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1988 Stream Channel Evaluation Hotophia Creek Demonstration Erosion Control Project

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December 11, 1990

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One of our obligations as a collaborator in the DEC Project is assess channel bed and bank stability conditions and the performance of remedial measures in the original DEC watersheds.

In an earlier report (TAP Report No. 9), we described the hydrologic related variables in Hotophia Creek Watershed (slope and aspect topography, hydrologic soil class, and land use) and their spatial distribution organized with a Geographic Information System (GIS).

This report continues the evaluation of Hotophia Creek watershed. It presents the results of our survey team that physically measures channel dimensions, assesses channel stability and locates erosion control structures.

We hope this report will be useful to you and your staffs. Please contact me with any suggestions to make our reports more useful. If personal contact with authors is desired, please call them at 601-232-2900.

Enclosures

cc:
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1988 Stream Channel Evaluation
Hotophia Creek
Demonstration Erosion Control Project

Submitted to the DEC Task Force

by

E. H. Grissinger, R. W. Darden, and W. A. Blackmarr

National Sedimentation Laboratory

Agricultural Research Service

United States Department of Agriculture

1988 Stream Channel Evaluation, Hotophia Creek Demonstration Erosion Control Project [1] [2]

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[2]Report submitted to Demonstration Erosion Control Task Force

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Abstract

Reconnaissance of channel stability conditions and of the performance of installed remedial measures on Hotophia Creek and major tributaries was completed during June and July, 1988. Variables evaluated every 100 feet of channel length include the condition of bank vegetation, bed material type, bank stability status, and condition of existing bank protection measures. In addition, channel top width, bottom width, and depth were estimated every 500 feet of channel length. For the 90,500 feet of channel evaluated, almost 19.5% of the banks were judged to be unstable to some degree. A total of 10,800 feet of channel banks were judged to be undergoing severe bank failure and 24,400 were judged to be undergoing moderate failure. Most of this bank instability occurred at two reaches, from about 29,000 to 39,000 and from about 49,000 to 59,000 feet channel distance (including lower reaches of confluent tributaries).

Introduction

Background

The Demonstration Erosion Control (DEC) Project in the Yazoo Basin was proposed by the U. S. Congress in 1984 in response to continuing sedimentation problems. The DEC project was organized as an interagency effort to combine technology and resources of research and action agencies, producing a watershed system approach for better land and water resource management.

Congress directed the U. S. Army Corps of Engineers and the USDA Soil Conservation Service to develop six demonstration watersheds where systematic watershed and flood control programs could be developed. Other research or service agencies, including the Agricultural Research Service, U. S. Army

Engineers Waterways Experiment Station and the U. S. Geological Survey, were requested to participate in the project in various capacities. One of the ways the USDA-ARS National Sedimentation Laboratory is participating in DEC is by documenting system properties and conditions, evaluating the efficiency of specific watershed management practices and structural measures, and documenting project progress.

Report Purpose

Specific problems identified and prioritized in each of the DEC watersheds included:

1. Erosion of hill lands,

2. Bank erosion and caving,

3. Channel filling and obstruction,

4. Sedimentation of agricultural lands,

5. Agricultural and urban land flooding.

Obviously, these individual problems are differing expressions of a singular (watershed) system involving runoff, erosion, and sediment transport. The purpose of this report is to document channel stability conditions and evaluations of existing bank protection measures as spatial elements within the total watershed system. To accomplish this spatial integrity, all field data for channel characterizations and evaluations of existing remedial measures are

organized in a Geographic Information System (GIS) and are geo-referenced to the same spatial coordinates as the watershed characterization data. The watershed data has been reported separately.

We solicit feedback from action agency personnel concerning specific needs not fully satisfied in this initial report. In particular, we need recommendations from action agency personnel concerning the types and range of descriptive information for individual remedial measures. Guidance would be appreciated concerning where necessary information and data could be obtained.

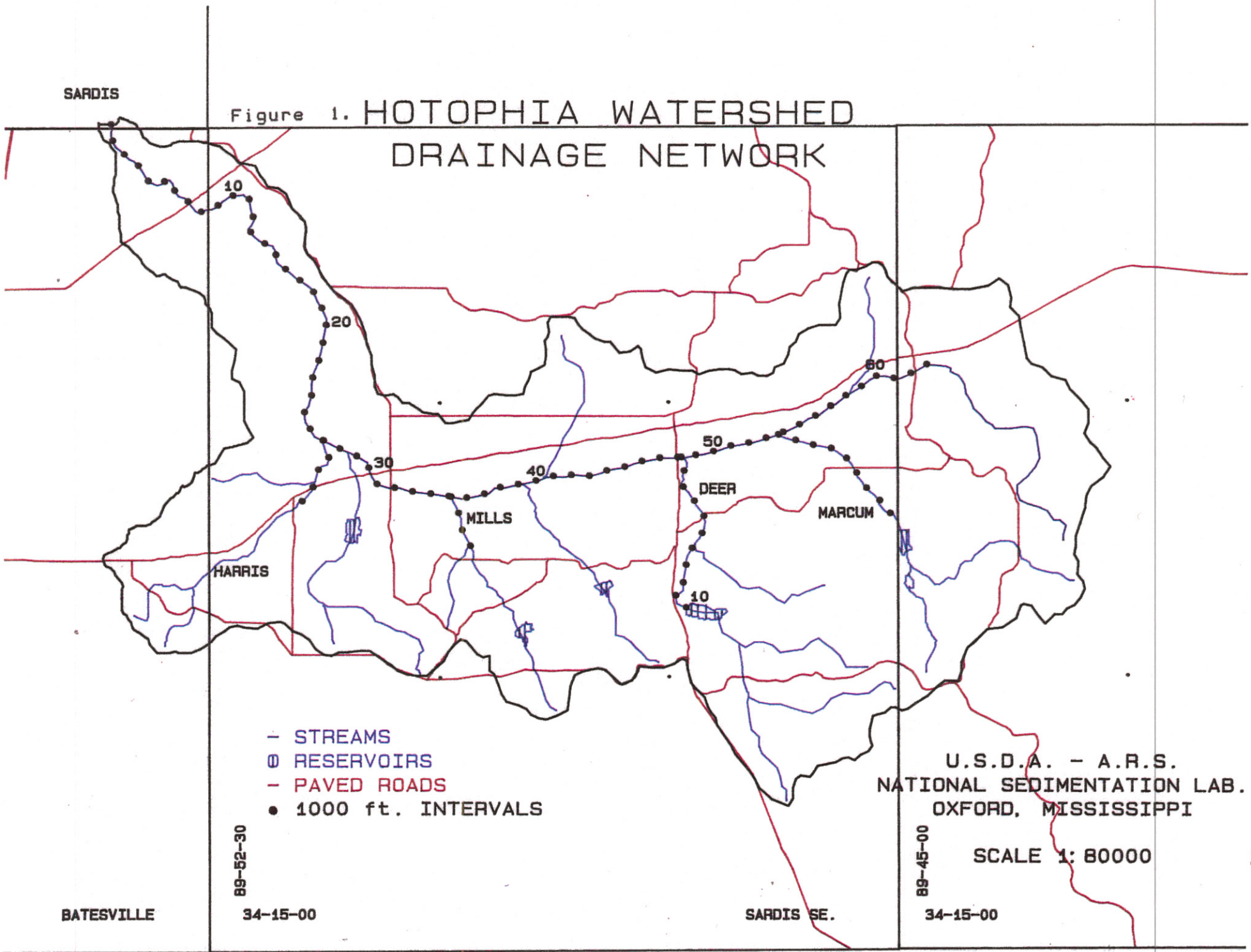
Procedures

A field data sheet is shown in Appendix I. The Station No. is the channel distance in thousands of feet. The Station No. along with other physical features are shown on Figure 1. Channel top width, bottom width, and depth are estimated every 500 feet and all other variables are indexed every 100 feet. The symbolism is generally self-explanatory. Bed material C S G stands for clay, sand, or gravel and bed status R H O C stands for rock bed controls, headcuts, obstructions, and chutes, respectively. The bank stability status classification refers to the envisioned degree of instability. Either "moderate" or "severe" bank instability coupled with raw banks (classified under bank vegetation) indicates continuous instability, whereas scattered sites of bank instability interspersed with vegetated banks are classified as "light."

Results

Results of the 1988 field investigations are included as Appendixes II through VI for the trunk channel of Hotophia and for Deer, Harris, Marcum, and Mills

Figure 1. HOTOPHIA WATERSHED DRAINAGE NETWORK



Creek tributaries. For each of these appendixes, Part A identifies channel conditions, Part B identifies bank conditions, Part C the installed protective measures, and Part D the bed material size class. In these appendixes (II through VI) Parts B, C, and D, channel locations are identified in 1000 feet increments by row and 100 feet increments by column. For bank vegetation (Part B) and bed material (Part D), a unique numerical code has been assigned for each attribute. Multiple attributes are identified by addition of these codes. For example, combinations of large trees (Code 1), brush (Code 2), and kudzu/grass (Code 4) are identified as Code 7. Evaluation summaries for these same channels are presented in Tables 1 through 5, respectively. For these summaries, the measurement units are total length in feet of each channel attribute except for the drop-pipe and low drop structure units which are the number of installed measures. The spatial distribution of bank vegetation and of bed material type are shown in Figures 2 and 3 respectively. Locations of existing bank protection measures are presented in Figure 4. Descriptive information about these measures is scant to totally unknown. Low drop structures are located in Figure 5, and are described in Appendix VII. At the time of this reconnaissance, low drop #4 (old #1) was buried by a long sand wave. The baffle plate and the throat of the drop were both buried. Locations of light, moderate, and severe bank instability are presented in Figure 6. Figures 7 through 10 show the estimated channel bottom widths, top widths, depths, and slopes for Hotophia Creek including tributaries. Please note that these are estimates and the values should not be considered otherwise. In particular, the slope estimates are constrained by the analytical procedures, and they should be considered relative in nature rather than absolute.

The high degree of variability of the slope values, Figure 10, is thought to be an artifact of the lack of precision in the Digital Elevation Models (DEM)

TABLE 1. HOTOPHIA CREEK CHANNEL EVALUATION SUMMARY

CHANNEL LENGTH EVALUATED = 62600 FEET

UNSTABLE BANKS [1]	LEFT	RIGHT
LIGHT	0	0
MODERATE	3900	3500
SEVERE	4500	3800

BANK VEGETATION [1]	LEFT	RIGHT
LG TREES	42200	42900
BRUSH	58900	59800
KUDZU/ GRASS	44700	44200

RAW BANKS [1]	
LEFT	5600
RIGHT	3100
BOTH	400

RIPRAP [1]	FULL	PARTIAL
LEFT	1500	3600
RIGHT	1600	3700
BOTH	1400	0

GROINS [1]	
LEFT	3500
RIGHT	900
BOTH	0

JACKS [1]	
LEFT	300
RIGHT	1000
BOTH	100

FENCE [1]	
LEFT	0
RIGHT	0
BOTH	0

DROP-PIPE [2]	
LEFT	22
RIGHT	20
BOTH	0

LOW DROP STRUCTURES [2]	
TOTAL	8

BED MATERIAL [1]	
CLAY	10100
SAND	62400
GRAVEL	100

[1] Measurement units are feet of bank per condition.

[2] Measurement units are numbers of installed measures.

TABLE 2. DEER CREEK CHANNEL EVALUATION SUMMARY

CHANNEL LENGTH EVALUATED = 10100 FEET

UNSTABLE BANKS[1]	LEFT	RIGHT
LIGHT	0	0
MODERATE	1800	2100
SEVERE	300	0

BANK VEGETATION[1]	LEFT	RIGHT
LG TREES	10100	10100
BRUSH	10100	10100
KUDZU/ GRASS	0	0

RAW BANKS[1]	
LEFT	300
RIGHT	0
BOTH	0

RIPRAP[1]	FULL	PARTIAL
LEFT	0	0
RIGHT	0	0
BOTH	0	0

GROINS[1]	
LEFT	0
RIGHT	0
BOTH	0

JACKS[1]	
LEFT	0
RIGHT	0
BOTH	0

FENCE[1]	
LEFT	0
RIGHT	0
BOTH	0

DROP-PIPE[2]	
LEFT	0
RIGHT	2
BOTH	0

LOW DROP STRUCTURES[2]	
TOTAL	0

BED MATERIAL[1]	
CLAY	2900
SAND	9900
GRAVEL	0

[1] Measurement units are feet of bank per condition.

[2] Measurement units are numbers of installed measures.

TABLE 3. HARRIS CREEK CHANNEL EVALUATION SUMMARY

CHANNEL LENGTH EVALUATED = 4600 FEET

UNSTABLE BANKS[1]	LEFT	RIGHT
LIGHT	0	0
MODERATE	2500	2200
SEVERE	500	300

BANK VEGETATION[1]	LEFT	RIGHT
LG TREES	3000	3000
BRUSH	3000	3000
KUDZU/ GRASS	0	0

RAW BANKS[1]	
LEFT	600
RIGHT	300
BOTH	0

RIPRAP[1]	FULL	PARTIAL
LEFT	0	800
RIGHT	800	0
BOTH	800	0

GROINS[1]	
LEFT	600
RIGHT	0
BOTH	0

JACKS[1]	
LEFT	0
RIGHT	0
BOTH	0

FENCE[1]	
LEFT	0
RIGHT	0
BOTH	0

DROP-PIPE[2]	
LEFT	1
RIGHT	0
BOTH	0

LOW DROP STRUCTURES[2]	
TOTAL	0

BED MATERIAL[1]

CLAY	4400
SAND	4600
GRAVEL	4600

[1] Measurement units are feet of bank per condition.

[2] Measurement units are numbers of installed measures.

TABLE 4. MARCUM CREEK CHANNEL EVALUATION SUMMARY

CHANNEL LENGTH EVALUATED = 9100 FEET

UNSTABLE BANKS [1]	LEFT	RIGHT
LIGHT	0	0
MODERATE	3600	4800
SEVERE	1200	0

BANK VEGETATION [1]	LEFT	RIGHT
LG TREES	6700	6700
BRUSH	8900	8900
KUDZU/ GRASS	0	0

RAW BANKS [1]	
LEFT	1900
RIGHT	0
BOTH	800

RIPRAP [1]	FULL	PARTIAL
LEFT	0	0
RIGHT	100	0
BOTH	200	0

GROINS [1]	
LEFT	0
RIGHT	0
BOTH	0

JACKS [1]	
LEFT	0
RIGHT	0
BOTH	0

FENCE [1]	
LEFT	0
RIGHT	0
BOTH	100

DROP-PIPE [2]	
LEFT	2
RIGHT	1
BOTH	0

LOW DROP STRUCTURES [2]	
TOTAL	1

BED MATERIAL [1]	
CLAY	9100
SAND	300
GRAVEL	0

[1] Measurement units are feet of bank per condition.

[2] Measurement units are numbers of installed measures.

TABLE 5. MILLS CREEK CHANNEL EVALUATION SUMMARY

CHANNEL LENGTH EVALUATED = 4100 FEET

UNSTABLE BANKS [1]	LEFT	RIGHT
LIGHT	0	0
MODERATE	0	0
SEVERE	200	0

BANK VEGETATION [1]	LEFT	RIGHT
LG TREES	700	700
BRUSH	4100	4100
KUDZU/ GRASS	4100	4100

RAW BANKS [1]	
LEFT	200
RIGHT	0
BOTH	0

RIPRAP [1]	FULL	PARTIAL
LEFT	0	0
RIGHT	0	0
BOTH	0	0

GROINS [1]	
LEFT	0
RIGHT	0
BOTH	0

JACKS [1]	
LEFT	0
RIGHT	0
BOTH	0

FENCE [1]	
LEFT	0
RIGHT	0
BOTH	0

DROP-PIPE [2]	
LEFT	1
RIGHT	0
BOTH	0

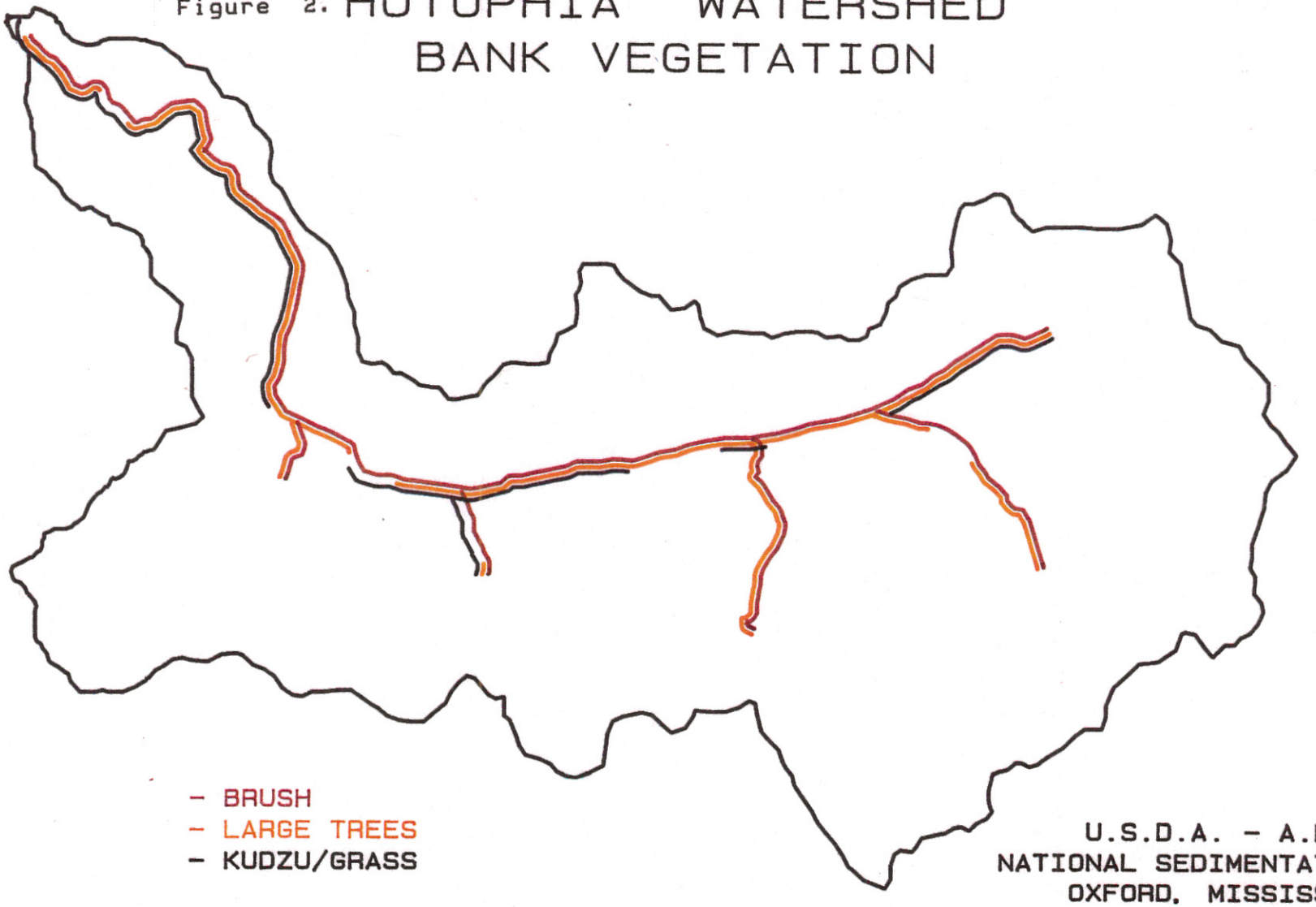
LOW DROP STRUCTURES [2]	
TOTAL	0

BED MATERIAL [1]	
CLAY	400
SAND	4100
GRAVEL	3800

[1] Measurement units are feet of bank per condition.

