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AN ECONOMIC ANALYSIS OF EROSION AND SEDIMENT DAMAGE IN THE LOWER RUNNING WATER DRAW WATERSHED

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CONTENTS

INTRODUCTION

The development and implementation of agricultural non-point source (NPS) pollution control plans was mandated by the 1972 Federal Pollution Control Act Amendments, Public Law 92-500. The purpose of this particular report is to present the results of a study on the economic impact of implementing potential agricultural NPS pollution controls in Lower Running Water Draw watershed. The study focuses on: (a) the effects of erosion control on farm income; (b) off-site sediment damages in the watershed; (c) the costs of administering and enforcing alternative erosion controls; and (d) on-farm economics of soil conservation practices. Erosion controls considered include the traditional voluntary programs combined with economic incentives as well as possible regulatory programs.

The focus of the study is on erosion and sedimentation because sediment is a potential transporter of pollutants. Practices to control agricultural non-point source pollution would probably be aimed at reducing soil loss. Conservation and conservation related practices are, at present, considered the best technical practices to abate agricultural non-point source pollution.

This is a study of both conservation and environmental economics, two areas that tend to be closely related. For this project, the concern was over potential pollution (an off-site problem), but because of long-run farm income consequences, this concern cannot be separated from conservation problems (an on-farm problem). Accordingly, the report contains substantial information on the short and long-run on-farm benefits and costs of various soil conservation practices for the specific soil mapping units in Lower Running Water Draw watershed. The results of this study are applicable to the majority of the soils in the High Plains Land Resource Area. Only sheet and rill erosion are considered in the study.

The first section of the report describes the selected "Best Management Practices" and examines the on-farm economics of soil conservation. The second section postulates various sediment damage control options and models the economic consequences of implementation, both to agricultural producers as a group, and to society.

DESCRIPTION OF THE WATERSHED

Lower Running Water Draw watershed (Figure 1) is located in the Southern High Plains Land Resource Area. It covers an area of 220.29 square miles or 140,985 acres in Hale, Lamb, Swisher, and Castro Counties, Texas. Running Water Draw is the uppermost headwater tributary of the Brazos River. It begins about 25 miles northwest of Clovis, New Mexico, and flows east-southeastward approximately 150 miles crossing the High Plains section of the Great Plains province. It flows through the city of Plainview in Hale County, Texas and becomes the White River at the eastern edge of the High Plains.

Lower Running Water Draw watershed lies entirely within the High Plains Land Resource Area which is characterized by an extremely flat surface with a gradual slope towards the southeast at an average of 8 to 10 feet per mile. This plains surface in the area of the watershed in question, is interrupted only by many flat-bottomed basins or "playas" and the narrow entrenched valley of Running Water Draw.

Elevations within the watershed range from approximately 3,875 above mean sea level along the watershed divide at the western boundary of Castro County to approximately 3,265 feet in the valley floor at the eastern boundary of Hale County.

Surface material consists of Recent and Pleistocene soil, slopewash, and valley fill and lake deposits of clay, silt and sand. The actual surface texture of soils in the watershed range from clay to fine sandy loam. The Amarillo fine sandy loam, Olton loam,

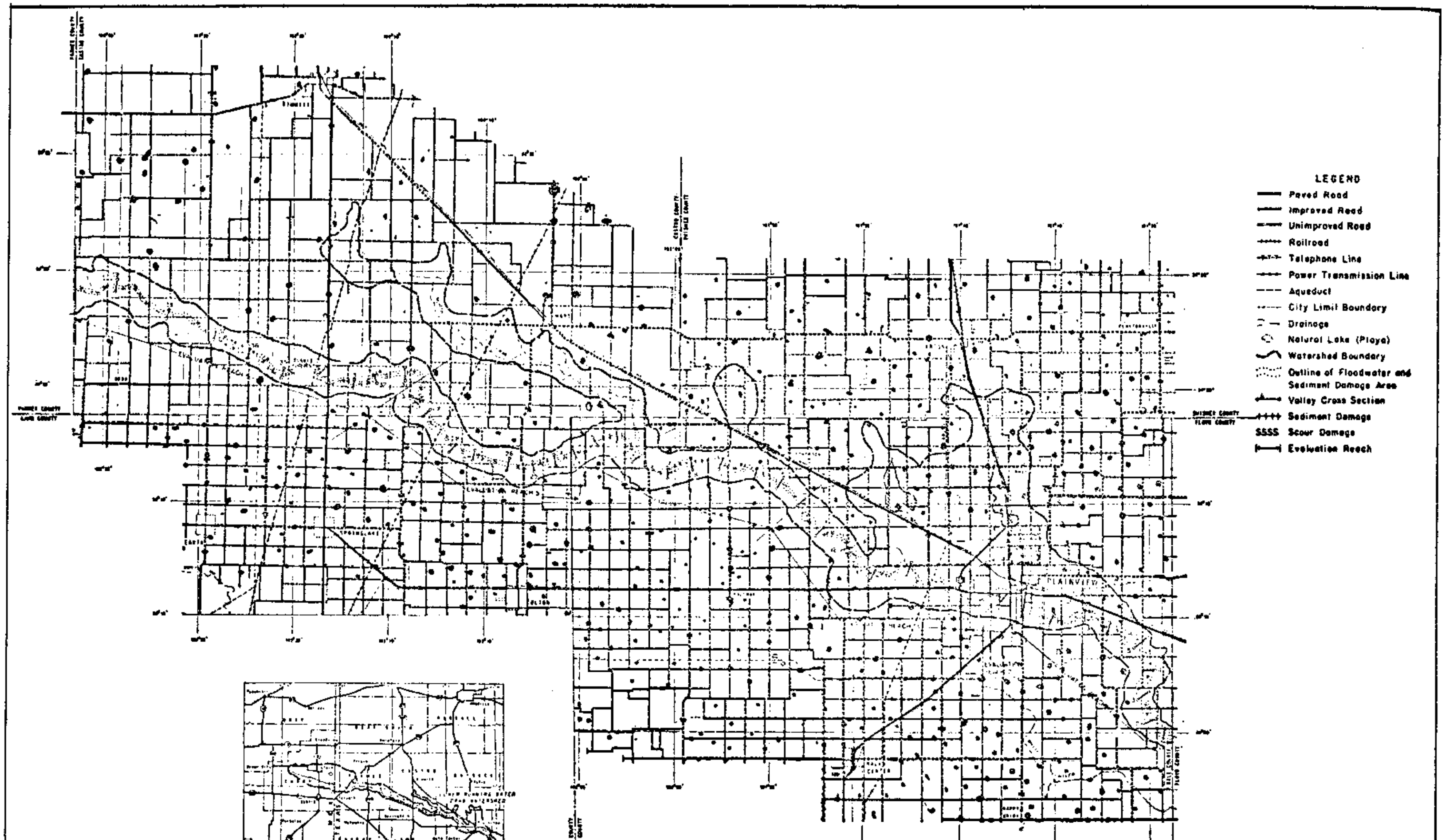

Figure 1
PROBLEM LOCATION MAP
LOWER RUNNING WATER DRAW
CASTRO, HALE, LAMB, AND SWISHER COUNTIES
TEXAS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

and Pullman, Acuff, and Olton clay loams are soils that are classified as nearly level to gently sloping. These soils are deep and slowly to moderately permeable. Potter loam and fine sandy loam are extremely shallow, strongly calcareous, slowly permeable, and occur on valley slopes up to 20 percent. Berda clay loam, and Mobeetie fine sandy loam, which are deep, calcareous, and moderately permeable make up the alluvial fans and footslopes in the valley. Spur and Bippus clay loams are deep, dark, slowly to moderately permeable bottomland soils, while clay loams of the Lofton series and clay and fine sandy loam of the Randall Series are lakebed or "playa" deposits. Individual soil mapping units and their extent in the watershed are given in Table 1.

As can be seen in Table 2, an estimated 71 percent of the watershed is in cropland. Twenty-five percent of the watershed is planted in cotton; 38 percent in feed grains; 6 percent in small grains; less than 1 percent in minor crops, 7 percent is pasture, 10 percent is rangeland, and 12 percent is in miscellaneous uses such as urban area, farmsteads, roads, railroads, and stream channels. Nearly all cropland is irrigated and occurs primarily on the nearly level plains surface. However, there is some cropland acreage on the valley slopes. A large majority of this land is irrigated with direction of flow parallel to the slope.

Range sites in the watershed are Deep Hardland, Mixed Land, Shallow Land, and Bottomland. The predominant vegetation consists of the following types of grasses: blue grama, sideoats grama,

Table 1. Total and irrigated acreage by soil mapping unit in the Lower Running Water Draw watershed.[a]

Soil Series	Table Abbrev.	Total Acreage	Irri-gated Acres
Acuff loam, 0-1% slope	AL01	2,921	2,337
Acuff loam, 1-3% slope	AL13	3,929	1,965
Acuff loam, 3-5% slope	AL35	234	0
Amarillo fine sandy loam, 0-1% slope	AF01	122	92
Amarillo fine sandy loam, 1-3% slope	AF13	232	116
Amarillo fine sandy loam, 3-5% slope	AF35	36	0
Berda loam, 1-5% slope	BL15	2,140	0
Berda loam, 5-8% slope	BL58	1,943	0
Bippus fine sandy loam, 0-1% slope	BF01	367	92
Bippus fine sandy loam, 1-3% slope	BF13	367	0
Bippus loam, 0-1% slope	BI01	5,982	4,487
Bippus loam, 1-3% slope	BI13	1,678	420
Bippus and Spur soils	BSPU	1,430	0
Drake clay loam, 1-3% slope	DL13	179	90
Drake clay loam, 3-8% slope	DL38	302	0
Estacado loam, 0-1% slope	EL01	4,662	3,497
Estacado loam, 1-3% slope	EL13	5,298	3,444
Lipan soils	LIPN	503	0
Lofton clay loam	LOFL	3,793	3,034
Mansker loam, 0-3% slope	ML03	5,971	2,388
Mansker loam, 3-5% slope	ML35	3,938	0
Mansker-Berda soils	MANB	1,177	0
Mansker-Estacado soils	MANE	1,546	309
Olton loam, 0-1% slope	OL01	16,337	15,520
Olton loam, 1-3% slope	OL13	4,546	4,319
Olton loam, 3-5% slope	OL35	43	9
Posey fine sandy loam, 0-3% slope	PF03	1,833	1,466
Posey soils, 3-5% slope	PF35	400	0
Potter gravelly loam, 0-3% slope	PG03	870	0
Pullman clay loam, 0-1% slope	PL01	45,199	42,939
Pullman clay loam, 3-5% slope	PL35	1,906	1,525
Randall clay	RANC	3,811	0
Roscoe soils	ROSC	200	0
Zita loam, 0-1% slope	ZL01	192	173
Zita loam. 1-3% slope	ZL13	96	86
Total Acreage		123,183	88,308

[a]Source: Soil and Water Conservation Service

Table 2. Average land use in Lower Running Water Draw watershed for the 1970-1975 period.[a]

Land Use	Acreage	Percent
Cropland		
Cotton	34,707	24.6
Grain Sorghum	44,307	31.4
Wheat, Small Grains	10,003	7.1
Corn	2,200	1.6
Soybeans	8,302	5.9
Minor Crops	500	.4
	100,019	71.0
Pasture and Rangeland	24,460	17.3
Miscellaneous[b]	16,506	11.7
Total	140,985	100.0

[a]Source: Soil and Water Conservation Service

[b]Includes roads, highways, railroad right-of-ways, towns, farmsteads, stream channels, etc.

buffalograss, little bluestem, vine mesquite, and western wheat grass. Other common vegetation includes scattered yucca, cholla, pricklypear, and sand sagebrush. If the range is grazed too closely, the better grasses die out, being replaced by less desirable vegetation such as sand dropseed, three-awn grasses, yucca, sand sagebrush, mesquite, and broom snake weed. Continued use for grazing during this stage will increase the chances of wind and water erosion.

The climate in the watershed tends to be of a semiarid nature. Summers are warm and predominantly clear, and the winters usually are mild. The mean temperatures range from 39 degrees F in January to mean 79 degrees F in July. Normal growing season is from April through October or approximately 206 days. Average rainfall is between 17.5 and 19.0 inches. Most rainfall occurs between April and October with approximately 10 inches of snow falling each year. Hail storms often severly damage crops during spring and early summer. Tornadoes generally occur each year, while severe windstorms are common in late spring.

The Lower Running Water Draw watershed is a Public Law 566 watershed protection project area. A system of land treatment measures and four floodwater retarding structures have been erected. The land treatment consists of measures, or combination of measures, which contribute directly to watershed protection, flood prevention, and sediment control. The four floodwater retarding structures have a combined storage capacity of 20,376 acre-feet including 13,082 acre-feet for floodwater detention and 7,294 acre-feet for sediment accumulation.

In a 1976 survey of conservation problems in Texas, agricultural non-point source pollutants in the High Plains Area were judged by Soil and Water Conservation District Directors to be a problem of slight to moderate severity, as were floods. They were ranked fifteenth and eighteenth, respectively, among the area's problems. However, water erosion, as a soil management problem, and the economics of conservation were ranked eighth and fifth, respectively, being considered problems of slight to fairly moderate proportions. Thus, the on-farm economics of conservation and water erosion problems is viewed as more critical than the off-farm down stream flooding and pollution problem. The complete survey results for the High Plains Land Resource Area are given in Table 3.

Table 3. Soil and water conservation district director's ratings of conservation problems in the High Plains Land Resource Area[a]

Conservation Problems	Rank	Present Severity[1]	Change in Condition in Past 10 Years[2]
Water-Related Problems			
Non-Point Source Pollution			
Agricultural Non-Point Source Pollutants	15	1.37	0.15
Silvicultural Non-Point Source Pollutants	24	0.57	0.02
Mining Operations Non-Point Source Pollutants	22	0.82	-0.12
Construction Site Non-Point Source Pollutants	19	1.02	-0.15
Waste Disposal Non-Point Source Pollutants	16	1.30	-0.17
Salt Water Intrusion	18	1.10	-0.02
Hydrologic Modifications	23	0.67	-0.02
Floods	18	1.10	-0.07
Inadequate Drainage	20	1.00	-0.10
Inefficient Irrigation Systems	7	1.95	0.52
Improper Use of Ground Water	10	1.77	0.67
Soil Management Problems			
Water Erosion	8	1.92	0.20
Wind Erosion	3	2.15	0.60
Soil Compaction	13	1.60	0.22
Inefficient Tillage Systems	11	1.72	0.60
Salinity	21	0.90	0.15
Loss of Soil Moisture	6	1.97	0.35
Plant Management Problems			
Undesirable Brush & Weeds	9	1.87	-0.35
Weeds on Cropland	2	2.17	-0.15
Difficulty of Grass Establishment	1	2.20	0.25
Overgrazing	10	1.77	0.17
Other Problems, Issues, & Policies			
Economics of Conservation	5	2.05	-0.50

[1]Scale of Present Severity
0.0 - 1.5 Slight to None
1.5 - 2.5 Moderate
2.5 - 3.5 Severe
3.5 - 4.5 Very Severe

[2]Scale of Change in Condition
-1.5 to -2.5 Much Worse
-0.5 to -1.5 Worse
-0.5 to 0.0 Slight Decline
0.0 to 0.5 Slight Improvement
0.5 to 1.5 Better
1.5 to 2.5 Much Better

[a]Source: Association of Texas Soil and Water Conservation District Directors.

THE APPROPRIATE PLANNING HORIZON AND DISCOUNTING FUTURE BENEFITS AND COSTS

The effect of soil conservation and erosion control on the agricultural economy is felt over a period of years as the mix of inputs change for a given output. Erosion carries away the topsoil reducing soil fertility and thus reducing crop yields. If erosion is slowed, future crop yields will be higher than they would otherwise have been, given the same level of management.

Farmers make many short-run decisions because they are concerned with next year's income. On the surface this suggests that farmers would use a short time horizon for planning conservation practices. However, most farmers are concerned about the future value of their land in addition to income flow. Inasmuch as the agricultural component of land values is the capitalized value (present value) of a highest and best use profit stream into perpetuity, and given the limited alternate uses for agricultural land in this part of Texas, the value of the land is tied closely to its future agricultural productivity. Thus, it was important that this study consider not only present productivity but also the effect on future productivity, and hence, land values of cropping and conservation practices. Therefore, a long planning horizon is appropriate for determining the best combination of crop rotations--conservation practices a landowner should employ. In order to emphasize this point and to demonstrate the importance of the length of the planning horizon, calculations were made for time horizons of 10, 100 and 200 years.

Discounting Future Benefits and Costs

As a point of reference from which to calculate the present value of future benefits and costs, 1977 was designated the base year.

All future benefits and costs were discounted to 1977 dollars using standard discounting techniques and a real interest rate of 1.5 percent. The 1.5 percent rate was arrived at by subtracting the average inflation rate of the last ten years which is 5.8 percent from the 7.3 percent average private interest rate charged by banks over the same 10 year period.

The present values of net returns associated with particular crop production activities are given in this study. Present value of net returns was computed as:

$$PV = \sum_{t=1}^{T} \left[B_t \left(\frac{1}{1+i}\right)^t - C_t \left(\frac{1}{1+i}\right)^t\right]$$

where

Σ = summation of discounted benefits and costs over time

t = time, in years

B_t = gross benefits in year t

C_t = gross costs in year t

i = interest rate minus inflation rate

$\left(\frac{1}{1+i}\right)$ = discount rate

T = length of planning horizon

ON-FARM ECONOMICS OF SOIL CONSERVATION

Examination of the on-farm economics of soil conservation and thus the farm income consequences of non-point pollution controls requires an immense amount of technical and economic information specific to the watershed. The data required for this type of analysis includes: (a) the expected yields of all relevant crops for each soil in the watershed; (b) expected prices, both current and future, for each crop and its associated production costs; (c) additional costs for the applicable conservation practices; (d) expected soil loss associated with each cropping practice-soil series combination; (e) and the effects of crop rotations on the yield of individual crops. These data were combined to estimate the net present value return associated with each crop rotation-conservation practice-mapping unit combination for time horizons of 10, 100 and 200 years.

Crop Yield

Table 4 gives the expected yield of the major crops in Lower Running Water Draw watershed for each soil mapping unit plus the yield of range grasses that could be expected if the land is not cropped. All yields are for a typical level of management and input quality. Dryland crops are capable of being grown on the given soil series, but at present time, most cropland is being irrigated. The yield data were furnished by Soil Conservation Service and Texas Agricultural Extension Service personnel familiar with the area.

