-0.09184		-0.1804
60	0.0328	-0.07872	-0.07544	-0.03608	0	-0.03608	-0.1148	-0.03608	-0.1148		-0.0656		-0.1148
63	0.0656	-0.08232	-0.05576	0.01968	-0.01312	-0.02296	-0.09512	-0.02296	-0.09512		-0.1148		-0.1148
66	0.0328	-0.07216	-0.10496	0.00856	-0.05904	-0.03608	-0.11808	-0.03608	-0.11808	DID NOT	-0.08856		-0.11808
69	-0.01312	-0.10496	-0.1312	-0.02952	-0.09184	-0.05576	-0.16072	-0.05576	-0.16072		-0.17712		-0.17712
72	0.06232	-0.05576	-0.05576	0.02624	-0.0328	-0.03936	-0.10168	-0.0328	-0.10168	USE	-0.11808		-0.11808
75	0.04264	-0.05576	-0.05904	-0.03936	-0.07216	-0.03608	-0.164	-0.03608	-0.164		-0.09512		-0.164
78	0.062	-0.0492	-0.05576	-0.0984	-0.04264	-0.05904	-0.1148	-0.05904	-0.1148	NUMBERS	-0.082		-0.1148
81	0.07544	-0.0492	-0.06232	-0.0492	-0.0656	-0.03608	-0.082	-0.03608	-0.082		-0.05576		-0.082
	amount of displacement from the original baseline (ft)												-3.48992
					GRANITE LANE 1				Bike size = >250cc				TOTAL
					PROFILE 2 (Middle of Slope)								

X VALUE	May 90 ->				August 90 ->				November 90 ->				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	
	amount of displacement from the original baseline (ft)												
3													
6	-0.00984	0.00856	0.00856										-0.00984
9	-0.00328	0.02624	0.05248	-0.00328						0.04264	0.05904		-0.00328
12	0.02296	0.0656	0.06232	0.00856						0.0492	0.08856		0
15	-0.00328	0.01868	0.0164	-0.04592	-0.04264					0.02952	0.06888		-0.04592
18	-0.00984	0.01312	0.04592	-0.0164	-0.01868					0.01868	0.0656	0.07216	-0.01968
21	-0.0164	0.03608	0.02624	0.02296	-0.00328	-0.00984				0.04592	0.07872	0.03248	-0.0164
24	0.00656	0.0492	0.01868	0.0328	0	-0.00656	0.0656	0.07872	0.05248	0.05576	0.07872	0.03248	-0.00656
27	-0.00656	0.0492	0.02296	0.04264	-0.00328	-0.02286	0.05576	0.07872	0.0492	0.00984	0.06888	0.02952	-0.02286
30	0.01312	0.00328	0.01968	-0.00656	-0.06232	-0.0656	0.00984	0.07872	0.0492				-0.0656
33	0.01968	0.03936	-0.01312	-0.04264	-0.0492	-0.06232	-0.00984	0.06888	0.02952	-0.00984	0.06888	0.02952	-0.06232
36	0.02296	0.0492	0.03608	-0.00656	-0.00984	-0.02296	0.01968	0.13776	0.06232	0.01968	0.13776	0.06232	-0.02296
39	0.04264	0.04264	0.05904	0.04264	0.03608	0.02624	0.03936	0.17712	0.11808	0.03936	0.17712	0.11808	0
42	0.0328	0.05576	0.05576	0.0656	0.00984	0	0.06888	0.11152	0.0984	0.06888	0.11152	0.0984	0
45	-0.02952	-0.00656	-0.00656	-0.01968	-0.0888	-0.0888	0.02952	0.09576	0.0328	0.02952	0.09576	0.0328	-0.06888
48	-0.07872	-0.03608	-0.10168	-0.10168	-0.1476	-0.20336	-0.082	0.01968	0.00984	-0.082	0.01968	0.00984	-0.1476
51	0.0164	0.01312	-0.04264	-0.10168	-0.11152	-0.14104	-0.0328	0.05248	0.01312	-0.0328	0.05248	0.01312	-0.14104
54	-0.00328	-0.00984	-0.00328	-0.03608	-0.07872	-0.12792	0.00328	0.05248	-0.05904	0.00328	0.05248	-0.05904	-0.12792
57	-0.0492	-0.00984	-0.07872	-0.0492	-0.14104	-0.1476	-0.03608	0.03936	-0.07544	-0.03608	0.03936	-0.07544	-0.1476
60	-0.00656	-0.00328	-0.09184	-0.12792	-0.17384	-0.1888	-0.06232	0.02296	-0.08856	-0.06232	0.02296	-0.08856	-0.1888
63	0.02952	0.01968	-0.07872	-0.13448	-0.1968	-0.23616	-0.10496	0.0164	-0.09184	-0.10496	0.0164	-0.09184	-0.23616
66	0.02296	-0.00328	-0.0492	-0.1312	-0.14432	-0.27224	-0.11808	0.01868	-0.09184	-0.11808	0.01868	-0.09184	-0.27224
69	0.0164	0	-0.11152	-0.10824	-0.19024	-0.21648	-0.14432	-0.04264	-0.082	-0.14432	-0.04264	-0.082	-0.21648
72	0.03936	0.03608	-0.09512	-0.12136	-0.16072	-0.30832	-0.16072	-0.10168	-0.15416	-0.16072	-0.10168	-0.15416	-0.30832
75	0.01968	0.05576	0.00328	-0.08528	-0.12464	-0.246	-0.13448	-0.03936	-0.15744	-0.13448	-0.03936	-0.15744	-0.246
78	-0.03608	0.06232	-0.06232	-0.09512	-0.15744	-0.19352	-0.07544	0.00984	-0.14104	-0.07544	0.00984	-0.14104	-0.19352
81		0.10496		-0.00656	-0.07872	-0.17712	-0.03936	0.1148	0.04264	-0.03936	0.1148	0.04264	-0.17712
TOTAL													-2.65352

amount of displacement from the original baseline (ft)

GRANITE LANE 1

PROFILE 3 (Bottom of Slope)

Bike size = >250cc

TOTAL

X VALUE	May 90 ->			August 90 ->			November 90			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	50 RUNS		
3										
6										
9	0	-0.08856	-0.03608	-0.00328	-0.00984	-0.01988	0			-0.08856
12	0.00328	-0.02296	0.01312	0.0164	-0.00328	0.01312	0			-0.02296
15	-0.00328	-0.02296	0	0.00984	-0.01312	0.01312	-0.01988			-0.02296
18	-0.00984	-0.00856	0.00328	0.0164	0.00984	0.01312	-0.03936			-0.03936
21	0.00984	0.00328	0	0.04264	0.00328	0.01988	-0.00328			-0.00328
24	-0.00856	0.04264	0.02296	0.11808	0.03608	0.04264	-0.0164			-0.0164
27	0.07872	0.04264	0.07544	0.12136	-0.02624	0.1148	0.07216			-0.02624
30	-0.00856	-0.0164	-0.0492	-0.0164	-0.11152	-0.01988	-0.082			-0.0492
33	-0.00328	-0.0656	-0.05576	-0.00984	-0.07872	-0.06888	-0.08856			-0.08856
36	-0.0492	-0.05904	-0.0656	-0.00656	-0.082	-0.06232	-0.05248			-0.082
39	-0.02624	-0.05904	-0.06232	-0.00328	-0.08856	-0.06232	-0.06888			-0.08856
42	-0.0164	-0.05248	-0.07544	-0.02296	-0.06232	-0.07872	-0.06888			-0.07872
45	-0.00656	-0.0492	-0.05576	-0.00984	-0.07872	-0.04592	-0.06232			-0.07872
48	0.04264	0.00984	-0.03936	0.02624	-0.05904	-0.05576	-0.10824			-0.05904
51	0.01312	-0.02624	-0.08528	0	-0.08888	-0.05576	-0.10824			-0.08528
54	-0.04264	-0.07544	-0.082	0.01988	-0.02296	-0.04264	-0.09512			-0.09512
57	-0.02952	-0.00328	-0.03608	0.0492	-0.00984	-0.00656	-0.05904			-0.05904
60	0.01988	0.01312	-0.02296	0.05904	0.00328	0.03936	-0.03608			-0.03608
63	-0.01312	-0.02952	0.02296	0.11808	0.00984	0.0328	0.01312			-0.02952
66	0.01312	0.0328	0.05904	0.11808	0.06232	0.06888	0.07872		0	0
69	0.02624	0.0492	0.05576	0.12136	0.05904	0.0984	0.08856		0	0
72	0.02952	0.01988	0.03608	0.14104	0.07216	0.12136	0.06232		0	0
75	0.0328	0.0164	0.03608	0.14432	0.06888	0.10168	0.05904		0	0
78	0.03608	0.0328	0.04592	0.16728	0.0656	0.12136	0.12792		0	0
81	0.03936	0.03608	0.0328	0.164	0.08856	0.12136	0.20008		0	0
84	0.02296	0.0164	0.02624	0.16072	0	0.1148	0		0	0
amount of displacement from the original baseline (ft)										
				GRANITE LANE 2	Bike size = 250/4				TOTAL	-1.0498
										PROFILE 1 (Top of Slope)