[2] Measurement units are numbers of installed measures.

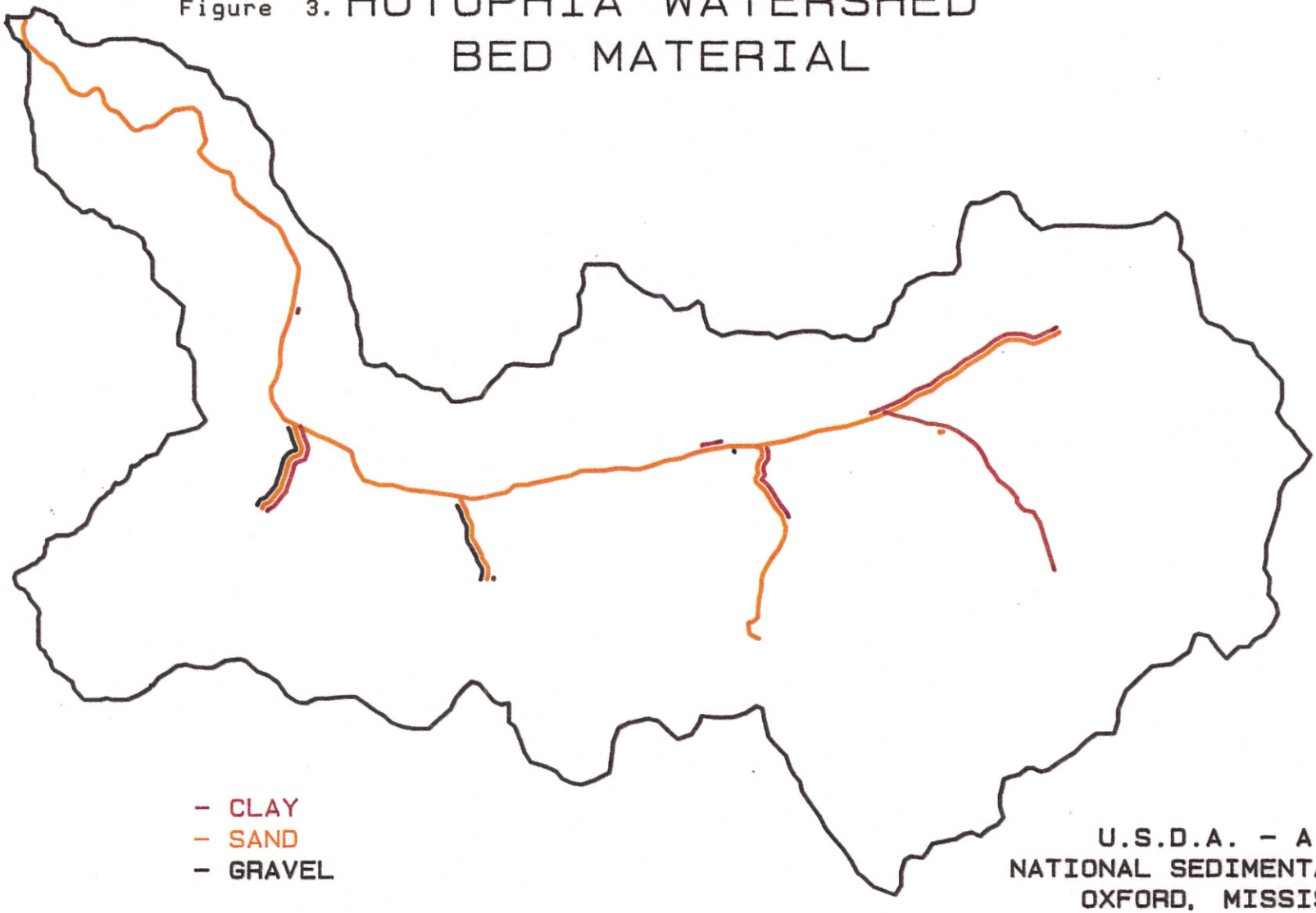
Figure 2. HOTOPHIA WATERSHED
BANK VEGETATION



U.S.D.A. - A.R.S.
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SCALE 1: 80000

Figure 3. HOTOPHIA WATERSHED
BED MATERIAL



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OXFORD, MISSISSIPPI

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Figure 4. HOTOPHIA WATERSHED
BANK PROTECTION

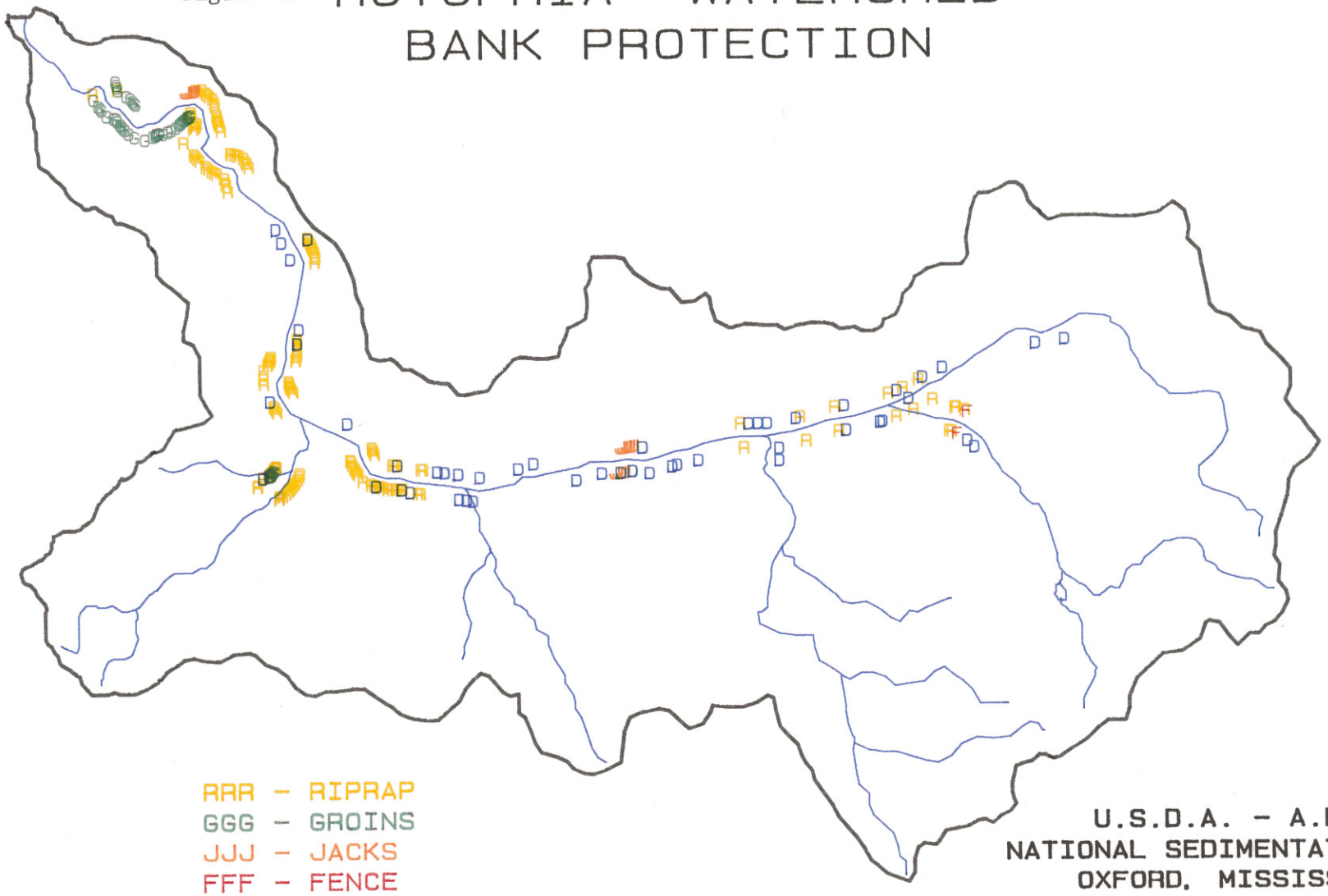
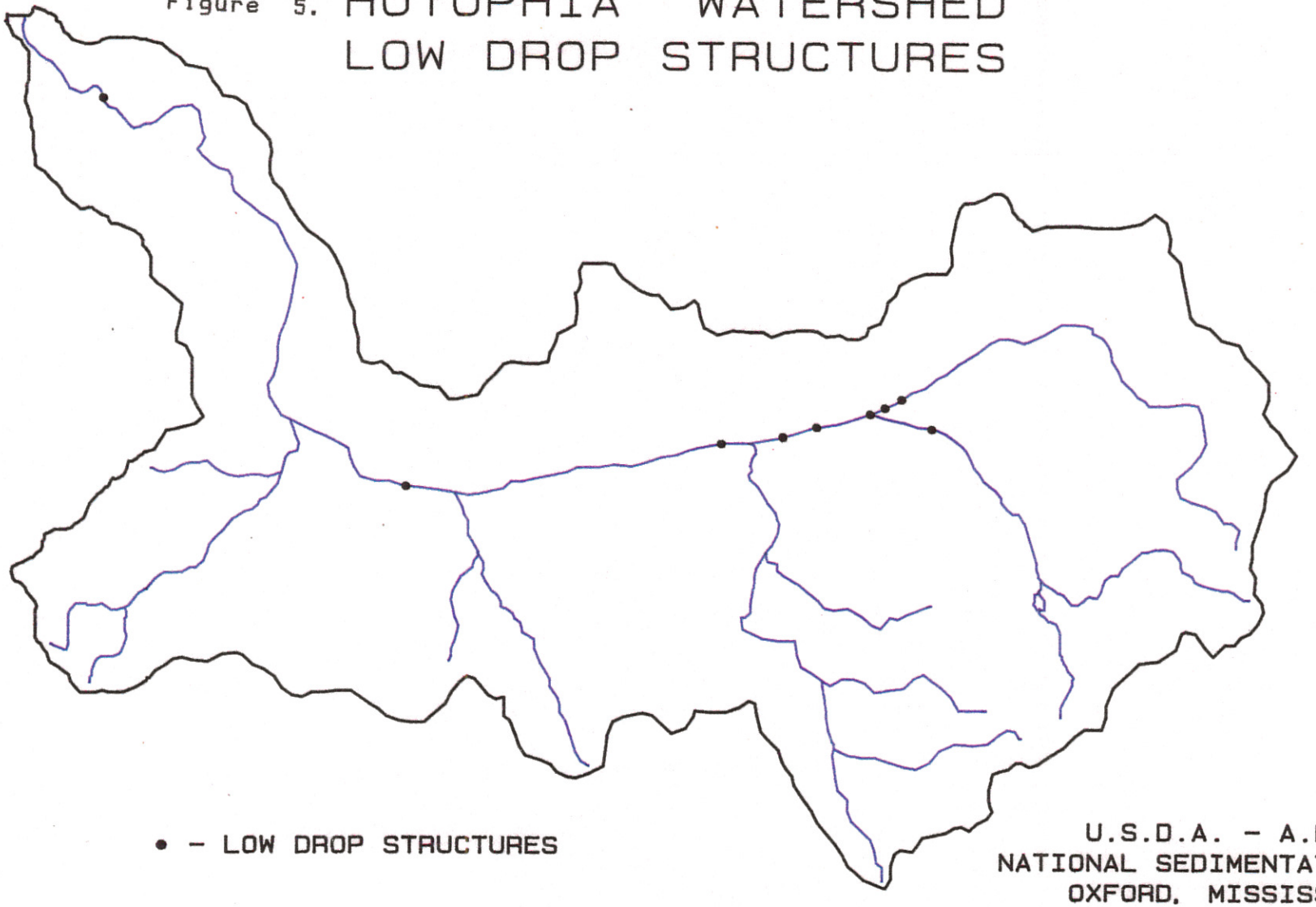


Figure 5. HOTOPHIA WATERSHED
LOW DROP STRUCTURES



• - LOW DROP STRUCTURES

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OXFORD, MISSISSIPPI

SCALE 1: 80000

Figure 6.

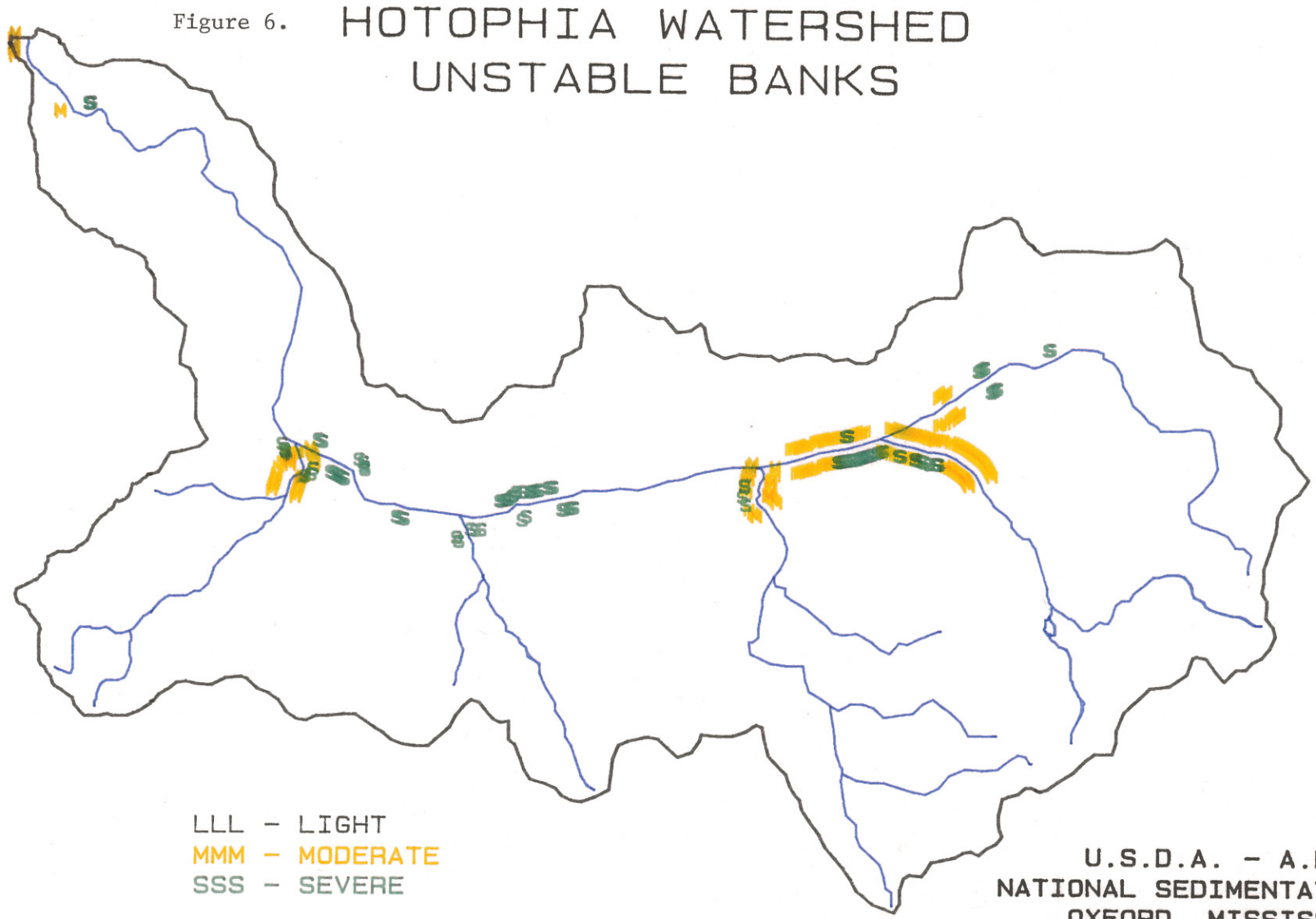

HOTOPHIA WATERSHED
UNSTABLE BANKS
LLL - LIGHT
MMM - MODERATE
SSS - SEVERE
U.S.D.A. - A.R.S.
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SCALE 1: 80000