Table 4. Crop yields for each soil mapping unit.[a]

	Dryland				Irrigated				
Soil	Cotton Lint (lbs)	Grain Sorghum (bu)	Wheat (bu)	Range (AUM)	Cotton Lint (lbs)	Grain Sorghum (bu)	Wheat (bu)	Corn (bu)	Soybeans (bu)
AL01	200.0	25.0	18.0	2.8	765.0	110.0	50.0	150.0	50.0
AL13	175.0	20.0	16.0	2.7	637.5	100.0	45.0	125.0	40.0
AL35	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0
AF01	250.0	25.0	15.0	3.7	850.0	110.0	50.0	140.0	0.0
AF13	200.0	20.0	12.0	3.5	722.5	100.0	45.0	120.0	0.0
AF35	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0
BL15	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0
BL58	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0
BF01	250.0	25.0	18.0	4.2	850.0	110.0	50.0	140.0	0.0
BF13	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0
BI01	225.0	25.0	18.0	4.2	765.0	110.0	60.0	140.0	45.0
BI13	200.0	20.0	16.0	4.0	637.5	100.0	50.0	120.0	30.0
BSPU	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0
DL13	0.0	12.0	10.0	2.5	0.0	60.0	35.0	0.0	0.0
DL38	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0
EL01	200.0	25.0	18.0	2.8	637.5	100.0	45.0	150.0	50.0
EL13	150.0	20.0	15.0	2.7	425.0	90.0	40.0	125.0	0.0
LIDN	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0
LOFL	190.0	20.0	15.0	3.0	722.5	140.0	55.0	150.0	0.0
ML03	150.0	18.0	12.0	2.9	297.5	50.0	25.0	110.0	0.0
ML35	125.0	14.0	10.0	2.8	0.0	40.0	20.0	0.0	0.0
MANB	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0
MANE	150.0	18.0	12.0	2.9	297.5	50.0	25.0	110.0	0.0
OL01	200.0	20.0	16.0	2.8	722.5	115.0	60.0	150.0	50.0
OL13	175.0	15.0	14.0	2.7	663.0	100.0	50.0	125.0	40.0
OL35	0.0	12.0	10.0	2.5	0.0	80.0	35.0	0.0	0.0
PF03	200.0	20.0	15.0	3.7	637.5	80.0	40.0	0.0	0.0
PF35	175.0	18.0	14.0	3.3	0.0	60.0	30.0	0.0	0.0
PG03	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
PL01	200.0	20.0	15.0	2.5	722.5	125.0	60.0	150.0	50.0
PL35	175.0	17.0	14.0	2.3	637.5	100.0	50.0	125.0	40.0
RANC	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
ROSC	225.0	30.0	20.0	2.5	0.0	0.0	0.0	0.0	0.0
ZL01	225.0	25.0	20.0	2.9	765.0	110.0	55.0	150.0	50.0
ZL13	200.0	20.0	16.0	2.8	637.5	100.0	45.0	125.0	40.0

[a]Source: Soil Conservation Service and Texas Agricultural Extension Service Personnel.

Crop Prices and Production Costs

Expected prices were defined as the average price received by Texas farmers for the specified crop between 1958-1976 adjusted to 1977 dollars by the index of prices paid for production items. This was done in order to establish as stable a set of long run price relationships as possible while at the same time tying prices to production costs.

Table 5 lists the production cost data. This production cost information was developed from a set of 1977 crop budgets for the High Plains Land Resource Area prepared by the Texas Agricultural Extension Service. The basic cost data was modified to fit each soil mapping unit. The modification consists of: (a) changing the harvest costs proportional to the yield for that crop for each rotation; and (b) adding the appropriate costs of the specified conservation practice. As the yield is reduced due to the effect of soil erosion the harvest cost per acre is proportionally reduced but the preharvest costs and equipment costs remain constant. For contouring, preharvest machinery and labor costs were increased by 10 percent. The added cost attributable to terracing was assumed to be the discounted sum of: (a) initial construction cost (Table 6); (b) an annual maintenance cost equal to five percent of the construction cost; (c) the cost of rebuilding terraces every 10 years, assumed to one-third of the construction cost; and (d) an increase in preharvest machinery and labor costs of 20 percent. Terracing construction cost are listed by soil mapping unit in Table 6.

Table 5. Crop production cost and input data.[a]

Crop	Pre-harvest Variable Costs ($/acre)	Harvest Costs ($/acre)	Equipment Depreciation Costs ($/acre)	Price Per Unit ($)	Pre-harvest Machinery and Labor Costs[b] ($/acre)	Insecticide Costs[b] ($/acre)	Herbicide Costs[b] ($/acre)	Fertilization Rates (lbs/acre) N	P
Dryland									
Cotton	55.54	15.75	12.01	0.52/lb lint 0.05/lb seed	38.44	0.0	7.00	0.0	0.0
Grain Sorghum	16.86	8.50	4.58	3.65/cwt.	11.19	0.0	0.0	30.0	0.0
Wheat, Small Grains	27.06	7.00	6.67	3.36/bu 14.73/AUM	18.56	0.0	0.0	0.0	0.0
Range	1.08	0.0	3.27	14.73/AUM	0.22	0.0	0.0	0.0	0.0
Irrigated									
Cotton	135.42	58.50	24.20	0.52/lb lint 0.05/lb seed	70.43	0.0	10.50	40.0	20.0
Grain Sorghum	104.72	20.80	33.10	3.65/cwt.	76.83	10.00	7.00	100.0	0.0
Wheat, Small Grains	84.36	11.00	19.96	3.36/bu 14.73/AUM	49.39	3.00	3.50	100.0	0.0
Corn	178.02	67.50	34.09	2.67/bu	96.58	15.00	8.75	150.0	0.0
Soybeans	77.29	13.50	28.52	5.06/bu	67.68	0.0	7.50	0.0	0.0

[a]Source: Texas Agricultural Extension Service Crop Budgets for the High Plains Region.

[b]These costs are included in the pre-harvest variable costs given in column 1.

Table 6. Terrace construction costs, average thickness of topsoil and yield loss equations by soil mapping unit.[a]

Soil	Terrace Construction Costs for: Close Grown Crops ($/acre)	Terrace Construction Costs for: Row Crops ($/acre)	Average Topsoil Thickness (inches)	Yield Loss Equation (See Fig. 2)
AL01	29.04	38.84	12	B
AL13	49.78	58.08	12	B
AL35	77.10	87.12	8	B
AF01	29.04	38.84	11	B
AF13	49.78	58.08	9	B
AF35	77.10	87.12	8	B
BL15	65.50	74.46	10	C
BL58	77.10	87.12	8	C
BF01	29.04	38.84	18	C
BF13	49.78	58.08	15	C
BI01	29.04	38.84	9	C
BI13	49.78	58.08	8	C
BSPU	29.04	38.84	12	C
DL13	49.78	58.08	10	C
DL38	77.10	87.12	8	C
EL01	29.04	38.84	16	B
EL13	49.78	58.08	12	B
LIPN	29.04	38.84	18	C
LOFL	29.04	38.84	9	B
ML03	49.78	58.08	6	B
ML35	77.10	87.12	5	B
MANB	65.50	74.46	7	B
MANE	49.78	58.08	10	B
OL01	29.04	38.84	14	B
OL13	49.78	58.08	12	B
OL35	77.10	87.12	11	B
PF03	49.78	58.08	10	B
PF35	77.10	87.12	6	B
PG03	49.78	58.08	8	A
PL01	29.04	38.84	10	B
PL35	49.78	58.08	8	B
RANC	29.04	38.84	24	C
ROSC	29.04	38.84	1	C
ZL01	29.04	38.84	12	B
ZL13	49.78	58.08	10	B

[a]Source: Texas Soil and Water Conservation Board and Texas Agricultural Extension Service.

Crop Rotations

Crop rotations rather than just single crops were considered in this study for two reasons. First, the previous crop influences erosion from the current crop, and average erosion for a rotation is not a simple average of erosion of the crops grown continuously. Secondly, rotations were considered because the yield of some crops will be higher (or lower) when grown in rotation with another crop.

Table 7 lists the crop rotations that were considered and the yield changes assumed for the cropping combinations. The yield of cotton grown continuously was reduced seventeen percent since the cotton crop enterprise budget was based on cotton produced in rotation with small grains. Continuous cotton would not benefit from the plant nutrient carryover or organic residue left by the small grain crop in a rotation and thus, over time the expected cotton yield would be less. Cotton grown in rotation with sorghum or corn was penalized five percent due to the fact that while sorghum and corn would provide some fertility carryover, it would not be as great as the carryover from small grains. The yield of cotton with small grains or cotton in a three year rotation was not decreased. Sorghum yields were increased seven percent in two year rotations with cotton and fourteen percent in the three year rotation. This yield increase is attributable to Johnson grass control and fertility carryover in the various rotations. Small grains in rotation with cotton, corn or sorghum were reduced ten percent as the small grains would have to be planted late and on stalk ground.

Table 7. Crop rotations considered in the analysis, associated USLE "C" factors and the additional yield resulting from growing a crop in rotation with another crop.[a]

Rotation and Added Yield (in percent)	Table Abbrev.	"C" Factor
Dryland		
Cotton (-17)	C	.60
Grain Sorghum	S	.55
Wheat, Small Grains	W	.10
Range	R	.04
Cotton/Wheat (-10)	C/W	.30
Cotton (-5)/Sorghum (7)	C/S	.55
Sorghum (7)/Wheat (-10)	S/W	.30
Cotton/Sorghum (14)/Wheat (-10)	C/S/W	.35
Irrigated		
Cotton (-17)	C-I	.60
Grain Sorghum	S-I	.55
Wheat, Small Grains	W-I	.10
Corn	CN-I	.55
Soybeans	SB-I	.60
Cotton/Wheat (-10)	C/W-I	.30
Cotton (-5)/Sorghum (7)	C/S-I	.55
Sorghum (7)/Wheat (-10)	S/W-I	.30
Cotton/Sorghum (14)/Wheat (-10)	C/S/W-I	.35
Cotton (-5)/Corn	C/CN-I	.55
Wheat (-10)/Corn	W/CN-I	.30
Corn/Soybeans	CN/SB-I	.55

[a]Source: Soil Conservation Service and Texas Agricultural Extension Service.

The late planting would decrease the moisture available for plant growth and the stalks would interfere with field preparation and uniform seed placement.

Soil Loss Factors

The universal soil loss equation was used to calculate gross soil loss in the watershed. This equation is:

$$A = RK(LS)CP$$

where A is gross erosion in tons per acre per year, R is a rainfall erosivity index, K is a soil-erodibility factor, LS is a topographic factor that represents the combined effects of slope length, and steepness, C is a cover and management factor, and P is a conservation practice factor. Values for all of these factors were furnished by the Soil Conservation Service and are reported in Tables 7 and 8. Also shown in Table 8 are the erosion tolerance limits, or "T" values, that have been established for each soil. Theoretically, if erosion is less than this T value, little or no yield reduction results from the soil loss. These T values are treated as potential constraints on erosion in one part of the economic analysis that is presented in a later section of this report.

Table 9 shows estimated per acre sheet and rill erosion rates for each soil mapping unit-conservation practice-crop rotation combination considered in the study.

Yield Loss Attributal to Erosion

In a long-run analysis of soil conservation the relationship between erosion and future crop yield is critical. This is because

Table 8. USLE factors by soil mapping unit for Lower Running Water Draw watershed.[a]

Soil	USLE FACTORS					
	K	LS Without Terraces	LS With Terraces	P Contouring	P Terracing	T Ton/Acre/ Year
AL01	0.28	0.14	0.14	1.00	1.00	5.0
AL13	0.28	0.20	0.20	0.60	0.60	5.0
AL35	0.28	0.35	0.35	1.00	1.00	5.0
AF01	0.24	0.13	0.13	1.00	1.00	5.0
AF13	0.24	0.33	0.23	0.60	0.60	5.0
AF35	0.24	0.51	0.40	1.00	1.00	5.0
BL15	0.28	0.35	0.30	1.00	1.00	5.0
BL58	0.28	0.40	0.40	1.00	1.00	5.0
BF01	0.28	0.12	0.12	1.00	1.00	5.0
BF13	0.28	0.20	0.20	1.00	1.00	5.0
BI01	0.28	0.16	0.16	1.00	1.00	5.0
BI13	0.28	0.33	0.26	0.60	0.60	5.0
BSPU	0.28	0.18	0.18	1.00	1.00	5.0
DL13	0.28	0.30	0.25	0.60	0.60	5.0
DL38	0.28	0.40	0.40	1.00	1.00	5.0
EL01	0.28	0.17	0.17	1.00	1.00	5.0
EL13	0.28	0.23	0.19	0.60	0.60	5.0
LIPN	0.32	0.13	0.13	1.00	1.00	5.0
LOFL	0.32	0.09	0.09	1.00	1.00	5.0
ML03	0.28	0.30	0.25	0.60	0.60	3.0
ML35	0.28	0.40	0.40	0.50	0.50	3.0
MANB	0.28	0.29	0.29	1.00	1.00	4.0
MANE	0.20	0.21	0.21	0.60	0.60	4.0
DL01	0.32	0.17	0.17	1.00	1.00	5.0
DL13	0.32	0.23	0.19	0.60	0.60	5.0
DL35	0.32	0.40	0.40	0.50	0.50	5.0
PF03	0.24	0.25	0.25	0.60	0.60	3.0
PF35	0.24	0.40	0.40	0.50	0.50	3.0
PG03	0.28	0.20	0.20	1.00	1.00	1.0
PL01	0.37	0.19	0.19	1.00	1.00	5.0
PL35	0.37	0.34	0.26	0.60	0.60	5.0
RANC	0.32	0.11	0.11	1.00	1.00	5.0
ROSC	0.32	0.10	0.10	1.00	1.00	5.0
ZL01	0.28	0.12	0.12	1.00	1.00	4.0
ZL13	0.28	0.17	0.17	0.60	0.60	4.0

[a]Source: Soil Conservation Service and Texas Agricultural Extension Service.

Table 9. Expected soil loss (tons/acre/year) for each crop rotation, soil type, and conservation practice.

Soil	Conservation Practice	Crop Rotation												
		C	S	W	R	CN	SB	C/W	C/S	S/W	C/S/W	C/CN	W/CN	CN/SB
AL01	SR	2.82	2.59	0.47	0.19	2.59	2.82	1.41	2.59	1.41	1.65	2.59	1.41	2.59
AL13	SR	4.03	3.70	0.67	0.27	3.70	4.03	2.02	3.70	2.02	2.35	3.70	2.02	3.70
	C	2.42	2.22	0.40	0.16	2.22	2.42	1.21	2.22	1.21	1.41	2.22	1.21	2.22
AL35	SR	7.06	6.47	1.18	0.47	6.47	7.06	3.53	6.47	3.53	4.12	6.47	3.53	6.47
AF01	SR	2.25	2.06	0.37	0.15	2.06	2.25	1.12	2.06	1.12	1.31	2.06	1.12	2.06
AF13	SR	5.70	5.23	0.95	0.38	5.23	5.70	2.85	5.23	2.85	3.33	5.23	2.85	5.23
	C	3.42	3.14	0.57	0.23	3.14	3.42	1.71	3.14	1.71	2.00	3.14	1.71	3.14
	T	2.38	2.19	0.40	0.16	2.19	2.38	1.19	2.19	1.19	1.39	2.19	1.19	2.19
AF35	SR	8.81	8.08	1.47	0.59	8.08	8.81	4.41	8.08	4.41	5.14	8.08	4.41	8.08
BL15	SR	7.06	6.47	1.18	0.47	6.47	7.06	3.53	6.47	3.53	4.12	6.47	3.53	6.47
BL58	SR	8.06	7.39	1.34	0.54	7.39	8.06	4.03	7.39	4.03	4.70	7.39	4.03	7.39
BF01	SR	2.42	2.22	0.40	0.16	2.22	2.42	1.21	2.22	1.21	1.41	2.22	1.21	2.22
BF13	SR	4.03	3.70	0.67	0.27	3.70	4.03	2.02	3.70	2.02	2.35	3.70	2.02	3.70
BI01	SR	3.23	2.96	0.54	0.22	2.96	3.23	1.61	2.96	1.61	1.88	2.96	1.61	2.96
BI13	SR	6.65	6.10	1.11	0.44	6.10	6.65	3.33	6.10	3.33	3.88	6.10	3.33	6.10
	C	3.99	3.66	0.67	0.27	3.66	3.99	2.00	3.66	2.00	2.33	3.66	2.00	3.66
	T	3.14	2.88	0.52	0.21	2.88	3.14	1.57	2.88	1.57	1.83	2.88	1.57	2.88
BSPU	SR	3.63	3.33	0.60	0.24	3.33	3.63	1.81	3.33	1.81	2.12	3.33	1.81	3.33

Table 9. (continued).

Soil	Conservation Practice	Crop Rotation												
		C	S	W	R	CN	SB	C/W	C/S	S/W	C/S/W	C/CN	W/CN	CN/SB
DL13	SR	6.05	5.54	1.01	0.40	5.54	6.05	3.02	5.54	3.02	3.53	5.54	3.02	5.54
	C	3.63	3.33	0.60	0.24	3.33	3.63	1.81	3.33	1.81	2.12	3.33	1.81	3.33
	T	3.02	2.77	0.50	0.20	2.77	3.02	1.51	2.77	1.51	1.76	2.77	1.51	2.77
DL38	SR	8.06	7.39	1.34	0.54	7.39	8.06	4.03	7.39	4.03	4.70	7.39	4.03	7.39
EL01	SR	3.43	3.14	0.57	0.23	3.14	3.43	1.71	3.14	1.71	2.00	3.14	1.71	3.14
EL13	SR	4.64	4.25	0.77	0.31	4.25	4.64	2.32	4.25	2.32	2.70	4.25	2.32	4.25
	C	2.78	2.55	0.46	0.19	2.55	2.78	1.39	2.55	1.39	1.62	2.55	1.39	2.55
	T	2.30	2.11	0.38	0.15	2.11	2.30	1.15	2.11	1.15	1.34	2.11	1.15	2.11
LIPN	SR	3.00	2.75	0.50	0.20	2.75	3.00	1.50	2.75	1.50	1.75	2.75	1.50	2.75
LOFL	SR	2.07	1.90	0.35	0.14	1.90	2.07	1.04	1.90	1.04	1.21	1.90	1.04	1.90
ML03	SR	6.05	5.54	1.01	0.40	5.54	6.05	3.02	5.54	3.02	3.53	5.54	3.02	5.54
	C	3.63	3.33	0.60	0.24	3.33	3.63	1.81	3.33	1.81	2.12	3.33	1.81	3.33
	T	3.02	2.77	0.50	0.20	2.77	3.02	1.51	2.77	1.51	1.76	2.77	1.51	2.77
ML35	SR	8.06	7.39	1.34	0.54	7.39	8.06	4.03	7.39	4.03	4.70	7.39	4.03	7.39
	C	4.03	3.70	0.67	0.27	3.70	4.03	2.02	3.70	2.02	2.35	3.70	2.02	3.70
MANB	SR	5.85	5.36	0.97	0.39	5.36	5.85	2.92	5.36	2.92	3.41	5.36	2.92	5.36
MANE	SR	4.23	3.88	0.71	0.28	3.88	4.23	2.12	3.88	2.12	2.47	3.88	2.12	3.88
	C	2.54	2.33	0.42	0.17	2.33	2.54	1.27	2.33	1.27	1.48	2.33	1.27	2.33
OL01	SR	3.92	3.59	0.65	0.26	3.59	3.92	1.96	3.59	1.96	2.38	3.59	1.96	3.59

Table 9. (continued).

Soil	Conservation Practice	Crop Rotation												
		C	S	W	R	CN	SB	C/W	C/S	S/W	C/S/W	C/CN	W/CN	CN/SB
OL13	SR	5.30	4.86	0.88	0.35	4.86	5.30	2.65	4.86	2.65	3.09	4.86	2.65	4.86
	C	3.18	2.91	0.53	0.21	2.91	3.18	1.59	2.91	1.59	1.85	2.91	1.59	2.91
	T	2.63	2.41	0.44	0.18	2.41	2.63	1.31	2.41	1.31	1.53	2.41	1.31	2.41
OL35	SR	9.22	8.45	1.54	0.61	8.45	9.22	4.61	8.45	4.61	5.38	8.45	4.61	8.45
	C	4.61	4.22	0.77	0.31	4.22	4.61	2.30	4.22	2.30	2.69	4.22	2.30	4.22
PF03	SR	4.32	3.96	0.72	0.29	3.96	4.32	2.16	3.96	2.16	2.52	3.96	2.16	3.96
	C	2.59	2.38	0.43	0.17	2.38	2.59	1.30	2.38	1.30	1.51	2.38	1.30	2.38
PF35	SR	6.91	6.34	1.15	0.46	6.34	6.91	3.46	6.34	3.46	4.03	6.34	3.46	6.34
	C	3.46	3.17	0.58	0.23	3.17	3.46	1.73	3.17	1.73	2.02	3.17	1.73	3.17
PG03	SR	4.03	3.70	0.67	0.27	3.70	4.03	2.02	3.70	2.02	2.35	3.70	2.02	3.70
PL01	SR	5.06	4.64	0.84	0.34	4.64	5.06	2.53	4.64	2.53	2.95	4.64	2.53	4.64
PL35	SR	9.06	8.30	1.51	0.60	8.30	9.06	4.53	8.30	4.53	5.28	8.30	4.53	8.30
	C	5.43	4.98	0.91	0.36	4.98	5.43	2.72	4.98	2.72	3.17	4.98	2.72	4.98
	T	4.16	3.81	0.69	0.28	3.81	4.16	2.08	3.81	2.08	2.42	3.81	2.08	3.81
RANC	SR	2.53	23.2	0.42	0.17	2.32	2.53	1.27	2.32	1.27	1.48	2.32	1.27	2.32
ROSC	SR	2.30	2.11	0.38	0.15	2.11	2.30	1.15	2.11	1.15	1.34	2.11	1.15	2.11
ZL01	SR	2.42	2.22	0.40	0.16	2.22	2.42	1.21	2.22	1.21	1.41	2.22	1.21	2.22
ZL13	SR	3.43	3.14	0.57	0.23	3.14	3.43	1.71	3.14	1.71	2.00	3.14	1.71	3.14
	C	2.06	1.88	0.34	0.14	1.88	2.06	1.03	1.88	1.03	1.20	1.88	1.03	1.88

the on-farm benefits from conservation practices arise mainly from the relatively higher future crop yield resulting from that conservation practice. Unfortunately, very little experimental or field data on this important relationship are available. Consequently, for purposes of this study it was necessary to develop estimates of this relationship for each soil mapping unit.