X VALUE	May 90 ->			August 90 ->			November 90			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	50 RUNS		
3										
6										
9										
12	0.01988	0.00984	0.01988	0.04284	0.0164	0.01988	-0.0164		-0.0164	
15	0.01988	0.02296	0.0164	0.02296	0.02952	0.02296	-0.02624		-0.02624	
18	0	0.00984	-0.00328	0.00328	-0.00984	-0.02296	-0.0164		-0.02296	
21	0.0328	0.02296	0.02952	0.0328	0.00656	0.00984	-0.02624		-0.02624	
24	0.04592	0.0328	0.02952	0.04264	0.00984	0.02624	-0.02952		-0.02952	
27	0.06888	0.05576	-0.00328	0.0328	0.01988	0.03608	-0.05576		-0.05576	
30	0.03936	-0.02952	-0.01988	-0.01988	-0.06232	-0.05248	-0.0492		-0.06232	
33	0.02624	-0.00328	-0.02952	-0.0492	-0.07216	-0.03936	-0.07544		-0.07544	
36	0.02624	0.00984	-0.01988	-0.0164	-0.07544	-0.04264	-0.082		-0.082	
39	0.07872	0.05904	0	-0.00328	-0.06232	-0.0164	-0.06232		-0.06232	
42	0.05576	0.02952	-0.05904	-0.02952	-0.07216	-0.04592	-0.0492		-0.07216	
45	0.0656	-0.02624	-0.0492	-0.02952	-0.0492	-0.00328	-0.06232		-0.06232	
48	0.0492	0.00984	-0.0328	-0.01988	-0.0492	0	-0.05904		-0.05904	
51	0.07216	0.05248	0.00328	0.0164	-0.04592	-0.02952	-0.04592		-0.04592	
54	0.10496	0.06232	0.01988	0.05904	-0.03608	-0.00856	-0.00984		-0.03608	
57	0.0984	0.03608	-0.00328	0.05576	-0.0328	-0.00984	-0.04592		-0.04592	
60	0.07544	-0.01988	-0.00656	0.04264	-0.03608	-0.00856	-0.02624		-0.03608	
63	0.07216	-0.01988	0.00328	0.00984	-0.05248	-0.00328	-0.00856		-0.05248	
66	0.12136	0.03936	0.0328	0.08528	-0.0164	0.02624	0.02296		-0.0164	
69	0.02624	-0.02952	-0.0656	0.03936	-0.00656	0.0656	-0.03608		-0.0656	
72	0.01988	0.02296	-0.02952	0.04592	-0.03608	0.02624	0.00984		-0.03608	
75	0.07872	0.07872	0.05904	0.10496	-0.00328	0.08528	0.06888		-0.00328	
78	0.0984	0.05904	0.0328	0.13776	0.04264	0.12136	0.09184		0	
81	0.13448	0.082	0.07216	0.1476	0.07544	0.16072	0.1312		0	
amount of displacement from the original baseline (ft)										
				GRANITE LANE 2	Bike size = 250/4				TOTAL	
PROFILE 2 (Middle of Slope)										

X VALUE	May 90 ->			August 90 ->			November 90			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	50 RUNS	BASELINE	
3				0.01312	0.04592		0			0
6				0.01988	0.08856	0.0656	0.0656	0.0656	0.06232	0
9	0.02296	0.08856		0.082	0.0656	0.05576	0.03608	0.03608	0.04592	-0.02624
12	-0.02624	0.02624		0.08528	0.08528	0.12136	0.02624	0.05904		0
15	0.05904	0.02296		0.0492	0.07544	0.12136	0.05248	0.05248		-0.0328
18	0.02952	-0.0328		0.07544	0.12792	0.1476	0.06888	0.07672		0
21	0.06888	0.00328		0.08856	0.09512	0.07544	0.0656	0.03608		0
24	0.05904	0		0.0656	0.06232	0.06232	0.01988	0.02296		0
27	0.07672	0.00328		-0.03936	-0.03936	0.01312	-0.05576	-0.0328		-0.06232
30	0.00656	-0.06232		-0.02952	0.02952	0.04592	-0.03936	-0.02952		-0.07216
33	-0.07216	-0.00656		0.03936	0.07872	0.06232	0.01988	0.00328		0
36	0.04264	0.02952		-0.00656	0.03936	0.06232	0.00984	0.00656		-0.02624
39	0.03936	-0.02624		-0.0328	0.00984	0.0328	-0.00328	-0.03608		-0.06232
42	0.00656	-0.06232		0.05576	0.05904	0.06232	-0.00656	-0.01312		-0.01312
45	0.10824	-0.01312		0.00984	0.01968	0.0492	-0.07872	-0.02296		-0.07872
48	0.0328	-0.00328		-0.01968	-0.06232	0.03608	-0.05576	0		-0.06232
51	0.05576	-0.0164		0.00328	-0.02624	0.0328	-0.02952	0		-0.04264
54	0	-0.04264		0.05904	0.02296	0.05576	-0.06888	0.01312		-0.06888
57	0.06232	0.00984		0.05576	0.06232	0.0328	-0.03936	0.0328		-0.03936
60	0.00656	-0.00656		0.0656	0.05904	0.06232	0.03936	0.05576		0
63	0.09512	0.04264		0.01312	-0.02296	0.07872	0.0164	0.04264		-0.02296
66	0.15416	0.08856		0.10168	-0.0164	0.16728	0.0984	0.1152		-0.0164
69	0.15744	0.01312								
72										
amount of displacement from the original baseline (ft)										-0.62648
GRANITE LANE 2										
PROFILE 3 (Bottom of Slope)										
Bike size = 250/4										
TOTAL										

X VALUE	May 90 ->				August 90 ->				November 90 ->				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASLINE	25 RUNS	50 RUNS	BASLINE	25 RUNS	50 RUNS	BASLINE	25 RUNS	50 RUNS	
3	-0.0328	-0.01312											-0.0328
6	0	-0.00856			0.02286					-0.07872			-0.00856
9	-0.01312	0.02952			0.0328					-0.03608			-0.07872
12	0.00656	0.0328			0.03608					-0.03608			-0.03608
15	-0.01968	0.02624	-0.00984		0.03608	0.04264				-0.0328			-0.0328
18	-0.00856	0.02296	-0.0164		0.0328	0.05248				-0.03608			-0.03608
21	0	0.01968	-0.00328		0.03608	0.05904				-0.03936			-0.03936
24	-0.00328	0.00656	-0.01312		0.04264	0.0576				-0.0328			-0.01312
27	0	0.00984	0		0.0492	0.07544				0.00656			0
30	-0.0164	-0.00984	-0.02952		0.04592	0.0592				-0.02624			-0.02952
33	0.00656	0.01312	-0.02296		0.07544	0.03608				0.00328			-0.02296
36	0.00328	0.0164	0.00328		0.07216	0.08528				0.00984	0.04592	0.05904	0
39	0.02624	0.0492	-0.00328		0.0984	-0.0576				-0.0984	-0.05904	-0.01968	-0.05904
42	0.03936	-0.01312	-0.1148		0.05576	0.00328				-0.04264	-0.00984	-0.00328	-0.05248
45	-0.01968	0.00656	-0.10496		-0.00984	-0.03936				-0.05576	-0.02624	-0.07544	-0.10496
48	-0.08888	-0.1148	-0.12464		-0.0328	-0.08528				-0.10168	-0.05248	-0.08232	-0.12464
51	-0.09512	-0.08512	-0.10824		-0.01968	-0.09232				-0.0984	-0.09512	-0.09512	-0.10824
54	-0.10168	-0.09164	-0.13776		-0.02296	-0.07216				-0.12464	-0.08528	-0.09904	-0.13776
57	-0.06888	-0.11152	-0.16368		-0.082	-0.14104				-0.13776	-0.08856	-0.07872	-0.16368
60	0.00984	-0.09512	-0.09164		-0.00328	0				-0.03936	0.01968	0.02624	-0.09512
63	0.00328	-0.082	-0.08528		0.02952	0.03936				-0.00984	0.06232	0.0168	-0.08528
66	-0.0164	-0.01968	-0.02296		0.09512	0.0984				0.0168	0.05576	0.12464	-0.02296
69	0	-0.0164	0.00328		0.1476	0.03608				0.08528	0.05904	0.12136	-0.0164
72	-0.01312	-0.01968	-0.02624		0.12464	0.082				0.1476	0.06232	0.11152	-0.02624
75	0.01312	-0.00328	0		0.12136	0.05576				0.13776	0.08528	0.16072	-0.00328
78	0.06232	0.04264	0.06232		0.17712	0.0984				0.17712	0.10496	0.19024	0
81	0.03936	-0.01312	0.05904		0.16728	0.08856				0.14432	0.1148	0.1312	-0.01312
amount of displacement from the original baseline (ft)													-1.3612
TOTAL													
GRANITE LANE 3													
PROFILE 1 (Top of Slope)													
Bike size = <250cc													

X VALUE	May 90 ->				August 90 ->				November 90 ->				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	
3													
6													
9	0.02952	0.0164											0
12	0.04592	0.04264		0.02624	0.00984		0.07544	0.05904	0.05576				0
15	0.03576	0.04264		0.03936	0.02624	0.0328	0.07544	0.04264	0.0492				0
18	0.00856	0.02296		0.02296	2.84E-20	0.00328	0.03608	0.02296	0.03608				0
21	0.05904	0.0492		0.0328	0.02952	0.02952	0.09184	0.06232	0.07872				0
24	0.02296	0.04592		0.0328	0.02296	0.02296	0.07544	0.05576	0.06888				0
27	0.0328	0.04264	0.01988	0.04264	0.03608	0.03608	0.10168	0.07544	0.09512				0
30	0.03936	0.00984	0.00984	0.04264	0.03936	0.04264	0.10496	0.092	0.10824				0
33	0.0164	-0.00856	0.01988	0.03608	0.05576	0.04264	0.08528	0.05904	0.07216				-0.00856
36	0	0.00984	0.00856	0.06232	0.03936	0.03936	0.0856	0.0492	0.0492				0
39	-0.00328	0.00856	-0.00984	0.04592	0.03608	0.03608	0.05248	0.01312	0.08232				-0.00328
42	0.03936	0.04592	0.02296	0.08856	0.04592	0.08232	0.11152	0.07216	0.12136				0
45	0.00984	0.00856	-0.01988	0.02624	0.0328	0.04264	0.0984	0.06232	0.10824				-0.01988
48	0.04264	0.02296	0.02952	0.03608	0.0328	0.02624	0.07544	0.0492	0.08856				0
51	0	-0.00856	-0.03608	-0.00328	-0.0164	-0.00328	0.06888	0.04592	0.05904				-0.03608
54	0.01312	0.02952	-0.00856	0.0164	0.01312	0.02296	0.06232	0.01988	0.07216				0
57	-0.0328	0.02952	-0.02624	0.00856	0.0164	-0.00984	0.0856	0.0164	0.06888				-0.0328
60	-0.05904	-0.04264	-0.05576	-0.01312	-0.00984	-0.00328	0.02952	0.02952	0.06888				-0.05904
63	-0.01988	0.02296	0.00984	0.03936	0.01312	0.03608	0.10168	0.13448	0.09184				-0.01988
66	0.04264	0.06888	0.02296	0.0884	0.082	0.07872	0.16728	0.12782	0.13776				0
69	0.0164	0.0492	0.02296	0.0492	0.06232	0.07216	0.1312	0.12136	0.12464				0
72	0.04264	0.08856	0.01312	0.01312	0.05576	0.07216	0.11152	0.09512	0.16072				0
75	0.0328	0.08528	0.01988	0.06232	0.0328	0.0492	0.0984	0.10496	0.10824				0
78	-0.02624	0.02952	0		0.0492	0.03608	0.06888	0.0656	0.12136				-0.02624
81	-0.01312	0.0164	-0.00984		0.04592	0.05576	0.0984	0.07216	0.12136				-0.01312
	amount of displacement from the original baseline (ft)				GRANITE LANE 3				TOTAL				
					PROFILE 2 (Middle of Slope)				Bike size = <250cc				-0.21648