Figure 7. HOTOPHIA WATERSHED
CHANNEL BOTTOM WIDTH

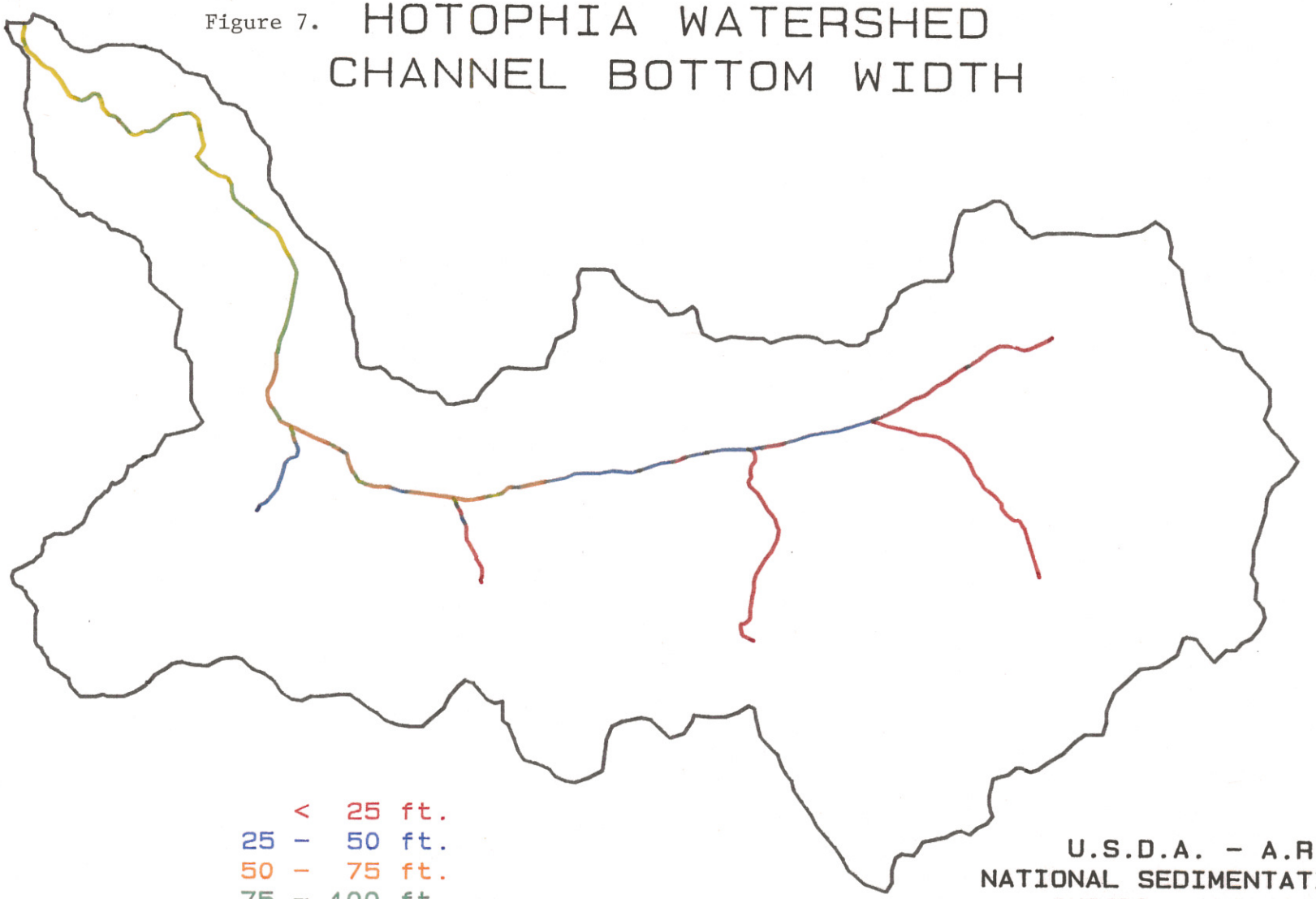


Figure 8. HOTOPHIA WATERSHED
CHANNEL TOP WIDTH

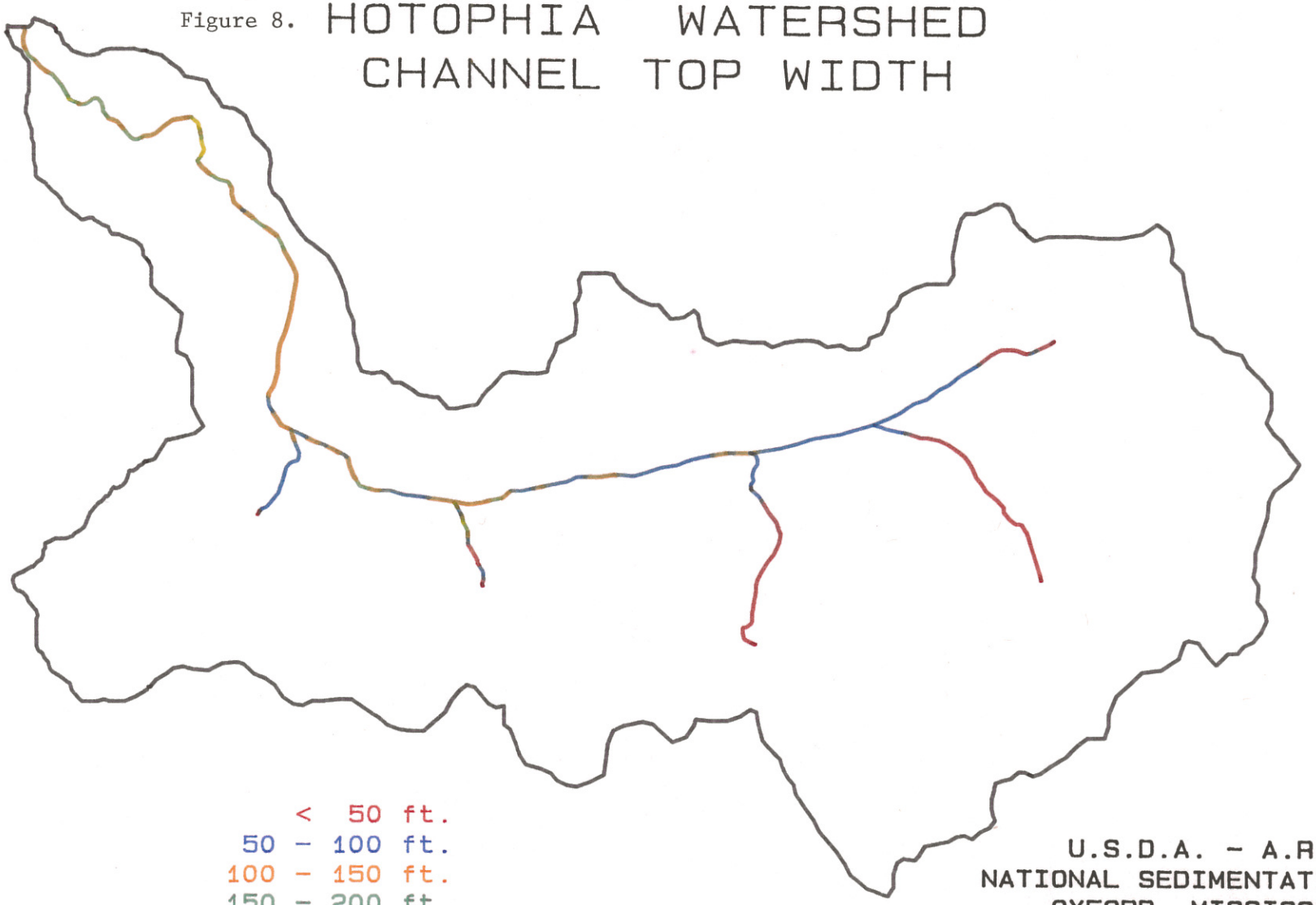


Figure 9. HOTOPHIA WATERSHED
CHANNEL DEPTH

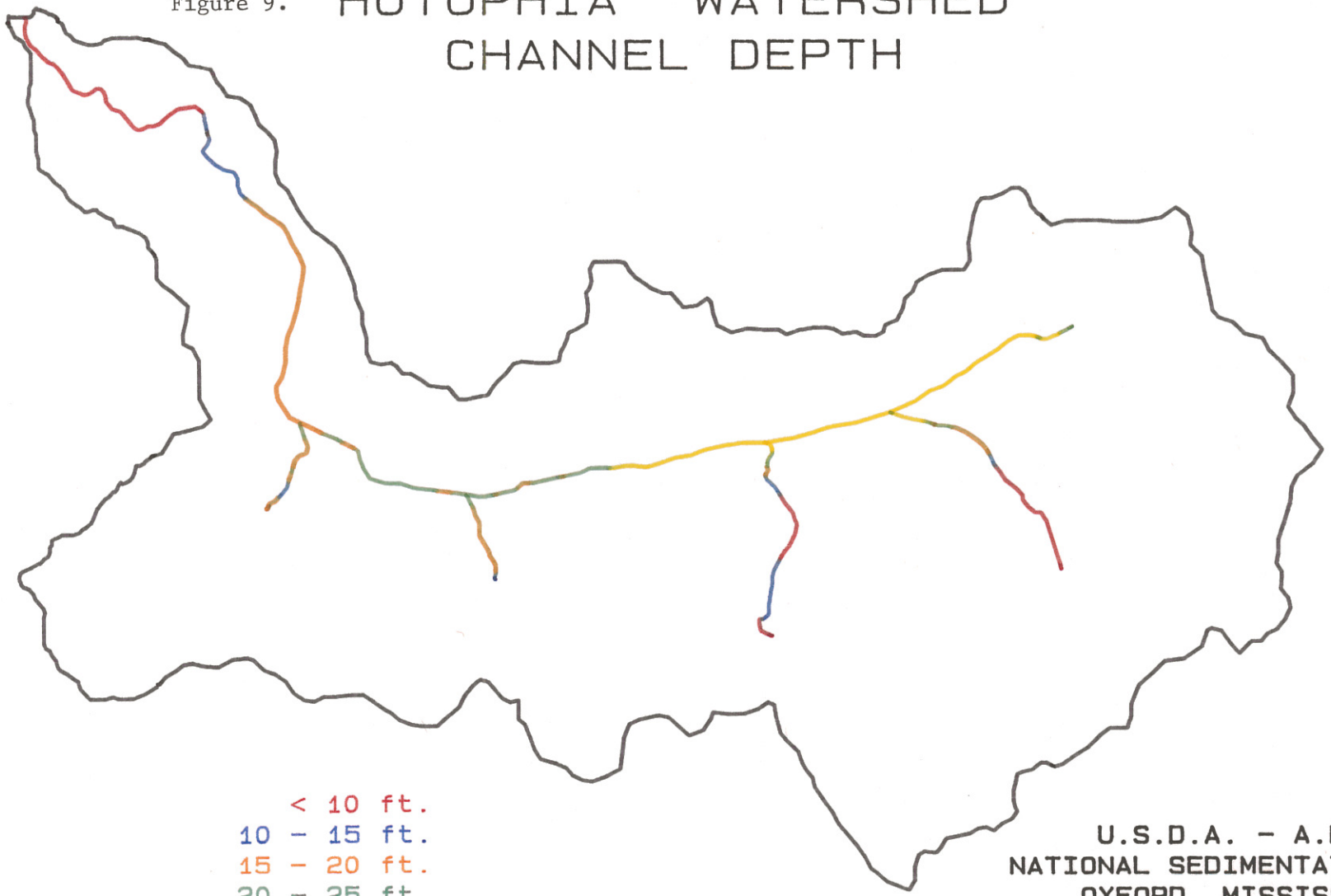
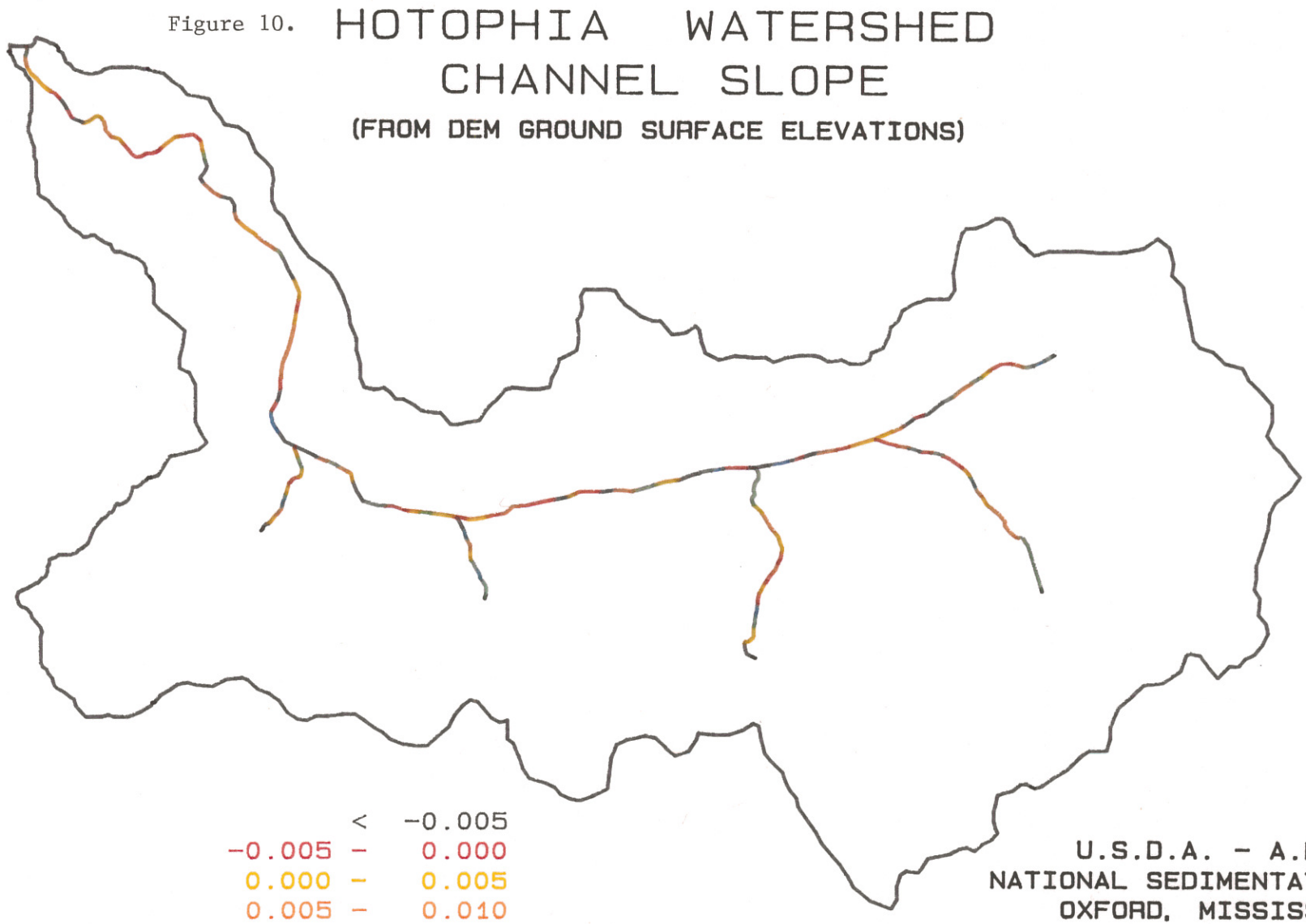


Figure 10.


HOTOPHIA WATERSHED
CHANNEL SLOPE
(FROM DEM GROUND SURFACE ELEVATIONS)
< -0.005
-0.005 - 0.000
0.000 - 0.005
0.005 - 0.010
0.010 - 0.015
> 0.015
U.S.D.A. - A.R.S.
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SCALE 1: 80000

elevations used in these calculations. For this calculation, the ground surface slope along the channel was estimated from the DEM elevations and the channel slope approximated by adjusting the ground surface slope for changes in the channel depth. The stated precision for DEM level 1 standards is "no point should have an absolute error exceeding 50 meters, no array of 49 contiguous points (7x7 points) may exhibit a relative error exceeding 21 meters, and the root mean square error of at least 20 points tested against mapped elevations cannot exceed 7 meters. The limit of allowable errors is based on a statistical bell curve wherein errors of 7, 21, and 50 meters are the equivalent of 1-, 2-, and 3-sigma, respectively." In contrast, the standard vertical accuracy for topographic quadrangle maps is that "not more than 10 percent of the tested elevations be in error by more than one-half of the contour interval." For the 7.5-minute quads of Hotophia Creek Watershed, the contour interval is 20 feet, hence at least 90 percent of the elevations should have errors less than 10 feet in magnitude. The comparison of elevations from these two sources, that is from DEMs and from topographic maps, is shown in Table 6. Differences are greater than expected; the DEM elevations averaged almost 15.5 feet higher than comparable elevations from topographic maps and the differences were not normally distributed (Figure 11). Figure 12 is a replot of channel slope based on ground surface slopes estimated by linear extrapolation of contour elevations from topographic maps. Slope data used in Figure 12 is listed in Part A of Appendixes II through VI. At this time, we believe the topographically-based slope values are more realistic than comparable values based on DEMs.

Figure 13 identifies locations with bank heights in excess of 20 feet and slopes equal or exceed 0.005. In general, these values reflect the most critical conditions with respect to cyclic bank failure due to mass instability.

Table 6. Differences in point elevations between topographic quad maps and comparable digital elevation models.

Δ Elevation[1] ft.	Number of Values					
	Hotophia	Deer	Harris	Marcum	Mills	Total
<-43 to -41		0				0
<-41 to -39		1			0	1
<-39 to -37		0			1	1
<-37 to -35	0	0			0	0
<-35 to -33	2	0			0	2
<-33 to -31	2	0			0	2
<-31 to -29	3	0			0	3
<-29 to -27	6	1			0	7
<-27 to -25	3	0			1	4
<-25 to -23	4	2	0		2	8
<-23 to -21	3	0	3		0	6
<-21 to -19	3	4	1			8
<-19 to -17	5	1	0	0		6
<-17 to -15	2	1	1	1		5
<-15 to -13	1	0	0	0		1
<-13 to -11	1			0		1
<-11 to - 9	0			1		1
<- 9 to - 7	5			1		6
<- 7 to - 5	7			1		8
<- 5 to - 3	4			0		4
<- 3 to - 1	4			1		5
<- 1 to + 1	4			0		4
<+ 1 to + 3	1			3		4
<+ 3 to + 5	2			1		3
<+ 5 to + 7	1			0		1
<+ 7 to + 9	0					0

[1] Topographic elevation minus DEM elevation

Figure 11. FREQUENCY OF DIFFERENCES BETWEEN DEM-BASED GROUND SURFACE ELEVATIONS ALONG EVALUATED CHANNELS AND ELEVATIONS ESTIMATED FROM TOPOGRAPHIC MAPS.

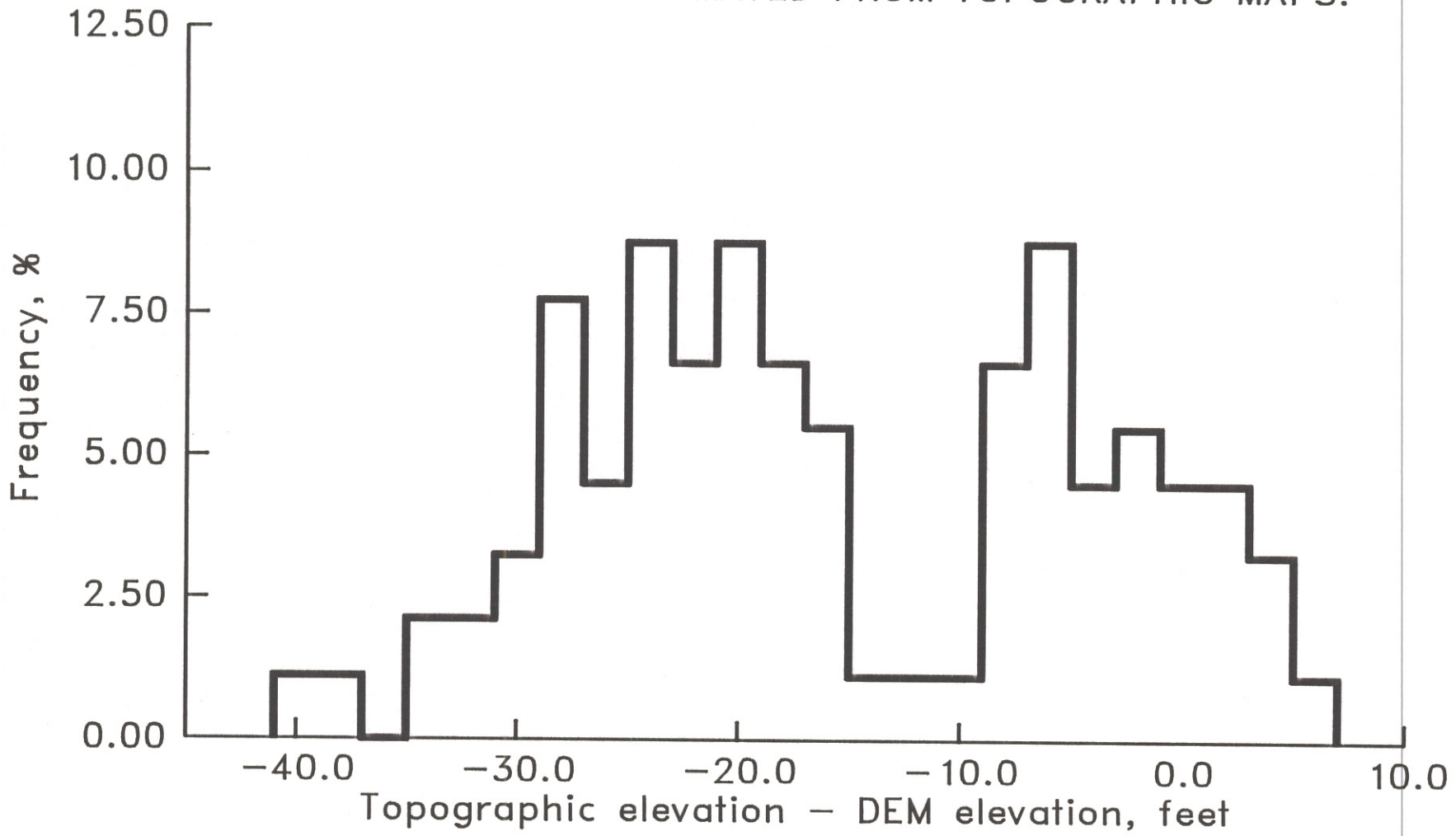


Figure 12.