Yield loss attributal to topsoil loss depends to a certain extent on the suitability of the subsoil for crop production. Soils in the watershed were classified into one of three groups. Group A consists of soil mapping units that have subsoil that is unsuitable for field crop production. For this group, crop yield was assumed to be zero after all topsoil was eroded. Group B consists of soil mapping units with subsoils that are slightly suitable for field crop production. It was assumed that crop yield on Group B soils would be 25 percent of the currently attainable yield after all the topsoil was eroded away. Group C consists of those soil mapping units with subsoils that are somewhat more suitable for crop production. After the loss of all topsoil, yield in this group was assumed to be 50 percent of present yield. The group to which each soil mapping unit belongs and initial average topsoil depth for each mapping unit is shown in Table 6.

Due to paucity of experimental or field data on the relationship between topsoil thickness and yield, it was necessary to subjectively specify this relationship for each soil group. After considerable discussion with Soil Conservation Service and Texas A&M University scientists, the three relationships shown in Figure 2

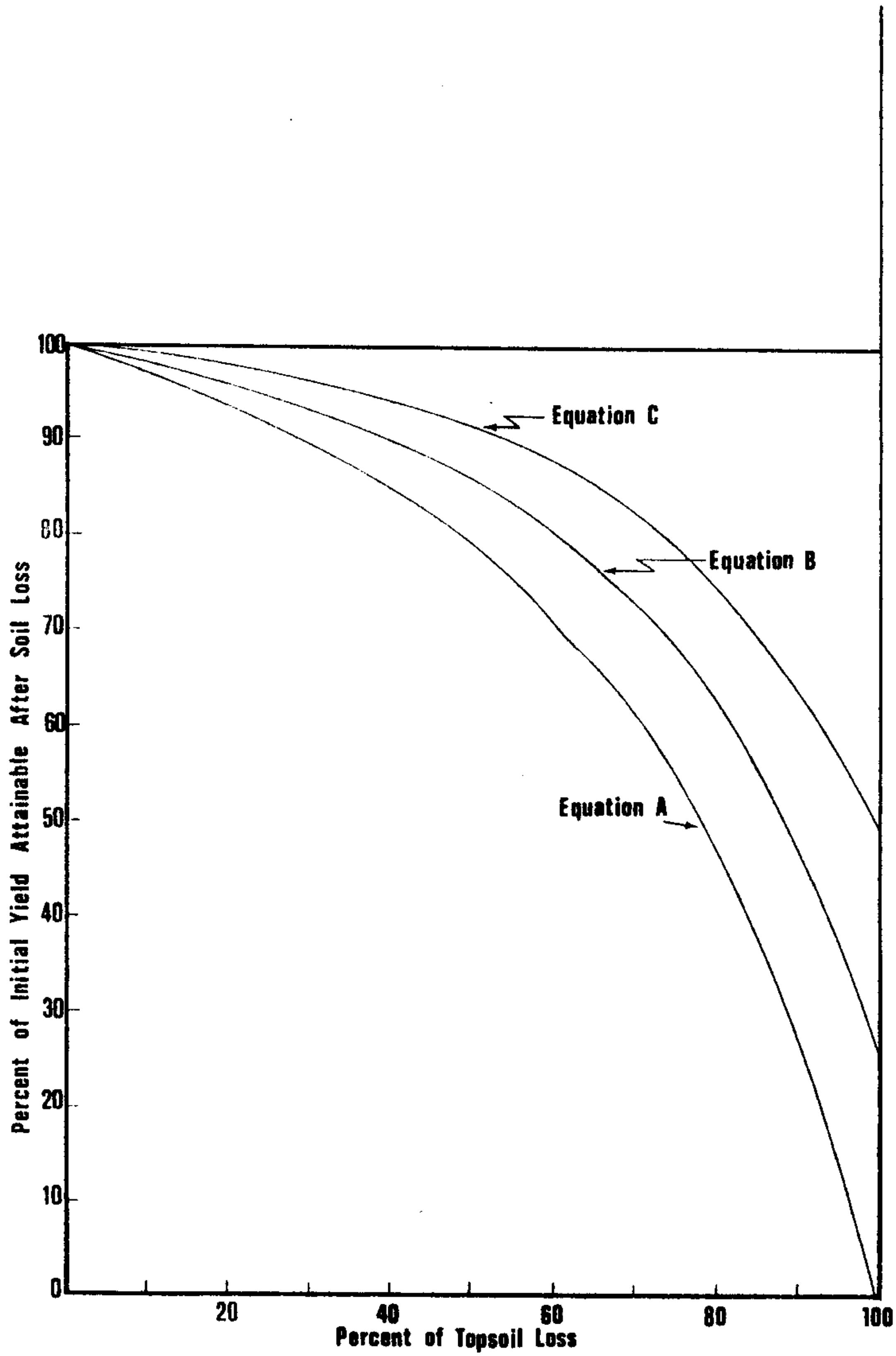

Figure 2. **Relationships between yield and topsoil eroded, Lower Running Water Draw Watershed.**

were specified. The functions in Figure 2 have two important characteristics. One is that each function is expressed in terms of percent of topsoil lost and percent of initial yield attainable after erosion. This reflects the fact that the loss of one inch on an initially shallow soil will decrease yield more than the loss of one inch of an initially deep soil. For example, the loss of one inch of a soil in Group A with an initial depth of 20 inches will reduce yield by about 2 percent, while the loss of one inch on a soil with an initial depth of 5 inches will decrease yield by about 8 percent.

The second important characteristic of the functions in Figure 2 is that the loss of the last remaining topsoil will reduce yield by more than the loss of the upper portions of initial topsoil. For instance, the loss of the first 20 percent of topsoil in Group A will reduce yield by about 8 percent, while the loss of the last 20 percent of topsoil will reduce yield by about 46 percent. Because of the critical nature of the relationship shown in Figure 2, additional experimental and field research appears warranted.

In determining the effects of erosion on yield, the bulk density of soil is important. Since erosion typically occurs when the soil is saturated with water, the bulk density of saturated soil was used. Based on unpublished field data, a bulk density of 140 tons per acre inch was used for all soils in the Lower Running Water Draw watershed.

Profitability of Conservation Practices

Profitability information for the various crop rotation-conservation practice combinations for each soil in Lower Running Water Draw watershed is given in Appendix A, Tables 14 through 48. All figures are based on the assumptions previously stated. All on-farm costs associated with conservation practices of contouring and terracing are included in the profit calculations. That is, there is no Federal cost sharing of terrace construction included nor is there any cost charged for the sediment leaving the fields.

As an illustration of the information given in these Tables, consider Table 14 which gives the data for Acuff loam with 0-1% slope.

The first column of this table gives the crop rotations considered for this soil, while the second column gives the conservation practice considered. Column 3 gives the associated annual percentage of topsoil lost under each respective alternative. Column 4 gives the per acre profit in year 1. The next block of columns gives annual yield as a percent of initial yield, and profit for years 10, 100, and 200. The final block of columns gives the present value of a farm profit stream to year 10, 100, and 200.

As a specific example consider continuous cotton on Acuff loam with 0-1% slope (Table 14). With straight row cultivation .168 percent of the twelve inches of topsoil would be lost annually. In year 1 net profit from cotton production on the soil would be $13.16 which declines year by year as the topsoil is eroded away until by the 200th year profits have dropped to $6.15. In physical terms, the yield declines to 95.9 percent in year 100 and 91.3

percent of the initial yield in year 200. The present value of profit for a 10 year period is $121. The present value of profit increases to $625 for 100 years and to $724 for 200 years. While the present value of profit continues to increase with longer time horizons it does so at a decelerating rate. This is caused not only by the effect of the discounting of future profits but also by the yield reduction as the topsoil is eroded away.

Many of the soils in Lower Running Water Draw watershed are too flat for contouring and terracing to have any significant effect on the rate of soil loss. For these soils only the straight row cultivation practice is listed. Also, only the crops that the soil can realistically be expected to grow are listed. Thus, a few soil mapping units such as Bippus and Spur soils have no field crop options and are only listed for completeness.

Twenty-three soil mapping units have the potential for irrigation while the remaining twelve are mainly range and pastureland with very limited dryland crop production. The expected yields for crops under irrigation and the acres available are listed as part of Table 4. Only on these soils is profit and yield information given for the irrigated rotations.

The information in Appendix A can also be used to compare the profitability of the three conservation practices for a particular crop as the time horizon is varied. For example, the present value of profit for continuous cotton production on Bippus loam with 1-3% slope (Table 25) and a ten year time horizon is $120 under straight row cultivation versus $86 for contouring and a negative $51 for terracing. However, as the time horizon is stretched to 200 years, straight row cotton cultivation is the second most profitable option at $426, with contouring first at $435, and terracing last at a negative $120.

Not only can the profitability of the conservation practices for each crop rotation be compared but the profitability of all the rotations can be compared to each other. The best crop rotation-conservation practice for each soil mapping unit and time horizon can then be located. To illustrate, given a 10 year time horizon, the most profitable crop rotation-conservation practice combination on Acuff loam with 1-3% slope (Table 15) is an irrigated cotton rotation under straight row cultivation. However, when the time horizon is shifted to 200 years, it is found that an irrigated cotton-grain sorghum rotation will be more profitable under the conservation practice of contouring. This demonstrates that crop rotations and the conservation practices involved shift in response to shifts in the time horizon.

Table 10 lists the most profitable (or least costly) conservation practice for each crop rotation by soil mapping unit, given a 100 year planning horizon. For most soil mapping unit-crop rotation combinations no extra conservation practices can be economically justified. Only on the steeper sloped soils with clean cultivation crops does contouring start to pay for itself. In Table 11 the planning horizon is increased to 200 years resulting in a further slight shift to contouring but still no call for terracing. These rather surprising results are somewhat due to the high cost of

Table 10. Most profitable conservation practice by soil types and crop rotation with a 100 year planning horizon.

Soil	Crop Rotations																			
	Dryland								Irrigated											
	C	S	W	R	C/W	C/S	S/W	C/S/W	C	S	W	CN	SB	C/W	C/S	S/W	C/S/W	C/CN	W/CN	CN/SB
AL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
AL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
AL35	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AF01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
AF13	SR	C	SR	SR	SR	SR	SR	SR	C	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
AF35	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BL15	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BL58	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BF01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
BF13	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BI01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
BI13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
BSPU	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DL13	--	SR	SR	SR	--	--	SR	--	--	SR	SR	--	--	--	--	SR	--	--	--	--
DL38	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
EL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
LIPN	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LOFL[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
ML03	SR	C	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
ML35	C	C	SR	SR	SR	C	SR	SR	--	--	--	--	--	--	--	--	--	--	--	--
MANB	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANE	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
OL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
OL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
OL35	--	SR	SR	SR	--	--	SR	--	--	SR	SR	--	--	--	--	SR	--	--	--	--
PF03	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	--	SR	SR	SR	SR	--	--	--
PF35	C	C	SR	SR	SR	C	SR	SR	--	C	SR	--	--	--	--	SR	--	--	--	-
PG03	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
PL35	SR	C	SR	SR	SR	C	SR	SR	C	C	SR	C	C	SR	C	SR	SR	C	SR	C
RANL	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ROSC[b]	SR	SR	SR	SR	SR	SR	SR	SR	--	--	--	--	--	--	--	--	--	--	--	--
ZL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
ZL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR

[a] C denotes contouring, SR straight row.

[b] Contouring and terracing infeasible due to flatness of land or shortness of average slope length.

Table 11. Most profitable conservation practice by soil types and crop rotation with a 200 year planning horizon.

Soil	Crop Rotation																			
	Dryland								Irrigated											
	C	S	W	R	C/W	C/S	S/W	C/S/W	C	S	W	CN	SB	C/W	C/S	S/W	C/S/W	C/CN	W/CN	CN/SB
AL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
AL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
AL35	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AF01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
AF13	SR	C	SR	SR	SR	SR	SR	SR	C	SR	SR	SR	--	SR	C	SR	SR	C	SR	--
AF35	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BL15	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BL58	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BF01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
BF13	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BI01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
BI13	C	C	SR	SR	SR	C	SR	SR	C	C	SR	C	C	SR	C	SR	SR	C	SR	C
BSPU	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DL13	--	SR	SR	SR	--	--	SR	--	--	SR	SR	--	--	--	--	SR	--	--	--	--
DL38	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
EL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
LIPN	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LOFL[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
ML03	C	SR	SR	SR	SR	C	SR	SR	C	C	SR	C	--	SR	C	SR	SR	C	SR	--
ML35	C	C	SR	SR	C	C	C	C	--	Z	Z	--	--	--	--	--	Z	--	--	--
MANB	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANE	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	SR	SR	SR	SR	SR	SR	--
OL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
OL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
OL35	--	C	SR	SR	--	--	SR	--	--	C	SR	--	--	--	--	SR	--	--	--	--
PF03	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	--	--	SR	SR	SR	SR	--	--	--
PF35	C	C	SR	SR	SR	C	C	C	--	Z	Z	--	--	--	--	Z	--	--	--	--
PG03	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
PL35	C	C	SR	SR	SR	C	SR	C	C	C	SR	C	C	C	C	C	C	C	C	C
RANL	--	--	--	SR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ROSC[b]	SR	SR	SR	SR	SR	SR	SR	SR	--	--	--	--	--	--	--	--	--	--	--	--
ZL01[b]	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
ZL13	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR

[a]C contouring, SR straight row, Z means yield in year 200 is zero for all systems.

[b]Contouring and terracing infeasible due to flatness of land or shortness of average slope length.

terracing, but in large part are caused by the general flatness of the land. Even those soils with greater than average slope are often unterracable due to the shortness of the slope length. There are probably small acreages of land in some of the soil mapping units that would profit from terracing but due to the aggregation over a complete soil mapping unit these small fields are lost in the calculations on the average. Nonetheless, the need for conservation practices with cultivated crops on hilly soils becomes increasingly apparent as the planning horizon is extended.

PUBLIC POLICY OPTIONS FOR NPS CONTROL

The previous section of this report focused on the on-farm economics of conservation aside from the NPS pollution issue. Let us now turn to the pollution question and consider whether controls are justified on economic grounds, on which control is economically the most efficient, and on implementing a control if a problem does indeed exist.

In designing a NPS control plan, it is necessary to define the feasible control methods from a technical perspective. For control of sheet and rill erosion and sediment resulting therefrom, the control methods considered here are the conservation practices of contouring and terracing, and changes in land use such as shifting to a crop which causes less erosion.

Once these technical alternatives are specified it is necessary to determine a way of implementing a pollution control method. The standard policy options for implementing a control include regulation, provision of economic incentives, education, and public investment. For point sources of pollutants, regulations are typically directed toward the pollutant at the point of emission into waterways. However, this is not possible with NPS pollutants because they enter waterways at an infinite number of points. Hence, regulations must be directed toward the agricultural practices that cause or influence the NPS pollutants.

The economic incentive option includes alternatives such as Federal or State cost-sharing arrangements for conservation practices, and excise taxes on inputs such as fertilizers and pesticides or even on soil loss. Education is a viable policy option in situations where producers or others are misusing inputs that cause pollution, or are not adopting conservation practices that would be profitable. In these situations a successful education program would increase producer's income as well as reducing the environmental damages caused by misuse of agricultural chemicals and production practices. Public investment is appropriate for controls that are not appropriate for individuals, but that can be justified by governmental units. An example would be the construction of municipal waste water treatment plants. In any particular NPS situation, a combination of the above policy options may provide the best solution to the problem.

The specific erosion-sedimentation control options considered for Lower Running Water Draw watershed are:

1. Restricting soil loss to be no greater than the SCS tolerance or "T" limits.
2. Restricting soil loss to be no greater than 2, 4, or 6 tons per acre.
3. Terracing subsidies or cost sharing arrangements for 50 and 100 percent of the annual costs.
4. Contouring subsidies or cost sharing arrangements for 50 and 100 percent of the additional cost for contouring.
5. Subsidies of 50 and 100 percent on the initial cost of constructing terraces.
6. Restricting soil loss to be no greater than the SCS limit combined with 50% contouring, terracing, or terracing construction subsidies.

7. Restricting soil loss to less than a specific limit of 2 tons per acre combined with a 50 percent subsidy toward contouring, terracing or construction costs of terraces.
8. Taxes on soil loss of 4, 6, 8, 10, 12, 16 and 20 cents per ton.
9. Taxes on soil loss of 4, 6, 8, 10, 12, 16, and 20 cents per ton combined with a subsidy of 50 percent of the cost of contouring or terracing.

Table 12 shows the specific options considered. These policy options were chosen to cover a wide range of available alternatives. Section 208 of the amended 1972 Federal Pollution Control Act does not specify the type of regulation or incentive that must be used so decision makers may choose from the above set of options or use the model to test others which experience or experiment may suggest.

The soil loss tax policy, while not practical, was considered because it is an economic efficiency norm for correcting for off-site sediment damages. Economic theory says that in a frictionless economy where all producers maximize profit, the "optimal" way to correct for off-site damages is to impose a tax on erosion exactly equal to marginal off-site damages at the socially optimal level of erosion. No other policy option will give a socially more efficient (i.e. less costly from society's viewpoint) allocation of resources to crop production. Other requirements for this to be the most efficient policy for pollution abatement are that: (a) the administrative and enforcement costs be equal for all policies; and (b) the administrative and enforcement costs be less than the gains associated with a tax policy. Under these conditions, the tax policy

Table 12. Alternate control options modeled.