X VALUE	May 90 ->			August 90 ->			November 90 ->			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUN	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	
3	-0.0164	-0.0088	-0.0361				-0.05248			-0.05248
6	0.01312	0.02624	-0.0459				-0.04592			-0.04592
9	-0.0394	-0.0033	-0.0722	-0.02624			-0.07544			-0.07554
12	-0.0164	-0.0164	-0.0918	-0.00984	-0.0295		-0.08528	-0.0295	-0.0394	-0.08528
15	0.02296	0.0164	-0.059	-0.00656	-0.0197		-0.082	-0.0164	-0.0492	-0.082
18	0.00856	-0.0098	-0.0984	-0.02624	-0.0426		-0.1148	-0.0492	-0.0656	-0.1148
21	0.00328	-0.023	-0.1148	-0.0492	-0.0722	-0.0984	-0.1148	-0.0899	-0.0656	-0.1148
24	0.01968	0.00984	-0.1246	-0.02624	-0.0426	-0.0722	-0.0984	-0.0525	-0.0492	-0.12464
27	0	-0.0197	-0.1509	-0.02952	-0.0656	-0.0851	-0.14432	-0.0899	-0.1214	-0.15088
30	0.0164	-0.0426	-0.1509	-0.03608	-0.0899	-0.0918	-0.14104	-0.0899	-0.0623	-0.15088
33	0.0328	0	-0.1378	-0.01968	-0.0656	-0.082	-0.15416	-0.0754	-0.0689	-0.15416
36	0.00656	-0.0164	-0.1968	-0.02952	-0.0886	-0.0951	-0.17384	-0.1148	-0.0918	-0.1968
39	-0.0525	-0.0558	-0.2165	-0.07872	-0.1148	-0.1476	-0.20008	-0.1214	-0.1214	-0.21648
42	-0.0295	-0.0459	-0.1804	-0.07216	-0.1181	-0.1476	-0.22632	-0.141	-0.1246	-0.22632
45	-0.0098	-0.0197	-0.2296	-0.10824	-0.1738	-0.1968	-0.28208	-0.2086	-0.2198	-0.28208
48	0.05248	-0.0328	-0.2427	-0.15088	-0.2165	-0.2493	-0.25256	-0.164	-0.1837	-0.25256
51	0.00328	0.0164	-0.1738	-0.15088	-0.1738	-0.1837	-0.21648	-0.141	-0.1279	-0.21648
54	-0.0394	0.02624	-0.2034	-0.10824	-0.1968	-0.2198	-0.21648	-0.1607	-0.1509	-0.21648
57	0	0.00328	-0.2394	-0.1476	-0.2034	-0.2283	-0.28208	-0.2198	-0.2624	-0.28208
60	0.08856	0.02952	-0.3378	-0.13776	-0.2919	-0.3149	-0.38048	-0.2755	-0.3706	-0.38048
63	0.02296	-0.0394	-0.3608	-0.26588	-0.3542	-0.3899	-0.4264	-0.351	-0.3608	-0.4264
66	0.0164	-0.0098	-0.351	-0.2952	-0.3149	-0.3313	-0.38704	-0.3149	-0.3083	-0.38704
69										
72										
75										
78										
	amount of displacement from the original baseline (ft)			GRANITE LANE 3 PROFILE 3 (Bottom of Slope)			Blke size = <250 co			TOTAL
										-4.23458

X VALUE	May 90 ->		August 90		November 90 ->		GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	BASELINE	50 RUNS	
3							
6	0.07872		0.02824				0
9	0.02296		0.03608	0.05904			0
12	0.0856	0.04592	0.02952	0.05576			0
15	0.09512	0.02296	0.02824	0.06232			0
18	0.05576	0.00328	0.00328	0.05904			0
21	0.07544	0.03608	0.0164	0.08856			0
24	0.08512	0.05248	0.05248	0.1148			0
27	0.10168	0.05576	0.07872	0.10496			0
30	0.07216	0	0.00984	0.00984		0.02296	0
33	0.01312	-0.082	-0.0656	0		-0.01312	-0.082
36	0.07872	0.0164	0.0164	0.07872	0.07216	0.07216	0
39	0.09184	0.05904	0.05904	0.14432	0.1148	0.1152	0
42	0.09184	0.06888	0.05576	0.13448	0.10496	0.09512	0
45	0.1148	0.00856	0.00856	0.0984	0.07216	0.07216	0
48	0.09512	-0.00984	0.03608	0.1148	0.07544	0.0492	-0.00984
51	0.0856	-0.02296	0.00328	0.12792	0.04264	0.05904	-0.02296
54	0.10168	0.02952	0.0164	0.1312	0.08232	0.06232	0
57	0.09512	0.02296	-0.03936	0.1312	0.05248	0.04592	-0.03936
60	0.10496	-0.00328	0.01312	0.11808	0.08232	0.05904	-0.00328
63	0.12792	-0.01312	0.03936	0.16728	0.07216	0.082	-0.01312
66	0.09512	0.0164	0.05904	0.18696	0.12792	0.13776	0
69	0.15088	0.05904	0.07216	0.18024	0.10496	0.18696	0
72	0.17712	0.06232	0.08528	0.22304	0.10168	0.18368	0
75	0.164	0.06232	0.10496	0.23616	0.12792	0.1804	0
78	0.17056	0.09184	0.164	0.328	0.20892	0.22632	0
81	0.15744	0.12136	0.17384	0.2952	0.21648	0.23616	0
84	0.21976	0.05904	0.18368	0.30176	0.22632	0.22632	0
	amount of displacement from the original baseline (ft)		GRANITE		Bike size = 250/2		-0.17056
			LANE 4		TOTAL		
			PROFILE 1 (Top of Slope)				

X VALUE	May 90 ->		August 90		November 90 ->		GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	BASELINE	50 RUNS	
3				-0.13448	-0.04264		-0.13448
6				-0.11148	-0.05248	-0.07544	-0.11148
9				-0.14432	-0.0656	-0.10496	-0.14432
12				-0.1312	-0.0656	-0.09512	-0.1312
15				-0.17056	-0.10824	-0.13448	-0.17712
18				-0.17712	-0.10824	-0.12464	-0.19024
21				-0.19352	-0.12136	-0.15416	-0.20336
24				-0.20336	-0.1476	-0.17712	-0.20664
27				-0.22632	-0.1312	-0.17384	-0.22632
30				-0.246	-0.15744	-0.19352	-0.246
33				-0.33128	-0.2132	-0.28536	-0.33128
36				-0.31616	-0.20336	-0.22632	-0.31616
39				-0.29192	-0.25584	-0.2852	-0.2952
42				-0.42868	-0.31616	-0.42312	-0.42312
45				-0.3772	-0.29848	-0.41	-0.41
48				-0.3936	-0.35424	-0.42968	-0.42968
51				-0.42312	-0.35424	-0.39032	-0.42312
54				-0.42868	-0.36376	-0.41656	-0.42868
57				-0.4264	-0.33128	-0.32472	-0.4264
60				-0.37392	-0.32472	-0.4428	-0.4428
63				-0.45264	-0.3608	-0.38048	-0.45264
66				-0.43624	-0.4264	-0.46576	-0.46216
69				-0.50512	-0.47888	-0.3936	-0.50512
72				-0.49856	-0.3772	-0.3608	-0.49856
75				-0.41328	-0.38704	-0.33784	-0.46904
78							
81							
84							
	amount of displacement from the original baseline (ft)		GRANITE LANE 4	PROFILE 3 (Bottom of Slope)		Blke size = 250/2	TOTAL
							-8.11144