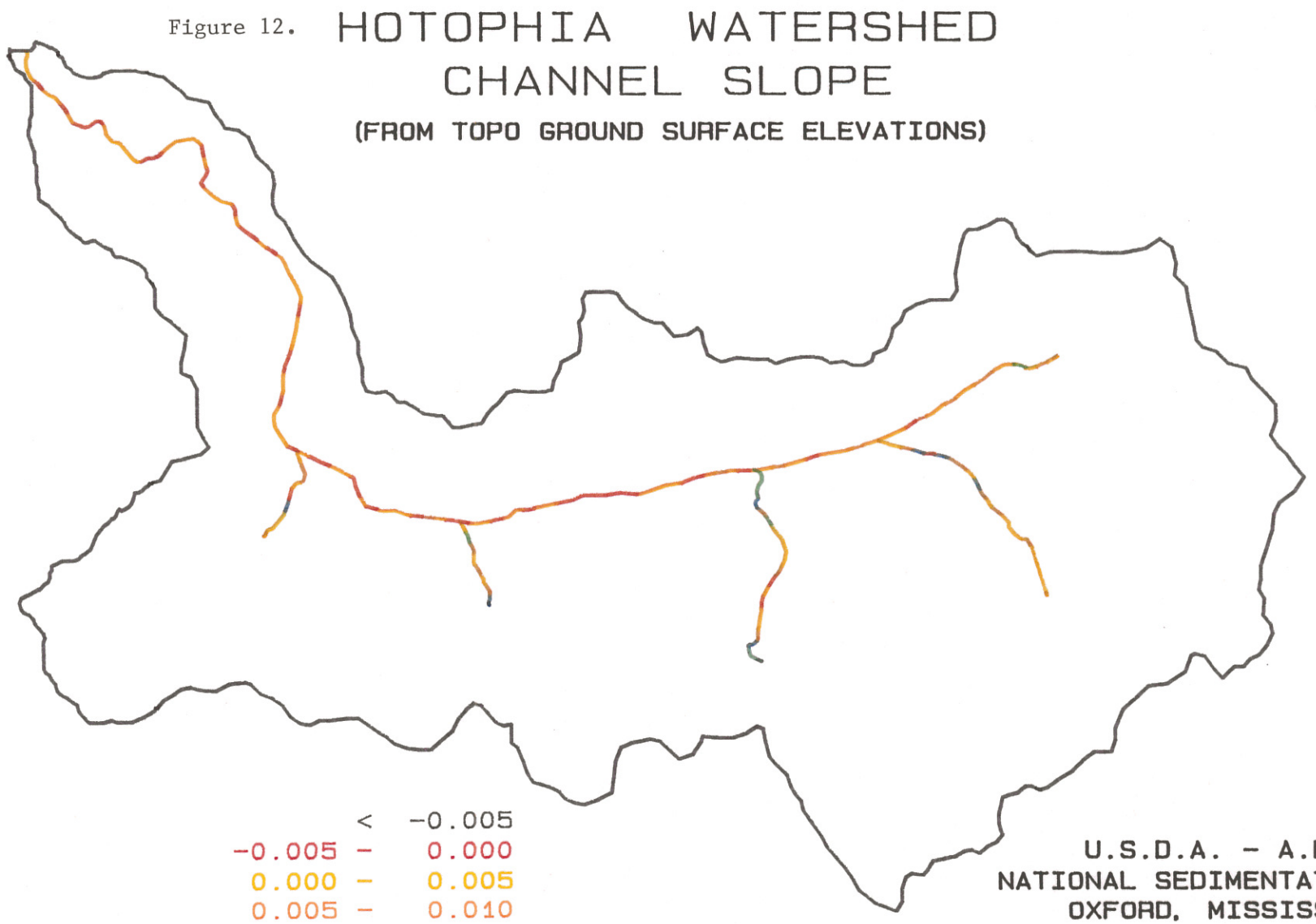
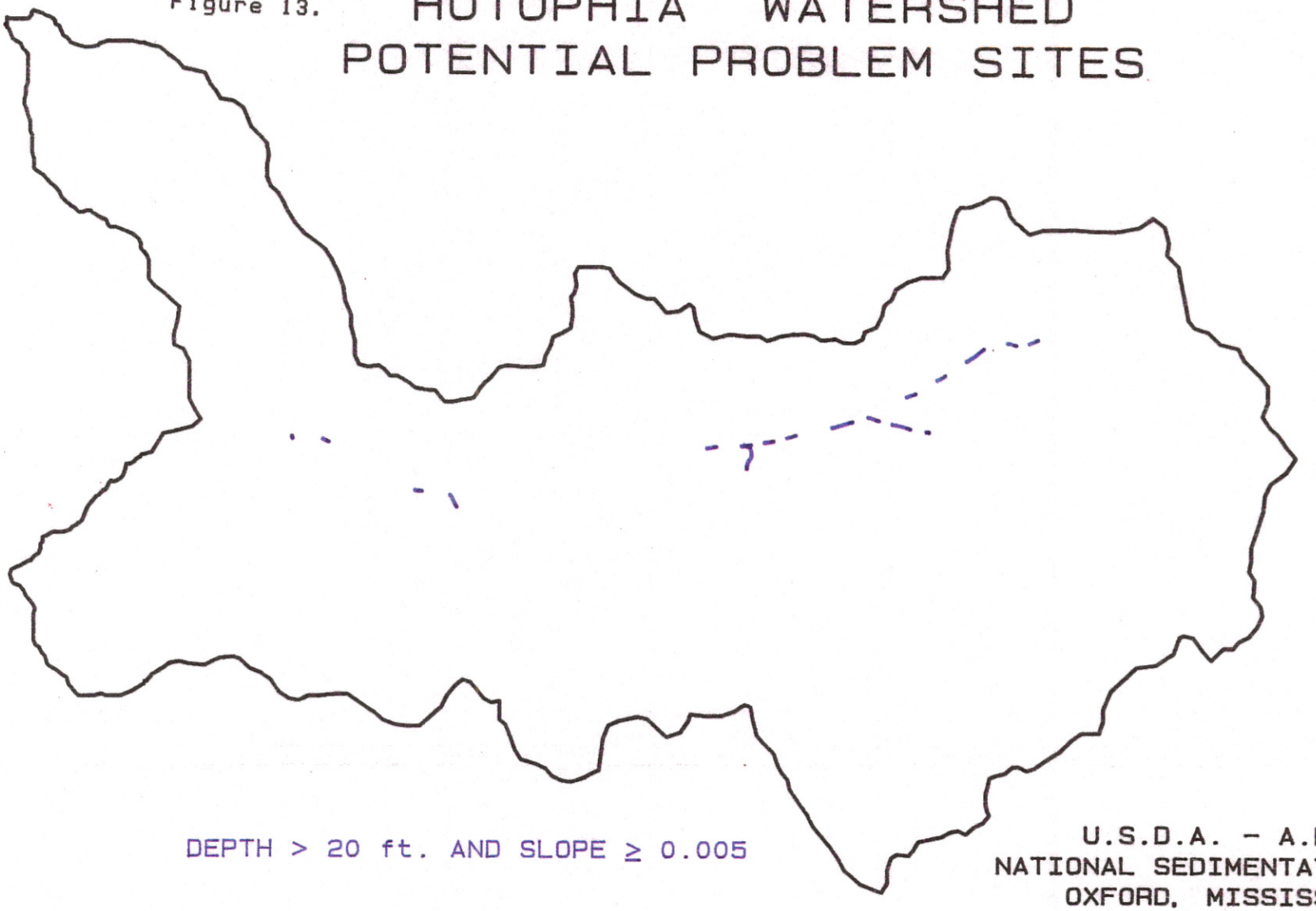

HOTOPHIA WATERSHED
CHANNEL SLOPE
(FROM TOPO GROUND SURFACE ELEVATIONS)
< -0.005
-0.005 - 0.000
0.000 - 0.005
0.005 - 0.010
0.010 - 0.015
> 0.015
U.S.D.A. - A.R.S.
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SCALE 1: 80000

Figure 13.


HOTOPHIA WATERSHED
POTENTIAL PROBLEM SITES
DEPTH > 20 ft. AND SLOPE ≥ 0.005
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SCALE 1: 80000

Discussion

In the main, the values reported herein reflect pre-project conditions for Hotophia Creek and major tributaries. For the 90,500 feet of channel evaluated (181,000 feet of bank), a total of 10,800 feet of banks were judged to be undergoing severe bank failure and 24,400 feet were judged to be undergoing moderate to light failure. Most of this bank instability occurred at two reaches, from about 29,000 to 39,000 and from about 49,000 to 59,000 feet channel distance (including lower reaches of confluent tributaries). These two unstable reaches are at and immediately downstream from the knickpoint. The downstream reach is typified by a relatively wide low-flow channel (as indicated by the approximately 70 feet channel bottom width, Appendix II). Bed material is sand and the channel slope is minimal. Channel depth is about 20 feet. Bank failures are due primarily to the weak bank toe materials. Bank toe materials throughout the upstream reach have appreciably higher shear strength. The channel depth is about 30 feet and the low-flow channel is about 30 feet wide. The channel slope is relatively high and is controlled by outcrops of consolidated clays. For this reach, bank instability is due primarily to the relatively high shear stress resulting from the increased slope coupled with the reduced channel bottom width. Bank angles are about 10° higher at this reach, reflecting the increased shear strength of the bank materials, particularly the bank toe materials. The intervening relatively stable reach is transitional. Channel depths increase from 20 feet at the downstream section to 30 feet upstream. Bank toe materials are comparable to those upstream, resulting in comparable channel bank angles and low-flow widths. The channel slope, however, is generally equivalent to that downstream. Obviously the stability of this reach results from the combined influences of increased bank material shear strength (relative to downstream conditions) and reduced shear stress (relative to upstream conditions).

Inherently, the maximum utility for much of this data will be in comparing the 1988 channel conditions with subsequent conditions.

The 1988 width, depth, and topographically-based slope values are thought to be useful predictors for future or potential bank failure problems. The most frequent form of bank instability is gravity-induced mass failure, and the three critical controls of such failure are bank height, bank angle, and bank material shear strength. In this data set, increases in channel depth generally increase the probability of mass bank failure and excessively wide channels reflect the occurrence of weak bank materials. Finally, high channel slopes suggest the possibility of relatively rapid toe removal and bank oversteepening leading to a relatively high frequency of cyclic failures. Thus maximum width, depth, and slope values should be useful as general predictors of sites of excessive erosion. For this application, excessive channel depths and slopes as identified in Figure 13 are judged to be the most critical identifiers of sites of potential instability. These locations of potential instability (Figure 13) are in general accord with locations of current instability (Figure 6), with the most frequent occurrence associated with knickpoint deepening of the channel at the upper reach.

The observed lack of precision of the DEM elevation values is of great concern, potentially limiting routine utilization of DEM-derived slope values for hydrologic and hydraulic evaluations. SPOT DEMs offer the promise of better precision but, at this time, we have no plans to evaluate this data source due to lack of funds.

Acknowledgements

The authors wish to thank Dan Brewer and Keith Parker for their diligent field evaluations often under severe climatic conditions and Dr W. C. Little, Glenn Herring, Joe Willis, Joe Murphey, and Johnny Walker for their technical assistance. This report was prepared as a part of research under the Technology Applications Project (TAP), USDA National Sedimentation Laboratory, Agricultural Research Service, Oxford, Mississippi in cooperation with the Demonstration Erosion Control (DEC) Project in the Yazoo Basin.

Appendix I Field data sheet

CREEK:								DATE:			
STATION NO.		00	100	200	300	400	500	600	700	800	900
TOP WIDTH											
BOTTOM WIDTH											
DEPTH											
BANK VEGATATION	LARGE TREES										
	BRUSH										
	KUDZU GRASS										
	RAW BANKS										
BED	MATERIAL C S G										
	STATUS R H O C										
BANK STABILITY STATUS	STABLE										
	MODERATE										
	SEVERE										
	FAILURE MODE										
EXISTING BANK PROTECTION	FULL RIP RAP										
	PARTIAL RIP RAP										
	GROINS										
	JACKS										
	FENCE										
	DROP-PIPE										
	DROP STR.										
NOTES AND OTHER FACTS	DITCH										
	STREAM										
	BRIDGE										
	POWER LINE										
	FORD										
	MISC.										

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
0	633021	1410193	130.0	100.0	9.0	0.003	197.8
100	633105	1410177	132.0	103.0	8.8	0.003	197.9
200	633105	1410077	134.0	106.0	8.6	0.003	198.0
300	633100	1409978	136.0	109.0	8.4	0.003	198.0
400	633062	1409886	138.0	112.0	8.2	0.003	198.1
500	633025	1409793	140.0	115.0	8.0	0.003	198.2
600	633023	1409693	141.0	112.0	8.0	0.001	198.3
700	633024	1409593	142.0	109.0	8.0	0.001	198.3
800	633049	1409497	143.0	106.0	8.0	0.001	198.4
900	633076	1409401	144.0	103.0	8.0	0.001	198.4
1000	633103	1409304	145.0	100.0	8.0	0.001	198.5
1100	633147	1409215	148.0	107.0	7.8	0.003	198.6
1200	633196	1409128	151.0	114.0	7.6	0.003	198.6
1300	633244	1409040	154.0	121.0	7.4	0.003	198.7
1400	633303	1408961	157.0	128.0	7.2	0.003	198.7
1500	633381	1408899	160.0	135.0	7.0	0.003	198.8
1600	633459	1408836	156.6	129.0	7.2	-0.001	198.9
1700	633536	1408773	153.2	123.0	7.4	-0.001	198.9
1800	633600	1408696	149.8	117.0	7.6	-0.001	199.0
1900	633664	1408619	146.4	111.0	7.8	-0.001	199.0
2000	633728	1408543	143.0	105.0	8.0	-0.001	199.1
2100	633795	1408468	144.4	111.0	7.8	0.003	199.2
2200	633873	1408406	145.8	117.0	7.6	0.003	199.3
2300	633951	1408344	147.2	123.0	7.4	0.003	199.3
2400	634029	1408281	148.6	129.0	7.2	0.003	199.4
2500	634121	1408242	150.0	135.0	7.0	0.003	199.5
2600	634214	1408206	152.0	134.0	7.0	0.001	199.6
2700	634301	1408160	154.0	133.0	7.0	0.001	199.6
2800	634365	1408083	156.0	132.0	7.0	0.001	199.7
2900	634429	1408007	158.0	131.0	7.0	0.001	199.7
3000	634493	1407930	160.0	130.0	7.0	0.001	199.8
3100	634558	1407853	159.0	126.8	7.2	-0.001	199.9
3200	634622	1407777	158.0	123.6	7.4	-0.001	199.9
3300	634686	1407700	157.0	120.4	7.6	-0.001	200.0
3400	634740	1407616	156.0	117.2	7.8	-0.001	200.0
3500	634789	1407529	155.0	114.0	8.0	-0.001	200.1
3600	634838	1407442	166.0	128.8	7.8	0.003	200.2
3700	634886	1407354	177.0	143.6	7.6	0.003	200.3
3800	634935	1407267	188.0	158.4	7.4	0.003	200.3
3900	634984	1407180	199.0	173.2	7.2	0.003	200.4

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
4000	635033	1407093	210.0	188.0	7.0	0.003	200.5
4100	635113	1407041	198.0	170.4	7.2	-0.002	200.5
4200	635206	1407005	186.0	152.8	7.4	-0.002	200.5
4300	635299	1406968	174.0	135.2	7.6	-0.002	200.5
4400	635392	1406931	162.0	117.6	7.8	-0.002	200.5
4500	635485	1406894	150.0	100.0	8.0	-0.002	200.5
4600	635578	1406879	152.0	99.6	8.2	-0.001	200.6
4700	635671	1406917	154.0	99.2	8.4	-0.001	200.6
4800	635763	1406955	156.0	98.8	8.6	-0.001	200.7
4900	635847	1407007	158.0	98.4	8.8	-0.001	200.7
5000	635925	1407070	160.0	98.0	9.0	-0.001	200.8
5100	636002	1407133	162.0	98.4	9.2	-0.001	200.9
5200	636088	1407174	164.0	98.8	9.4	-0.001	201.0
5300	636188	1407174	166.0	99.2	9.6	-0.001	201.2
5400	636263	1407122	168.0	99.6	9.8	-0.001	201.3
5500	636328	1407045	170.0	100.0	10.0	-0.001	201.4
5600	636390	1406967	174.0	110.0	10.0	0.001	201.5
5700	636417	1406871	178.0	120.0	10.0	0.001	201.7
5800	636444	1406775	182.0	130.0	10.0	0.001	201.8
5900	636471	1406679	186.0	140.0	10.0	0.001	202.0
6000	636474	1406579	190.0	150.0	10.0	0.001	202.1
6100	636532	1406500	178.0	138.0	9.7	0.004	202.2
6200	636596	1406423	166.0	126.0	9.4	0.004	202.2
6300	636660	1406346	154.0	114.0	9.1	0.004	202.3
6400	636724	1406270	142.0	102.0	8.8	0.004	202.3
6500	636819	1406239	130.0	90.0	8.5	0.004	202.4
6600	636915	1406211	129.0	87.0	8.2	0.004	202.5
6700	637010	1406183	128.0	84.0	7.9	0.004	202.7
6800	637092	1406132	127.0	81.0	7.6	0.004	202.8
6900	637156	1406055	126.0	78.0	7.3	0.004	203.0
7000	637220	1405979	125.0	75.0	7.0	0.004	203.1
7100	637284	1405902	137.0	77.0	7.0	0.001	203.2
7200	637349	1405825	149.0	79.0	7.0	0.001	203.3
7300	637413	1405749	161.0	81.0	7.0	0.001	203.5
7400	637477	1405672	173.0	83.0	7.0	0.001	203.6
7500	637541	1405595	185.0	85.0	7.0	0.001	203.7
7600	637605	1405519	182.0	98.0	7.0	0.001	203.8
7700	637675	1405449	179.0	111.0	7.0	0.001	204.0
7800	637761	1405397	176.0	124.0	7.0	0.001	204.1
7900	637849	1405373	173.0	137.0	7.0	0.001	204.3