Control Option	Table Abbrev.
Annual soil loss less than SCS Tolerance limit (T)	SL < T
Annual soil loss less than 2 tons per acre	SL < 2
Annual soil loss less than 4 tons per acre	SL < 4
Annual soil loss less than 6 tons per acre	SL < 6
Subsidy equal to 50 percent of annual terracing costs	TR 50
Subsidy equal to 100 percent of annual terracing costs	TR 100
Subsidy equal to 50 percent of annual contouring costs	C 50
Subsidy equal to 100 percent of annual contouring costs	C 100
Subsidy equal to 50 percent of the initial cost of constructing terraces	IT 50
Subsidy equal to 100 percent of the initial cost of constructing terraces	IT 100
Soil loss < T, 50% terracing costs subsidy	SL < T, TR 50
Soil loss < T, 50% contouring costs subsidy	SL < T, C 50
Soil loss < T, 50% initial terrace construction cost subsidy	SL < T, IT 50
Soil loss < 2, 50% terracing costs subsidy	SL < 2, TR 50
Soil loss < 2, 50% contouring costs subsidy	SL < 2, C 50
Soil loss < 2, 50% initial terrace construction costs subsidy	SL < 2, IT 50
A tax on annual soil loss of 4 cents per ton	TX 4
A tax on annual soil loss of 6 cents per ton	TX 6
A tax on annual soil loss of 8 cents per ton	TX 8
A tax on annual soil loss of 10 cents per ton	TX 10
A tax on annual soil loss of 12 cents per ton	TX 12
A tax on annual soil loss of 16 cents per ton	TX 16
A tax on annual soil loss of 20 cents per ton	TX 20
A 4 cent tax on soil loss with a 50% subsidy on terracing or contouring costs	TX 4, 50 T&C
A 6 cent tax on soil loss with a 50% subsidy on terracing or contouring costs	TX 6, 50 T&C
An 8 cent tax on soil loss with a 50% subsidy on terracing or contouring costs	TX 8, 50 T&C
A 10 cent tax on soil loss with a 50% subsidy on terracing or contouring costs	TX 10, 50 T&C
A 12 cent tax on soil loss with a 50% subsidy on terracing or contouring costs	TX 12, 50 T&C
A 16 cent tax on soil loss with a 50% subsidy on terracing or contouring costs	TX 16, 50 T&C
A 20 cent tax on soil loss with a 50% subsidy on terracing or contouring costs	TX 20, 50 T&C

can be used as a norm against which the other policies (which may be more practical and politically viable) can be evaluated.

To decide whether erosion-sedimentation control is justified on economic grounds and to identify the economically most efficient policy option, the following types of information are needed:

A. The off-site environmental damages that would be abated by the policy;

B. The private and social costs incurred by farmers and society when alternative policy options are implemented at various levels of control; and

C. The implementation, administrative, and enforcement costs associated with each policy.

These benefits and cost components, once combined, indicate whether a particular policy at a specific level of control is justified on economic efficiency grounds. Of course, in deciding between policies, the distributional or equity aspects and political acceptability must also be considered.

Estimates of the above economic impacts for the policy options listed previously are presented in the sections which follow.

OFF-SITE SEDIMENT DAMAGES

A procedure for estimating off-site damages resulting from sediment in a watershed was developed by Lee and Guntermann. This procedure attributes damages to the following factors: (1) an increase in annual cost for a reservoir resulting from a shortened economic life; (2) an increase in the annual cost for flood control structures caused by sediment reducing their economic life; (3) the sediment component of flood damages and damages associated with sediment that remains in the watershed; (4) the increase in sediment damage that occurs after the end of a reservoir's economic life or after the end of a flood control structure's economic life; (5) the loss of recreational benefits resulting from the siltation of a reservoir; and (6) the loss of water supply benefits resulting from sediment displacing the water supply pool in a reservoir.

The Lee and Guntermann procedure implicitly assumes that sediment will not be dredged from a reservoir or removed from a flood control structure. Also implicitly assumed was that a new reservoir or a new flood control structure would not be built to replace an existing one once it is completely filled with silt. These do not appear to be realistic assumptions for Lower Running Water Draw because the watershed does not contain a reservoir with a permanent pool and because the flood control structures were not built with large sediment storage capacity. Consequently, the Lee and Guntermann procedure was not used. Rather, sediment damages were attributed to: (a) the cost of removing the sediment build-up in the four flood control structures by draining and then cleaning out the accumulated sediment; and (b) the sediment component of flood damages and damages associated with sediment that remains in the watershed. Computational formula and damage estimates for each of these components follow.

Cost of Removing Sediment from Flood Control Structures

For this component of damages, it was assumed that the sediment pool in a flood control structure would be allowed to completely fill. Then, before sediment reduced the flood control capacity of the structure, the structure would be drained in a dry period and the sediment removed by bulldozing or a similar operation. SCS engineers estimate that this type of operation would cost about $1.01 cents per ton of sediment removed. With N as the life of the sediment pool it was assumed that a structure would be cleaned every N years. N was computed by the following formula:

$$N = \frac{K\ C_{RS}}{G_e A_N D_R T_E}$$

where

N is the life of the sediment pool in years;

C_{RS} is the capacity of the sediment pool in acre-feet;

G_e is the gross erosion based on a particular crop rotation, tillage system, conservation practice, and management level for the watershed in tons/acre/year;

A_N is the net drainage area in acres;

T_E is the trap efficiency of the structure;

D_R is the delivery ratio used to convert gross erosion to sediment delivered; and

K is the conversion constant from acre-feet to tons.

Values for C_{RS}, A_N, and D_R were obtained from the PL-566 watershed work plans for Lower Running Water Draw. K was assumed to equal 1680 tons per acre-foot, and T_E to equal .95.

The present value cost of removing sediment from flood control structures in the watershed into perpetuity is given by the formula:

$$PV = \sum_{S=1}^{4} \sum_{t=1}^{\infty} \left(\frac{1}{1+i}\right)^{N_s t} C_r C_{RS,S} K$$

$$= \sum_{S=1}^{4} \frac{\left(\frac{1}{1+i}\right)^{N_s}}{1 - \left(\frac{1}{1+i}\right)^{N_s}} C_r C_{RS,S} K$$

where

PV = present value cost

C_r = per ton cost of removing sediment from a flood control structure (= \$1.01)

N_s = life of the sediment pool of the S^{th} structure

i = interest rate

$C_{RS,S}$ = capacity of the sediment pool in the S^{th} structure in acre-feet

The annualized cost of removing sediment from flood control structures is:

$$D_{FS} = i \cdot PV = i \sum_{S=1}^{4} \frac{(\frac{1}{1+i})^{N_s}}{1 - (\frac{1}{1+i})^{N_s}} C_r C_{RS,S} K$$

where

D_{FS} = annualized cost of removing sediment from all flood control structures in Lower Running Water Draw watershed.

Estimates of D_{FS} for various levels of erosion are given in Table 13.

Sediment Component of Flood Damages and Damages Associated with Sediment that Remains in the Watershed

Estimates of this component of damages (D_S) were obtained directly from the PL-566 watershed work plan. In 1977 dollars the damages totalled $1,143 for a gross erosion rate of 7.03 tons per acre. For other erosion rates these damages were assumed proportional to total erosion.

Total Damages

The total off-site damages in Lower Running Water Draw watershed with the average gross erosion rate at 7.03 tons per acre per year are $90,161 annually. Total damages for other erosion rates are given in Table 13 and the total damage function is shown in Figure 3. In evaluating the off-site damages that would be abated by controls on sheet and rill erosion, it was assumed that erosion due to gullies and streambanks would be about 168 thousand tons per year. Furthermore, erosion from the 16,506 acres of land classed as miscellaneous (Table 2) was estimated to be 116 thousand tons

Table 13. Annualized off-site sediment damages in Lower Running Water Draw watershed for various gross erosion levels.

	Damages (Dollars) associated with Gross Erosion (1000 tons) of:						
Damage Component	352	705	1,057	1,410	1,762	2,115	2,467
Flood Control Structures (D_{FS})	14,621	72,574	142,838	216,743	292,736	369,701	446,713
Other (D_S)	414	827	1,241	1,655	2,069	2,482	2,896
Total Damages	15,035	73,401	144,079	218,398	294,805	372,183	449,609

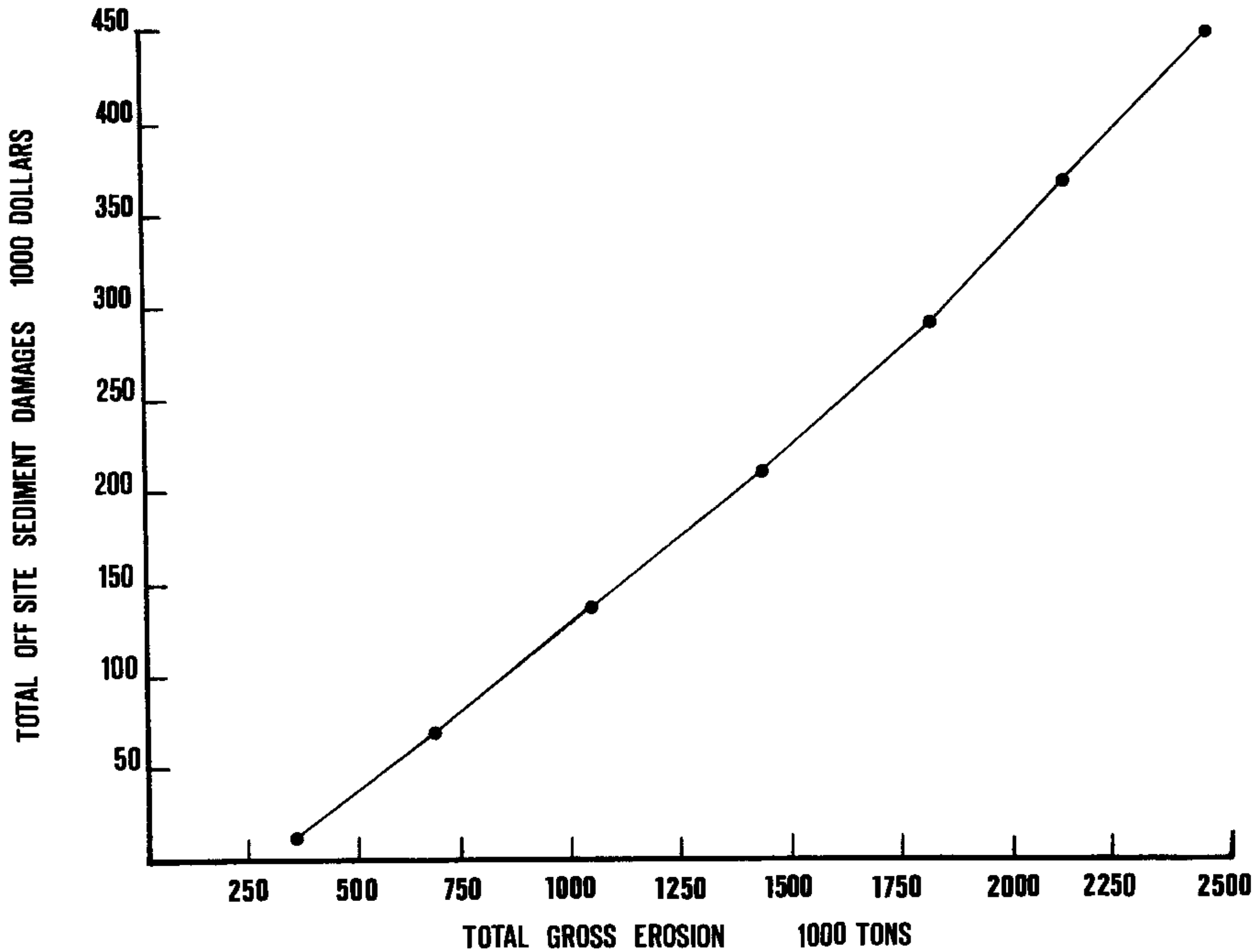

Figure 3. Total off-site sediment damages in Lower Running Water Draw watershed.

per year for a total base erosion rate of 284 thousand tons. Thus, referring to Figure 3 it can be seen that off-site damages would be approximately $4,000 in the absence of sheet and rill erosion from crop or range land. Damages attributed to sheet and rill erosion would be in addition to this base level of damages.

ECONOMIC CONSEQUENCES OF NPS POLLUTION CONTROL POLICIES

To calculate the economic consequences of the various control options it was necessary to make certain basic assumptions. These assumptions can be critical to the results of the study and must be kept in mind if the report is to be correctly interpreted. These assumptions include: (a) relative expected prices will remain constant; (b) expected present value of profit is a good indicator of farmers' decision criteria; (c) farm profits, government cost or revenue and sediment damage abatement have the same value weights; and (d) farmers will act rationally and in their own self interest.

Assumption one rules out any large technological breakthroughs that would drastically change production costs or yield of one crop in relation to the others. It also rules out the discovery of presently unknown ways to cheaply restore the soil fertility of eroded soils or to remove sediment from waterways at little or no cost. Furthermore, major changes in crop prices relative to the general price structure would invaidate the conclusions of this study. If crop prices fell relative to other prices, off-site damages would carry significantly more weight and greater erosion control would be socially beneficial. On the other hand if relative crop prices rose, off-site damages would become less important and the optimal erosion control would depend on the on-farm trade-offs between present production and future production.

The second assumption asserts that the shifts in cropping patterns will take place, as this is the decision criteria built into the model. Farmers have other decision criteria in addition to profit. These other criteria might include; personal preference for one crop over another, preference for leisure rather than more profit, varying estimates of risk and uncertainty, and others. While these other criteria play a part in farmers' decisions it is a general assumption of economics that expected profit is the most important consideration and will yield generally accurate results.

The third assumption is the rationale behind the net social benefit calculation. It indicates that for the purposes of this study "government" is considered only as a point of accounting, i.e. a frictionless point of transfer for part of the jointly held social wealth. Net social benefit does not change if money transfers from farm income to government or vice versa. Also, it implies that farm income is equal in social desirability to a similar dollar amount of off-site sediment damage abatement. This can be defended by noting that if the dollar value of the off-site damages have been correctly estimated then it would be better for farmers as a group to pay for the damages directly. The alternative in obtaining off-site sediment damage abatement is a farmer's loss in profits that exceeds the value of damages abated.

The last assumption rules out ignorance of, or uncertainty about, the most profitable cropping system--conservation practice. It also implies the assumption that financing will be available for any necessary equipment shifts or terrace construction. Neither of these conditions will always be met and that failure will reduce the actual change caused by implementation of any of the control options specified.

Because the benefits of soil conservation accrue over time, rather than immediately, the length of a farmer's planning horizon also influences the crops that will be grown and the conservation practices employed. This, in turn, influences the estimated economic impact of NPS control options. Due to uncertainty about the length of farmers' planning horizon, estimated effects are shown for three horizons. These are 10 years, 100 years, and 200 years. Results based on these planning horizons will likely bracket the actual economic impacts of the erosion controls considered.

Administrative and Enforcement Costs

The cost of administering and enforcing any of the NPS controls considered here has been estimated to be 21 cents per acre of land in the Lower Running Water Draw watershed. These costs will thus be $26,141 annually for the agricultural land in the watershed. The largest component of this cost estimate is based on the amount of technical assistance that would be required to implement the policies. While there will be slight cost differences between policies, this figure gives a rough floor to the administration and enforcement costs. This cost figure should be kept in mind when considering the benefit and cost figures given in Appendix B, Tables 49 through 57.

Estimated effects of various erosion-sedimentation control policies on farm income, government cost or revenue, soil loss,

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*G.E. Kretzschmar, Jr. Texas Soil and Water Conservation Board, personal communication.

off-site sediment damages abated, and net social benefits are shown in Table 49 for a planning horizon of 10 years. Table 50 gives the associated acreage distribution, while Table 51 shows the extent and cost of terracing and contouring by control option. With only a ten year planning horizon, terracing and contouring were found to be unprofitable in the benchmark model solution (Table 51). The distribution of crop acreage in the benchmark solution (Table 50) was reasonably close to actual crop acreages in recent years (Table 2).

The first column of Table 49 gives the estimated farm income effect of the policies. For example, a restriction that per acre soil loss not to exceed the SCS tolerance (T) limits, would decrease annualized farm income in the watershed by $61,440. Since this policy does not involve a tax or subsidy, the government cost is zero (column 2). The limit to T values would reduce soil loss in the watershed by 14.6 thousand tons, which decreases off-site sediment damages by $2600 annually. The final column gives net social benefits excluding any administrative or enforcement costs. This column is calculated by adding off-site damages abated plus government revenue, minus government subsidies, to the change in farm income. For the soil loss less than "T" option, net social benefits, excluding administrative costs, declined by $58,850. If administrative costs for this policy are added, the net social benefits would decline even further. The negative net social welfare is the result of a larger loss in annual farm income than gain in off-site damages abated.

From Table 49 it can be seen that none of the policy options chosen show a positive net social benefit. Thus, we must conclude that with a 10 year planning horiozn and the previously stated assumptions none of the options considered would be an economically advantageous policy.

Model results for a 100 year planning horizon are given in Tables 52 through 54 and results for the 200 year planning horizon in Tables 55 through 57. Comparison of these results with the 10 year planning horizon results demonstrates the importance of the length of the planning period.

When comparing the benchmark or base run of the three time periods, it is notable that as the time horizon lengthens the trend is for the optimal crop distribution to shift from sorghum to more small grains, while maintaining the level of cotton production. The production of cotton is sufficiently valuable that its greater propensity to cause soil erosion is overcome in the longer planning periods, and the production level maintained, by switching some soils to cotton-small grain rotations and by increased use of contouring as a conservation measure. Very little of the dryland acreage is cropped, but all the land that can be irrigated with the available water supply is kept in crop production. It was assumed in this study that the present amount of irrigated acreage could be maintained over all the relevant planning periods. This may not be true at the present rate of water use per acre but might be possible as the increased energy costs of pumping water encourages better utilization and more careful application of the reduced supply.

There is a noticable trend in the way the various options effect the change in farm income, net social benefit, crop distribution, and amount of contouring and terracing as the planning period lengthens. Given a short 10 year planning horizon regulation of soil loss causes large losses in annualized farm income and net social benefits without causing much change in cropping patterns or large increases in conservation practices. That is with the exception of the extreme regulation forcing soil loss to be kept below 2 tons per acre. This limitation does force large changes in the cropping pattern and some contouring and terracing but only at a very high net social cost.

Taxes per ton of soil loss have no effect on cropping patterns, soil loss, or terraced and contoured acreage with the 10 year planning horizon. This is true even when a 50 percent terracing or 50 percent contouring subsidy is added. For the 100 year planning period the tax options also fail to influence the crop distribution though a small decrease in soil loss was affected by the addition of the conservation practice subsidies. Over the 200 year planning horizon the soil loss tax had no effect on the cropping pattern or soil loss. However, the tax combined with a 50 percent contouring subsidy actually caused results contrary to those desired, by increasing soil erosion up to 3,970 tons per year. The increased erosion is caused by the shift in the cropping pattern to more corn production. The contouring subsidy makes corn production on contoured land more profitable, increasing the acreage planted to corn and hence, increasing the total erosion in the watershed, even though it decreases the soil loss on particular fields.

In general, the options and planning horizons chosen demonstration four things about the effects of imposing non-point source controls in Lower Running Water Draw watershed. These are: (1) only the most stringent control measures would effect cropping patterns over any likely planning horizon; (2) the longer the planning period assumed, the greater amount of conservation practices will result from any control option; (3) application of control policies can not be assumed to always reduce total soil erosion in the watershed, and; (4) even excluding administration costs none of the options tested showed a positive net social benefit over any planning period.

SUMMARY AND CONCLUSION

This report looks at both the on-farm economics of soil conservation and the economic consequences of various non-point source pollution control options. These topics are joined in this study because they deal with different facets of the same problem. Unlike some pollutants, the sediment that washes off farmers' fields to become a problem downstream is a valuable resource, not a waste product. Because the soil is valuable in itself, some level of soil conservation practice is going to be economically desirable even if the downstream pollution damages are not considered by the farmer. The results presented in the first section show that soil conservation does indeed pay and that its value is greater, the longer the planning horizon of the decision maker. This suggests that an educational program in this area may reduce sediment damage while increasing farm income at the same time.

The second section of this report deals with the total economic impact of various soil loss control options. Options based on regulation, taxation, economic incentive and combinations thereof are modeled. Given the estimate of off-site sediment damages and the assumptions of the model, the analysis suggests that soil loss controls or subsidies are not presently warranted from a social welfare viewpoint in Lower Running Water Draw. However, it should be noted that the estimate of off-site damages is imprecise at best. Many types of environmental damage are intangible and others are caused indirectly. Future research should be directed toward calculating more precise and complete estimates of environmental damage.