X VALUE	May 90 ->			August 90 ->			November 90 ->			March 91			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	
3	-0.0164	-0.05904						-0.00856		0.00856		-0.02624	-0.05904
6	0.01312	-0.02624	0.00328					0.00328	0.01312	0.02296	-0.04592	-0.0164	-0.04592
9	-0.04264	-0.01968	0	0.00984				-0.02952	0.00856	2.27E-20	-0.0656	-0.03608	-0.0656
12	0.00656	-0.0492	0.00656	-0.0328		-0.03936		-0.04592	-0.03936	-0.03608	-0.1148	-0.07872	-0.1148
15	-0.00984	-0.0492	0.01312	-0.04592	-0.02624	-0.0492	-0.01312	-0.06888	-0.03608	-0.03936	-0.17384	-0.1476	-0.17384
18	-0.0328	-0.0492	0	-0.04264	-0.0492	-0.05576	-0.05576	-0.12464	-0.08856	-0.10168	-0.20664	-0.15416	-0.20664
21	-0.0656	-0.04592	-0.07216	-0.07216	-0.06232	-0.1148	-0.1148	-0.14104	-0.10496	-0.164	-0.25584	-0.17056	-0.25584
24	0.01688	-0.00656	-0.02624	-0.02624	-0.03608	-0.0656	-0.02952	-0.09184	-0.08528	-0.12464	-0.19352	-0.10496	-0.19352
27	0.02296	-0.04264	0.00328	-0.04264	-0.05576	-0.06888	-0.0656	-0.12792	-0.07872	-0.10824	-0.164	-0.10496	-0.164
30	-0.02952	-0.07544	-0.03608	-0.082	-0.06888	-0.09512	-0.082	-0.1312	-0.08512	-0.11808	-0.2132	-0.14104	-0.2132
33	-0.04592	-0.0328	-0.01312	-0.10496	-0.06888	-0.04592	-0.05904	-0.10824	-0.08528	-0.09184	-0.20992	-0.1476	-0.20992
36	0.06888	0.05248	0.12464	0.01968	-0.00328	0.05904	0.03608	0.03608	0.03608	0.0328	-0.09512	-0.08856	-0.09512
39	-0.0656	0.00656	0.09512	-0.02624	-0.06856	0	-0.00328	-0.05904	0.00984	-0.01968	-0.15088	-0.12136	-0.15088
42	-0.04592	0.04592	0.15416	0.06888	-0.09184	0	0.02952	-0.02952	0.03936	0.00328	-0.11808	-0.07216	-0.11808
45	0.02952	0.05576	0.20992	0.10824	-0.07872	0.07872	0.09512	0.0164	0.01968	0.04592	-0.09184	-0.02296	-0.09184
48	0.0164	-0.00328	0.16072	0.03608	-0.09184	0.0328	0.03608	-0.0164	-0.02952	0.01968	-0.14432	-0.05248	-0.14432
51	0.04592	0.01968	0.10824	0.06232	-0.1148	0.08232	0.0328	0.06232	0.07216	0.02296	-0.09512	-0.08528	-0.1148
54	0.00656	0.04592	0.12792	0.04592	-0.1148	0.11152	0.0656	0.07216	0.07544	0.07544	-0.11152	-0.06888	-0.1148
57	0.04264	0.10496	0.17712	0.1312	-0.0492	0.2132	0.22632	0.12792	0.16728	0.15744	-0.07216	-0.02952	-0.07216
60	-0.04592	0.082	0.14432	0.10824	-0.07872	0.15088	0.20008	0.07216	0.14432	0.10496	-0.10824	-0.04592	-0.10824
63	0.05576	0.0492	0.13448	0.0856	-0.02624	0.11808	0.19352		0.09184	0.082	-0.13448	-0.04592	-0.13448
66	0.00984	0.00984	0.10168	0.0328	-0.02624	0.07872	0.13448		0.05248	0.0656	-0.1312	-0.07544	-0.1312
69	0.07872	0.09512	0.17384	0.11808	0.02952	0.164	0.20684		0.17056	0.20008	-0.02952	-0.02296	-0.02952
72	0.09512	0.02624	0.13448		0.04264	0.246			0.21648	0.02952	0.02624	0	0
Amount of Displacement from the Original Baseline (ft)													
SEDIMENTARY LANE 1													
PROFILE 1 (Top of Slope)													
Blake size = >250cc													
TOTAL													-3.00778

X VALUE	May 90 ->					August 90 ->					November 90 ->					March 91					GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	
	Amount of Displacement from the Original Baseline (ft)																				
3	-0.01312	0.04264	0.07216	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	0.08856	-0.0856
6	-0.082	-0.10168	0.02296	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	0.0328	-0.10168
9	-0.05576	-0.05248	0.00328	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	0.06232	-0.05248
12	-0.01968	-0.04264	-0.00984	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	0.09512	-0.04264
15	-0.01312	-0.00328	0.11808	0.082	0.08856	0.05904	0.11808	0.08856	0.05904	0.11808	0.08856	0.05904	0.11808	0.08856	0.05904	0.11808	0.08856	0.05904	0.11808	0.08856	-0.01312
18	-0.0328	-0.11152	0.13448	0.03608	0.07872	0.02624	0.07872	0.02624	0.07872	0.02624	0.07872	0.02624	0.07872	0.02624	0.07872	0.02624	0.07872	0.02624	0.07872	0.02624	-0.11152
21	-0.05904	0.0492	0.17384	0.05904	0.08856	0.05904	0.08856	0.05904	0.08856	0.05904	0.08856	0.05904	0.08856	0.05904	0.08856	0.05904	0.08856	0.05904	0.08856	0.05904	-0.05904
24	-0.02624	-0.01312	0.1476	0.05904	0.10168	0.0656	0.10168	0.0656	0.10168	0.0656	0.10168	0.0656	0.10168	0.0656	0.10168	0.0656	0.10168	0.0656	0.10168	0.0656	-0.02624
27	0.05576	0.03248	0.14104	0.07216	0.07544	0.08856	0.12792	0.05904	0.19024	0.09512	0.07872	0.08856	0.12792	0.05904	0.19024	0.09512	0.07872	0.08856	0.12792	0.05904	-0.07872
30	-0.00328	0.01968	0.11152	0.04592	0.03608	0.02624	0.03608	0.02624	0.03608	0.02624	0.03608	0.02624	0.03608	0.02624	0.03608	0.02624	0.03608	0.02624	0.03608	0.02624	-0.12464
33	0.02624	0.01312	0.0492	-0.0164	0.00656	0.00328	-0.02624	-0.01968	0.09512	0.01968	0.09512	0.01968	0.09512	0.01968	0.09512	0.01968	0.09512	0.01968	0.09512	0.01968	-0.1604
36	0.082	-0.02296	0.01312	-0.06232	-0.082	-0.05904	-0.07544	-0.10496	0.04592	-0.03936	-0.22632	-0.08856	-0.03936	-0.22632	-0.08856	-0.03936	-0.22632	-0.08856	-0.03936	-0.22632	-0.22632
39	0.00328	-0.0984	-0.082	-0.164	-0.1804	-0.164	-0.1804	-0.164	-0.1804	-0.164	-0.1804	-0.164	-0.1804	-0.164	-0.1804	-0.164	-0.1804	-0.164	-0.1804	-0.164	-0.36408
42	-0.10824	-0.18088	-0.02296	-0.1312	-0.14432	-0.14104	-0.16968	-0.2296	-0.02624	-0.1804	-0.32472	-0.11808	-0.32472	-0.11808	-0.32472	-0.11808	-0.32472	-0.11808	-0.32472	-0.11808	-0.32472
45	-0.07872	-0.19024	-0.13448	-0.17384	-0.1804	-0.16728	-0.21648	-0.2296	-0.07544	-0.19352	-0.3608	-0.18368	-0.3608	-0.18368	-0.3608	-0.18368	-0.3608	-0.18368	-0.3608	-0.18368	-0.3608
48	-0.10496	-0.1312	-0.04264	-0.12464	-0.10824	-0.12136	-0.15088	-0.1804	-0.02624	-0.12792	-0.328	-0.23616	-0.328	-0.23616	-0.328	-0.23616	-0.328	-0.23616	-0.328	-0.23616	-0.328
51	-0.02952	-0.082	0.05576	-0.04264	0.0164	-0.05248	-0.09184	-0.06184	0.04264	-0.03936	-0.28864	-0.1148	-0.28864	-0.1148	-0.28864	-0.1148	-0.28864	-0.1148	-0.28864	-0.1148	-0.28864
54	-0.00984	-0.07544	0.0492	-0.09184	0.00984	-0.07544	-0.1312	-0.04264	0.01312	-0.03608	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584
57	-0.01312	-0.08232	0.05576	-0.05248	0.00984	-0.05576	-0.12136	-0.03608	0.11808	0.0328	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584	-0.00856	-0.25584
60	0.03608	-0.0328	0.05904	-0.02296	0.0164	0.02296	-0.07872	0.0328	0.18968	0.0656	-0.18968	0.0328	0.18968	0.0656	-0.18968	0.0328	0.18968	0.0656	-0.18968	0.0328	-0.18968
63	0.02624	-0.01968	0.08232	0.02952	0.09512	0.00656	-0.0328	0.0328	0.16728	0.17712	-0.20992	0.0492	-0.20992	0.0492	-0.20992	0.0492	-0.20992	0.0492	-0.20992	0.0492	-0.20992
66	0.04592	-0.04264	0.0164	0.02624	0.00656	-0.00656	-0.02296	0.02296	0.18968	0.19024	-0.18368	0.03936	-0.18368	0.03936	-0.18368	0.03936	-0.18368	0.03936	-0.18368	0.03936	-0.18368
69	-0.0164	-0.08856	0.00328	0.01968	0.02624	0.00984	0.04592	-0.02296	0.1804	0.1804	-0.12136	0.08856	-0.12136	0.08856	-0.12136	0.08856	-0.12136	0.08856	-0.12136	0.08856	-0.12136
72	0.03608	-0.0656	0.02952	0.0328	0.04592	0.00984	-0.04264	-0.0328	0.20008	0.16968	-0.12792	0.12136	-0.12792	0.12136	-0.12792	0.12136	-0.12792	0.12136	-0.12792	0.12136	-0.12792
75	0.02952	-0.04592	0.07544	0.04592	0.17384	0.01968	-0.02624	0.13448	0.23944	0.21648	-0.09184	0.12782	-0.09184	0.12782	-0.09184	0.12782	-0.09184	0.12782	-0.09184	0.12782	-0.09184
78	0.01968	0.02624	0.04264	-0.00656	0.08856	0.0164	-0.08232	0.0984	0.2296	0.23944	-0.1476	0.08856	-0.1476	0.08856	-0.1476	0.08856	-0.1476	0.08856	-0.1476	0.08856	-0.1476
81	0.1312	0.01312	0.12464	0.07872	0.10824	0.08856	0.00656	0.12136	0.30832	0.27224	-0.05904	0.15416	-0.05904	0.15416	-0.05904	0.15416	-0.05904	0.15416	-0.05904	0.15416	-0.05904
84	-0.03936	-0.07216	0.10168	0.00656	0.0984	0.01968	-0.02296	0.12464	0.20008	0.20684	-0.10496	0.1148	-0.10496	0.1148	-0.10496	0.1148	-0.10496	0.1148	-0.10496	0.1148	-0.10496
87	-0.02952	-0.15088	-0.00328	0.03608	-0.01312	-0.08528			0.20008	0.22632	-0.15744	0.09512	-0.15744	0.09512	-0.15744	0.09512	-0.15744	0.09512	-0.15744	0.09512	-0.15744
TOTAL																					-4.78552

SEDIMENTARY
LANE 1
PROFILE 2 (Middle of Slope)

Amount of Displacement
from the Original
Baseline (ft)