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
8000	637942	1405411	170.0	150.0	7.0	0.001	204.4
8100	638034	1405449	162.0	138.0	7.2	-0.001	204.5
8200	638123	1405495	154.0	126.0	7.4	-0.001	204.5
8300	638208	1405547	146.0	114.0	7.6	-0.001	204.6
8400	638303	1405566	138.0	102.0	7.8	-0.001	204.6
8500	638403	1405567	130.0	90.0	8.0	-0.001	204.7
8600	638502	1405572	128.0	88.0	8.4	-0.003	204.8
8700	638594	1405609	126.0	86.0	8.8	-0.003	205.0
8800	638687	1405647	124.0	84.0	9.2	-0.003	205.1
8900	638772	1405697	122.0	82.0	9.6	-0.003	205.3
9000	638846	1405764	120.0	80.0	10.0	-0.003	205.4
9100	638920	1405832	124.0	82.0	10.0	0.001	205.5
9200	638993	1405899	128.0	84.0	10.0	0.001	205.5
9300	639067	1405967	132.0	86.0	10.0	0.001	205.6
9400	639147	1406027	136.0	88.0	10.0	0.001	205.6
9500	639228	1406086	140.0	90.0	10.0	0.001	205.7
9600	639309	1406145	140.0	93.0	10.0	0.001	205.8
9700	639390	1406204	140.0	96.0	10.0	0.001	206.0
9800	639470	1406263	140.0	99.0	10.0	0.001	206.1
9900	639564	1406289	140.0	102.0	10.0	0.001	206.3
10000	639663	1406303	140.0	105.0	10.0	0.001	206.4
10100	639762	1406317	142.0	103.0	10.0	0.001	206.5
10200	639861	1406330	144.0	101.0	10.0	0.001	206.6
10300	639960	1406344	146.0	99.0	10.0	0.001	206.8
10400	640059	1406358	148.0	97.0	10.0	0.001	206.9
10500	640159	1406371	150.0	95.0	10.0	0.001	207.0
10600	640255	1406377	180.0	107.0	10.0	0.001	207.1
10700	640329	1406310	210.0	119.0	10.0	0.001	207.3
10800	640404	1406243	240.0	131.0	10.0	0.001	207.4
10900	640478	1406176	270.0	143.0	10.0	0.001	207.6
11000	640553	1406110	300.0	155.0	10.0	0.001	207.7
11100	640594	1406024	270.0	144.0	10.4	-0.003	207.8
11200	640610	1405926	240.0	133.0	10.8	-0.003	207.8
11300	640627	1405827	210.0	122.0	11.2	-0.003	207.9
11400	640644	1405729	180.0	111.0	11.6	-0.003	207.9
11500	640661	1405630	150.0	100.0	12.0	-0.003	208.0
11600	640680	1405532	172.0	125.0	11.6	0.005	208.1
11700	640700	1405434	194.0	150.0	11.2	0.005	208.3
11800	640721	1405336	216.0	175.0	10.8	0.005	208.4
11900	640742	1405238	238.0	200.0	10.4	0.005	208.6

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
12000	640768	1405142	260.0	225.0	10.0	0.005	208.7
12100	640807	1405050	249.0	211.6	10.2	-0.001	208.8
12200	640834	1404959	238.0	198.2	10.4	-0.001	208.9
12300	640786	1404871	227.0	184.8	10.6	-0.001	209.1
12400	640738	1404783	216.0	171.4	10.8	-0.001	209.2
12500	640690	1404695	205.0	158.0	11.0	-0.001	209.3
12600	640631	1404615	194.0	144.4	11.2	-0.001	209.4
12700	640568	1404538	183.0	130.8	11.4	-0.001	209.6
12800	640511	1404460	172.0	117.2	11.6	-0.001	209.7
12900	640575	1404384	161.0	103.6	11.8	-0.001	209.9
13000	640639	1404307	150.0	90.0	12.0	-0.001	210.0
13100	640703	1404230	148.0	90.0	12.0	0.001	210.1
13200	640769	1404155	146.0	90.0	12.0	0.001	210.1
13300	640843	1404088	144.0	90.0	12.0	0.001	210.2
13400	640918	1404021	142.0	90.0	12.0	0.001	210.2
13500	640992	1403954	140.0	90.0	12.0	0.001	210.3
13600	641066	1403888	147.0	102.0	12.0	0.001	210.4
13700	641148	1403830	154.0	114.0	12.0	0.001	210.6
13800	641234	1403779	161.0	126.0	12.0	0.001	210.7
13900	641319	1403728	168.0	138.0	12.0	0.001	210.9
14000	641405	1403676	175.0	150.0	12.0	0.001	211.0
14100	641499	1403644	174.0	144.0	12.0	0.001	211.1
14200	641596	1403621	173.0	138.0	12.0	0.001	211.1
14300	641694	1403598	172.0	132.0	12.0	0.001	211.2
14400	641791	1403575	171.0	126.0	12.0	0.001	211.2
14500	641871	1403529	170.0	120.0	12.0	0.001	211.3
14600	641919	1403442	160.0	112.8	12.4	-0.003	211.4
14700	641968	1403354	150.0	105.6	12.8	-0.003	211.5
14800	642017	1403267	140.0	98.4	13.2	-0.003	211.7
14900	642022	1403168	130.0	91.2	13.6	-0.003	211.8
15000	642023	1403068	120.0	84.0	14.0	-0.003	211.9
15100	642023	1402968	122.0	83.2	14.0	0.001	212.0
15200	642047	1402872	124.0	82.4	14.0	0.001	212.2
15300	642074	1402775	126.0	81.6	14.0	0.001	212.3
15400	642101	1402679	128.0	80.8	14.0	0.001	212.5
15500	642162	1402604	130.0	80.0	14.0	0.001	212.6
15600	642237	1402537	124.0	80.0	14.4	-0.003	212.7
15700	642311	1402471	118.0	80.0	14.8	-0.003	212.9
15800	642386	1402404	112.0	80.0	15.2	-0.003	213.0
15900	642461	1402339	106.0	80.0	15.6	-0.003	213.2

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
16000	642543	1402281	100.0	80.0	16.0	-0.003	213.3
16100	642624	1402222	110.0	84.8	16.2	-0.001	213.4
16200	642705	1402164	120.0	89.6	16.4	-0.001	213.4
16300	642787	1402106	130.0	94.4	16.6	-0.001	213.5
16400	642868	1402048	140.0	99.2	16.8	-0.001	213.5
16500	642942	1401981	150.0	104.0	17.0	-0.001	213.6
16600	643017	1401914	152.0	101.8	16.8	0.003	213.7
16700	643091	1401847	154.0	99.6	16.6	0.003	213.8
16800	643166	1401781	156.0	97.4	16.4	0.003	214.0
16900	643246	1401722	158.0	95.2	16.2	0.003	214.1
17000	643332	1401670	160.0	93.0	16.0	0.003	214.2
17100	643418	1401619	154.0	95.0	16.4	-0.003	214.3
17200	643504	1401568	148.0	97.0	16.8	-0.003	214.5
17300	643587	1401513	142.0	99.0	17.2	-0.003	214.6
17400	643668	1401454	136.0	101.0	17.6	-0.003	214.8
17500	643749	1401396	130.0	103.0	18.0	-0.003	214.9
17600	643831	1401338	136.0	107.6	17.8	0.003	215.0
17700	643912	1401280	142.0	112.2	17.6	0.003	215.2
17800	643980	1401210	148.0	116.8	17.4	0.003	215.3
17900	644029	1401122	154.0	121.4	17.2	0.003	215.5
18000	644077	1401035	160.0	126.0	17.0	0.003	215.6
18100	644126	1400948	158.0	123.6	16.8	0.003	215.7
18200	644166	1400856	156.0	121.2	16.6	0.003	215.7
18300	644204	1400764	154.0	118.8	16.4	0.003	215.8
18400	644243	1400671	152.0	116.4	16.2	0.003	215.8
18500	644282	1400579	150.0	114.0	16.0	0.003	215.9
18600	644326	1400490	150.0	111.2	16.0	0.001	216.0
18700	644375	1400403	150.0	108.4	16.0	0.001	216.1
18800	644424	1400315	150.0	105.6	16.0	0.001	216.3
18900	644473	1400228	150.0	102.8	16.0	0.001	216.4
19000	644521	1400141	150.0	100.0	16.0	0.001	216.5
19100	644570	1400053	148.0	96.0	16.0	0.001	216.6
19200	644619	1399966	146.0	92.0	16.0	0.001	216.8
19300	644661	1399876	144.0	88.0	16.0	0.001	216.9
19400	644700	1399784	142.0	84.0	16.0	0.001	217.1
19500	644739	1399691	140.0	80.0	16.0	0.001	217.2
19600	644778	1399599	140.0	82.0	16.0	0.001	217.3
19700	644802	1399505	140.0	84.0	16.0	0.001	217.4
19800	644786	1399407	140.0	86.0	16.0	0.001	217.6
19900	644770	1399308	140.0	88.0	16.0	0.001	217.7

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
20000	644755	1399209	140.0	90.0	16.0	0.001	217.8
20100	644739	1399110	138.0	88.4	16.2	-0.001	217.9
20200	644722	1399012	136.0	86.8	16.4	-0.001	218.0
20300	644702	1398914	134.0	85.2	16.6	-0.001	218.0
20400	644683	1398816	132.0	83.6	16.8	-0.001	218.1
20500	644663	1398718	130.0	82.0	17.0	-0.001	218.2
20600	644643	1398620	130.0	82.4	16.8	0.003	218.3
20700	644627	1398521	130.0	82.8	16.6	0.003	218.4
20800	644611	1398422	130.0	83.2	16.4	0.003	218.6
20900	644595	1398323	130.0	83.6	16.2	0.003	218.7
21000	644579	1398225	130.0	84.0	16.0	0.003	218.8
21100	644563	1398126	130.0	83.8	16.0	0.001	218.9
21200	644544	1398028	130.0	83.6	16.0	0.001	219.1
21300	644524	1397930	130.0	83.4	16.0	0.001	219.2
21400	644504	1397832	130.0	83.2	16.0	0.001	219.4
21500	644484	1397734	130.0	83.0	16.0	0.001	219.5
21600	644460	1397637	125.0	83.4	16.0	0.001	219.6
21700	644434	1397541	120.0	83.8	16.0	0.001	219.7
21800	644407	1397444	115.0	84.2	16.0	0.001	219.9
21900	644381	1397348	110.0	84.6	16.0	0.001	220.0
22000	644355	1397251	105.0	85.0	16.0	0.001	220.1
22100	644329	1397154	105.0	85.0	16.4	-0.003	220.2
22200	644297	1397060	105.0	85.0	16.8	-0.003	220.4
22300	644259	1396967	105.0	85.0	17.2	-0.003	220.5
22400	644222	1396875	105.0	85.0	17.6	-0.003	220.7
22500	644184	1396782	105.0	85.0	18.0	-0.003	220.8
22600	644146	1396690	106.0	85.0	18.2	-0.001	220.9
22700	644108	1396597	107.0	85.0	18.4	-0.001	221.1
22800	644070	1396505	108.0	85.0	18.6	-0.001	221.2
22900	644052	1396406	109.0	85.0	18.8	-0.001	221.4
23000	644036	1396308	110.0	85.0	19.0	-0.001	221.5
23100	644020	1396209	110.0	82.0	18.8	0.003	221.6
23200	644004	1396110	110.0	79.0	18.6	0.003	221.7
23300	643988	1396012	110.0	76.0	18.4	0.003	221.9
23400	643985	1395912	110.0	73.0	18.2	0.003	222.0
23500	643985	1395812	110.0	70.0	18.0	0.003	222.1
23600	643986	1395712	116.0	71.0	18.0	0.001	222.2
23700	643986	1395612	122.0	72.0	18.0	0.001	222.4
23800	643987	1395512	128.0	73.0	18.0	0.001	222.5
23900	643987	1395412	134.0	74.0	18.0	0.001	222.7

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
24000	643969	1395314	140.0	75.0	18.0	0.001	222.8
24100	643943	1395218	134.0	74.8	18.4	-0.003	222.9
24200	643916	1395121	128.0	74.6	18.8	-0.003	223.0
24300	643890	1395025	122.0	74.4	19.2	-0.003	223.2
24400	643864	1394928	116.0	74.2	19.6	-0.003	223.3
24500	643838	1394832	110.0	74.0	20.0	-0.003	223.4
24600	643801	1394740	110.0	73.2	20.0	0.002	223.6
24700	643748	1394655	110.0	72.4	20.0	0.002	223.8
24800	643696	1394570	110.0	71.6	20.0	0.002	224.0
24900	643644	1394484	110.0	70.8	20.0	0.002	224.2
25000	643591	1394399	110.0	70.0	20.0	0.002	224.4
25100	643584	1394305	103.0	68.0	19.8	0.003	224.5
25200	643601	1394207	96.0	66.0	19.6	0.003	224.7
25300	643617	1394108	89.0	64.0	19.4	0.003	224.8
25400	643634	1394010	82.0	62.0	19.2	0.003	225.0
25500	643651	1393911	75.0	60.0	19.0	0.003	225.1
25600	643687	1393820	82.0	63.8	19.0	0.001	225.2
25700	643740	1393735	89.0	67.6	19.0	0.001	225.3
25800	643794	1393651	96.0	71.4	19.0	0.001	225.5
25900	643847	1393566	103.0	75.2	19.0	0.001	225.6
26000	643900	1393481	110.0	79.0	19.0	0.001	225.7
26100	643953	1393397	109.0	78.2	19.0	0.001	225.8
26200	644006	1393312	108.0	77.4	19.0	0.001	226.0
26300	644060	1393227	107.0	76.6	19.0	0.001	226.1
26400	644113	1393143	106.0	75.8	19.0	0.001	226.3
26500	644166	1393058	105.0	75.0	19.0	0.001	226.4
26600	644256	1393015	104.0	72.0	19.2	-0.001	226.5
26700	644347	1392972	103.0	69.0	19.4	-0.001	226.6
26800	644437	1392929	102.0	66.0	19.6	-0.001	226.8
26900	644527	1392886	101.0	63.0	19.8	-0.001	226.9
27000	644618	1392843	100.0	60.0	20.0	-0.001	227.0
27100	644708	1392800	98.0	60.4	19.8	0.003	227.1
27200	644798	1392757	96.0	60.8	19.6	0.003	227.3
27300	644888	1392714	94.0	61.2	19.4	0.003	227.4
27400	644979	1392671	92.0	61.6	19.2	0.003	227.6
27500	645068	1392626	90.0	62.0	19.0	0.003	227.7
27600	645157	1392581	94.0	64.6	19.2	0.000	227.9
27700	645246	1392535	98.0	67.2	19.4	0.000	228.1
27800	645335	1392490	102.0	69.8	19.6	0.000	228.3
27900	645424	1392444	106.0	72.4	19.8	0.000	228.5

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
28000	645514	1392399	110.0	75.0	20.0	0.000	228.7
28100	645603	1392354	107.0	73.0	20.4	-0.003	228.8
28200	645696	1392317	104.0	71.0	20.8	-0.003	228.9
28300	645789	1392281	101.0	69.0	21.2	-0.003	229.1
28400	645882	1392244	98.0	67.0	21.6	-0.003	229.2
28500	645975	1392207	95.0	65.0	22.0	-0.003	229.3
28600	646068	1392170	98.0	68.0	21.6	0.005	229.4
28700	646158	1392128	101.0	71.0	21.2	0.005	229.6
28800	646247	1392082	104.0	74.0	20.8	0.005	229.7
28900	646336	1392037	107.0	77.0	20.4	0.005	229.9
29000	646425	1391991	110.0	80.0	20.0	0.005	230.0
29100	646514	1391946	107.0	74.0	20.0	0.001	230.1
29200	646603	1391900	104.0	68.0	20.0	0.001	230.2
29300	646692	1391854	101.0	62.0	20.0	0.001	230.4
29400	646778	1391803	98.0	56.0	20.0	0.001	230.5
29500	646864	1391752	95.0	50.0	20.0	0.001	230.6
29600	646950	1391701	98.0	50.6	20.2	-0.001	230.7
29700	647027	1391643	101.0	51.2	20.4	-0.001	230.9
29800	647048	1391545	104.0	51.8	20.6	-0.001	231.0
29900	647069	1391448	107.0	52.4	20.8	-0.001	231.2
30000	647089	1391350	110.0	53.0	21.0	-0.001	231.3
30100	647110	1391252	111.0	56.4	21.2	-0.001	231.4
30200	647149	1391160	112.0	59.8	21.4	-0.001	231.6
30300	647188	1391068	113.0	63.2	21.6	-0.001	231.7
30400	647227	1390975	114.0	66.6	21.8	-0.001	231.9
30500	647265	1390883	115.0	70.0	22.0	-0.001	232.0
30600	647313	1390796	127.0	76.6	21.8	0.004	232.2
30700	647366	1390711	139.0	83.2	21.6	0.004	232.4
30800	647420	1390627	151.0	89.8	21.4	0.004	232.5
30900	647473	1390542	163.0	96.4	21.2	0.004	232.7
31000	647526	1390457	175.0	103.0	21.0	0.004	232.9
31100	647616	1390421	170.0	95.4	21.2	-0.001	233.0
31200	647712	1390393	165.0	87.8	21.4	-0.001	233.2
31300	647808	1390365	160.0	80.2	21.6	-0.001	233.3
31400	647904	1390336	155.0	72.6	21.8	-0.001	233.5
31500	648000	1390308	150.0	65.0	22.0	-0.001	233.6
31600	648096	1390279	138.0	64.0	22.0	0.001	233.7
31700	648192	1390251	126.0	63.0	22.0	0.001	233.9
31800	648291	1390247	114.0	62.0	22.0	0.001	234.0
31900	648391	1390248	102.0	61.0	22.0	0.001	234.2

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
32000	648491	1390248	90.0	60.0	22.0	0.001	234.3
32100	648591	1390249	89.0	58.0	22.0	0.001	234.4
32200	648691	1390249	88.0	56.0	22.0	0.001	234.5
32300	648791	1390250	87.0	54.0	22.0	0.001	234.7
32400	648886	1390218	86.0	52.0	22.0	0.001	234.8
32500	648981	1390186	85.0	50.0	22.0	0.001	234.9
32600	649075	1390154	85.0	48.4	21.8	0.003	235.0
32700	649170	1390122	85.0	46.8	21.6	0.003	235.2
32800	649265	1390090	85.0	45.2	21.4	0.003	235.3
32900	649359	1390058	85.0	43.6	21.2	0.003	235.5
33000	649458	1390042	85.0	42.0	21.0	0.003	235.6
33100	649557	1390030	88.0	47.4	21.2	-0.001	235.7
33200	649656	1390019	91.0	52.8	21.4	-0.001	235.8
33300	649756	1390007	94.0	58.2	21.6	-0.001	236.0
33400	649855	1389996	97.0	63.6	21.8	-0.001	236.1
33500	649954	1389984	100.0	69.0	22.0	-0.001	236.2
33600	650054	1389973	100.0	68.4	21.6	0.006	236.4
33700	650153	1389961	100.0	67.8	21.2	0.006	236.6
33800	650252	1389949	100.0	67.2	20.8	0.006	236.8
33900	650352	1389937	100.0	66.6	20.4	0.006	237.0
34000	650451	1389924	100.0	66.0	20.0	0.006	237.2
34100	650550	1389911	101.0	66.2	20.0	0.001	237.3
34200	650649	1389898	102.0	66.4	20.0	0.001	237.5
34300	650748	1389885	103.0	66.6	20.0	0.001	237.6
34400	650847	1389873	104.0	66.8	20.0	0.001	237.8
34500	650947	1389860	105.0	67.0	20.0	0.001	237.9
34600	651046	1389846	106.0	67.4	20.2	-0.001	238.0
34700	651145	1389831	107.0	67.8	20.4	-0.001	238.1
34800	651244	1389817	108.0	68.2	20.6	-0.001	238.3
34900	651343	1389803	109.0	68.6	20.8	-0.001	238.4
35000	651441	1389788	110.0	69.0	21.0	-0.001	238.5
35100	651540	1389774	112.0	68.2	21.2	-0.001	238.6
35200	651639	1389759	114.0	67.4	21.4	-0.001	238.8
35300	651738	1389741	116.0	66.6	21.6	-0.001	238.9
35400	651836	1389721	118.0	65.8	21.8	-0.001	239.1
35500	651934	1389702	120.0	65.0	22.0	-0.001	239.2
35600	652032	1389683	119.0	66.0	21.8	0.004	239.4
35700	652130	1389664	118.0	67.0	21.6	0.004	239.6
35800	652229	1389674	117.0	68.0	21.4	0.004	239.8
35900	652327	1389691	116.0	69.0	21.2	0.004	240.0