The estimated farm income consequences of NPS control options that are presented in this report were based on the assumption that crop prices would not change in response to the implementation of a particular policy. This is a reasonable assumption as long as the policy is imposed only in a small area with no changes in outside areas. However, if a pollution control policy is imposed in a large area or for the whole nation, it is expected that crop prices will change in response to implementing a policy that significantly effects cropping patterns, yield or production costs. Thus, the results presented in this study apply only if NPS controls are imposed in small areas or in ways that do not effect comparative crop prices.

APPENDIX A

Profit and yield information by soil series for 10, 100 and 200 year planning horizons.

TABLE 14. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES AL01.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.168	13.16	100.0	13.16	95.9	9.84	91.3	6.15	121.	625.	724.
S	SR	0.154	25.38	100.0	25.38	96.3	23.63	92.2	21.71	234.	1283.	1549.
W	SR	0.028	29.48	100.0	29.48	99.9	29.42	99.0	28.85	272.	1522.	1862.
R	SR	0.011	37.34	100.0	37.34	100.0	37.34	100.0	37.34	344.	1928.	2363.
C/W	SR	0.084	26.42	100.0	26.42	98.2	25.02	95.9	23.26	244.	1347.	1630.
C/S	SR	0.154	26.74	100.0	26.74	96.3	24.08	92.2	21.16	247.	1338.	1606.
S/W	SR	0.084	25.91	100.0	25.91	98.2	24.93	95.9	23.71	239.	1326.	1611.
C/S/W	SR	0.098	27.98	100.0	27.98	97.8	26.45	95.2	24.67	258.	1424.	1724.
IRRIGATED CROPS												
C	SR	0.168	152.72	100.0	152.72	95.9	139.89	91.3	125.58	1408.	7676.	9244.
S	SR	0.154	78.45	100.0	78.45	96.3	70.35	92.2	61.49	723.	3922.	4703.
W	SR	0.028	79.39	100.0	79.39	99.9	79.22	99.0	77.57	732.	4098.	5014.
CN	SR	0.154	107.39	100.0	107.39	96.3	95.43	92.2	82.33	990.	5355.	6409.
SB	SR	0.168	127.90	100.0	127.90	95.9	118.30	91.3	107.60	1180.	6447.	7779.
C/W	SR	0.084	138.86	100.0	138.86	98.2	133.90	95.9	127.73	1281.	7110.	8641.
C/S	SR	0.154	145.74	100.0	145.74	96.3	134.71	92.2	122.64	1344.	7349.	8866.
S/W	SR	0.084	77.30	100.0	77.30	98.2	73.68	95.9	69.16	713.	3948.	4785.
C/S/W	SR	0.098	127.53	100.0	127.53	97.8	121.73	95.2	114.97	1176.	6508.	7895.
C/CN	SR	0.154	152.64	100.0	152.64	96.3	139.96	92.2	126.09	1408.	7679.	9249.
W/CN	SR	0.084	84.20	100.0	84.20	98.2	79.77	95.9	74.25	777.	4294.	5198.
CN/SB	SR	0.154	117.65	100.0	117.65	96.3	107.29	92.2	95.95	1085.	5910.	7110.

TABLE 15. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES AL13.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.240	3.07	100.0	3.07	94.0	-1.14	85.7	-7.02	28.	84.	48.
	C	0.144	-0.77	100.0	-0.77	96.5	-3.23	92.7	-5.91	-7.	-78.	-128.
S	SR	0.220	16.02	100.0	16.02	94.6	13.98	87.5	11.35	148.	791.	944.
	C	0.132	14.90	100.0	14.90	96.8	13.71	93.4	12.42	137.	751.	905.
W	SR	0.040	22.46	100.0	22.46	99.5	22.18	98.3	21.50	207.	1158.	1413.
	C	0.024	20.60	100.0	20.60	100.0	20.60	99.3	20.19	190.	1064.	1302.
R	SR	0.016	34.98	100.0	34.98	100.0	34.98	99.8	34.89	323.	1806.	2213.
C/W	SR	0.120	17.19	100.0	17.19	97.2	15.26	94.0	13.14	159.	860.	1027.
	C	0.072	14.34	100.0	14.34	98.5	13.34	96.5	11.98	132.	729.	878.
C/S	SR	0.220	15.96	100.0	15.96	94.6	12.67	87.5	8.42	147.	767.	897.
	C	0.132	13.48	100.0	13.48	96.8	11.57	93.4	9.48	124.	667.	792.
S/W	SR	0.120	17.74	100.0	17.74	97.2	16.45	94.0	15.03	164.	897.	1082.
	C	0.072	16.25	100.0	16.25	98.5	15.58	96.5	14.67	150.	832.	1009.
C/S/W	SR	0.140	18.36	100.0	18.36	96.6	16.37	93.0	14.21	169.	917.	1098.
	C	0.084	16.11	100.0	16.11	98.2	15.03	95.9	13.69	149.	819.	988.
IRRIGATED CROPS												
C	SR	0.240	100.67	100.0	100.67	94.0	85.13	85.7	63.49	928.	4923.	5830.
	C	0.144	93.62	100.0	93.62	96.5	84.56	92.7	74.70	863.	4693.	5634.
S	SR	0.220	58.79	100.0	58.79	94.6	48.08	87.5	34.27	542.	2849.	3354.
	C	0.132	51.11	100.0	51.11	96.8	44.89	93.4	38.12	471.	2545.	3038.

TABLE 15. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.040	61.02	100.0	61.02	99.5	60.22	98.3	58.19	563.	3146.	3838.
	C	0.024	56.08	100.0	56.08	100.0	56.08	99.3	54.86	517.	2895.	3544.
CN	SR	0.220	54.14	100.0	54.14	94.6	39.64	87.5	20.94	499.	2543.	2930.
	C	0.132	44.48	100.0	44.48	96.8	36.06	93.4	26.89	410.	2170.	2549.
SB	SR	0.240	81.16	100.0	81.16	94.0	70.00	85.7	54.46	748.	3993.	4748.
	C	0.144	74.39	100.0	74.39	96.5	67.88	92.7	60.80	686.	3740.	4499.
C/W	SR	0.120	99.23	100.0	99.23	97.2	92.67	94.0	85.43	915.	5028.	6075.
	C	0.072	93.24	100.0	93.24	98.5	89.83	96.5	85.19	860.	4777.	5802.
C/S	SR	0.220	105.42	100.0	105.42	94.6	91.58	87.5	73.73	972.	5202.	6197.
	C	0.132	98.06	100.0	98.06	96.8	90.02	93.4	81.27	904.	4942.	5952.
S/W	SR	0.120	58.52	100.0	58.52	97.2	53.42	94.0	47.80	540.	2948.	3545.
	C	0.072	52.21	100.0	52.21	98.5	49.56	96.5	45.96	481.	2667.	3228.
C/S/W	SR	0.140	93.98	100.0	93.98	96.6	86.33	93.0	78.01	867.	4734.	5703.
	C	0.084	87.49	100.0	87.49	98.2	83.34	95.9	78.18	807.	4467.	5414.
C/CN	SR	0.220	96.22	100.0	96.22	94.6	80.85	87.5	61.04	887.	4700.	5563.
	C	0.132	87.87	100.0	87.87	96.8	78.95	93.4	69.23	810.	4403.	5279.
W/CN	SR	0.120	49.31	100.0	49.31	97.2	43.42	94.0	36.93	455.	2461.	2937.
	C	0.072	42.01	100.0	42.01	98.5	38.95	96.5	34.79	387.	2136.	2571.
CN/SB	SR	0.220	67.65	100.0	67.65	94.6	55.31	87.5	39.39	624.	3278.	3858.
	C	0.132	59.44	100.0	59.44	96.8	52.27	93.4	44.46	548.	2961.	3535.

TABLE 16. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES AL35.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.042	32.47	100.0	32.47	99.5	32.27	98.2	31.80	299.	1675.	2049.

TABLE 17. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES AF01.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.146	33.34	100.0	33.34	96.5	29.77	92.6	25.90	307.	1666.	1995.
S	SR	0.134	25.38	100.0	25.38	96.8	23.88	93.3	22.24	234.	1288.	1559.
W	SR	0.024	18.95	100.0	18.95	100.0	18.95	99.2	18.55	175.	978.	1197.
R	SR	0.010	49.71	100.0	49.71	100.0	49.71	100.0	49.71	458.	2566.	3145.
C/W	SR	0.073	33.84	100.0	33.84	98.5	32.57	96.5	30.86	312.	1733.	2105.
C/S	SR	0.134	38.29	100.0	38.29	96.8	35.63	93.3	32.74	353.	1937.	2339.
S/W	SR	0.073	21.17	100.0	21.17	98.5	20.43	96.5	19.45	195.	1085.	1318.
C/S/W	SR	0.085	32.87	100.0	32.87	98.1	31.51	95.8	29.82	303.	1681.	2040.
IRRIGATED CROPS												
C	SR	0.146	187.43	100.0	187.43	96.5	175.17	92.6	161.83	1728.	9486.	11467.
S	SR	0.134	78.45	100.0	78.45	96.8	71.51	93.3	63.96	723.	3946.	4745.
W	SR	0.024	79.39	100.0	79.39	100.0	79.39	99.2	77.99	732.	4099.	5018.
CN	SR	0.134	86.09	100.0	86.09	96.8	76.52	93.3	66.11	794.	4300.	5145.
C/W	SR	0.073	159.76	100.0	159.76	98.5	155.38	96.5	149.46	1473.	8201.	9983.
C/S	SR	0.134	165.60	100.0	165.60	96.8	155.51	93.3	144.54	1527.	8397.	10160.
S/W	SR	0.073	77.30	100.0	77.30	98.5	74.32	96.5	70.30	713.	3959.	4806.
C/S/W	SR	0.085	141.32	100.0	141.32	98.1	136.23	95.8	129.92	1303.	7235.	8793.
C/CN	SR	0.134	161.85	100.0	161.85	96.8	150.69	93.3	138.55	1493.	8188.	9889.
W/CN	SR	0.073	73.55	100.0	73.55	98.5	70.07	96.5	65.37	678.	3760.	4554.

TABLE 18. YIELD LOSS AND PER ACRE RETURN TO LANC AND MANAGEMENT FOR SOIL SERIES AF13.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PRCFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.453	13.16	99.3	12.63	87.0	2.66	43.8	-32.22	120.	499.	415.
	C	0.272	9.32	99.9	9.26	93.2	3.82	82.3	-4.95	86.	382.	394.
	T	0.189	-0.16	100.0	-5.54	95.3	-4.12	89.9	-8.31	-51.	-82.	-136.
S	SR	0.415	16.02	99.5	15.82	88.6	11.73	55.2	-0.77	147.	752.	846.
	C	0.249	14.90	100.0	14.90	93.8	12.57	84.8	9.22	137.	728.	861.
	T	0.173	8.15	100.0	2.77	95.8	6.35	91.0	4.76	26.	384.	463.
W	SR	0.075	8.41	100.0	8.41	98.4	7.75	96.3	6.87	78.	427.	513.
	C	0.045	6.55	100.0	6.55	99.3	6.28	98.0	5.70	60.	337.	407.
	T	0.032	-0.13	100.0	-4.74	99.8	-0.39	98.8	-0.64	-44.	-16.	-11.
R	SR	0.030	47.20	100.0	47.20	99.8	47.12	98.9	46.63	435.	2437.	2984.
C/W	SR	0.226	16.94	100.0	16.94	94.4	13.15	87.0	8.15	156.	808.	942.
	C	0.136	14.09	100.0	14.09	96.7	11.89	93.2	9.49	130.	694.	822.
	T	0.095	6.42	100.0	1.81	97.9	4.80	95.3	3.27	17.	304.	363.
C/S	SR	0.415	21.73	99.5	21.38	88.6	14.15	55.2	-7.94	200.	989.	1080.
	C	0.249	19.25	100.0	19.25	93.8	15.14	84.8	9.21	178.	921.	1074.
	T	0.173	11.14	100.0	5.76	95.8	8.12	91.0	5.15	53.	518.	612.
S/W	SR	0.226	11.42	100.0	11.42	94.4	9.23	87.0	6.34	105.	551.	647.
	C	0.136	9.93	100.0	9.93	96.7	8.66	93.2	7.27	92.	493.	588.
	T	0.095	3.62	100.0	-1.00	97.9	2.61	95.3	1.80	-9.	167.	204.
C/S/W	SR	0.264	18.20	100.0	18.18	93.4	14.32	83.2	8.34	168.	870.	1014.
	C	0.158	15.95	100.0	15.95	96.1	13.68	91.9	11.19	147.	787.	936.
	T	0.110	8.87	100.0	4.26	97.4	7.18	94.5	5.66	39.	428.	515.
IRRIGATED CROPS												
C	SR	0.453	135.37	99.3	133.44	87.0	96.98	43.8	-30.49	1244.	6331.	7039.
	C	0.272	128.33	99.9	128.14	93.2	108.23	82.3	76.20	1183.	6265.	7406.
	T	0.189	115.65	100.0	110.27	95.3	101.71	89.9	85.87	1017.	5729.	6860.
S	SR	0.415	58.79	99.5	57.74	88.6	36.29	55.2	-29.31	540.	2641.	2843.
	C	0.249	51.11	100.0	51.11	93.8	38.91	84.8	21.28	471.	2422.	2807.
	T	0.173	37.79	100.0	32.41	95.8	29.23	91.0	20.03	299.	1803.	2116.

TABLE 18. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.075	61.02	100.0	61.02	98.4	58.41	96.3	54.96	563.	3121.	3786.
	C	0.045	56.08	100.0	56.08	99.3	55.00	98.0	52.75	517.	2888.	3519.
	T	0.032	46.31	100.0	41.70	99.8	45.79	98.8	44.32	385.	2381.	2918.
CN	SR	0.415	43.49	99.5	42.13	88.6	14.24	55.2	-71.04	398.	1733.	1612.
	C	0.249	33.83	100.0	33.83	93.8	17.98	84.8	-4.94	312.	1465.	1586.
	T	0.173	18.54	100.0	13.16	95.8	7.47	91.0	-4.56	121.	768.	816.
C/W	SR	0.226	120.14	100.0	120.14	94.4	105.99	87.0	87.33	1108.	5955.	7116.
	C	0.136	114.15	100.0	114.15	96.7	105.92	93.2	96.97	1053.	5768.	6962.
	T	0.095	103.33	100.0	98.72	97.9	97.77	95.3	91.59	910.	5256.	6377.
C/S	SR	0.415	125.29	99.5	123.83	88.6	93.93	55.2	2.50	1152.	5919.	6705.
	C	0.249	117.92	100.0	117.92	93.8	100.92	84.8	76.36	1088.	5786.	6867.
	T	0.173	104.93	100.0	99.55	95.8	93.08	91.0	80.17	918.	5215.	6256.
S/W	SR	0.226	58.52	100.0	58.52	94.4	48.44	87.0	35.15	540.	2845.	3356.
	C	0.136	52.21	100.0	52.21	96.7	46.35	93.2	39.97	481.	2606.	3118.
	T	0.095	41.07	100.0	36.46	97.9	37.06	95.3	32.71	336.	2062.	2484.
C/S/W	SR	0.264	107.77	100.0	107.68	93.4	91.89	83.2	67.41	994.	5280.	6258.
	C	0.158	101.29	100.0	101.29	96.1	92.01	91.9	81.81	934.	5081.	6108.
	T	0.110	89.97	100.0	85.36	97.4	83.60	94.5	76.83	787.	4550.	5503.
C/CN	SR	0.415	110.75	99.5	109.18	88.6	76.81	55.2	-22.16	1018.	5123.	5685.
	C	0.249	102.40	100.0	102.40	93.8	84.00	84.8	57.41	944.	4960.	5836.
	T	0.173	88.42	100.0	83.04	95.8	75.61	91.0	61.62	766.	4347.	5180.
W/CN	SR	0.226	43.99	100.0	43.99	94.4	32.64	87.0	17.67	406.	2073.	2393.
	C	0.136	36.69	100.0	36.69	96.7	30.09	93.2	22.91	338.	1794.	2113.
	T	0.095	24.56	100.0	19.95	97.9	20.07	95.3	15.15	184.	1204.	1425.

TABLE 19. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES AF35.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.052	44.70	100.0	44.70	99.1	44.27	97.6	43.51	412.	2304.	2817.

TABLE 20. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES BL15.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.034	44.70	100.0	44.70	99.9	44.67	99.3	44.35	412.	2308.	2827.

TABLE 21. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES BL58.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.048	42.34	100.0	42.34	99.6	42.18	98.8	41.78	391.	2185.	2675.

TABLE 22. YIELD LOSS AND PER ACRE RETURN TO LANC AND MANAGEMENT FOR SOIL SERIES BF01.

ROT	CP	% SOIL LCST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.096	33.34	100.0	33.34	98.8	32.12	97.4	30.73	307.	1707.	2074.
S	SR	0.088	25.38	100.0	25.38	98.9	24.88	97.6	24.27	234.	1305.	1592.
W	SR	0.016	29.48	100.0	29.48	100.0	29.48	100.0	29.46	272.	1522.	1865.
R	SR	0.006	57.07	100.0	57.07	100.0	57.07	100.0	57.07	526.	2947.	3611.
C/W	SR	0.048	38.58	100.0	38.58	99.6	38.27	98.8	37.50	356.	1990.	2432.
C/S	SR	0.088	38.29	100.0	38.29	98.9	37.40	97.6	36.33	353.	1967.	2397.
S/W	SR	0.048	25.91	100.0	25.91	99.6	25.72	98.8	25.26	239.	1337.	1634.
C/S/W	SR	0.056	36.00	100.0	36.00	99.5	35.61	98.5	34.88	332.	1856.	2267.
IRRIGATED CRCPS												
C	SR	0.096	187.43	100.0	187.43	98.8	183.24	97.4	178.46	1728.	9627.	11739.
S	SR	0.088	78.45	100.0	78.45	98.9	76.13	97.6	73.32	723.	4025.	4898.
W	SR	0.016	79.39	100.0	79.39	100.0	79.39	100.0	79.33	732.	4099.	5024.
CN	SR	0.088	86.09	100.0	86.09	98.9	82.88	97.6	79.01	794.	4409.	5357.
C/W	SR	0.048	159.76	100.0	159.76	99.6	158.74	98.8	156.24	1473.	8243.	10081.
C/S	SR	0.088	165.60	100.0	165.60	98.9	162.22	97.6	158.14	1527.	8512.	10383.
S/W	SR	0.048	77.30	100.0	77.30	99.6	76.61	98.8	74.91	713.	3987.	4872.
C/S/W	SR	0.056	141.32	100.0	141.32	99.5	139.94	98.5	137.32	1303.	7287.	8905.
C/CN	SR	0.088	161.85	100.0	161.85	98.9	158.11	97.6	153.59	1493.	8314.	10135.
W/CN	SR	0.048	73.55	100.0	73.55	99.6	72.74	98.8	70.76	678.	3793.	4631.

TABLE 23. YIELD LOSS AND PER ACRE RETURN TO LANC AND MANAGEMENT FOR SOIL SERIES BF13.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.013	54.57	100.0	54.57	100.0	54.57	100.0	54.57	503.	2817.	3453.