BIKE size = >250 cc

X VALUE	May 90 ->				August 90 ->				November 90				GREATEST DISPLACEMENT
	25 RUNS		50 RUNS		100 RUNS		BASELINE		25 RUNS		50 RUNS		
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	BASELINE	25 RUNS	BASELINE	BASELINE	BASELINE	BASELINE	BASELINE	
3	-0.0164	0.05248	0.0164	-0.00856	0.01968	-0.05248	0.00328	0.00328	0.00328	0.00328	0.00328	0.00328	-0.0164
6	0.06232	0.04592	0.02952	-0.00856	0.01968	-0.05248	0.03608	0.03608	0.03608	0.03608	0.03608	0.03608	-0.05248
9	0.0984	0.082	0.01312	0.00328	0.01968	-0.02624	0.01312	0.01312	0.01312	0.01312	0.01312	0.01312	-0.02624
12	0.08856	0.1148	0.09512	0.02624	0.09232	-0.01968	0.02952	0.02952	0.02952	0.02952	0.02952	0.02952	-0.01968
15	0.0492	0.07216	0.0656	0.00856	0.04592	-0.0328	0.0164	0.0164	-0.0328	0.0164	0.0164	0.0164	-0.0328
18	0.12136	0.11152	0.10496	0.05248	0.07544	0.00984	0.00856	0.00856	0.00856	0.00856	0.00856	0.00856	0
21	0.10496	0.0888	0.0888	0.03936	0.0888	-0.00856	0.00856	0.00856	0.00856	0.00856	0.00856	0.00856	-0.00856
24	-0.12792	-0.13448	-0.1148	-0.21976	-0.16728	-0.24928	-0.18696	-0.13448	-0.18696	-0.13448	-0.18696	-0.13448	-0.24928
27	-0.13776	-0.09512	-0.0888	-0.1968	-0.14104	-0.22632	-0.164	-0.10168	-0.164	-0.10168	-0.164	-0.10168	-0.22632
30	-0.12464	-0.15416	-0.12792	-0.20664	-0.16072	-0.21648	-0.17712	-0.08528	-0.17712	-0.08528	-0.17712	-0.08528	-0.17712
33	-0.1312	-0.15416	-0.1312	-0.19024	-0.11808	-0.23616	-0.15088	0.00328	-0.15088	0.00328	-0.15088	0.00328	-0.15088
36	-0.0984	-0.1476	-0.09184	-0.21648	-0.14432	-0.24272	-0.12464	0.02624	-0.12464	0.02624	-0.12464	0.02624	-0.12464
39	-0.09512	-0.05576	-0.03608	-0.23944	-0.15744	-0.2624	-0.1476	-0.0164	-0.1476	-0.0164	-0.1476	-0.0164	-0.1476
42	-0.11808	-0.0984	-0.10168	-0.26896	-0.1968	-0.29848	-0.21648	-0.02952	-0.21648	-0.02952	-0.21648	-0.02952	-0.21648
45	-0.17712	-0.1312	-0.07872	-0.3444	-0.24928	-0.37084	-0.28864	-0.082	-0.28864	-0.082	-0.28864	-0.082	-0.28864
48	-0.15744	-0.19024	-0.11808	-0.38376	-0.2788	-0.41984	-0.32472	-0.1312	-0.32472	-0.1312	-0.32472	-0.1312	-0.32472
51	-0.19024	-0.20008	-0.1148	-0.38704	-0.30504	-0.4264	-0.30176	-0.08856	-0.30176	-0.08856	-0.30176	-0.08856	-0.30176
54	-0.25256	-0.17384	-0.14104	-0.37084	-0.28536	-0.41656	-0.28896	-0.0492	-0.28896	-0.0492	-0.28896	-0.0492	-0.28896
57	-0.2788	-0.23288	-0.23616	-0.37084	-0.31616	-0.4592	-0.25912	-0.07872	-0.25912	-0.07872	-0.25912	-0.07872	-0.25912
60	-0.26568	-0.25256	-0.28208	-0.43296	-0.34768	-0.40672	-0.328	-0.07872	-0.328	-0.07872	-0.328	-0.07872	-0.328
63	-0.40016	-0.38048	-0.328	-0.53792	-0.43296	-0.48856	-0.4428	-0.17712	-0.4428	-0.17712	-0.4428	-0.17712	-0.17712
66	-0.35424	-0.38376	-0.30176	-0.48544	-0.3936	-0.51496	-0.4592	-0.19352	-0.4592	-0.19352	-0.4592	-0.19352	-0.19352
69	-0.38376	-0.3936	-0.28208	-0.43624	-0.34112	-0.48856	-0.3772	-0.164	-0.3772	-0.164	-0.3772	-0.164	-0.164
72	-0.37392	-0.30832	-0.24928	-0.41656	-0.32472	-0.44608	-0.35752	-0.08856	-0.35752	-0.08856	-0.35752	-0.08856	-0.08856
75	-0.53136	-0.45264	-0.27552	-0.47232	-0.31488	-0.48216	-0.3608	-0.05904	-0.3608	-0.05904	-0.3608	-0.05904	-0.05904
78	-0.45592	-0.35752	-0.2952	-0.39032	-0.31488	-0.44836	-0.31488	-0.02624	-0.31488	-0.02624	-0.31488	-0.02624	-0.02624
81	-0.41984	-0.38376	-0.25912	-0.43952	-0.328	-0.45264	-0.30176	0.00328	-0.30176	0.00328	-0.30176	0.00328	0
84			-0.46248	-0.46248	-0.34768	-0.49528	-0.25584	0.0656	-0.25584	0.0656	-0.25584	0.0656	0
	Amount of Displacement from the original Baseline (ft)												-3.92816
	SEDIMENTARY LANE 2												TOTAL
	PROFILE 1 (Top of Slope)												

Amount of Displacement from the original Baseline (ft)

SEDIMENTARY LANE 2

Blk size = 250/4

PROFILE 1 (Top of Slope)

X VALUE	May 90 ->				August 90 ->				November 90		March 91		GREATEST DISPLACEMENT
	25 RUNS				BASELINE				50 RUNS		BASELINE		
	50 RUNS	100 RUNS	25 RUNS	50 RUNS	25 RUNS	50 RUNS	25 RUNS	50 RUNS	BASELINE	BASELINE			
3	-0.02952								-0.0164				-0.02952
6	-0.04592	0.07216	0.13776						0.00328				-0.04592
9	0.01312	0.08856	0.12792						0				0
12	-0.10824	-0.01968	0.09184						-0.09512	0.01312			-0.10824
15	-0.05576	0.04264	0.05576		0.02296	0.03608			-0.0492	0.15416			-0.05576
18	-0.08528	0.0656	0.10824		0.0492	0.0328	0.04264		-0.06232	0.16728			-0.08528
21	-0.01968	0.09512	0.18368		0.0492	-0.0164	-0.00328		-0.0492	0.18024			-0.0492
24	0.0984	0.11152	0.20664		0.00656	0.00656	0		-0.10168	0.18368			-0.10168
27	0.1148	0.0492	0.19352		-0.00656	0.00656	-0.0164		-0.13776	0.20008			-0.13776
30	0.05904	0.1804	0.2296		0.02296	0.0328	-0.01968		-0.10496	0.20008			-0.10496
33	0.08856	0.1968	0.31816		0.08856	0.0984	0.08528		-0.05248	0.21648			-0.05248
36	0.14104	0.19352	0.31816		0.09512	0.10496	0.09512		-0.05248	0.1968			-0.05248
39	0.04264	0.17056	0.25256		0.0328	0.0328	0.02296		-0.13448	0.13448			-0.13448
42	0.09184	0.20336	0.3444		0.08528	0.03608	0.0164		-0.12136	0.20664			-0.12136
45	0.10496	0.19352	0.3116		-0.00328	-0.02296	-0.01312		-0.164	0.17384			-0.164
48	0.09512	0.15744	0.20992		-0.02624	-0.0328	-0.06888		-0.20664	0.16072			-0.20664
51	0.12792	0.13448	0.26896		0.00656	0.0164	0.03608		-0.18696	0.17056			-0.18696
54	0.09232	0.164	0.26896		-0.04592	-0.00984	0.00328		-0.23288	0.16728			-0.23288
57	0.1476	0.2788	0.33128		0.04592	0.09184	0.0328		-0.17712	0.22632			-0.17712
60	0.16072	0.2788	0.35088		0.03936	0.11808	0.07544		-0.16072	0.20664			-0.16072
63	0.23944	0.35424	0.48216		0.08856	0.12792	0.10824		-0.07872	0.32144			-0.07872
66	0.34768	0.32144	0.51168		0.03936	0.08856	0.09184		-0.08232	0.27552			-0.08232
69	0.28208	0.29192	0.41		0.10168	0.11152	0.10824		-0.08528	0.24928			-0.08528
72	0.28864	0.3608	0.49856		0.17056	0.1968	0.19352		-0.06888	0.34112			-0.06888
75	0.32472	0.44608	0.56088		0.2132	0.2624	0.22304		-0.04264	0.41656			-0.04264
78	0.3936	0.5412	0.56056		0.27552	0.29848	0.28864		0	0.42968			0
81	0.3772	0.5248	0.64616		0.29848	0.328	0.30832		0.00328	0.4428			0
Amount of Displacement from the original Baseline (ft)													-2.54528
SEDIMENTARY													
LANE 2													
PROFILE 2 (Middle of Slope)													
Bike size = 250/4													
TOTAL													