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
36000	652425	1389709	115.0	70.0	21.0	0.004	240.2
36100	652524	1389726	114.0	69.6	20.8	0.003	240.3
36200	652622	1389743	113.0	69.2	20.6	0.003	240.4
36300	652721	1389761	112.0	68.8	20.4	0.003	240.6
36400	652818	1389784	111.0	68.4	20.2	0.003	240.7
36500	652915	1389808	110.0	68.0	20.0	0.003	240.8
36600	653012	1389832	128.0	76.8	20.2	0.000	241.0
36700	653109	1389855	146.0	85.6	20.4	0.000	241.2
36800	653207	1389877	164.0	94.4	20.6	0.000	241.4
36900	653305	1389898	182.0	103.2	20.8	0.000	241.6
37000	653403	1389918	200.0	112.0	21.0	0.000	241.8
37100	653501	1389938	182.0	101.6	20.8	0.003	241.9
37200	653599	1389958	164.0	91.2	20.6	0.003	242.1
37300	653687	1389997	146.0	80.8	20.4	0.003	242.2
37400	653761	1390064	128.0	70.4	20.2	0.003	242.4
37500	653835	1390132	110.0	60.0	20.0	0.003	242.5
37600	653909	1390199	106.0	57.6	20.0	0.002	242.7
37700	653983	1390266	102.0	55.2	20.0	0.002	242.9
37800	654079	1390276	98.0	52.8	20.0	0.002	243.0
37900	654179	1390276	94.0	50.4	20.0	0.002	243.2
38000	654279	1390277	90.0	48.0	20.0	0.002	243.4
38100	654379	1390277	91.0	49.4	20.2	-0.001	243.5
38200	654479	1390278	92.0	50.8	20.4	-0.001	243.7
38300	654577	1390298	93.0	52.2	20.6	-0.001	243.8
38400	654674	1390322	94.0	53.6	20.8	-0.001	244.0
38500	654771	1390346	95.0	55.0	21.0	-0.001	244.1
38600	654868	1390370	97.0	57.0	21.0	0.002	244.3
38700	654966	1390392	99.0	59.0	21.0	0.002	244.5
38800	655064	1390412	101.0	61.0	21.0	0.002	244.7
38900	655162	1390432	103.0	63.0	21.0	0.002	244.9
39000	655259	1390452	105.0	65.0	21.0	0.002	245.1
39100	655357	1390472	103.0	61.2	20.8	0.003	245.2
39200	655455	1390493	101.0	57.4	20.6	0.003	245.3
39300	655553	1390513	99.0	53.6	20.4	0.003	245.5
39400	655651	1390533	97.0	49.8	20.2	0.003	245.6
39500	655749	1390553	95.0	46.0	20.0	0.003	245.7
39600	655847	1390573	92.0	43.8	20.4	-0.002	245.9
39700	655945	1390594	89.0	41.6	20.8	-0.002	246.1
39800	656043	1390614	86.0	39.4	21.2	-0.002	246.3
39900	656141	1390634	83.0	37.2	21.6	-0.002	246.5

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
40000	656239	1390654	80.0	35.0	22.0	-0.002	246.7
40100	656337	1390674	81.0	33.2	22.2	-0.001	246.8
40200	656434	1390697	82.0	31.4	22.4	-0.001	247.0
40300	656524	1390741	83.0	29.6	22.6	-0.001	247.1
40400	656613	1390785	84.0	27.8	22.8	-0.001	247.3
40500	656703	1390829	85.0	26.0	23.0	-0.001	247.4
40600	656793	1390873	88.0	26.8	23.2	0.000	247.6
40700	656888	1390897	91.0	27.6	23.4	0.000	247.8
40800	656988	1390897	94.0	28.4	23.6	0.000	248.0
40900	657088	1390898	97.0	29.2	23.8	0.000	248.2
41000	657188	1390898	100.0	30.0	24.0	0.000	248.4
41100	657288	1390899	102.0	30.0	24.2	-0.001	248.5
41200	657388	1390899	104.0	30.0	24.4	-0.001	248.6
41300	657488	1390900	106.0	30.0	24.6	-0.001	248.8
41400	657588	1390900	108.0	30.0	24.8	-0.001	248.9
41500	657688	1390901	110.0	30.0	25.0	-0.001	249.0
41600	657788	1390901	109.0	30.0	25.2	0.000	249.2
41700	657887	1390909	108.0	30.0	25.4	0.000	249.4
41800	657986	1390926	107.0	30.0	25.6	0.000	249.6
41900	658084	1390944	106.0	30.0	25.8	0.000	249.8
42000	658183	1390961	105.0	30.0	26.0	0.000	250.0
42100	658281	1390978	104.0	30.0	26.4	-0.003	250.1
42200	658379	1390996	103.0	30.0	26.8	-0.003	250.3
42300	658478	1391000	102.0	30.0	27.2	-0.003	250.4
42400	658577	1390987	101.0	30.0	27.6	-0.003	250.6
42500	658677	1390975	100.0	30.0	28.0	-0.003	250.7
42600	658776	1390962	99.0	29.4	28.4	-0.002	250.9
42700	658875	1390949	98.0	28.8	28.8	-0.002	251.1
42800	658974	1390936	97.0	28.2	29.2	-0.002	251.2
42900	659073	1390924	96.0	27.6	29.6	-0.002	251.4
43000	659173	1390911	95.0	27.0	30.0	-0.002	251.6
43100	659269	1390933	94.0	26.6	30.0	0.001	251.7
43200	659364	1390962	93.0	26.2	30.0	0.001	251.9
43300	659460	1390991	92.0	25.8	30.0	0.001	252.0
43400	659556	1391021	91.0	25.4	30.0	0.001	252.2
43500	659651	1391050	90.0	25.0	30.0	0.001	252.3
43600	659747	1391080	92.0	25.2	30.0	0.002	252.5
43700	659842	1391109	94.0	25.4	30.0	0.002	252.7
43800	659937	1391141	96.0	25.6	30.0	0.002	252.9
43900	660031	1391174	98.0	25.8	30.0	0.002	253.1

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
44000	660126	1391207	100.0	26.0	30.0	0.002	253.3
44100	660220	1391240	100.0	26.4	30.0	0.001	253.4
44200	660314	1391273	100.0	26.8	30.0	0.001	253.5
44300	660409	1391306	100.0	27.2	30.0	0.001	253.7
44400	660506	1391329	100.0	27.6	30.0	0.001	253.8
44500	660605	1391344	100.0	28.0	30.0	0.001	253.9
44600	660703	1391360	94.0	27.4	30.0	0.002	254.1
44700	660802	1391375	88.0	26.8	30.0	0.002	254.3
44800	660901	1391390	82.0	26.2	30.0	0.002	254.5
44900	661000	1391406	76.0	25.6	30.0	0.002	254.7
45000	661099	1391421	70.0	25.0	30.0	0.002	254.9
45100	661192	1391455	74.0	24.8	30.4	-0.003	255.0
45200	661285	1391493	78.0	24.6	30.8	-0.003	255.2
45300	661378	1391531	82.0	24.4	31.2	-0.003	255.3
45400	661470	1391568	86.0	24.2	31.6	-0.003	255.5
45500	661563	1391606	90.0	24.0	32.0	-0.003	255.6
45600	661657	1391638	91.0	25.8	32.2	0.000	255.8
45700	661754	1391662	92.0	27.6	32.4	0.000	256.0
45800	661851	1391686	93.0	29.4	32.6	0.000	256.2
45900	661948	1391710	94.0	31.2	32.8	0.000	256.4
46000	662046	1391734	95.0	33.0	33.0	0.000	256.6
46100	662144	1391754	94.0	31.2	32.8	0.003	256.7
46200	662241	1391774	93.0	29.4	32.6	0.003	256.8
46300	662339	1391795	92.0	27.6	32.4	0.003	257.0
46400	662437	1391815	91.0	25.8	32.2	0.003	257.1
46500	662535	1391835	90.0	24.0	32.0	0.003	257.2
46600	662634	1391851	96.0	25.2	31.6	0.006	257.4
46700	662733	1391866	102.0	26.4	31.2	0.006	257.6
46800	662832	1391881	108.0	27.6	30.8	0.006	257.8
46900	662930	1391897	114.0	28.8	30.4	0.006	258.0
47000	663029	1391912	120.0	30.0	30.0	0.006	258.2
47100	663128	1391928	115.0	29.4	30.0	0.001	258.3
47200	663227	1391941	110.0	28.8	30.0	0.001	258.5
47300	663327	1391941	105.0	28.2	30.0	0.001	258.6
47400	663427	1391942	100.0	27.6	30.0	0.001	258.8
47500	663527	1391942	95.0	27.0	30.0	0.001	258.9
47600	663627	1391943	106.0	29.6	30.2	0.000	259.1
47700	663727	1391943	117.0	32.2	30.4	0.000	259.3
47800	663827	1391944	128.0	34.8	30.6	0.000	259.4
47900	663927	1391944	139.0	37.4	30.8	0.000	259.6

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
48000	664027	1391945	150.0	40.0	31.0	0.000	259.8
48100	664127	1391945	141.0	39.0	30.8	0.005	260.1
48200	664227	1391946	132.0	38.0	30.6	0.005	260.4
48300	664327	1391951	123.0	37.0	30.4	0.005	260.6
48400	664425	1391968	114.0	36.0	30.2	0.005	260.9
48500	664524	1391986	105.0	35.0	30.0	0.005	261.2
48600	664622	1392003	96.6	32.2	30.0	0.003	261.5
48700	664720	1392021	88.2	29.4	30.0	0.003	261.8
48800	664819	1392038	79.8	26.6	30.0	0.003	262.2
48900	664918	1392055	71.4	23.8	30.0	0.003	262.5
49000	665016	1392071	63.0	21.0	30.0	0.003	262.8
49100	665115	1392086	64.4	20.8	29.6	0.007	263.1
49200	665214	1392102	65.8	20.6	29.2	0.007	263.3
49300	665313	1392117	67.2	20.4	28.8	0.007	263.6
49400	665412	1392132	68.6	20.2	28.4	0.007	263.8
49500	665510	1392148	70.0	20.0	28.0	0.007	264.1
49600	665608	1392169	71.0	21.4	28.2	0.001	264.4
49700	665704	1392195	72.0	22.8	28.4	0.001	264.7
49800	665801	1392222	73.0	24.2	28.6	0.001	265.1
49900	665897	1392248	74.0	25.6	28.8	0.001	265.4
50000	665994	1392275	75.0	27.0	29.0	0.001	265.7
50100	666090	1392301	75.4	28.2	28.8	0.005	266.0
50200	666187	1392327	75.8	29.4	28.6	0.005	266.3
50300	666283	1392354	76.2	30.6	28.4	0.005	266.5
50400	666378	1392385	76.6	31.8	28.2	0.005	266.8
50500	666472	1392418	77.0	33.0	28.0	0.005	267.1
50600	666567	1392451	75.6	32.6	28.4	-0.001	267.4
50700	666661	1392484	74.2	32.2	28.8	-0.001	267.7
50800	666756	1392517	72.8	31.8	29.2	-0.001	268.1
50900	666850	1392550	71.4	31.4	29.6	-0.001	268.4
51000	666946	1392576	70.0	31.0	30.0	-0.001	268.7
51100	667045	1392593	69.2	30.2	30.0	0.003	269.0
51200	667143	1392611	68.4	29.4	30.0	0.003	269.2
51300	667242	1392628	67.6	28.6	30.0	0.003	269.5
51400	667340	1392646	66.8	27.8	30.0	0.003	269.7
51500	667439	1392663	66.0	27.0	30.0	0.003	270.0
51600	667537	1392680	65.8	27.2	30.0	0.003	270.3
51700	667636	1392695	65.6	27.4	30.0	0.003	270.5
51800	667735	1392710	65.4	27.6	30.0	0.003	270.8
51900	667834	1392726	65.2	27.8	30.0	0.003	271.0

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
52000	667932	1392741	65.0	28.0	30.0	0.003	271.3
52100	668031	1392757	66.0	28.4	29.8	0.005	271.6
52200	668130	1392772	67.0	28.8	29.6	0.005	271.8
52300	668226	1392798	68.0	29.2	29.4	0.005	272.1
52400	668322	1392828	69.0	29.6	29.2	0.005	272.3
52500	668418	1392857	70.0	30.0	29.0	0.005	272.6
52600	668513	1392886	71.0	30.4	28.4	0.009	272.9
52700	668609	1392916	72.0	30.8	27.8	0.009	273.3
52800	668704	1392945	73.0	31.2	27.2	0.009	273.6
52900	668800	1392974	74.0	31.6	26.6	0.009	274.0
53000	668896	1393004	75.0	32.0	26.0	0.009	274.3
53100	668991	1393033	74.0	31.6	26.2	0.001	274.6
53200	669087	1393063	73.0	31.2	26.4	0.001	274.8
53300	669182	1393092	72.0	30.8	26.6	0.001	275.1
53400	669278	1393121	71.0	30.4	26.8	0.001	275.3
53500	669373	1393151	70.0	30.0	27.0	0.001	275.6
53600	669469	1393180	71.0	29.0	27.0	0.003	275.9
53700	669562	1393216	72.0	28.0	27.0	0.003	276.2
53800	669655	1393253	73.0	27.0	27.0	0.003	276.6
53900	669748	1393291	74.0	26.0	27.0	0.003	276.9
54000	669840	1393329	75.0	25.0	27.0	0.003	277.2
54100	669933	1393367	74.0	24.2	27.2	0.001	277.5
54200	670025	1393406	73.0	23.4	27.4	0.001	277.7
54300	670116	1393448	72.0	22.6	27.6	0.001	278.0
54400	670207	1393489	71.0	21.8	27.8	0.001	278.2
54500	670297	1393531	70.0	21.0	28.0	0.001	278.5
54600	670388	1393573	69.0	21.2	28.2	0.001	278.8
54700	670479	1393614	68.0	21.4	28.4	0.001	279.1
54800	670570	1393656	67.0	21.6	28.6	0.001	279.3
54900	670661	1393698	66.0	21.8	28.8	0.001	279.6
55000	670743	1393754	65.0	22.0	29.0	0.001	279.9
55100	670826	1393811	64.0	21.2	29.2	-0.001	280.0
55200	670908	1393869	63.0	20.4	29.4	-0.001	280.0
55300	670990	1393926	62.0	19.6	29.6	-0.001	280.1
55400	671072	1393983	61.0	18.8	29.8	-0.001	280.1
55500	671154	1394040	60.0	18.0	30.0	-0.001	280.2
55600	671236	1394097	62.0	19.2	30.0	0.008	281.0
55700	671328	1394135	64.0	20.4	30.0	0.008	281.8
55800	671422	1394168	66.0	21.6	30.0	0.008	282.5
55900	671517	1394201	68.0	22.8	30.0	0.008	283.3

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
56000	671611	1394234	70.0	24.0	30.0	0.008	284.1
56100	671705	1394267	69.0	23.8	30.0	0.004	284.5
56200	671800	1394300	68.0	23.6	30.0	0.004	284.9
56300	671884	1394352	67.0	23.4	30.0	0.004	285.3
56400	671961	1394415	66.0	23.2	30.0	0.004	285.7
56500	672039	1394478	65.0	23.0	30.0	0.004	286.1
56600	672117	1394541	65.0	22.0	30.2	0.002	286.5
56700	672194	1394604	65.0	21.0	30.4	0.002	286.9
56800	672272	1394667	65.0	20.0	30.6	0.002	287.3
56900	672351	1394727	65.0	19.0	30.8	0.002	287.7
57000	672441	1394771	65.0	18.0	31.0	0.002	288.1
57100	672531	1394815	64.0	16.8	30.8	0.006	288.5
57200	672621	1394859	63.0	15.6	30.6	0.006	288.9
57300	672711	1394903	62.0	14.4	30.4	0.006	289.2
57400	672794	1394956	61.0	13.2	30.2	0.006	289.6
57500	672872	1395019	60.0	12.0	30.0	0.006	290.0
57600	672950	1395083	60.0	12.4	30.0	0.004	290.4
57700	673027	1395146	60.0	12.8	30.0	0.004	290.8
57800	673105	1395209	60.0	13.2	30.0	0.004	291.2
57900	673182	1395272	60.0	13.6	30.0	0.004	291.6
58000	673260	1395334	60.0	14.0	30.0	0.004	292.0
58100	673346	1395386	59.0	16.6	30.0	0.004	292.4
58200	673431	1395438	58.0	19.2	30.0	0.004	292.8
58300	673516	1395491	57.0	21.8	30.0	0.004	293.2
58400	673602	1395543	56.0	24.4	30.0	0.004	293.6
58500	673687	1395595	55.0	27.0	30.0	0.004	294.0
58600	673772	1395647	54.0	24.0	29.6	0.008	294.4
58700	673858	1395699	53.0	21.0	29.2	0.008	294.8
58800	673943	1395751	52.0	18.0	28.8	0.008	295.1
58900	674028	1395803	51.0	15.0	28.4	0.008	295.5
59000	674112	1395858	50.0	12.0	28.0	0.008	295.9
59100	674189	1395921	49.0	12.6	27.8	0.006	296.3
59200	674267	1395984	48.0	13.2	27.6	0.006	296.7
59300	674345	1396047	47.0	13.8	27.4	0.006	297.1
59400	674422	1396110	46.0	14.4	27.2	0.006	297.5
59500	674500	1396174	45.0	15.0	27.0	0.006	297.9
59600	674577	1396237	41.2	14.8	27.0	0.004	298.3
59700	674665	1396284	37.4	14.6	27.0	0.004	298.7
59800	674755	1396328	33.6	14.4	27.0	0.004	299.1
59900	674844	1396372	29.8	14.2	27.0	0.004	299.5