TABLE 24. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES BI01.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.256	23.25	100.0	23.25	96.6	20.15	91.4	15.43	214.	1144.	1362.
S	SR	0.235	25.38	100.0	25.38	96.9	23.91	92.7	21.94	234.	1284.	1555.
W	SR	0.043	29.48	100.0	29.48	99.8	29.32	99.0	28.83	272.	1521.	1861.
R	SR	0.017	57.07	100.0	57.07	100.0	57.07	99.9	57.03	526.	2947.	3611.
C/W	SR	0.128	32.50	100.0	32.50	98.3	31.09	96.6	29.66	300.	1658.	2014.
C/S	SR	0.235	32.52	100.0	32.52	96.9	30.10	92.7	26.86	300.	1636.	1974.
S/W	SR	0.128	25.91	100.0	25.91	98.3	25.00	96.6	24.08	239.	1325.	1612.
C/S/W	SR	0.149	31.99	100.0	31.99	98.0	30.53	96.0	29.09	295.	1629.	1979.
IRRIGATED CROPS												
C	SR	0.256	152.72	100.0	152.72	96.6	142.05	91.4	125.83	1408.	7692.	9288.
S	SR	0.235	78.45	100.0	78.45	96.9	71.67	92.7	62.56	723.	3930.	4730.
W	SR	0.043	116.13	100.0	116.13	99.8	115.59	99.0	113.86	1071.	5993.	7332.
CN	SR	0.235	86.09	100.0	86.09	96.9	76.73	92.7	64.18	794.	4279.	5125.
SB	SR	0.256	104.53	100.0	104.53	96.6	97.35	91.4	86.42	964.	5267.	6361.
C/W	SR	0.128	155.39	100.0	155.39	98.3	150.50	96.6	145.57	1433.	7954.	9684.
C/S	SR	0.235	145.74	100.0	145.74	96.9	136.50	92.7	124.10	1344.	7360.	8903.
S/W	SR	0.128	93.84	100.0	93.84	98.3	90.18	96.6	86.50	865.	4793.	5827.
C/S/W	SR	0.149	138.44	100.0	138.44	98.0	132.99	96.0	127.59	1277.	7065.	8590.
C/CN	SR	0.235	141.99	100.0	141.99	96.9	131.70	92.7	117.90	1309.	7148.	8630.
W/CN	SR	0.128	90.09	100.0	90.09	98.3	85.86	96.6	81.61	831.	4592.	5572.
CN/SB	SR	0.235	95.31	100.0	95.31	96.9	87.33	92.7	76.63	879.	4779.	5756.

TABLE 25. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES BI13.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.594	13.16	99.4	12.70	88.3	3.68	50.0	-27.20	120.	541.	426.
	C	0.356	9.32	99.9	9.23	95.1	5.36	81.6	-5.51	86.	408.	435.
	T	0.281	-0.16	100.0	-5.54	96.2	-3.39	89.6	-8.54	-51.	-74.	-120.
S	SR	0.544	16.02	99.5	15.84	90.3	12.37	50.0	-2.71	147.	770.	854.
	C	0.327	14.90	100.0	14.88	95.6	13.24	85.3	9.39	137.	739.	880.
	T	0.257	8.15	100.0	2.77	96.6	6.65	91.3	4.89	26.	387.	470.
W	SR	0.099	22.46	100.0	22.46	98.7	21.75	97.3	20.96	207.	1151.	1401.
	C	0.059	20.60	100.0	20.60	99.4	20.28	98.4	19.72	190.	1061.	1295.
	T	0.047	13.92	100.0	9.31	99.7	13.56	98.8	13.26	86.	709.	876.
R	SR	0.040	54.57	100.0	54.57	99.8	54.46	99.1	54.02	503.	2817.	3449.
C/W	SR	0.297	23.26	100.0	23.26	96.0	20.32	88.3	14.59	215.	1147.	1364.
	C	0.178	20.41	100.0	20.41	97.6	18.64	95.1	16.79	188.	1025.	1234.
	T	0.140	12.74	100.0	8.13	98.1	11.17	96.2	9.97	75.	628.	763.
C/S	SR	0.544	21.73	99.5	21.42	90.3	15.29	50.0	-11.38	200.	1022.	1092.
	C	0.327	19.25	100.0	19.22	95.6	16.32	85.3	9.51	178.	940.	1107.
	T	0.257	11.14	100.0	5.76	96.6	8.66	91.3	5.38	53.	523.	624.
S/W	SR	0.297	17.74	100.0	17.74	96.0	15.94	88.3	12.42	164.	883.	1056.
	C	0.178	16.25	100.0	16.25	97.6	15.16	95.1	14.03	150.	821.	993.
	T	0.140	9.94	100.0	5.33	98.1	8.91	96.2	8.24	49.	491.	602.
C/S/W	SR	0.346	22.37	99.9	22.32	95.3	19.39	82.9	11.64	206.	1100.	1300.
	C	0.208	20.12	100.0	20.12	97.2	18.37	94.0	16.32	186.	1009.	1214.
	T	0.164	13.04	100.0	8.43	97.8	11.48	95.6	10.26	78.	642.	781.
IRRIGATED CROPS												
C	SR	0.594	100.67	99.4	99.18	88.3	70.10	50.0	-29.48	924.	4752.	5060.
	C	0.356	93.62	99.9	93.35	95.1	80.86	81.6	45.83	863.	4599.	5427.
	T	0.281	80.95	100.0	75.57	96.2	70.98	89.6	53.92	697.	3989.	4769.
S	SR	0.544	58.79	99.5	57.85	90.3	39.66	50.0	-39.51	540.	2738.	2880.
	C	0.327	51.11	100.0	51.02	95.6	42.42	85.3	22.19	471.	2478.	2905.
	T	0.257	37.79	100.0	32.41	96.6	30.83	91.3	20.69	299.	1818.	2153.

TABLE 25. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.099	79.39	100.0	79.39	98.7	77.08	97.3	74.50	732.	4071.	4957.
	C	0.059	74.45	100.0	74.45	99.4	73.40	98.4	71.57	687.	3836.	4683.
	T	0.047	64.69	100.0	60.07	99.7	63.90	98.8	62.54	554.	3327.	4076.
CN	SR	0.544	43.49	99.5	42.27	90.3	18.62	50.0	-84.31	398.	1859.	1660.
	C	0.327	33.83	100.0	33.72	95.6	22.54	85.3	-3.76	312.	1538.	1713.
	T	0.257	18.54	100.0	13.16	96.6	9.56	91.3	-3.70	121.	788.	863.
SB	SR	0.594	34.42	99.4	33.62	88.3	17.95	50.0	-35.70	315.	1537.	1472.
	C	0.356	27.65	99.9	27.50	95.1	20.77	81.6	1.90	255.	1301.	1482.
	T	0.281	15.25	100.0	9.87	96.2	9.79	89.6	0.69	91.	680.	775.
C/W	SR	0.297	107.50	100.0	107.50	96.0	97.97	88.3	79.38	991.	5374.	6452.
	C	0.178	101.51	100.0	101.51	97.6	95.75	95.1	89.76	936.	5147.	6237.
	T	0.140	90.69	100.0	86.08	98.1	86.00	96.2	81.71	794.	4607.	5599.
C/S	SR	0.544	105.42	99.5	104.21	90.3	80.69	50.0	-21.65	969.	5059.	5586.
	C	0.327	98.06	100.0	97.95	95.6	86.83	85.3	60.68	904.	4855.	5779.
	T	0.257	85.07	100.0	79.69	96.6	76.13	91.3	62.95	735.	4223.	5075.
S/W	SR	0.297	66.79	100.0	66.79	96.0	59.31	88.3	44.73	616.	3310.	3951.
	C	0.178	60.48	100.0	60.48	97.6	55.96	95.1	51.26	558.	3049.	3681.
	T	0.140	49.34	100.0	44.73	98.1	45.62	96.2	42.29	412.	2486.	3013.
C/S/W	SR	0.346	99.43	99.9	99.23	95.3	88.44	82.9	59.85	917.	4931.	5867.
	C	0.208	92.94	100.0	92.94	97.2	86.47	94.0	78.91	857.	4687.	5664.
	T	0.164	81.63	100.0	77.02	97.8	76.32	95.6	71.34	710.	4124.	5002.
C/CN	SR	0.544	90.89	99.5	89.57	90.3	63.96	50.0	-47.49	835.	4274.	4570.
	C	0.327	82.54	100.0	82.42	95.6	70.31	85.3	41.84	761.	4035.	4760.
	T	0.257	68.56	100.0	63.18	96.6	58.85	91.3	44.48	583.	3357.	4003.
W/CN	SR	0.297	52.25	100.0	52.25	96.0	43.88	88.3	27.54	482.	2543.	2999.
	C	0.178	44.96	100.0	44.96	97.6	39.90	95.1	34.63	415.	2239.	2681.
	T	0.140	32.83	100.0	28.22	98.1	28.69	96.2	24.94	260.	1627.	1955.
CN/SB	SR	0.544	38.95	99.5	38.01	90.3	19.69	50.0	-60.00	357.	1712.	1620.
	C	0.327	30.74	100.0	30.65	95.6	21.99	85.3	1.63	283.	1425.	1614.
	T	0.257	16.90	100.0	11.52	96.6	9.89	91.3	-0.32	106.	739.	829.

TABLE 26. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES BSPU.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.014	57.07	100.0	57.07	100.0	57.07	100.0	57.07	526.	2947.	3611.

TABLE 27. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES DL13.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
S	SR	0.396	1.03	99.8	0.99	94.4	-0.23	75.5	-4.47	9.	31.	14.
	C	0.238	-0.08	100.0	-0.08	96.8	-0.80	92.5	-1.77	-1.	-17.	-30.
	T	0.198	-6.83	100.0	-12.22	97.3	-7.64	94.4	-8.10	-113.	-374.	-452.
W	SR	0.072	1.39	100.0	1.39	99.2	1.11	98.1	0.71	13.	69.	80.
	C	0.043	-0.47	100.0	-0.47	99.7	-0.56	99.0	-0.84	-4.	-25.	-32.
	T	0.036	-7.15	100.0	-11.76	99.9	-7.37	99.2	-7.43	-108.	-378.	-454.
R	SR	0.029	32.47	100.0	32.47	100.0	32.47	99.5	32.28	299.	1677.	2054.
S/W	SR	0.216	0.24	100.0	0.24	97.1	-0.56	93.6	-1.54	2.	-2.	-12.
	C	0.130	-1.25	100.0	-1.25	98.3	-1.73	96.5	-2.21	-11.	-71.	-93.
	T	0.108	-7.56	100.0	-12.17	98.6	-8.13	97.1	-8.37	-112.	-404.	-490.
IRRIGATED CROPS												
S	SR	0.396	-19.85	99.8	-20.07	94.4	-26.50	75.5	-48.73	-183.	-1145.	-1525.
	C	0.238	-27.54	100.0	-27.54	96.8	-31.28	92.5	-36.39	-254.	-1488.	-1872.
	T	0.198	-40.85	100.0	-46.23	97.3	-44.20	94.4	-47.50	-426.	-2173.	-2689.
W	SR	0.072	24.28	100.0	24.28	99.2	23.25	98.1	21.79	224.	1244.	1508.
	C	0.043	19.34	100.0	19.34	99.7	19.01	99.0	17.99	178.	997.	1214.
	T	0.036	9.57	100.0	4.96	99.9	9.25	99.2	8.55	46.	485.	600.
S/W	SR	0.216	-0.09	100.0	-0.09	97.1	-3.59	93.6	-7.85	-1.	-65.	-124.
	C	0.130	-6.40	100.0	-6.40	98.3	-8.49	96.5	-10.58	-59.	-360.	-469.
	T	0.108	-17.54	100.0	-22.15	98.6	-19.41	97.1	-21.04	-204.	-936.	-1159.

TABLE 28. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES DL38.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.048	29.97	100.0	29.97	99.6	29.85	98.8	29.56	276.	1547.	1893.

TABLE 29. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES EL01.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.153	13.16	100.0	13.16	96.3	10.16	92.2	6.88	121.	632.	736.
S	SR	0.140	25.38	100.0	25.38	96.6	23.80	92.9	22.08	234.	1286.	1556.
W	SR	0.025	29.48	100.0	29.48	100.0	29.48	99.2	28.95	272.	1522.	1863.
R	SR	0.010	37.34	100.0	37.34	100.0	37.34	100.0	37.34	344.	1928.	2363.
C/W	SR	0.076	26.42	100.0	26.42	98.4	25.18	96.3	23.56	244.	1350.	1636.
C/S	SR	0.140	26.74	100.0	26.74	96.6	24.33	92.9	21.71	247.	1344.	1615.
S/W	SR	0.076	25.91	100.0	25.91	98.4	25.05	96.3	23.92	239.	1328.	1615.
C/S/W	SR	0.089	27.98	100.0	27.98	98.0	26.62	95.6	24.98	258.	1428.	1730.
IRRIGATED CROPS												
C	SR	0.153	100.67	100.0	100.67	96.3	90.99	92.2	80.40	928.	5044.	6058.
S	SR	0.140	58.79	100.0	58.79	96.6	52.14	92.9	44.91	542.	2933.	3508.
W	SR	0.025	61.02	100.0	61.02	100.0	61.01	99.2	59.64	563.	3150.	3855.
CN	SR	0.140	107.39	100.0	107.39	96.6	96.58	92.9	84.84	990.	5378.	6451.
SB	SR	0.153	127.90	100.0	127.90	96.3	119.21	92.2	109.71	1180.	6466.	7813.
C/W	SR	0.076	99.23	100.0	99.23	98.4	95.51	96.3	90.63	915.	5081.	6171.
C/S	SR	0.140	105.42	100.0	105.42	96.6	96.83	92.9	87.48	972.	5311.	6397.
S/W	SR	0.076	58.52	100.0	58.52	98.4	55.63	96.3	51.84	540.	2989.	3619.
C/S/W	SR	0.089	93.98	100.0	93.98	98.0	89.49	95.6	84.06	867.	4796.	5814.
C/CN	SR	0.140	122.84	100.0	122.84	96.6	112.40	92.9	101.05	1133.	6182.	7441.
W/CN	SR	0.076	75.94	100.0	75.94	98.4	72.17	96.3	67.23	700.	3878.	4696.
CN/SB	SR	0.140	117.65	100.0	117.65	96.6	108.29	92.9	98.12	1085.	5930.	7147.

TABLE 30. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES EL13.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.276	-7.02	99.9	-7.07	93.1	-11.22	81.8	-18.04	-65.	-438.	-594.
	C	0.166	-10.86	100.0	-10.86	96.0	-13.31	91.5	-16.03	-100.	-600.	-767.
	T	0.137	-20.34	100.0	-25.72	96.7	-22.54	93.1	-24.49	-237.	-1091.	-1350.
S	SR	0.253	16.02	100.0	16.02	93.7	13.65	84.4	10.18	148.	785.	931.
	C	0.152	14.90	100.0	14.90	96.3	13.52	92.3	12.01	137.	747.	898.
	T	0.125	8.15	100.0	2.77	97.0	6.82	93.7	5.81	26.	394.	481.
W	SR	0.046	18.95	100.0	18.95	99.3	18.59	97.9	17.86	175.	976.	1189.
	C	0.028	17.09	100.0	17.09	99.9	17.05	99.0	16.58	158.	882.	1079.
	T	0.023	10.41	100.0	5.80	100.0	10.23	99.3	10.06	53.	528.	657.
R	SR	0.018	34.98	100.0	34.98	100.0	34.98	99.6	34.83	323.	1806.	2213.
C/W	SR	0.138	9.53	100.0	9.53	96.7	7.53	93.1	5.36	88.	461.	539.
	C	0.083	6.68	100.0	6.68	98.2	5.60	96.0	4.24	62.	332.	391.
	T	0.068	-1.00	100.0	-5.61	98.6	-2.00	96.7	-2.98	-52.	-69.	-87.
C/S	SR	0.253	10.19	100.0	10.19	93.7	6.73	84.4	1.66	94.	464.	523.
	C	0.152	7.70	100.0	7.70	96.3	5.69	92.3	3.49	71.	366.	423.
	T	0.125	-0.41	100.0	-5.79	97.0	-2.25	93.7	-3.83	-53.	-56.	-77.
S/W	SR	0.138	16.16	100.0	16.16	96.7	14.70	93.1	13.12	149.	812.	976.
	C	0.083	14.67	100.0	14.67	98.2	13.89	96.0	12.90	135.	748.	905.
	T	0.068	8.36	100.0	3.75	98.6	7.58	96.7	6.92	35.	416.	512.
C/S/W	SR	0.161	13.31	100.0	13.31	96.1	11.19	91.7	8.86	123.	653.	773.
	C	0.097	11.05	100.0	11.05	97.8	9.88	95.2	8.50	102.	555.	664.
	T	0.080	3.98	100.0	-0.63	98.3	2.88	96.1	1.89	-6.	186.	225.
IRRIGATED CROPS												
C	SR	0.276	13.90	99.9	13.77	93.1	1.87	81.8	-17.69	128.	502.	451.
	C	0.166	6.86	100.0	6.86	96.0	-0.16	91.5	-7.96	63.	240.	205.
	T	0.137	-5.81	100.0	-11.19	96.7	-11.73	93.1	-17.73	-103.	-398.	-549.
S	SR	0.253	39.13	100.0	39.13	93.7	27.96	84.4	11.54	361.	1821.	2084.
	C	0.152	31.45	100.0	31.45	96.3	24.92	92.3	17.80	290.	1521.	1780.
	T	0.125	18.13	100.0	12.75	97.0	12.64	93.7	7.07	118.	848.	982.

TABLE 30. CONTINUED.

ROT	CP	% SOIL LCST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.046	42.65	100.0	42.65	99.3	41.65	97.9	39.62	393.	2195.	2671.
	C	0.028	37.71	100.0	37.71	99.9	37.59	99.0	36.29	348.	1947.	2379.
	T	0.023	27.94	100.0	23.33	100.0	27.77	99.3	26.97	215.	1433.	1764.
CN	SR	0.253	54.14	100.0	54.14	93.7	37.33	84.4	12.62	499.	2496.	2836.
	C	0.152	44.48	100.0	44.48	96.3	34.67	92.3	23.94	410.	2142.	2498.
	T	0.125	29.19	100.0	23.81	97.0	21.04	93.7	12.54	220.	1380.	1599.
C/W	SR	0.138	38.70	100.0	38.70	96.7	33.03	93.1	26.86	357.	1911.	2269.
	C	0.083	32.71	100.0	32.71	98.2	29.64	96.0	25.80	302.	1652.	1980.
	T	0.068	21.89	100.0	17.28	98.6	19.38	96.7	16.27	159.	1097.	1319.
C/S	SR	0.253	45.25	100.0	45.25	93.7	33.01	84.4	15.01	417.	2119.	2434.
	C	0.152	37.89	100.0	37.89	96.3	30.74	92.3	22.93	349.	1843.	2167.
	T	0.125	24.90	100.0	19.52	97.0	18.90	93.7	12.77	180.	1190.	1394.
S/W	SR	0.138	39.73	100.0	39.73	96.7	34.39	93.1	28.58	366.	1970.	2345.
	C	0.083	33.42	100.0	33.42	98.2	30.54	96.0	26.92	308.	1691.	2030.
	T	0.068	22.29	100.0	17.67	98.6	19.91	96.7	16.99	163.	1119.	1348.
C/S/W	SR	0.161	46.63	100.0	46.63	96.1	39.59	91.7	31.83	430.	2294.	2722.
	C	0.097	40.14	100.0	40.14	97.8	36.21	95.2	31.61	370.	2021.	2422.
	T	0.080	28.82	100.0	24.21	98.3	25.59	96.1	21.85	223.	1444.	1735.
C/CN	SR	0.253	46.57	100.0	46.56	93.7	31.89	84.4	10.32	429.	2143.	2432.
	C	0.152	38.22	100.0	38.22	96.3	29.65	92.3	20.28	352.	1838.	2142.
	T	0.125	24.23	100.0	18.85	97.0	17.09	93.7	9.70	174.	1138.	1316.
W/CN	SR	0.138	41.05	100.0	41.05	96.7	34.42	93.1	27.23	379.	2018.	2387.
	C	0.083	33.75	100.0	33.75	98.2	30.17	96.0	25.69	311.	1700.	2031.
	T	0.068	21.62	100.0	17.01	98.6	18.72	96.7	15.06	157.	1079.	1291.