X VALUE	May 90 ->			August 90 ->			November 90			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUN	BASELINE	25 RUNS	50 RUNS	BASELINE	BASELINE		
3	0.0656	0.07216	0.05904						0	
6	0.05904	0.10168	0.0656	0.01988					0	
9	0.0984	0.12792	0.09184	0.04592		0.06888	0.05248	0.01988	0	
12	0.0984	0.12792	0.1148	0.0492	0.07544	0.07216	0.07216	0.05248	0	
15	0.1148	0.1148	0.09184	0.05248	0.03936	0.02852	0.05576	0.02296	0	
18	0.07872	0.11152	0.05248	-0.0656	-0.0164	-0.0361	0.02296	-0.0361	-0.03608	
21	0.11152	0.12464	0.09512	-0.0984	-0.0459	-0.0689	-0.0164	-0.0361	-0.0984	
24	0.1476	0.15744	0.17712	-0.05904	0.00656	-0.0361	0.04592	-0.0066	-0.05904	
27	0.1476	0.14432	0.13776	-0.07544	-0.0197	-0.0886	0.01988	-0.0262	-0.08856	
30	0.1312	0.10168	0.12136	-0.1312	-0.0984	-0.1246	-0.01312	-0.105	-0.1312	
33	0.20992	0.1476	0.15088	-0.1148	-0.082	-0.0722	0.02296	-0.0295	-0.1148	
36	0.13776	0.17712	0.12464	-0.1476	-0.1181	-0.1312	0.0492	-0.0787	-0.1476	
39	0.19024	0.17056	0.11152	-0.16072	-0.1115	-0.1378	-0.03608	-0.0951	-0.16072	
42	0.15744	0.15744	0.14104	-0.11808	-0.082	-0.1082	-0.0328	-0.1148	-0.11808	
45	0.1476	0.22632	0.17712	-0.082	-0.0459	-0.0656	0.00328	-0.0623	-0.082	
48	0.12136	0.164	0.1476	-0.13448	-0.082	-0.0984	-0.07216	-0.0984	-0.13448	
51	0.07544	0.10824	0.0492	-0.15744	-0.1312	-0.1476	-0.164	-0.1771	-0.17712	
54	0.0984	0.11152	0.04592	-0.18368	-0.1706	-0.164	-0.14432	-0.2296	-0.2296	
57	0.12136	0.14104	0.13776	-0.11152	-0.0787	-0.0918	-0.07872	-0.105	-0.11152	
60	0.17384	0.17384	0.19352	-0.0984	-0.059	-0.0262	-0.0164	-0.0558	-0.0984	
63	0.09184	0.06232	0.00984	-0.20008	-0.1738	-0.187	-0.15088	-0.1771	-0.20008	
66	0.07872	0.05576	0.02952	-0.1312	-0.1115	-0.0492	-0.11152	-0.1181	-0.1312	
69	0.12792	0.17056	0.082	-0.09512	-0.0394	-0.023	-0.07216	-0.0853	-0.09512	
72	0.11152	0.11152	0.082	-0.06888	-0.0131	-0.0361	-0.05248	-0.0918	-0.09184	
75	0.10168	0.1312	0.08856	-0.0984	-0.0459	-0.1017	-0.09512	-0.1378	-0.13776	
78	0.11152	0.0984		-0.082	-0.0295	-0.0722	-0.06232		-0.082	
Amount of Displacement										
SEDIMENTARY										
Bike size = 250/4										
TOTAL										
-2.5256										

X VALUE	May 90 ->				August 90 ->				November 90 ->				March 91				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	
3	-0.02952	-0.02298	-0.02298														-0.02624
6	-0.00984	0.02952	0.02298														-0.00656
9	0.0656	0.08988	0.07216		0.07216												0.00656
12	0.02952	0.0328	0.0632		0.06528	-0.0164			0.05904						-0.0164		0.01668
15	-0.0164	-0.02952	-0.07872		-0.0164	-0.0984			0						-0.1148		-0.09512
18	0.03936	0.00656	0.02952		0.02824	-0.06888			-0.0632						-0.10168		-0.1148
21	0.01668	0.00984	0.02952		0.08528	-0.0164			-0.0328						-0.03936		-0.10168
24	0.00656	-0.01312	-0.00984		0.08856	-0.08528			-0.0328						-0.10496		-0.10496
27	0.0328	-0.01968	-0.04264		0.03936	-0.10496			-0.0632						-0.12464		-0.12464
30	0.04592	-0.02624	-0.01968		0.05576	-0.10496			-0.07544						-0.23616		-0.23616
33	0.04264	0.01312	0.05248		0.08528	-0.1152			-0.09184						-0.27552		-0.27552
36	-0.00328	-0.03936	-0.01968		0.0328	-0.14104			-0.07872						-0.25256		-0.25256
39	0	-0.0492	-0.01312		0.02952	-0.17056			-0.12464						-0.28536		-0.28536
42	0.0328	-0.02296	0.0164		0.05576	-0.17364			-0.15416						-0.27224		-0.27224
45	-0.02952	-0.08528	-0.09184		-0.00328	-0.26568			-0.13776						-0.21648		-0.21648
48	0.03608	-0.02624	-0.0656		0.07544	-0.20008			-0.24272						-0.3116		-0.3116
51	0.082	0.0164	-0.07216		0.07544	-0.20664			-0.19352						-0.24928		-0.24928
54	0.00656	-0.02624	-0.0984		-0.01968	-0.28208			-0.23288						-0.2768		-0.2768
57	-0.04592	-0.08856	-0.14104		-0.05248	-0.32144			-0.27552						-0.36736		-0.36736
60	0.04264	-0.03608	-0.09184		0.04592	-0.27224			-0.34112						-0.43624		-0.43624
63	0.04592	-0.0328	-0.05248		0.00656	-0.28208			-0.27552						-0.34768		-0.34768
66	0.02624	-0.02952	-0.07872		0.05248	-0.23944			-0.25584						-0.34768		-0.34768
69	0.02952	-0.01968	0.02296		0.10168	-0.21648			-0.24272						-0.32144		-0.32144
72	0.07216	0.03608	0.05576		0.15416	-0.17364			-0.20992						-0.2952		-0.2952
75	0.08528	0.05248	0.0492		0.20336	-0.15088			0.0328						-0.23944		-0.23944
78	0.05904	0.05904	0.0328		0.248	-0.11808			-0.12464						-0.17056		-0.17056
81	0.0492	0.02624	0.0492		0.31616	-0.04264			-0.14104						-0.19024		-0.19024
84			-0.00984		0.30176	-0.09184			-0.10168						-0.20992		-0.20992
															-0.19352		-0.19352
																	-6.01552

Amount of Displacement from the original Baseline (ft)

SEDIMENTARY LANE 3

PROFILE 1 (Top of Slope)

Blake size = 250/2

TOTAL

X VALUE	May 90 ->			August 90 ->			November 90 ->			March 91			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUN	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUN	BASELINE		
3	-0.0033	-0.1378	-0.0951	-0.0656	-0.0394							-0.0328	-0.13776
6	-0.0033	0.01312	-0.0886	-0.06232	-0.0328				-0.0262	0.00656		-0.0197	-0.08856
9	-0.0361	-0.0295	-0.0623	-0.07544	-0.0295	-0.0754				-0.0131		-0.0656	-0.07544
12	0.00328	0.02624	-0.0558	0.02296	0.03936	0.0328			0.03936	0.02624		-0.0361	-0.05576
15	-0.0984	-0.082	-0.0525	0.00328	0.04264	0.02624	0.03936		0.0164	0		-0.0951	-0.0984
18	-0.0098	-0.0098	-0.105	-0.0492	0.00328	-0.0262	0.02296	0.01968	-0.0066	-0.0328	-0.1476		-0.10496
21	0.05904	0.04592	-0.0098	0.05904	0.12136	0.082	0.07872	0.07872	0.09512	0.0984	-0.0164		-0.0164
24	0.00656	-0.0164	-0.0918	-0.0164	0.00656	-0.0066	0.0656	0.03608	0.03608	0.03608	-0.0722		-0.09184
27	-0.0098	-0.0131	-0.0492	-0.00984	0.01312	0.0328	0.07216	0.04264	0.07872	0.0492	-0.0262		-0.0492
30	-0.0459	-0.0426	-0.0459	0.0164	0.05904	0.0328	0.07872	0.0492	0.07216	0.08528	-0.0426		-0.04592
33	0.0492	-0.0131	-0.0525	-0.04264	0.00656	0.07216	0.09184	0.11152	0.0492	0.08856	-0.1246		-0.12464
36	0.00328	0.00328	-0.0262	-0.05248	0	0.04264	0.07872	0.09184	0.05248	0.00984	-0.1509		-0.15088
39	0.01312	-0.0066	-0.0623	-0.04264	-0.0033	0.02952	0.082	0.0328	0.04264	0.01312	-0.1771		-0.17712
42	0.00328	0.01968	-0.0623	-0.0328	0	0.00656	0.05248	0.01968	0.00984	0.0492	-0.2001		-0.20008
45	-0.0328	-0.0328	-0.1148	-0.09184	-0.0787	-0.0426	0.00984	0	-0.0262	0.03608	-0.2821		-0.28208
48	0.00328	0.0328	-0.0558	-0.02624	-0.0164	0.01312	0.10496	0.03936	0.02296	0.07216	-0.2558		-0.25584
51	0.0164	0.01312	-0.023	0.02296	0.05576	0.06888	0.11808	0.09184	0.06888	0.05576	-0.2591		-0.25912
54	-0.0033	0.01312	-0.1017	-0.02952	0.0492	0.06232	0.08956	0.0656	0.02952	0.02624	-0.2493		-0.24928
57	0.0164	0.02624	-0.1214	-0.04592	0.0164	-0.0098	0.082	0.05576	0.02952	0.0164	-0.2427		-0.24272
60	0.01968	0.02952	-0.1246	-0.05248	-0.0164	0.00328	0.10168	0.03936	0.02296	0.01968	-0.2394		-0.23944
63	0.04264	0.05904	-0.0853	0.00328	0.03608	0.05576	0.16072	0.0656	0.07216	0.04264	-0.2089		-0.20892
66	0.20336	0.2624	0.13776	0.2132	0.23616	0.27224	0.33784	0.28208	0.28536	0.21976	-0.0131		-0.01312
69	0.05576	0.10168	0.00984	0.05248	0.0984	0.13776	0.2296	0.15088	0.19024	0.12136	-0.1279		-0.12792
72	-0.0033	0.00984	-0.0328	-0.01312	0.02624	0.0656	0.1804	0.09184	0.16072	0.13448	-0.1673		-0.16728
75	-0.0394	-0.023	-0.0558	-0.02624	-0.0098	0.00328	0.20008	0.0328	0.0656	0.07216	-0.2034		-0.20336
78	0.06888	0.07216		0.09184	0.05904	0.10824	0.246	0.15088		0.13448	0		0
Amount of Displacement from the original Baseline (ft)													TOTAL
SEDIMENTARY LANE 3													-3.66704
PROFILE 2 (Middle of Slope)													
Bike size = 250/2													