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II A. HOTOPHIA CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
60000	674934	1396416	26.0	14.0	27.0	0.004	299.9
60100	675026	1396454	28.4	14.8	27.2	0.003	300.4
60200	675126	1396454	30.8	15.6	27.4	0.003	300.9
60300	675226	1396455	33.2	16.4	27.6	0.003	301.5
60400	675326	1396455	35.6	17.2	27.8	0.003	302.0
60500	675426	1396456	38.0	18.0	28.0	0.003	302.5
60600	675522	1396429	38.4	18.0	27.4	0.011	303.0
60700	675618	1396401	38.8	18.0	26.8	0.011	303.5
60800	675714	1396372	39.2	18.0	26.2	0.011	304.1
60900	675808	1396340	39.6	18.0	25.6	0.011	304.6
61000	675901	1396303	40.0	18.0	25.0	0.011	305.1
61100	675994	1396267	43.0	18.4	25.2	0.003	305.6
61200	676092	1396258	46.0	18.8	25.4	0.003	306.0
61300	676186	1396292	49.0	19.2	25.6	0.003	306.5
61400	676278	1396330	52.0	19.6	25.8	0.003	306.9
61500	676370	1396368	55.0	20.0	26.0	0.003	307.4
61600	676461	1396410	52.0	19.8	25.8	0.007	307.9
61700	676552	1396452	49.0	19.6	25.6	0.007	308.4
61800	676643	1396493	46.0	19.4	25.4	0.007	309.0
61900	676734	1396535	43.0	19.2	25.2	0.007	309.5
62000	676825	1396577	40.0	19.0	25.0	0.007	310.0
62100	676916	1396618	40.0	19.0	25.0	0.004	310.4
62200	677007	1396660	40.0	19.0	25.0	0.004	310.8
62300	677093	1396711	40.0	19.0	25.0	0.004	311.2
62400	677178	1396763	40.0	19.0	25.0	0.004	311.6
62500	677264	1396815	40.0	19.0	25.0	0.004	312.0

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX II B. HOTOPHIA CREEK BANK CONDITION

CHANNEL LOCATION	UNSTABLE BANKS		BANK VEGETATION		RAW BANKS
	L - LIGHT M - MODERATE S - SEVERE		1 - LARGE TREES 2 - BRUSH 4 - KUDZU/GRASS		L - LEFT R - RIGHT X - BOTH
	LEFT	RIGHT	LEFT	RIGHT	
	0123456789	0123456789	0123456789	0123456789	0123456789
(ft)	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
0+	MMMMMMMMM		4444444444	4444444444	LLLLLLLLL
1000+			4444433333	3333333333	
2000+			3333333333	3333333333	
3000+	MM		7777777777	7777777777	LL
4000+		SSSSS	7777775555	7777774444	RRRRR
5000+			7777776666	6666666666	
6000+			6666666666	6666666666	
7000+			6666677777	6666677777	
8000+			6666666677	6666666666	
9000+			7777777777	6666666666	
10000+			7777776666	6666666666	
11000+			7777777777	6666667777	
12000+			7777666777	7777777777	
13000+			7777777777	7777777777	
14000+			7777777777	7777777777	
15000+			7777777777	7777777777	
16000+			7777777777	7777777777	
17000+			7777776666	7777776666	
18000+			7777777777	6666666666	
19000+			6666666777	6777777777	
20000+			7777776666	7777776666	
21000+			6666666666	6666666666	
22000+			7777777777	7777777777	
23000+			6666666777	6666666777	
24000+			6666666666	7777777777	
25000+			7777777777	7777777777	
26000+			3333333333	3333333333	
27000+		SSS	3333333333	3333333333	RRR
28000+	SS		3333333333	3333333333	LL
29000+	SSSSSS	SSSS	3322222222	3333333333	LLLLLLRRRR
30000+			2222266666	2222266666	
31000+			6666666666	6666666666	
32000+	SSSS		6666667777	6666667777	LLLL
33000+			7777777776	7777777776	
34000+			6666666666	6666666666	
35000+	SSS		6677777777	6677777777	LLL
36000+		SS	3333333333	3333333333	RR
37000+	SS	SSS SSSSS	3333777777	3333777777	RRRLLRRRRR
38000+		SSSSS	7777777777	7777777777	RRRRR
39000+	SS SSS	SSS	7777777777	7777777777	RRR RR LLL

APPENDIX II B. HOTOPHIA CREEK BANK CONDITION

CHANNEL LOCATION	UNSTABLE BANKS		BANK VEGETATION		RAW BANKS
	L - LIGHT M - MODERATE S - SEVERE		1 - LARGE TREES 2 - BRUSH 4 - KUDZU/GRASS		L - LEFT R - RIGHT X - BOTH
	LEFT	RIGHT	LEFT	RIGHT	
	0123456789	0123456789	0123456789	0123456789	0123456789
(ft)	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
40000+			7777777777	7777777777	
41000+			7777777777	7777777777	
42000+			7777777777	7777777777	
43000+			3333333333	3333333333	
44000+			3333333333	3333333333	
45000+			3333333333	3333333333	
46000+			3333333333	3333333333	
47000+			7666666667	7666666667	
48000+			7766666666	7766666666	
49000+	MMMM	MMMM	3333333333	3333333333	
50000+	MMMMM MMM	MMMMM MMM	3333333333	3333333333	
51000+	MMMMMSSSSS	MMMMMMMMMM	333333	3333333333	LLLLL
52000+	SSSSSSSSSS	SSMMMMMMMM	2222222222	2222233333	LLLLLLLL
53000+	SSSS		2222222333	3333333333	LLLL
54000+			3333377777	3333377777	
55000+			7766666666	7766666666	
56000+	MMMMMMMMMM	MMMMM	3333333333	3333333333	LLLLL
57000+			7777777777	7777777777	
58000+	SSSS	SSSS	7777774444	7777774444	XXXX
59000+			4444444444	4444444444	
60000+			7777777777	7777777777	
61000+		SS	7776666666	7777776666	RR
62000+			777777	777777	

APPENDIX II C. HOTOPHIA CREEK PROTECTION MEASURES

CHANNEL LOCATION	RIPRAP		GROINS	JACKS	FENCE
	L - LEFT R - RIGHT X - BOTH		L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH
	FULL	PARTIAL			
(ft)	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
0+					
1000+					
2000+					
3000+					
4000+					
5000+	X		RRRR		
6000+			LLLLLLLRRR		
7000+			RRLLLLLLLL		
8000+			LLLLLLLLLL		
9000+			LLLLLLLLLL		
10000+	RRRRR			RRRRR	
11000+	RRRLLLRRRR				
12000+	RRRLLLLLLL				
13000+	LLL	LLLLL			
14000+		RRRRRRRRR			
15000+		LLLL			
16000+					
17000+					
18000+					
19000+		RRRRRRRRRR			
20000+					
21000+					
22000+					
23000+		RRRRRRR			
24000+		RRRLLLLLLL			
25000+		LLLRRRRRRR			
26000+		LLLL			
27000+					
28000+					
29000+					
30000+	XXR	R LLLLL			
31000+		XX LLLLLLLL			
32000+	XLL				
33000+	XX				
34000+					
35000+					
36000+					
37000+					
38000+					
39000+					

CHANNEL LOCATION	RIPRAP		GROINS	JACKS	FENCE
	L - LEFT R - RIGHT X - BOTH		L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH
	FULL	PARTIAL			
(ft)	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
40000+					
41000+				LLLXR	
42000+				RRRR	
43000+					
44000+					
45000+					
46000+					
47000+	X				
48000+					
49000+		X			
50000+					
51000+	X				
52000+					
53000+		X			
54000+	X				
55000+	X				
56000+					
57000+					
58000+					
59000+					
60000+					
61000+					
62000+					

APPENDIX II C. HOTOPHIA CREEK PROTECTION MEASURES (CONTINUED)

CHANNEL LOCATION (ft)	DROP-PIPE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000	LOW DROP STRUCTURE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000
0+		
1000+		
2000+		
3000+		
4000+		
5000+		X
6000+		
7000+		
8000+		
9000+		
10000+		
11000+		
12000+		
13000+		
14000+		
15000+		
16000+		
17000+	L	
18000+	L	
19000+	R L	
20000+		
21000+		
22000+	R	
23000+	R	
24000+		
25000+	L	
26000+		
27000+		
28000+	R	
29000+		
30000+		
31000+	L	
32000+	R L L	
33000+	R	X
34000+	R R	
35000+	L LR	
36000+		
37000+	R	
38000+	R	
39000+	L	

APPENDIX II C. HOTOPHIA CREEK PROTECTION MEASURES (CONTINUED)

CHANNEL LOCATION (ft)	DROP-PIPE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000	LOW DROP STRUCTURE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000
40000+		
41000+	L L	
42000+	L R	
43000+	L L	
44000+	L	
45000+	L	
46000+		
47000+	R R	X
48000+	R	
49000+	R	X
50000+		
51000+	LR	X
52000+	L	
53000+	L	X
54000+	R	X
55000+	R	X
56000+	R	
57000+		
58000+		
59000+		
60000+		
61000+	L L	
62000+		

APPENDIX II D. HOTOPHIA CREEK BED MATERIAL

CHANNEL LOCATION (ft)	BED MATERIAL 1 - CLAY 2 - SAND 4 - GRAVEL 0123456789 0000000000 0000000000
0+	2222222222
1000+	2222222222
2000+	2222222222
3000+	2222222222
4000+	2222222222
5000+	2222222222
6000+	2222222222
7000+	2222222222
8000+	2222222222
9000+	2222222222
10000+	2222222222
11000+	2222222222
12000+	2222222222
13000+	2222222222
14000+	2222222222
15000+	2222222222
16000+	2222222222
17000+	2222222222
18000+	2222222222
19000+	2222222222
20000+	2222222222
21000+	2222333222
22000+	2222222222
23000+	2222222222
24000+	2222222222
25000+	2222222222
26000+	2222222222
27000+	2222222222
28000+	2222222222
29000+	2222222222
30000+	2222222222
31000+	2222222222
32000+	2222222222
33000+	2222222222
34000+	2222222222
35000+	2222222222
36000+	2222222222
37000+	2222222222
38000+	2222222222
39000+	2222222222

APPENDIX II D. HOTOPHIA CREEK BED MATERIAL

CHANNEL LOCATION	BED MATERIAL 1 - CLAY 2 - SAND 4 - GRAVEL
	0123456789
(ft)	0000000000
	0000000000
40000+	2222222222
41000+	2222222222
42000+	2222222222
43000+	2222222222
44000+	2222222222
45000+	2222222222
46000+	332223333
47000+	2224222222
48000+	2222222222
49000+	2222222222
50000+	2222222222
51000+	2222222222
52000+	2222222222
53000+	2222333333
54000+	3333333333
55000+	3333333333
56000+	3333333333
57000+	3333333333
58000+	3333333333
59000+	3333333333
60000+	3333333333
61000+	3333333333
62000+	333333

APPENDIX III A. DEER CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
0	664217	1391946	65.0	9.0	28.0	0.011	260.5
100	664310	1391909	64.0	9.6	27.6	0.011	261.2
200	664403	1391872	63.0	10.2	27.2	0.011	261.9
300	664480	1391820	62.0	10.8	26.8	0.011	262.7
400	664519	1391727	61.0	11.4	26.4	0.011	263.4
500	664554	1391635	60.0	12.0	26.0	0.011	264.1
600	664554	1391535	60.0	12.6	25.4	0.014	264.9
700	664550	1391436	60.0	13.2	24.8	0.014	265.7
800	664487	1391359	60.0	13.8	24.2	0.014	266.4
900	664423	1391282	60.0	14.4	23.6	0.014	267.2
1000	664376	1391196	60.0	15.0	23.0	0.014	268.0
1100	664350	1391099	61.0	14.4	22.2	0.015	268.7
1200	664324	1391003	62.0	13.8	21.4	0.015	269.5
1300	664318	1390907	63.0	13.2	20.6	0.015	270.2
1400	664357	1390815	64.0	12.6	19.8	0.015	271.0
1500	664384	1390725	65.0	12.0	19.0	0.015	271.7
1600	664320	1390648	62.0	12.0	17.8	0.020	272.5
1700	664257	1390570	59.0	12.0	16.6	0.020	273.3
1800	664243	1390486	56.0	12.0	15.4	0.020	274.0
1900	664282	1390394	53.0	12.0	14.2	0.020	274.8
2000	664332	1390309	50.0	12.0	13.0	0.020	275.6
2100	664406	1390242	52.0	12.6	12.8	0.008	276.2
2200	664481	1390176	54.0	13.2	12.6	0.008	276.8
2300	664555	1390109	56.0	13.8	12.4	0.008	277.3
2400	664630	1390042	58.0	14.4	12.2	0.008	277.9
2500	664688	1389962	60.0	15.0	12.0	0.008	278.5
2600	664741	1389877	53.0	14.4	11.4	0.012	279.1
2700	664794	1389793	46.0	13.8	10.8	0.012	279.7
2800	664848	1389708	39.0	13.2	10.2	0.012	280.3
2900	664901	1389623	32.0	12.6	9.6	0.012	280.9
3000	664950	1389536	25.0	12.0	9.0	0.012	281.5
3100	664999	1389449	24.0	11.0	8.8	0.005	281.8
3200	665048	1389362	23.0	10.0	8.6	0.005	282.1
3300	665105	1389280	22.0	9.0	8.4	0.005	282.5
3400	665169	1389204	21.0	8.0	8.2	0.005	282.8
3500	665233	1389127	20.0	7.0	8.0	0.005	283.1
3600	665298	1389050	20.0	8.0	8.2	0.001	283.4
3700	665362	1388974	20.0	9.0	8.4	0.001	283.8
3800	665415	1388891	20.0	10.0	8.6	0.001	284.1
3900	665442	1388795	20.0	11.0	8.8	0.001	284.5

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX III A. DEER CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
4000	665470	1388699	20.0	12.0	9.0	0.001	284.8
4100	665499	1388603	22.0	12.6	8.8	0.005	285.1
4200	665537	1388511	24.0	13.2	8.6	0.005	285.4
4300	665576	1388419	26.0	13.8	8.4	0.005	285.8
4400	665559	1388321	28.0	14.4	8.2	0.005	286.1
4500	665539	1388223	30.0	15.0	8.0	0.005	286.4
4600	665519	1388125	29.0	14.4	8.0	0.004	286.8
4700	665499	1388027	28.0	13.8	8.0	0.004	287.2
4800	665459	1387936	27.0	13.2	8.0	0.004	287.6
4900	665415	1387846	26.0	12.6	8.0	0.004	288.0
5000	665371	1387756	25.0	12.0	8.0	0.004	288.4
5100	665327	1387667	24.0	11.6	7.8	0.006	288.8
5200	665283	1387577	23.0	11.2	7.6	0.006	289.2
5300	665236	1387489	22.0	10.8	7.4	0.006	289.6
5400	665172	1387412	21.0	10.4	7.2	0.006	290.0
5500	665109	1387335	20.0	10.0	7.0	0.006	290.4
5600	665045	1387257	22.0	9.8	7.6	-0.003	290.7
5700	664984	1387178	24.0	9.6	8.2	-0.003	290.9
5800	664932	1387093	26.0	9.4	8.8	-0.003	291.2
5900	664880	1387008	28.0	9.2	9.4	-0.003	291.4
6000	664827	1386923	30.0	9.0	10.0	-0.003	291.7
6100	664775	1386838	29.6	8.8	10.2	0.001	292.0
6200	664725	1386751	29.2	8.6	10.4	0.001	292.3
6300	664677	1386663	28.8	8.4	10.6	0.001	292.7
6400	664629	1386576	28.4	8.2	10.8	0.001	293.0
6500	664581	1386488	28.0	8.0	11.0	0.001	293.3
6600	664555	1386391	29.4	9.4	11.4	0.000	293.7
6700	664529	1386295	30.8	10.8	11.8	0.000	294.1
6800	664503	1386198	32.2	12.2	12.2	0.000	294.5
6900	664500	1386099	33.6	13.6	12.6	0.000	294.9
7000	664500	1385999	35.0	15.0	13.0	0.000	295.3
7100	664501	1385899	34.4	14.8	13.2	0.001	295.6
7200	664484	1385800	33.8	14.6	13.4	0.001	295.9
7300	664465	1385702	33.2	14.4	13.6	0.001	296.3
7400	664445	1385604	32.6	14.2	13.8	0.001	296.6
7500	664425	1385506	32.0	14.0	14.0	0.001	296.9
7600	664408	1385408	31.6	13.2	14.2	0.001	297.2
7700	664392	1385309	31.2	12.4	14.4	0.001	297.6
7800	664376	1385210	30.8	11.6	14.6	0.001	297.9
7900	664360	1385111	30.4	10.8	14.8	0.001	298.3

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX III A. DEER CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
8000	664345	1385013	30.0	10.0	15.0	0.001	298.6
8100	664338	1384913	29.0	10.4	14.6	0.007	298.9
8200	664339	1384813	28.0	10.8	14.2	0.007	299.2
8300	664339	1384713	27.0	11.2	13.8	0.007	299.6
8400	664340	1384613	26.0	11.6	13.4	0.007	299.9
8500	664298	1384533	25.0	12.0	13.0	0.007	300.2
8600	664221	1384470	25.0	12.0	12.2	0.022	301.6
8700	664143	1384407	25.0	12.0	11.4	0.022	303.0
8800	664059	1384363	25.0	12.0	10.6	0.022	304.3
8900	663959	1384363	25.0	12.0	9.8	0.022	305.7
9000	663932	1384300	25.0	12.0	9.0	0.022	307.1
9100	663949	1384202	25.4	11.6	9.0	0.012	308.3
9200	663966	1384103	25.8	11.2	9.0	0.012	309.5
9300	663983	1384005	26.2	10.8	9.0	0.012	310.6
9400	664000	1383906	26.6	10.4	9.0	0.012	311.8
9500	664054	1383836	27.0	10.0	9.0	0.012	313.0
9600	664145	1383793	27.0	10.0	9.0	0.014	314.4
9700	664235	1383750	27.0	10.0	9.0	0.014	315.8
9800	664325	1383707	27.0	10.0	9.0	0.014	317.1
9900	664416	1383664	27.0	10.0	9.0	0.014	318.5
10000	664506	1383621	27.0	10.0	9.0	0.014	319.9

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX III B. DEER CREEK BANK CONDITION

CHANNEL LOCATION	UNSTABLE BANKS		BANK VEGETATION		RAW BANKS
	L - LIGHT M - MODERATE S - SEVERE		1 - LARGE TREES 2 - BRUSH 4 - KUDZU/GRASS		L - LEFT R - RIGHT X - BOTH
	LEFT	RIGHT	LEFT	RIGHT	
(ft)	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
0+	MMMMM	MMMMM	3333333333	3333333333	
1000+	MMMMMMMSSS	MMMMMMMMMM	3333333333	3333333333	LLL
2000+	MMMMMM	MMMMMM	3333333333	3333333333	
3000+			3333333333	3333333333	
4000+			3333333333	3333333333	
5000+			3333333333	3333333333	
6000+			3333333333	3333333333	
7000+			3333333333	3333333333	
8000+			3333333333	3333333333	
9000+			3333333333	3333333333	
10000+			3	3	

APPENDIX III C. DEER CREEK PROTECTION MEASURES

CHANNEL LOCATION	RIPRAP		GROINS	JACKS	FENCE
	L - LEFT R - RIGHT X - BOTH		L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH
	FULL	PARTIAL			
(ft)	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
0+					
1000+					
2000+					
3000+					
4000+					
5000+					
6000+					
7000+					
8000+					
9000+					
10000+					

APPENDIX III C. DEER CREEK PROTECTION MEASURES
(CONTINUED)

CHANNEL LOCATION (ft)	DROP-PIPE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000	LOW DROP STRUCTURE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000
0+	R	
1000+	R	
2000+		
3000+		
4000+		
5000+		
6000+		
7000+		
8000+		
9000+		
10000+		

APPENDIX III D. DEER CREEK BED MATERIAL

CHANNEL LOCATION (ft)	BED MATERIAL 1 - CLAY 2 - SAND 4 - GRAVEL 0123456789 0000000000 0000000000
0+	2222333333
1000+	3333333333
2000+	3333333222
3000+	2222333333
4000+	2222222222
5000+	2222222222
6000+	2222222222
7000+	2222222222
8000+	22222222
9000+	2222222222
10000+	2