TABLE 31. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES LIPN.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.008	57.07	100.0	57.07	100.0	57.07	100.0	57.07	526.	2947.	3611.

TABLE 32. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES LOFL.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.165	9.12	100.0	9.12	96.0	6.04	91.5	2.62	84.	421.	477.
S	SR	0.151	16.02	100.0	16.02	96.3	14.65	92.3	13.15	148.	805.	969.
W	SR	0.027	18.95	100.0	18.95	99.9	18.91	99.0	18.44	175.	978.	1196.
R	SR	0.011	39.84	100.0	39.84	100.0	39.84	100.0	39.84	367.	2057.	2521.
C/W	SR	0.082	19.25	100.0	19.25	98.2	18.01	96.0	16.44	178.	979.	1182.
C/S	SR	0.151	19.42	100.0	19.42	96.3	17.08	92.3	14.53	179.	966.	1154.
S/W	SR	0.082	16.16	100.0	16.16	98.2	15.38	96.0	14.40	149.	825.	1000.
C/S/W	SR	0.096	19.72	100.0	19.72	97.8	18.41	95.3	16.88	182.	1001.	1209.
IRRIGATED CROPS												
C	SR	0.165	135.37	100.0	135.37	96.0	123.51	91.5	110.36	1248.	6797.	8179.
S	SR	0.151	137.43	100.0	137.43	96.3	127.35	92.3	116.35	1267.	6937.	8372.
W	SR	0.027	97.76	100.0	97.76	99.9	97.62	99.0	95.83	902.	5047.	6176.
CN	SR	0.151	107.39	100.0	107.39	96.3	95.69	92.3	82.92	990.	5360.	6419.
C/W	SR	0.082	136.67	100.0	136.67	98.2	131.89	96.0	125.87	1260.	7000.	8508.
C/S	SR	0.151	167.36	100.0	167.36	96.3	155.79	92.3	143.15	1543.	8458.	10217.
S/W	SR	0.082	117.13	100.0	117.13	98.2	112.89	96.0	107.55	1080.	5997.	7288.
C/S/W	SR	0.096	148.27	100.0	148.27	97.8	142.17	95.3	135.00	1367.	7576.	9199.
C/CN	SR	0.151	142.70	100.0	142.70	96.3	130.67	92.3	117.54	1316.	7178.	8643.
W/CN	SR	0.082	92.47	100.0	92.47	98.2	88.01	96.0	82.40	853.	4721.	5721.

TABLE 33. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES ML03.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.720	-7.02	98.5	-7.91	68.3	-26.22	25.0	-52.42	-68.	-620.	-1126.
	C	0.432	-10.86	99.4	-11.22	87.9	-18.21	50.3	-40.97	-101.	-688.	-976.
	T	0.360	-20.34	99.6	-25.93	90.5	-26.27	68.3	-39.53	-238.	-1163.	-1503.
S	SR	0.660	12.27	98.7	11.83	73.9	3.48	25.0	-13.01	112.	508.	441.
	C	0.396	11.15	99.5	10.99	89.3	7.54	60.1	-2.29	103.	512.	566.
	T	0.330	4.40	99.7	-1.06	91.5	1.33	73.9	-4.39	-9.	165.	173.
W	SR	0.120	8.41	100.0	8.41	97.2	7.21	94.0	5.90	78.	417.	495.
	C	0.072	6.55	100.0	6.55	98.5	5.93	96.5	5.09	60.	332.	397.
	T	0.060	-0.13	100.0	-4.74	98.9	-0.77	97.2	-1.32	-44.	-20.	-21.
R	SR	0.048	38.66	100.0	38.66	99.3	38.34	97.8	37.73	357.	1994.	2438.
C/W	SR	0.360	4.79	99.6	4.59	90.5	-0.46	68.3	-12.79	44.	153.	105.
	C	0.216	1.94	100.0	1.94	94.7	-1.02	87.9	-4.79	18.	49.	22.
	T	0.180	-5.74	100.0	-10.35	95.6	-8.36	90.5	-10.98	-95.	-346.	-444.
C/S	SR	0.660	8.18	98.7	7.50	73.9	-5.56	25.0	-31.33	73.	227.	-7.
	C	0.396	5.70	99.5	5.45	89.3	0.05	60.1	-15.30	52.	194.	143.
	T	0.330	-2.41	99.7	-7.93	91.5	-7.10	73.9	-16.15	-72.	-216.	-318.
S/W	SR	0.360	9.41	99.6	9.28	90.5	5.91	68.3	-2.32	87.	423.	464.
	C	0.216	7.93	100.0	7.93	94.7	5.95	87.9	3.44	73.	375.	434.
	T	0.180	1.61	100.0	-3.00	95.6	-0.20	90.5	-1.89	-28.	47.	48.
C/S/W	SR	0.420	8.77	99.5	8.50	88.4	3.03	53.8	-14.01	80.	352.	330.
	C	0.252	6.52	100.0	6.52	93.7	3.42	84.5	-1.11	60.	281.	304.
	T	0.210	-0.56	100.0	-5.17	94.8	-3.29	88.4	-6.30	-48.	-82.	-122.
IRRIGATED CROPS												
C	SR	0.720	-38.15	98.5	-39.95	68.3	-76.68	25.0	-129.25	-358.	-2487.	-3783.
	C	0.432	-45.20	99.4	-45.91	87.9	-59.94	50.3	-105.61	-418.	-2589.	-3440.
	T	0.360	-57.87	99.6	-63.68	90.5	-69.57	68.3	-96.39	-584.	-3204.	-4095.
S	SR	0.660	-39.51	98.7	-40.79	73.9	-65.16	25.0	-113.24	-369.	-2405.	-3479.
	C	0.396	-47.20	99.5	-47.66	89.3	-57.74	60.1	-86.39	-436.	-2623.	-3393.
	T	0.330	-60.51	99.7	-66.14	91.5	-69.08	73.9	-86.15	-608.	-3285.	-4138.

TABLE 33. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.120	-12.46	100.0	-12.46	97.2	-15.07	94.0	-17.95	-115.	-681.	-870.
	C	0.072	-17.40	100.0	-17.40	98.5	-18.76	96.5	-20.60	-161.	-913.	-1140.
	T	0.060	-27.17	100.0	-31.78	98.9	-28.37	97.2	-29.78	-293.	-1421.	-1748.
CN	SR	0.660	22.19	98.7	19.15	73.9	-38.92	25.0	-153.53	195.	276.	-928.
	C	0.396	12.53	99.5	11.43	89.3	-12.60	60.1	-80.88	113.	202.	-176.
	T	0.330	-2.76	99.7	-8.74	91.5	-22.89	73.9	-63.87	-76.	-512.	-912.
C/W	SR	0.360	-17.46	99.6	-17.87	90.5	-28.30	68.3	-53.78	-162.	-1096.	-1514.
	C	0.216	-23.45	100.0	-23.45	94.7	-29.57	87.9	-37.35	-216.	-1317.	-1693.
	T	0.180	-34.27	100.0	-38.88	95.6	-39.51	90.5	-45.11	-359.	-1862.	-2336.
C/S	SR	0.660	-26.61	98.7	-28.20	73.9	-58.46	25.0	-118.19	-251.	-1827.	-2899.
	C	0.396	-33.98	99.5	-34.55	89.3	-47.07	60.1	-82.66	-315.	-1986.	-2655.
	T	0.330	-46.97	99.7	-52.66	91.5	-57.56	73.9	-78.82	-483.	-2623.	-3356.
S/W	SR	0.360	-27.14	99.6	-27.48	90.5	-36.03	68.3	-56.93	-251.	-1561.	-2053.
	C	0.216	-33.45	100.0	-33.45	94.7	-38.47	87.9	-44.85	-309.	-1814.	-2288.
	T	0.180	-44.59	100.0	-49.20	95.6	-48.92	90.5	-53.48	-454.	-2380.	-2959.
C/S/W	SR	0.420	-20.02	99.5	-20.64	88.4	-33.13	53.8	-72.07	-186.	-1263.	-1779.
	C	0.252	-26.51	100.0	-26.51	93.7	-33.59	84.5	-43.95	-245.	-1495.	-1926.
	T	0.210	-37.83	100.0	-42.44	94.8	-43.85	88.4	-50.94	-391.	-2063.	-2592.
C/CN	SR	0.660	0.80	98.7	-1.62	73.9	-47.89	25.0	-139.20	-0.	-652.	-1808.
	C	0.396	-7.55	99.5	-8.43	89.3	-27.57	60.1	-81.97	-71.	-744.	-1250.
	T	0.330	-21.53	99.7	-27.39	91.5	-37.61	73.9	-70.22	-249.	-1409.	-1950.
W/CN	SR	0.360	0.27	99.6	-0.29	90.5	-14.73	68.3	-49.99	2.	-255.	-549.
	C	0.216	-7.03	100.0	-7.03	94.7	-15.50	87.9	-26.26	-65.	-510.	-734.
	T	0.180	-19.15	100.0	-23.76	95.6	-26.33	90.5	-34.15	-219.	-1114.	-1444.

TABLE 34. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES ML35.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	1.152	-17.11	97.3	-18.47	25.0	-54.94	25.0	-54.94	-163.	-1402.	-2042.
	C	0.576	-20.95	99.0	-21.48	80.3	-30.90	25.0	-58.78	-195.	-1235.	-1730.
S	SR	1.056	4.78	97.6	4.14	25.0	-14.89	25.0	-14.89	42.	16.	-158.
	C	0.528	3.66	99.1	3.43	83.2	-0.74	25.0	-16.00	33.	118.	51.
W	SR	0.192	1.39	100.0	1.39	95.3	-0.27	89.7	-2.23	13.	44.	32.
	C	0.096	-0.47	100.0	-0.47	97.8	-1.23	95.3	-2.13	-4.	-34.	-53.
R	SR	0.077	36.16	100.0	36.16	98.4	35.50	96.3	34.65	333.	1859.	2269.
C/W	SR	0.576	-4.45	99.0	-4.93	80.3	-13.56	25.0	-39.09	-42.	-370.	-652.
	C	0.288	-7.30	99.9	-7.35	92.7	-10.66	80.3	-16.41	-67.	-437.	-583.
C/S	SR	1.056	-1.60	97.6	-2.65	25.0	-33.77	25.0	-33.77	-19.	-460.	-854.
	C	0.528	-4.08	99.1	-4.46	83.2	-11.28	25.0	-36.25	-39.	-327.	-554.
S/W	SR	0.576	2.25	99.0	1.94	80.3	-3.64	25.0	-20.13	20.	25.	-97.
	C	0.288	0.76	99.9	0.72	92.7	-1.41	80.3	-5.13	7.	0.	-30.
C/S/W	SR	0.672	-0.15	98.7	-0.69	72.9	-11.10	25.0	-30.41	-3.	-162.	-422.
	C	0.336	-2.40	99.7	-2.51	91.3	-5.90	72.9	-13.35	-22.	-187.	-282.
IRRIGATED CROPS												
S	SR	1.056	-59.18	97.6	-61.10	25.0	-118.16	25.0	-118.16	-553.	-3748.	-5124.
	C	0.528	-66.86	99.1	-67.56	83.2	-80.07	25.0	-125.84	-619.	-3665.	-4772.
W	SR	0.192	-30.84	100.0	-30.84	95.3	-34.31	89.7	-38.40	-284.	-1651.	-2067.
	C	0.096	-35.77	100.0	-35.77	97.8	-37.37	95.3	-39.25	-330.	-1868.	-2312.
S/W	SR	0.576	-45.93	99.0	-46.71	80.3	-60.76	25.0	-102.28	-426.	-2600.	-3509.
	C	0.288	-52.24	99.9	-52.33	92.7	-57.70	80.3	-67.07	-482.	-2795.	-3502.

TABLE 35. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES MANB.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.040	44.70	100.0	44.70	99.5	44.47	98.3	43.87	412.	2307.	2822.

TABLE 36. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES MANE.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.302	-7.02	99.8	-7.12	92.3	-11.67	78.3	-20.17	-65.	-446.	-613.
	C	0.181	-10.86	100.0	-10.86	95.5	-13.56	90.4	-16.65	-100.	-606.	-777.
S	SR	0.277	12.27	99.9	12.24	93.0	9.92	81.6	6.08	113.	591.	693.
	C	0.166	11.15	100.0	11.15	95.9	9.78	91.4	8.26	103.	554.	661.
W	SR	0.050	8.41	100.0	8.41	99.2	8.07	97.7	7.44	78.	432.	523.
	C	0.030	6.55	100.0	6.55	99.8	6.48	98.9	6.08	60.	338.	412.
R	SR	0.020	38.66	100.0	38.66	100.0	38.66	99.5	38.45	357.	1996.	2446.
C/W	SR	0.151	4.79	100.0	4.79	96.3	2.75	92.3	0.53	44.	215.	237.
	C	0.091	1.94	100.0	1.94	98.0	0.82	95.5	-0.53	18.	86.	89.
C/S	SR	0.277	8.18	99.9	8.14	93.0	4.51	81.6	-1.49	75.	357.	387.
	C	0.166	5.70	100.0	5.70	95.9	3.56	91.4	1.18	53.	260.	291.
S/W	SR	0.151	9.41	100.0	9.41	96.3	8.06	92.3	6.57	87.	465.	552.
	C	0.091	7.93	100.0	7.93	98.0	7.18	95.5	6.28	73.	400.	479.
C/S/W	SR	0.176	8.77	100.0	8.77	95.7	6.64	90.8	4.22	81.	417.	484.
	C	0.106	6.52	100.0	6.52	97.6	5.31	94.8	3.94	60.	320.	376.
IRRIGATED CROPS												
C	SR	0.302	-38.15	99.8	-38.35	92.3	-47.48	78.3	-64.54	-352.	-2138.	-2753.
	C	0.181	-45.20	100.0	-45.20	95.5	-50.61	90.4	-56.81	-417.	-2423.	-3039.
S	SR	0.277	-39.51	99.9	-39.60	93.0	-46.36	81.6	-57.56	-364.	-2163.	-2745.
	C	0.166	-47.20	100.0	-47.20	95.9	-51.19	91.4	-55.64	-435.	-2502.	-3117.

TABLE 36. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.050	-12.46	100.0	-12.46	99.2	-13.21	97.7	-14.59	-115.	-649.	-809.
	C	0.030	-17.40	100.0	-17.40	99.8	-17.56	98.9	-18.44	-161.	-899.	-1107.
CN	SR	0.277	22.19	99.9	22.00	93.0	5.86	81.6	-20.81	204.	852.	821.
	C	0.166	12.53	100.0	12.53	95.9	3.01	91.4	-7.58	116.	492.	482.
C/W	SR	0.151	-17.46	100.0	-17.46	96.3	-21.67	92.3	-26.26	-161.	-968.	-1240.
	C	0.091	-23.45	100.0	-23.45	98.0	-25.77	95.5	-28.55	-216.	-1240.	-1553.
C/S	SR	0.277	-26.61	99.9	-26.71	93.0	-35.12	81.6	-49.02	-246.	-1527.	-1988.
	C	0.166	-33.98	100.0	-33.98	95.9	-38.94	91.4	-44.46	-313.	-1835.	-2312.
S/W	SR	0.151	-27.14	100.0	-27.14	96.3	-30.59	92.3	-34.36	-250.	-1456.	-1829.
	C	0.091	-33.45	100.0	-33.45	98.0	-35.35	95.5	-37.64	-309.	-1751.	-2173.
C/S/W	SR	0.176	-20.02	100.0	-20.02	95.7	-24.89	90.8	-30.41	-185.	-1114.	-1428.
	C	0.106	-26.51	100.0	-26.51	97.6	-29.27	94.8	-32.40	-245.	-1406.	-1762.
C/CN	SR	0.277	0.80	99.9	0.65	93.0	-12.21	81.6	-33.46	7.	-192.	-414.
	C	0.166	-7.55	100.0	-7.55	95.9	-15.14	91.4	-23.58	-70.	-513.	-726.
W/CN	SR	0.151	0.27	100.0	0.27	96.3	-5.55	92.3	-11.90	2.	-78.	-170.
	C	0.091	-7.03	100.0	-7.03	98.0	-10.23	95.5	-14.09	-65.	-403.	-540.

TABLE 37. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES OL01.

ROT	CP	% SOIL LCST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.200	13.16	100.0	13.16	95.1	9.18	89.1	4.39	121.	612.	699.
S	SR	0.183	16.02	100.0	16.02	95.5	14.33	90.3	12.39	148.	799.	958.
W	SR	0.033	22.46	100.0	22.46	99.7	22.31	98.7	21.72	207.	1159.	1416.
R	SR	0.013	37.34	100.0	37.34	100.0	37.34	100.0	37.32	344.	1928.	2363.
C/W	SR	0.100	23.26	100.0	23.26	97.7	21.58	95.1	19.62	215.	1179.	1421.
C/S	SR	0.183	21.73	100.0	21.73	95.5	18.75	90.3	15.32	200.	1072.	1276.
S/W	SR	0.100	17.74	100.0	17.74	97.7	16.70	95.1	15.51	164.	902.	1091.
C/S/W	SR	0.117	22.37	100.0	22.37	97.3	20.64	94.2	18.73	206.	1130.	1362.
IRRIGATED CROPS												
C	SR	0.200	135.37	100.0	135.37	95.1	120.83	89.1	103.32	1248.	6741.	8076.
S	SR	0.183	88.28	100.0	88.28	95.5	78.11	90.3	66.40	814.	4388.	5248.
W	SR	0.033	116.13	100.0	116.13	99.7	115.54	98.7	113.23	1071.	5994.	7329.
CN	SR	0.183	107.39	100.0	107.39	95.5	93.01	90.3	76.47	990.	5304.	6318.
SB	SR	0.200	127.90	100.0	127.90	95.1	116.39	89.1	102.51	1180.	6407.	7706.
C/W	SR	0.100	144.94	100.0	144.94	97.7	138.61	95.1	131.29	1337.	7399.	8980.
C/S	SR	0.183	141.06	100.0	141.06	95.5	128.02	90.3	113.02	1301.	7065.	8493.
S/W	SR	0.100	99.10	100.0	99.10	97.7	94.07	95.1	88.25	914.	5050.	6119.
C/S/W	SR	0.117	135.24	100.0	135.24	97.3	127.88	94.2	119.73	1247.	6877.	8330.
C/CN	SR	0.183	142.70	100.0	142.70	95.5	127.92	90.3	110.91	1316.	7121.	8539.
W/CN	SR	0.100	100.74	100.0	100.74	97.7	94.82	95.1	87.98	929.	5123.	6196.
CN/SB	SR	0.183	117.65	100.0	117.65	95.5	105.20	90.3	90.88	1085.	5866.	7031.