X VALUE	May 80 ->			August 90 ->			November 90 ->			March 91			GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUN	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUN	BASELINE		
3	0.21976	0.17384	0.1476							-0.0886	-0.105	-0.10498	
6	0.15744	0.10498	0.13776	-0.0492	-0.082			-0.0918	-0.0754	-0.1082	-0.2785	-0.27552	
9	0.11808	0.09512	0.09184	-0.0492	-0.1017			-0.0459	0.01988	-0.187	-0.2624	-0.2624	
12	0.18698	0.14104	0.13776	0	-0.0361	-0.0754		-0.0538	0.01988	-0.2558	-0.246	-0.25584	
15	0.15416	0.09184	0.12136	-0.02952	-0.0951	-0.0787		-0.0538	-0.0131	-0.2919	-0.2722	-0.29192	
18	0.08856	0.0656	0.09184	-0.04592	-0.0853	-0.0787		-0.105	-0.0428	-0.269	-0.2558	-0.26898	
21	0.09512	0.05576	0.06888	-0.03248	-0.0951	-0.082	-0.1476	-0.105	-0.0754	-0.2362	-0.2558	-0.25898	
24	0.08528	0.00984	0.03936	-0.07872	-0.1246	-0.0918	-0.16072	-0.1082	-0.1509	-0.2558	-0.2854	-0.28536	
27	0.11808	-0.0066	0.0164	-0.03608	-0.0886	-0.0754	-0.1312	-0.0886	-0.1115	-0.2362	-0.246	-0.246	
30	0.11808	0.0658	0.10824	-0.02298	-0.0951	-0.0853	-0.14104	-0.0658	-0.0787	-0.2198	-0.2329	-0.23288	
33	0.12792	0.082	0.07872	0	-0.0787	-0.0381	-0.10168	-0.059	-0.0856	-0.1607	-0.2382	-0.23616	
36	0.164	0.09512	0.09184	0.02952	0.00984	0.01988	-0.0984	-0.0459	-0.0722	-0.1804	-0.223	-0.22304	
39	0.1804	0.06888	0.14104	0.05904	0.00328	0.00984	-0.10498	-0.1279	-0.0295	-0.1802	-0.1988	-0.1988	
42	0.16072	0.07544	0.20992	0.0856	0.00856	-0.0033	-0.08528	-0.1181	-0.0787	-0.1873	-0.1708	-0.17056	
45	0.24272	0.13448	0.11152	0.08232	0.01312	-0.0098	-0.0984	-0.1017	-0.0394	-0.1509	-0.1574	-0.15744	
48	0.15744	0.11808	0.05904	-0.0328	-0.0754	-0.0823	-0.16072	-0.1673	-0.141	-0.2066	-0.2132	-0.2132	
51	0.16072	0.13776	0.04592	-0.03936	-0.0984	-0.1115	-0.19352	-0.1738	-0.1378	-0.1902	-0.2099	-0.20992	
54	0.17384	0.10168	0.0856	-0.082	-0.1574	-0.141	-0.27224	-0.223	-0.1706	-0.2099	-0.2099	-0.27224	
57	0.13776	0.02952	0.0856	-0.1148	-0.1607	-0.1476	-0.2788	-0.2528	-0.1804	-0.2528	-0.2283	-0.2788	
60	0.17056	0.35424	0.082	-0.08528	-0.1246	-0.1214	-0.22304	-0.1542	-0.1378	-0.1935	-0.2788	-0.2788	
63	0.12792	0.04264	0.01988	-0.07216	-0.1443	-0.1542	-0.23288	-0.1988	-0.1673	-0.2165	-0.2558	-0.25584	
66	0.15744	0.12792	0.07872	-0.10824	-0.1443	-0.1115	-0.21648	-0.1902	-0.2088	-0.2427	-0.2198	-0.21978	
69	0.23288	0.12464	0.10168	-0.07872	-0.1017	-0.0918	-0.15744	-0.1708	-0.2165	-0.2132	-0.2132	-0.21648	
72	0.26588	0.13448	0.07872	-0.02298	-0.0492	-0.0428	-0.13448	-0.1607	-0.1161	-0.2066	-0.1708	-0.20664	
75	0.20864	0.15088	0.05576	-0.03608	-0.0951	-0.023	-0.1476	-0.1708	-0.1673	-0.164	-0.1804	-0.1804	
78	0.17712	0.05904	0.06888	-0.06888	-0.0984	-0.0428	-0.20008	-0.1804	-0.2034	-0.2132	-0.223	-0.22304	
81	0.24272	0.13776	0.05248	-0.0656	-0.0886	-0.0525	-0.20864	-0.1837	-0.1607	-0.1771	-0.2362	-0.23616	
84	0.20336	0.1478	0.12484	-0.03608	-0.0787	-0.0328	-0.20008	-0.1708	-0.1738	-0.1607	-0.2296	-0.2296	
87	0.17384	0.1148	0.17712	0.00984	-0.0197	0.0164	-0.18698	-0.1509	-0.0856	-0.0918	-0.18698	-0.18698	
90	0.19024	0.15088	0.2132	0.02952	-0.0033	0.00328	-0.18368	-0.2034	-0.1607	-0.1279	-0.20336	-0.20336	
93	0.1988	0.09512	0.23616	0.05904	0.02296	0.02952	-0.15416	-0.1771	-0.0951			-0.17712	
Amount of Displacement from the original Baseline (ft)													
							SEDIMENTARY LANE 3	Bike size = 250/2			TOTAL	-7.052	
PROFILE 3 (Bottom of Slope)													

X VALUE	May 90				August 90				November 90				March 91				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	
3	0.05248	0.04264	-0.05904														-0.05904
6	0.164	0.03608	-0.05904														-0.05904
9	0.09184	-0.03608	-0.08528														-0.08528
12	0.05248	-0.04264	-0.07872		0.00856												-0.07872
15	0.04264	-0.07216	-0.12464	-0.00856	-0.01312												-0.12464
18	0.0656	-0.0656	-0.12464	-0.0328	-0.05576												-0.12464
21	0.06232	-0.05904	-0.12136	-0.0164	-0.0656	-0.01868											-0.12136
24	0.10824	-0.08232	-0.10168	-0.02286	-0.00856	-0.04264											-0.10168
27	0.07872	-0.10168	-0.10496	-0.09512	-0.07872	-0.08528											-0.10496
30	0.09512	-0.07544	-0.10168	-0.082	-0.09512	-0.082											-0.10168
33	0.08528	-0.05576	-0.12136	-0.07216	-0.09512	-0.05904											-0.1312
36	0.08528	-0.12792	-0.15744	-0.12136	-0.12464	-0.12792											-0.17712
39	0.07216	-0.12792	-0.14432	-0.15416	-0.13448	-0.18088											-0.1804
42	0.08528	-0.12792	-0.11152	-0.15416	-0.12464	-0.1312											-0.15416
45	0.13448	-0.0984	-0.11152	-0.12464	-0.09512	-0.11152											-0.15744
48	0.10496	-0.12464	-0.13448	-0.15416	-0.12464	-0.14432											-0.17384
51	0.10824	-0.164	-0.1968	-0.18368	-0.15088	-0.15416											-0.20864
54	0.12136	-0.164	-0.1804	-0.20992	-0.1804	-0.18688											-0.20992
57	0.14104	-0.17056	-0.164	-0.17712	-0.1476	-0.16728											-0.21848
60	0.16072	-0.12792	-0.15088	-0.1476	-0.10496	-0.12136											-0.15088
63	0.12136	-0.16728	-0.19352	-0.18368	-0.14432	-0.164											-0.19352
66	0.13776	-0.17056	-0.19352	-0.16072	-0.12464	-0.14104											-0.20008
69	0.082	-0.20892	-0.20864	-0.19352	-0.164	-0.18688											-0.20892
72	0.08856	-0.17712	-0.22632	-0.17384	-0.13776	-0.17712											-0.22632
75	0.1804	-0.18352	-0.18688	-0.15744	-0.1148	-0.13448											-0.19352
78	0.18696	-0.21976	-0.21848		-0.12792												-0.21976
81	0.14432	-0.23844	-0.246		-0.17384												-0.246
Amount of Displacement from the original Baseline (ft)																	
SEDIMENTARY LANE 4																	
PROFILE 1 (Top of Slope)																	
Bike size = <250cc																	
TOTAL																	-4.20824