APPENDIX IV A. HARRIS CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
0	644586	1392858	120.0	112.0	20.0	0.003	227.0
100	644587	1392758	117.0	102.8	20.2	0.003	227.5
200	644625	1392666	114.0	93.6	20.4	0.003	227.9
300	644664	1392574	111.0	84.4	20.6	0.003	228.4
400	644693	1392478	108.0	75.2	20.8	0.003	228.8
500	644720	1392382	105.0	66.0	21.0	0.003	229.3
600	644748	1392286	99.0	59.2	20.6	0.009	229.8
700	644782	1392192	93.0	52.4	20.2	0.009	230.2
800	644821	1392100	87.0	45.6	19.8	0.009	230.7
900	644860	1392008	81.0	38.8	19.4	0.009	231.1
1000	644899	1391915	75.0	32.0	19.0	0.009	231.6
1100	644919	1391822	76.0	33.0	18.8	0.007	232.1
1200	644893	1391726	77.0	34.0	18.6	0.007	232.5
1300	644867	1391629	78.0	35.0	18.4	0.007	233.0
1400	644832	1391541	79.0	36.0	18.2	0.007	233.4
1500	644736	1391512	80.0	37.0	18.0	0.007	233.9
1600	644640	1391483	79.0	35.6	18.0	0.005	234.4
1700	644545	1391453	78.0	34.2	18.0	0.005	234.8
1800	644469	1391394	77.0	32.8	18.0	0.005	235.3
1900	644406	1391317	76.0	31.4	18.0	0.005	235.7
2000	644342	1391240	75.0	30.0	18.0	0.005	236.2
2100	644316	1391143	71.0	31.0	18.6	-0.001	236.7
2200	644290	1391047	67.0	32.0	19.2	-0.001	237.1
2300	644264	1390950	63.0	33.0	19.8	-0.001	237.6
2400	644238	1390854	59.0	34.0	20.4	-0.001	238.0
2500	644211	1390757	55.0	35.0	21.0	-0.001	238.5
2600	644185	1390661	58.0	35.2	19.6	0.019	239.0
2700	644151	1390567	61.0	35.4	18.2	0.019	239.5
2800	644113	1390474	64.0	35.6	16.8	0.019	240.1
2900	644081	1390380	67.0	35.8	15.4	0.019	240.6
3000	644055	1390283	70.0	36.0	14.0	0.019	241.1
3100	644029	1390187	70.0	35.8	14.0	0.005	241.6
3200	643989	1390097	70.0	35.6	14.0	0.005	242.2
3300	643925	1390020	70.0	35.4	14.0	0.005	242.7
3400	643862	1389943	70.0	35.2	14.0	0.005	243.3
3500	643798	1389866	70.0	35.0	14.0	0.005	243.8
3600	643735	1389788	76.0	35.0	14.4	0.002	244.4
3700	643671	1389711	82.0	35.0	14.8	0.002	245.0
3800	643608	1389634	88.0	35.0	15.2	0.002	245.5
3900	643544	1389556	94.0	35.0	15.6	0.002	246.1

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX IV A. HARRIS CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
4000	643466	1389499	100.0	35.0	16.0	0.002	246.7
4100	643374	1389461	86.0	34.0	16.0	0.005	247.2
4200	643281	1389423	72.0	33.0	16.0	0.005	247.7
4300	643231	1389343	58.0	32.0	16.0	0.005	248.3
4400	643193	1389250	44.0	31.0	16.0	0.005	248.8
4500	643132	1389175	30.0	30.0	16.0	0.005	249.3

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX IV B. HARRIS CREEK BANK CONDITION

CHANNEL LOCATION	UNSTABLE BANKS		BANK VEGETATION		RAW BANKS
	L - LIGHT M - MODERATE S - SEVERE		1 - LARGE TREES 2 - BRUSH 4 - KUDZU/GRASS		L - LEFT R - RIGHT X - BOTH
	LEFT	RIGHT	LEFT	RIGHT	
	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
(ft)					
0+	SSSSSMMMMM	MMMMM	3333333333	3333333333	LLLLLL
1000+	MMMMMMMMMM	MMMSSSMMMM	3333333333	3333333333	RRR
2000+	MMMMMMMMMM	MMMMMMMMMM	3333333333	3333333333	
3000+					
4000+					

APPENDIX IV C. HARRIS CREEK PROTECTION MEASURES

CHANNEL LOCATION	RIPRAP		GROINS	JACKS	FENCE
	L - LEFT R - RIGHT X - BOTH		L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH
	FULL	PARTIAL			
	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
(ft)					
0+					
1000+					
2000+					
3000+	XXXRRRRRRR	LLLLLLL	LLLLL		
4000+	RXXXXX	L	L		

APPENDIX IV C. HARRIS CREEK PROTECTION MEASURES
(CONTINUED)

CHANNEL LOCATION	DROP-PIPE	LOW DROP STRUCTURE
	L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH
	0123456789	0123456789
(ft)	0000000000	0000000000
	0000000000	0000000000
0+		
1000+		
2000+		
3000+		
4000+	L	

APPENDIX IV D. HARRIS CREEK BED MATERIAL

CHANNEL LOCATION	BED MATERIAL
	1 - CLAY 2 - SAND 4 - GRAVEL
	0123456789
(ft)	0000000000
	0000000000
0+	7777777777
1000+	7777777777
2000+	7777777777
3000+	6677777777
4000+	777777

APPENDIX V A. MARCUM CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
0	669578	1393188	60.0	6.0	25.0	0.005	276.6
100	669671	1393151	61.0	5.8	25.2	0.005	277.3
200	669764	1393115	62.0	5.6	25.4	0.005	277.9
300	669857	1393078	63.0	5.4	25.6	0.005	278.6
400	669950	1393041	64.0	5.2	25.8	0.005	279.2
500	670043	1393004	65.0	5.0	26.0	0.005	279.9
600	670138	1392976	63.0	5.0	26.2	0.004	280.5
700	670236	1392953	61.0	5.0	26.4	0.004	281.2
800	670333	1392930	59.0	5.0	26.6	0.004	281.8
900	670430	1392907	57.0	5.0	26.8	0.004	282.5
1000	670528	1392885	55.0	5.0	27.0	0.004	283.1
1100	670626	1392866	54.0	5.0	26.8	0.008	283.7
1200	670724	1392847	53.0	5.0	26.6	0.008	284.3
1300	670822	1392828	52.0	5.0	26.4	0.008	284.9
1400	670920	1392808	51.0	5.0	26.2	0.008	285.5
1500	671018	1392788	50.0	5.0	26.0	0.008	286.1
1600	671113	1392756	50.0	6.4	24.8	0.018	286.7
1700	671208	1392723	50.0	7.8	23.6	0.018	287.3
1800	671302	1392691	50.0	9.2	22.4	0.018	287.8
1900	671397	1392659	50.0	10.6	21.2	0.018	288.4
2000	671492	1392627	50.0	12.0	20.0	0.018	289.0
2100	671587	1392595	49.0	11.6	20.6	0.000	289.6
2200	671686	1392593	48.0	11.2	21.2	0.000	290.2
2300	671786	1392594	47.0	10.8	21.8	0.000	290.8
2400	671885	1392586	46.0	10.4	22.4	0.000	291.4
2500	671983	1392567	45.0	10.0	23.0	0.000	292.0
2600	672082	1392548	44.8	10.0	22.0	0.016	292.6
2700	672180	1392529	44.6	10.0	21.0	0.016	293.2
2800	672278	1392510	44.4	10.0	20.0	0.016	293.7
2900	672374	1392484	44.2	10.0	19.0	0.016	294.3
3000	672464	1392441	44.0	10.0	18.0	0.016	294.9
3100	672555	1392398	43.2	9.8	18.0	0.006	295.5
3200	672645	1392356	42.4	9.6	18.0	0.006	296.1
3300	672735	1392313	41.6	9.4	18.0	0.006	296.7
3400	672820	1392260	40.8	9.2	18.0	0.006	297.3
3500	672901	1392202	40.0	9.0	18.0	0.006	297.9
3600	672983	1392144	41.0	9.6	18.0	0.006	298.5
3700	673064	1392086	42.0	10.2	18.0	0.006	299.1
3800	673145	1392028	43.0	10.8	18.0	0.006	299.7
3900	673225	1391968	44.0	11.4	18.0	0.006	300.3

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX V A. MARCUM CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
4000	673304	1391906	45.0	12.0	18.0	0.006	300.9
4100	673382	1391843	46.0	11.6	18.0	0.004	301.3
4200	673457	1391778	47.0	11.2	18.0	0.004	301.7
4300	673522	1391702	48.0	10.8	18.0	0.004	302.0
4400	673586	1391625	49.0	10.4	18.0	0.004	302.4
4500	673641	1391542	50.0	10.0	18.0	0.004	302.8
4600	673690	1391455	46.0	10.4	16.6	0.018	303.2
4700	673739	1391368	42.0	10.8	15.2	0.018	303.6
4800	673787	1391280	38.0	11.2	13.8	0.018	304.0
4900	673826	1391188	34.0	11.6	12.4	0.018	304.4
5000	673864	1391096	30.0	12.0	11.0	0.018	304.8
5100	673903	1391003	29.0	11.6	10.6	0.008	305.2
5200	673942	1390911	28.0	11.2	10.2	0.008	305.6
5300	674000	1390831	27.0	10.8	9.8	0.008	306.0
5400	674064	1390754	26.0	10.4	9.4	0.008	306.4
5500	674128	1390677	25.0	10.0	9.0	0.008	306.8
5600	674193	1390601	26.0	10.4	9.0	0.004	307.2
5700	674245	1390516	27.0	10.8	9.0	0.004	307.6
5800	674294	1390428	28.0	11.2	9.0	0.004	307.9
5900	674342	1390341	29.0	11.6	9.0	0.004	308.3
6000	674401	1390262	30.0	12.0	9.0	0.004	308.7
6100	674480	1390200	29.0	11.6	8.8	0.006	309.1
6200	674558	1390138	28.0	11.2	8.6	0.006	309.5
6300	674636	1390076	27.0	10.8	8.4	0.006	309.9
6400	674715	1390014	26.0	10.4	8.2	0.006	310.3
6500	674793	1389952	25.0	10.0	8.0	0.006	310.7
6600	674871	1389889	24.2	9.6	8.0	0.004	311.1
6700	674937	1389814	23.4	9.2	8.0	0.004	311.5
6800	675001	1389738	22.6	8.8	8.0	0.004	311.9
6900	675066	1389661	21.8	8.4	8.0	0.004	312.3
7000	675130	1389585	21.0	8.0	8.0	0.004	312.7
7100	675134	1389486	20.8	8.2	8.0	0.003	313.0
7200	675135	1389386	20.6	8.4	8.0	0.003	313.3
7300	675194	1389308	20.4	8.6	8.0	0.003	313.7
7400	675258	1389231	20.2	8.8	8.0	0.003	314.0
7500	675323	1389154	20.0	9.0	8.0	0.003	314.3
7600	675387	1389078	19.8	8.8	8.0	0.004	314.7
7700	675465	1389015	19.6	8.6	8.0	0.004	315.1
7800	675543	1388953	19.4	8.4	8.0	0.004	315.5
7900	675622	1388891	19.2	8.2	8.0	0.004	315.9

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX V A. MARCUM CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
8000	675716	1388876	19.0	8.0	8.0	0.004	316.3
8100	675816	1388876	18.8	7.8	7.8	0.006	316.7
8200	675904	1388856	18.6	7.6	7.6	0.006	317.1
8300	675953	1388769	18.4	7.4	7.4	0.006	317.4
8400	676002	1388682	18.2	7.2	7.2	0.006	317.8
8500	676051	1388595	18.0	7.0	7.0	0.006	318.2
8600	676112	1388516	18.0	7.0	7.0	0.003	318.5
8700	676671	1386714	18.0	7.0	7.0	0.003	318.9
8800	676696	1386617	18.0	7.0	7.0	0.003	319.2
8900	676721	1386521	18.0	7.0	7.0	0.003	319.6
9000	676745	1386424	18.0	7.0	7.0	0.003	319.9

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX V C. MARCUM CREEK PROTECTION MEASURES

CHANNEL LOCATION	RIPRAP		GROINS	JACKS	FENCE
	L - LEFT R - RIGHT X - BOTH		L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH
	FULL	PARTIAL			
(ft)	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
0+					
1000+					
2000+		XX			
3000+	R				X
4000+					
5000+					
6000+					
7000+					
8000+					
9000+					

APPENDIX V C. MARCUM CREEK PROTECTION MEASURES
(CONTINUED)

CHANNEL LOCATION (ft)	DROP-PIPE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000	LOW DROP STRUCTURE L - LEFT R - RIGHT X - BOTH 0123456789 0000000000 0000000000
0+	R	
1000+		
2000+		X
3000+	L	
4000+	L	
5000+		
6000+		
7000+		
8000+		
9000+		

APPENDIX V D. MARCUM CREEK BED MATERIAL

CHANNEL LOCATION	BED MATERIAL
	1 - CLAY 2 - SAND 4 - GRAVEL
	0123456789
(ft)	0000000000
	0000000000
0+	1111111111
1000+	1111111111
2000+	1111113331
3000+	1111111111
4000+	1111111111
5000+	1111111111
6000+	1111111111
7000+	1111111111
8000+	1111111111
9000+	1

APPENDIX VI A. MILLS CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		CHANNEL WIDTH		DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
0	651563	1389758	250.0	180.0	21.0	0.005	238.8
100	651627	1389681	212.0	147.0	21.0	0.005	239.3
200	651674	1389594	174.0	114.0	21.0	0.005	239.7
300	651713	1389502	136.0	81.0	21.0	0.005	240.2
400	651756	1389412	98.0	48.0	21.0	0.005	240.6
500	651805	1389325	60.0	15.0	21.0	0.005	241.1
600	651854	1389238	90.0	18.0	20.4	0.011	241.6
700	651902	1389150	120.0	21.0	19.8	0.011	242.0
800	651929	1389054	150.0	24.0	19.2	0.011	242.5
900	651956	1388957	180.0	27.0	18.6	0.011	242.9
1000	651984	1388861	210.0	30.0	18.0	0.011	243.4
1100	652030	1388773	198.0	28.0	18.0	0.007	244.1
1200	652079	1388686	186.0	26.0	18.0	0.007	244.8
1300	652128	1388598	174.0	24.0	18.0	0.007	245.6
1400	652156	1388506	162.0	22.0	18.0	0.007	246.3
1500	652157	1388406	150.0	20.0	18.0	0.007	247.0
1600	652157	1388306	129.0	19.2	18.2	0.005	247.7
1700	652158	1388206	108.0	18.4	18.4	0.005	248.5
1800	652158	1388106	87.0	17.6	18.6	0.005	249.2
1900	652159	1388006	66.0	16.8	18.8	0.005	250.0
2000	652182	1387914	45.0	16.0	19.0	0.005	250.7
2100	652245	1387837	46.0	15.6	18.8	0.009	251.4
2200	652294	1387750	47.0	15.2	18.6	0.009	252.1
2300	652343	1387663	48.0	14.8	18.4	0.009	252.9
2400	652392	1387575	49.0	14.4	18.2	0.009	253.6
2500	652441	1387488	50.0	14.0	18.0	0.009	254.3
2600	652490	1387401	50.0	13.8	18.2	0.005	255.0
2700	652538	1387313	50.0	13.6	18.4	0.005	255.7
2800	652582	1387225	50.0	13.4	18.6	0.005	256.5
2900	652588	1387126	50.0	13.2	18.8	0.005	257.2
3000	652641	1387042	50.0	13.0	19.0	0.005	257.9
3100	652694	1386957	51.0	12.8	18.8	0.006	258.3
3200	652747	1386872	52.0	12.6	18.6	0.006	258.7
3300	652801	1386788	53.0	12.4	18.4	0.006	259.0
3400	652836	1386698	54.0	12.2	18.2	0.006	259.4
3500	652837	1386598	55.0	12.0	18.0	0.006	259.8
3600	652837	1386498	51.0	11.6	16.8	0.018	260.4
3700	652826	1386400	47.0	11.2	15.6	0.018	261.0
3800	652788	1386308	43.0	10.8	14.4	0.018	261.6
3900	652760	1386216	39.0	10.4	13.2	0.018	262.2

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX VI A. MILLS CREEK CHANNEL CONDITIONS

CHANNEL LOCATION	MISSISSIPPI COORDINATES		WIDTH		CHANNEL DEPTH	SLOPE	GSE*
	EASTING	NORTHING	TOP	BOTTOM			
(ft)			(ft)	(ft)	(ft)		(ft)
4000	652809	1386128	35.0	10.0	12.0	0.018	262.8

* --- FROM TOPOGRAPHIC QUAD MAPS

APPENDIX VI B. MILLS CREEK BANK CONDITION

CHANNEL LOCATION	UNSTABLE BANKS		BANK VEGETATION		RAW BANKS
	L - LIGHT M - MODERATE S - SEVERE		1 - LARGE TREES 2 - BRUSH 4 - KUDZU/GRASS		L - LEFT R - RIGHT X - BOTH
	LEFT	RIGHT	LEFT	RIGHT	
	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
(ft)					
0+			6666666666	6666666666	
1000+	SS		6666666666	6666666666	LL
2000+			6666666666	6666666666	
3000+			6666777777	6666777777	
4000+			7	7	

APPENDIX VI C. MILLS CREEK PROTECTION MEASURES

CHANNEL LOCATION	RIPRAP		GROINS	JACKS	FENCE
	L - LEFT R - RIGHT X - BOTH		L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH	L - LEFT R - RIGHT X - BOTH
	FULL	PARTIAL			
(ft)	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000	0123456789 0000000000 0000000000
0+					
1000+					
2000+					
3000+					
4000+					

APPENDIX VI D. MILLS CREEK BED MATERIAL

CHANNEL LOCATION (ft)	BED MATERIAL 1 - CLAY 2 - SAND 4 - GRAVEL 0123456789 0000000000 0000000000
0+	2226666666
1000+	6666666666
2000+	6666666666
3000+	6666666777
4000+	7

Appendix VII. Low drop structures

Drop #	Year Built	Comments	Invert Elevation ft.	Channel Location ft. COE+	Channel Location ft. ARS++	Bank Height Above Invert ft.	Slope Between Drops
Hotophia							
1	~1981 repaired 1982	Riprap	199	5,545	5,950	10	
2	1984-85	Riprap	236	32,600	33,050	17	.0014
3	1984-85	Riprap	257	47,050	47,050	21	.0015
4(1)*	1979-80		261	49,695	49,700	23	.0015
5(2)*	1979-80		265	51,140	51,200	22	.0028
6(3)*	1979-80	Self-launch riprap	271	53,330	53,600	24	.0023
7(4)*	1979-80		276	54,350	54,300	22	.0059
8(5)*	1979-80	Self-launch riprap	280	54,990	55,100	20	.0063
Marcum							
1	1987-88(?)	Riprap	---	---	2,580	--	---

*Original number in parentheses

\+ From Hotophia Creek Channel Improvement Plan, 1987, Water Engineering and Technology, Inc., Fort Collins, CO, report to COE.

++ From Figure 1 this report.