X VALUE	May 90 ->				August 90 ->				November 90 ->				March 91				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	
3	-0.00984	0.05904	0.06888		0.00984	0.02952			0.00328	-0.00328	0.02298		0				-0.00864
6	-0.02624	-0.04592	-0.00856		0.00856	-0.01312			0.00856	-0.01312			0.00856				-0.04592
9	-0.00984	0.0328	0	-0.00984	-0.00328	-0.0492			-0.00328	-0.0492			0.0328				-0.0492
12	-0.06232	0.04592	0.03936	-0.0164	-0.04264	-0.05576			-0.04264	-0.05576			0				-0.06232
15	-0.02298	0.05576	0.05576	0.00856	0.02624	-0.0328			0.00856	-0.0328	0.00656		-0.01312				-0.0328
18	-0.05782	0.04264	0.0164	0.01988	-0.0164	-0.0328			-0.0164	-0.0328	0.02298		-0.03936				-0.07872
21	-0.05576	0.0328	0.00856	-0.02298	-0.03608	-0.03936			0.00856	-0.03936	0.0328		-0.0328				-0.05576
24	-0.09512	-0.00656	-0.0164	-0.03608	-0.05248	-0.04592			-0.00328	-0.04592	0.0328		-0.03936				-0.09512
27	-0.04264	0.03936	0.00984	-0.02624	-0.06232	-0.082			-0.02952	-0.01312	-0.0656		-0.0492				-0.082
30	-0.01312	0.01988	-0.02624	-0.00328	-0.0656	-0.09512			-0.02624	-0.0164	-0.082		-0.04264				-0.09512
33	-0.08528	0.0328	-0.00328	-0.01988	-0.10496	-0.13448			-0.04592	-0.0984	-0.03936		-0.0856				-0.13448
36	-0.0492	0.08232	0.02624	-0.00984	-0.07544	-0.09512			-0.0164	-0.00328	-0.09512		-0.05904				-0.09512
39	-0.08528	0.02624	0.00328	-0.04592	-0.10496	-0.15088			-0.06232	-0.04592	-0.12792		-0.1312				-0.15088
42	-0.03608	0.0328	-0.03608	-0.01988	-0.07872	-0.12136			-0.05904	-0.03608	-0.07544		-0.082				-0.12136
45	-0.05904	0.05576	0.03608	0.00856	-0.0492	-0.09184			-0.0492	-0.09184	-0.08888		-0.03608				-0.09184
48	-0.0492	0.04592	0.00328	0.04264	-0.05904	-0.11808			-0.02298	0.00984	-0.07544		-0.02298				-0.11808
51	-0.07872	0.01312	0.00328	-0.01988	-0.11808	-0.1476			-0.05904	-0.02952	-0.1148		-0.07216				-0.1476
54	-0.07872	0.0328	-0.00856	0.00328	-0.1148	-0.14432			-0.03936	0.00328	-0.1148		-0.01988				-0.14432
57	0.0856	0.05248	0.00328	0.0328	-0.04264	-0.12792			-0.00856	0.02624	-0.08888		-0.0164				-0.12792
60	-0.0492	0.05248	0.01312	0.02952	-0.05904	-0.15416			-0.00856	-0.10168	0.03608		-0.02952				-0.15416
63	-0.07544	0.02952	0.00984	0.06232	-0.0492	-0.12464			0.00328	1.14E-19	0.02298		-0.02952				-0.12464
66	-0.1312	0.0328	0.00328	0.0856	-0.04264	-0.0984			-0.00328	0.0164	-0.08856		-0.02952				-0.1312
69	-0.15744	0.02298	-0.00656	0.07544	-0.07216	-0.11808			-0.0328	0.00984	-0.11808		-0.0164				-0.15744
72	-0.15744	-0.00328	-0.07544	0.06232	-0.08528	-0.1476			-0.01312	0.01312	-0.13778		-0.02298				-0.15744
75	-0.11152	0.0328	-1.1E-19	0.07872	-0.03936	-0.11152			-0.01312	0.07544	-0.07544		0.0164				-0.11152
78	-0.11152	0.01988	-0.00328	0.15744	-0.05248	-0.14432					-0.05904		-1.1E-19				-0.14432
81	-0.08856	0.08856	0.00984		-0.02624	-0.11152							0.01312				-0.11152
																	-2.83064

Amount of Displacement from the original Baseline (ft)

SEDIMENTARY LANE 4

Bike size = <250cc

PROFILE 2 (Middle of Slope)

TOTAL

X VALUE	May 90 ->				August 90 ->				November 90 ->				March 91				GREATEST DISPLACEMENT
	25 RUNS	50 RUNS	100 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	BASELINE	25 RUNS	50 RUNS	100 RUNS	BASELINE	50 RUNS	100 RUNS	
3	0.15088	0.15088	0.0984														0
6	0.19024	0.17712	0.14104	0.16728	0.1476	0.15416	0.12792	0.0984	0.1804	0.15088	0.0984	0.1804	0.15088	0.17056	0.1804	0.15088	0
9	0.14432	0.18368	0.09512	0.13448	0.1312	0.092	0.08512	0.13448	0.17384	0.17384	0.08512	0.17384	0.14104	0.13776	0.17384	0.14104	0
12	0.17056	0.15088	0.082	0.14432	0.14104	0.13448	0.09184	0.12464	0.15088	0.15088	0.09184	0.15088	0.14104	0.164	0.15088	0.14104	0
15	0.15744	0.16072	0.0492	0.14104	0.10496	0.10496	0.05248	0.13448	0.15416	0.15416	0.05248	0.15416	0.15744	0.19024	0.15416	0.15744	0
18	0.23944	0.11808	0.06888	0.10496	0.10168	0.10168	0.05904	0.10496	0.14432	0.14432	0.05904	0.14432	0.12136	0.20336	0.12136	0.20336	0
21	0.21976	0.21648	0.07544	0.09184	0.11148	0.11152	0.0856	0.0984	0.15416	0.15416	0.0856	0.15416	0.10824	0.23944	0.10824	0.23944	0
24	0.22304	0.20336	0.09184	0.12792	0.11152	0.12464	0.07872	0.12792	0.20864	0.20864	0.07872	0.20864	0.14104	0.22304	0.14104	0.22304	0
27	0.17384	0.17384	0.05904	0.07216	0.09184	0.09184	0.02952	0.0656	0.12792	0.12792	0.02952	0.12792	0.08528	0.14104	0.08528	0.14104	0
30	0.13448	0.13776	0.0184	0.06232	0.0856	0.07544	0.05576	0.0656	0.082	0.082	0.05576	0.082	0.05904	0.08528	0.05904	0.08528	0
33	0.18368	0.21648	0.09184	0.13448	0.12464	0.14104	0.10496	0.11808	0.15416	0.15416	0.10496	0.15416	0.15416	0.14432	0.15416	0.14432	0
36	0.24928	0.24272	0.15416	0.16072	0.17712	0.1804	0.10496	0.164	0.2132	0.2132	0.10496	0.2132	0.19352	0.18368	0.19352	0.18368	0
39	0.24928	0.246	0.15744	0.17384	0.17056	0.17712	0.10496	0.17384	0.1868	0.1868	0.17384	0.1868	0.1868	0.17384	0.1868	0.1868	0
42	0.20864	0.22304	0.12464	0.164	0.15416	0.17384	0.09184	0.1476	0.23288	0.23288	0.09184	0.23288	0.20864	0.20864	0.20864	0.20864	0
45	0.2624	0.25912	0.164	0.18696	0.18696	0.17056	0.1148	0.1804	0.21648	0.21648	0.1148	0.21648	0.10168	0.25256	0.10168	0.25256	0
48	0.22304	0.27224	0.1476	0.16072	0.18368	0.15744	0.09512	0.16072	0.1968	0.1968	0.09512	0.1968	0.15744	0.2952	0.15744	0.2952	0
51	0.2788	0.30832	0.17056	0.23288	0.23944	0.23616	0.17712	0.246	0.29192	0.29192	0.17712	0.29192	0.1968	0.36736	0.1968	0.36736	0
54	0.29848	0.33456	0.2132	0.246	0.23616	0.23616	0.1968	0.246	0.29848	0.29848	0.1968	0.29848	0.22632	0.35752	0.22632	0.35752	0
57	0.28864	0.31816	0.19024	0.22304	0.20992	0.23944	0.21648	0.2296	0.28536	0.28536	0.21648	0.28536	0.25584	0.3116	0.25584	0.3116	0
60	0.2788	0.28536	0.16072	0.23616	0.26208	0.24928	0.20992	0.25584	0.28864	0.28864	0.20992	0.28864	0.23944	0.37084	0.23944	0.37084	0
63	0.2788	0.28536	0.16072	0.23616	0.26208	0.24928	0.20992	0.25584	0.28864	0.28864	0.20992	0.28864	0.23944	0.37084	0.23944	0.37084	0
66	0.28536	0.36736	0.21976	0.28192	0.30504	0.30504	0.25256	0.2788	0.33128	0.33128	0.25256	0.33128	0.246	0.36408	0.246	0.36408	0
69	0.27552	0.33128	0.18696	0.26568	0.2952	0.27224	0.21648	0.26568	0.30504	0.30504	0.21648	0.30504	0.21976	0.328	0.21976	0.328	0
72	0.25912	0.28208	0.09512	0.25256	0.28208	0.25912	0.17712	0.24928	0.27224	0.27224	0.17712	0.24928	0.17056	0.34112	0.17056	0.34112	0
75	0.30176	0.24928	0.15416	0.2788	0.30176	0.28896		0.26568	0.31468	0.31468		0.31468	0.22304	0.33784	0.22304	0.33784	0
78	0.35424	0.39032	0.23944	0.33456	0.36736	0.32472			0.35096	0.35096		0.35096	0.26896	0.3444	0.26896	0.3444	0
81	0.34112	0.41	0.22632	0.37392	0.39032	0.33456							0.29848	0.42312	0.29848	0.42312	0
Amount of Displacement from the original Baseline (ft)																	0
SEDIMENTARY LANE 4																	0
Bike size = <250cc																	0
PROFILE 3 (Bottom of Slope)																	0
TOTAL																	0

APPENDIX B - SOIL DISPLACEMENT PROFILES***EXPLANATION***

The data points labeled "Greatest Displacement" on the enclosed graphs are listed in the column labeled "Greatest Displacement" on the respective tables in Appendix A. Data points representing the greatest displacement of soil at each measuring point along each microprofile were plotted. This graphical representation of each microprofile shows the trail produced by the motorcycles during this study at a given location (profile) along the slope.

SEDIMENTARY LANE 1 PROFILE 1

SEDIMENTARY

LANE 1 PROFILE 2

SEDIMENTARY

LANE 1 PROFILE 3

SEDIMENTARY

LANE 2 PROFILE 1

SEDIMENTARY

LANE 2 PROFILE 2

SEDIMENTARY LANE 2 PROFILE 3

SEDIMENTARY LANE 3 PROFILE 1

SEDIMENTARY LANE 3 PROFILE 2

SEDIMENTARY

LANE 3 PROFILE 3

SEDIMENTARY LANE 4 PROFILE 1

SEDIMENTARY **LANE 4 PROFILE 2**

SEDIMENTARY

LANE 4 PROFILE 3

—■— Greatest Displacement

GRANITE

LANE 1 PROFILE 1

GRANITE LANE 1 PROFILE 2

GRANITE LANE 1 PROFILE 3

GRANITE LANE 2 PROFILE 1

GRANITE

LANE 2 PROFILE 2

GRANITE LANE 2 PROFILE 3

GRANITE LANE 3 PROFILE 1

GRANITE

LANE 3 PROFILE 3

GRANITE LANE 4 PROFILE 2

GRANITE LANE 4 PROFILE 3