TABLE 38. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES OL13.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.315	3.07	99.8	2.92	91.9	-2.62	76.3	-13.66	28.	56.	-14.
	C	0.189	-0.77	100.0	-0.77	95.3	-4.06	89.9	-7.90	-7.	-95.	-159.
	T	0.156	-10.25	100.0	-15.63	96.2	-13.14	92.0	-15.88	-144.	-583.	-735.
S	SR	0.289	6.65	99.9	6.62	92.7	4.60	80.1	1.07	61.	307.	347.
	C	0.173	5.53	100.0	5.53	95.8	4.34	91.0	2.99	51.	266.	311.
	T	0.143	-1.22	100.0	-6.60	96.5	-2.40	92.8	-3.25	-61.	-89.	-108.
W	SR	0.053	15.43	100.0	15.43	99.1	15.00	97.6	14.24	142.	793.	965.
	C	0.032	13.58	100.0	13.58	99.8	13.48	98.8	12.98	125.	701.	855.
	T	0.026	6.90	100.0	2.28	100.0	6.71	99.1	6.47	21.	347.	434.
R	SR	0.021	34.98	100.0	34.98	100.0	34.98	99.4	34.76	323.	1806.	2213.
C/W	SR	0.158	14.03	100.0	14.03	96.2	11.54	91.9	8.81	129.	684.	807.
	C	0.095	11.18	100.0	11.18	97.9	9.80	95.3	8.17	103.	559.	666.
	T	0.078	3.50	100.0	-1.11	98.3	2.25	96.2	1.04	-10.	159.	190.
C/S	SR	0.289	10.95	99.9	10.88	92.7	6.90	80.1	-0.07	101.	492.	547.
	C	0.173	8.47	100.0	8.47	95.8	6.11	91.0	3.46	78.	398.	458.
	T	0.143	0.36	100.0	-5.02	96.5	-1.77	92.8	-3.65	-46.	-22.	-39.
S/W	SR	0.158	9.57	100.0	9.57	96.2	8.14	91.9	6.57	88.	471.	559.
	C	0.095	8.08	100.0	8.08	97.9	7.29	95.3	6.35	75.	407.	488.
	T	0.078	1.77	100.0	-2.84	98.3	0.97	96.2	0.35	-26.	75.	94.
C/S/W	SR	0.184	12.75	100.0	12.75	95.5	10.34	90.3	7.57	118.	618.	727.
	C	0.110	10.50	100.0	10.50	97.4	9.13	94.5	7.59	97.	523.	622.
	T	0.091	3.42	100.0	-1.19	98.0	2.16	95.5	1.04	-11.	154.	184.
IRRIGATED CROPS												
C	SR	0.315	111.08	99.8	110.51	91.9	89.25	76.3	46.95	1024.	5341.	6229.
	C	0.189	104.03	100.0	104.03	95.3	91.43	89.9	76.70	959.	5159.	6162.
	T	0.156	91.36	100.0	85.98	96.2	80.85	92.0	69.76	793.	4542.	5448.
S	SR	0.289	58.79	99.9	58.55	92.7	44.44	80.1	19.70	542.	2777.	3203.
	C	0.173	51.11	100.0	51.11	95.8	42.75	91.0	33.34	471.	2501.	2959.
	T	0.143	37.79	100.0	32.41	96.5	30.78	92.8	23.58	299.	1835.	2174.

TABLE 38. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.053	79.39	100.0	79.39	99.1	77.77	97.6	74.93	732.	4086.	4979.
	C	0.032	74.45	100.0	74.45	99.8	74.07	98.8	72.23	687.	3843.	4697.
	T	0.026	64.69	100.0	60.07	100.0	64.46	99.1	63.09	554.	3330.	4086.
CN	SR	0.289	54.14	99.9	53.82	92.7	34.70	80.1	1.20	499.	2445.	2726.
	C	0.173	44.48	100.0	44.48	95.8	33.17	91.0	20.42	410.	2110.	2442.
	T	0.143	29.19	100.0	23.81	96.5	19.76	92.8	9.94	220.	1354.	1553.
SB	SR	0.315	81.16	99.8	80.77	91.9	66.09	76.3	36.87	748.	3918.	4583.
	C	0.189	74.39	100.0	74.39	95.3	65.69	89.9	55.52	686.	3694.	4417.
	T	0.156	61.99	100.0	56.61	96.2	54.67	92.0	47.07	522.	3077.	3692.
C/W	SR	0.158	113.77	100.0	113.77	96.2	104.33	91.9	93.96	1049.	5723.	6893.
	C	0.095	107.78	100.0	107.78	97.9	102.53	95.3	96.34	994.	5497.	6663.
	T	0.078	96.96	100.0	92.35	98.3	92.71	96.2	87.61	852.	4950.	6017.
C/S	SR	0.289	111.38	99.9	111.07	92.7	92.39	80.1	59.66	1027.	5408.	6364.
	C	0.173	104.02	100.0	104.02	95.8	92.97	91.0	80.51	959.	5189.	6218.
	T	0.143	91.03	100.0	85.65	96.5	81.81	92.8	72.22	790.	4549.	5472.
S/W	SR	0.158	66.79	100.0	66.79	96.2	59.57	91.9	51.64	616.	3333.	3992.
	C	0.095	60.48	100.0	60.48	97.9	56.47	95.3	51.73	558.	3071.	3707.
	T	0.078	49.34	100.0	44.73	98.3	46.04	96.2	42.19	412.	2502.	3032.
C/S/W	SR	0.184	103.57	100.0	103.57	95.5	92.90	90.3	80.59	955.	5169.	6199.
	C	0.110	97.08	100.0	97.08	97.4	91.00	94.5	84.17	895.	4928.	5957.
	T	0.091	85.77	100.0	81.16	98.0	80.78	95.5	75.19	748.	4358.	5284.
C/CN	SR	0.289	102.18	99.9	101.83	92.7	81.15	80.1	44.90	942.	4896.	5708.
	C	0.173	93.83	100.0	93.83	95.8	81.58	91.0	67.79	865.	4643.	5534.
	T	0.143	79.65	100.0	74.46	96.5	69.66	92.8	59.02	687.	3957.	4734.
W/CN	SR	0.158	57.58	100.0	57.58	96.2	49.29	91.9	40.18	531.	2840.	3375.
	C	0.095	50.28	100.0	50.28	97.9	45.68	95.3	40.23	464.	2537.	3044.
	T	0.078	38.16	100.0	33.54	98.3	34.40	96.2	29.94	309.	1920.	2311.
CN/SB	SR	0.289	67.65	99.9	67.38	92.7	51.11	80.1	22.59	624.	3195.	3685.
	C	0.173	59.44	100.0	59.44	95.8	49.81	91.0	38.96	548.	2910.	3444.
	T	0.143	45.59	100.0	40.21	96.5	37.54	92.8	29.21	371.	2222.	2634.

TABLE 39. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES OL35.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
S	SR	0.549	1.03	99.0	0.82	82.0	-3.01	25.0	-15.82	9.	-11.	-100.
	C	0.274	-0.08	99.9	-0.10	93.1	-1.63	82.0	-4.13	-1.	-32.	-61.
W	SR	0.100	1.39	100.0	1.39	97.7	0.59	95.1	-0.34	13.	61.	64.
	C	0.050	-0.47	100.0	-0.47	99.2	-0.75	97.7	-1.27	-4.	-26.	-37.
R	SR	0.040	32.47	100.0	32.47	99.5	32.30	98.3	31.85	299.	1676.	2050.
S/W	SR	0.299	0.24	99.8	0.20	92.4	-1.87	78.7	-5.68	2.	-26.	-61.
	C	0.150	-1.25	100.0	-1.25	96.4	-2.26	92.4	-3.36	-11.	-80.	-111.
IRRIGATED CROPS												
S	SR	0.549	19.47	99.0	17.97	82.0	-8.84	25.0	-98.50	175.	557.	71.
	C	0.274	11.79	99.9	11.67	93.1	0.95	82.0	-16.52	109.	414.	360.
W	SR	0.100	24.28	100.0	24.28	97.7	21.35	95.1	17.95	224.	1215.	1448.
	C	0.050	19.34	100.0	19.34	99.2	18.31	97.7	16.41	178.	991.	1195.
S/W	SR	0.299	20.95	99.8	20.73	92.4	10.17	78.7	-9.26	193.	887.	935.
	C	0.150	14.64	100.0	14.64	96.4	9.48	92.4	3.86	135.	675.	760.

TABLE 40. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES PF03.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.309	13.16	99.8	13.01	92.1	6.82	77.4	-5.11	121.	565.	601.
	C	0.185	9.32	100.0	9.32	95.4	5.64	90.2	1.40	86.	419.	467.
S	SR	0.283	16.02	99.9	15.98	92.9	13.35	80.9	8.88	148.	779.	918.
	C	0.170	14.90	100.0	14.90	95.8	13.34	91.2	11.60	137.	744.	892.
W	SR	0.051	18.95	100.0	18.95	99.2	18.50	97.6	17.70	175.	975.	1186.
	C	0.031	17.09	100.0	17.09	99.8	16.99	98.8	16.48	158.	882.	1078.
R	SR	0.021	49.71	100.0	49.71	100.0	49.71	99.5	49.43	458.	2566.	3145.
C/W	SR	0.154	21.68	100.0	21.68	96.2	18.97	92.1	16.00	200.	1076.	1284.
	C	0.093	18.83	100.0	18.83	97.9	17.33	95.4	15.54	174.	953.	1147.
C/S	SR	0.283	21.73	99.9	21.67	92.9	17.01	80.9	9.11	200.	1037.	1206.
	C	0.170	19.25	100.0	19.25	95.8	16.50	91.2	13.43	178.	949.	1128.
S/W	SR	0.154	16.16	100.0	16.16	96.2	14.52	92.1	12.72	149.	808.	969.
	C	0.093	14.67	100.0	14.67	97.9	13.76	95.4	12.68	135.	746.	901.
C/S/W	SR	0.180	21.33	100.0	21.33	95.6	18.60	90.5	15.48	197.	1056.	1259.
	C	0.108	19.08	100.0	19.08	97.5	17.53	94.7	15.77	176.	964.	1160.
IRRIGATED CROPS												
C	SR	0.309	100.67	99.8	100.18	92.1	80.21	77.4	41.75	928.	4828.	5623.
	C	0.185	93.62	100.0	93.62	95.4	81.78	90.2	68.08	863.	4635.	5530.
S	SR	0.283	19.47	99.9	19.31	92.9	8.26	80.9	-10.52	179.	804.	830.
	C	0.170	11.79	100.0	11.79	95.8	5.25	91.2	-2.05	109.	502.	532.
W	SR	0.051	42.65	100.0	42.65	99.2	41.40	97.6	39.17	393.	2192.	2664.
	C	0.031	37.71	100.0	37.71	99.8	37.44	98.8	36.00	348.	1946.	2376.
C/W	SR	0.154	90.96	100.0	90.96	96.2	82.60	92.1	73.44	839.	4564.	5486.
	C	0.093	84.97	100.0	84.97	97.9	80.35	95.4	74.83	784.	4328.	5239.
C/S	SR	0.283	84.39	99.9	84.15	92.9	67.78	80.9	39.95	778.	4058.	4745.
	C	0.170	77.02	100.0	77.02	95.8	67.34	91.2	56.52	710.	3818.	4556.
S/W	SR	0.154	29.21	100.0	29.21	96.2	23.58	92.1	17.40	269.	1419.	1666.
	C	0.093	22.90	100.0	22.90	97.9	19.78	95.4	16.07	211.	1143.	1356.
C/S/W	SR	0.180	73.73	100.0	73.73	95.6	64.61	90.5	54.20	680.	3655.	4364.
	C	0.108	67.24	100.0	67.24	97.5	62.06	94.7	56.21	620.	3400.	4096.

TABLE 41. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES PF35.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.823	3.07	98.2	1.81	56.1	-27.91	25.0	-49.89	24.	-220.	-751.
	C	0.411	-0.77	99.5	-1.14	88.7	-8.76	56.1	-31.76	-8.	-180.	-360.
S	SR	0.754	12.27	98.4	11.74	64.6	0.34	25.0	-13.01	111.	478.	372.
	C	0.377	11.15	99.6	11.01	90.0	7.76	64.6	-0.78	103.	515.	577.
W	SR	0.137	15.43	100.0	15.43	96.7	13.81	93.1	12.05	142.	772.	925.
	C	0.069	13.58	100.0	13.58	98.6	12.90	96.7	11.96	125.	694.	840.
R	SR	0.055	44.70	100.0	44.70	99.0	44.23	97.4	43.45	412.	2304.	2816.
C/W	SR	0.411	14.03	99.5	13.69	88.7	6.71	56.1	-14.35	129.	596.	603.
	C	0.206	11.18	100.0	11.18	94.9	7.89	88.7	3.86	103.	521.	596.
C/S	SR	0.754	13.96	98.4	13.03	64.6	-6.73	25.0	-29.88	126.	451.	182.
	C	0.377	11.47	99.6	11.23	90.0	5.60	64.6	-9.22	105.	488.	502.
S/W	SR	0.411	12.57	99.5	12.36	88.7	8.03	56.1	-5.05	116.	569.	619.
	C	0.206	11.09	100.0	11.09	94.9	9.05	88.7	6.54	102.	537.	633.
C/S/W	SR	0.480	14.86	99.3	14.45	85.7	6.96	34.1	-21.63	136.	635.	622.
	C	0.240	12.61	100.0	12.61	94.0	9.31	85.7	4.71	116.	593.	683.
IRRIGATED CROPS												
S	SR	0.754	-19.85	98.4	-21.72	64.6	-61.61	25.0	-108.33	-190.	-1568.	-2671.
	C	0.377	-27.54	99.6	-28.02	90.0	-39.39	64.6	-69.29	-255.	-1633.	-2194.
W	SR	0.137	5.91	100.0	5.91	96.7	2.27	93.1	-1.69	54.	250.	258.
	C	0.069	0.97	100.0	0.97	98.6	-0.55	96.7	-2.67	9.	34.	18.
S/W	SR	0.411	-8.36	99.5	-8.94	88.7	-21.11	56.1	-57.81	-78.	-655.	-1025.
	C	0.206	-14.67	100.0	-14.67	94.9	-20.39	88.7	-27.42	-135.	-855.	-1122.

TABLE 42. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES PG03.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.024	12.88	100.0	12.88	99.4	12.78	98.1	12.55	119.	665.	812.

TABLE 43. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES PL01.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.362	13.16	99.6	12.87	90.5	5.48	68.0	-12.69	121.	542.	543.
S	SR	0.331	16.02	99.7	15.92	91.5	12.82	73.7	6.16	148.	769.	895.
W	SR	0.060	18.95	100.0	18.95	98.9	18.35	97.1	17.44	175.	973.	1182.
R	SR	0.024	32.47	100.0	32.47	100.0	32.47	99.3	32.20	299.	1677.	2054.
C/W	SR	0.181	21.68	100.0	21.68	95.6	18.47	90.5	14.80	200.	1066.	1266.
C/S	SR	0.331	21.73	99.7	21.56	91.5	16.07	73.7	4.30	200.	1020.	1165.
S/W	SR	0.181	16.16	100.0	16.16	95.6	14.22	90.5	12.00	149.	802.	958.
C/S/W	SR	0.211	21.33	100.0	21.33	94.8	18.10	88.3	14.08	197.	1046.	1240.
IRRIGATED CROPS												
C	SR	0.362	135.37	99.6	134.31	90.5	107.30	68.0	40.88	1247.	6486.	7506.
S	SR	0.331	107.94	99.7	107.30	91.5	86.94	73.7	43.24	995.	5194.	6052.
W	SR	0.060	116.13	100.0	116.13	98.9	113.66	97.1	109.84	1071.	5973.	7279.
CN	SR	0.331	107.39	99.7	106.56	91.5	80.08	73.7	23.27	989.	5052.	5784.
SB	SR	0.362	127.90	99.6	127.06	90.5	105.67	68.0	53.04	1178.	6205.	7254.
C/W	SR	0.181	144.94	100.0	144.94	95.6	132.65	90.5	118.59	1337.	7278.	8764.
C/S	SR	0.331	151.58	99.7	150.80	91.5	125.92	73.7	72.52	1397.	7363.	8641.
S/W	SR	0.181	109.62	100.0	109.62	95.6	99.38	90.5	87.67	1011.	5489.	6597.
C/S/W	SR	0.211	142.63	100.0	142.63	94.8	128.29	88.3	110.38	1315.	7116.	8538.
C/CN	SR	0.331	142.70	99.7	141.85	91.5	114.62	73.7	56.20	1315.	6861.	7990.
W/CN	SR	0.181	100.74	100.0	100.74	95.6	89.25	90.5	76.10	929.	5010.	5994.
CN/SB	SR	0.331	117.65	99.7	116.92	91.5	94.01	73.7	44.82	1084.	5647.	6569.

TABLE 44. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES PL35.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.809	3.07	98.3	1.84	58.0	-26.59	25.0	-49.89	24.	-209.	-731.
	C	0.485	-0.77	99.2	-1.31	85.5	-11.04	32.1	-48.73	-9.	-212.	-464.
	T	0.371	-10.25	99.6	-15.90	90.2	-17.40	66.0	-34.29	-145.	-664.	-912.
S	SR	0.741	10.40	98.5	9.91	66.0	-0.41	25.0	-13.48	94.	395.	285.
	C	0.445	9.28	99.4	9.08	87.3	5.24	46.3	-7.82	85.	410.	427.
	T	0.340	2.53	99.7	-2.94	91.2	-0.49	72.1	-6.35	-26.	69.	55.
W	SR	0.135	15.43	100.0	15.43	96.8	13.84	93.2	12.11	142.	773.	926.
	C	0.081	13.58	100.0	13.58	98.3	12.72	96.1	11.64	125.	691.	834.
	T	0.062	6.90	100.0	2.28	98.8	6.14	97.1	5.45	21.	341.	420.
R	SR	0.054	29.97	100.0	29.97	99.1	29.65	97.5	29.11	276.	1545.	1888.
C/W	SR	0.404	14.03	99.5	13.70	89.0	6.89	58.0	-13.13	129.	598.	611.
	C	0.243	11.18	100.0	11.18	94.0	7.27	85.5	1.78	103.	508.	571.
	T	0.186	3.50	100.0	-1.11	95.4	0.37	90.2	-2.86	-10.	122.	123.
C/S	SR	0.741	12.95	98.5	12.07	66.0	-6.56	25.0	-30.13	116.	412.	146.
	C	0.445	10.47	99.4	10.11	87.3	3.19	46.3	-20.38	96.	415.	374.
	T	0.340	2.36	99.7	-3.19	91.2	-2.91	72.1	-13.65	-28.	20.	-39.
S/W	SR	0.404	11.57	99.5	11.38	89.0	7.25	58.0	-4.87	106.	521.	565.
	C	0.243	10.08	100.0	10.08	94.0	7.72	85.5	4.39	93.	479.	556.
	T	0.186	3.77	100.0	-0.84	95.4	1.81	90.2	-0.08	-8.	156.	179.
C/S/W	SR	0.472	14.16	99.3	13.77	86.1	6.57	37.1	-20.21	130.	603.	591.
	C	0.283	11.91	99.9	11.85	92.9	8.01	80.9	1.48	110.	545.	614.
	T	0.216	4.83	100.0	0.22	94.6	1.73	87.8	-1.82	2.	190.	206.
IRRIGATED CROPS												
C	SR	0.809	100.67	98.3	96.14	58.0	-8.65	25.0	-94.55	912.	3844.	2958.
	C	0.485	93.62	99.2	91.65	85.5	55.78	32.1	-83.14	858.	4201.	4394.
	T	0.371	80.95	99.6	74.55	90.2	55.13	66.0	-7.68	695.	3711.	4150.
S	SR	0.741	58.79	98.5	55.76	66.0	-7.98	25.0	-88.67	532.	2156.	1415.
	C	0.445	51.11	99.4	49.87	87.3	26.19	46.3	-54.46	468.	2210.	2247.
	T	0.340	37.79	99.7	31.84	91.2	20.25	72.1	-17.01	298.	1628.	1746.

TABLE 44. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.135	79.39	100.0	79.39	96.8	73.44	93.2	66.97	732.	4009.	4835.
	C	0.081	74.45	100.0	74.45	98.3	71.26	96.1	67.20	687.	3806.	4618.
	T	0.062	64.69	100.0	60.07	98.8	62.36	97.1	59.29	554.	3310.	4033.
CN	SR	0.741	54.14	98.5	50.04	66.0	-36.29	25.0	-145.55	485.	1605.	305.
	C	0.445	44.48	99.4	42.81	87.3	10.73	46.3	-98.48	406.	1716.	1478.
	T	0.340	29.19	99.7	23.04	91.2	5.50	72.1	-45.03	218.	1074.	973.
SB	SR	0.809	81.16	98.3	77.91	58.0	2.64	25.0	-59.07	737.	3218.	2685.
	C	0.485	74.39	99.2	72.98	85.5	47.21	32.1	-52.58	682.	3386.	3608.
	T	0.371	61.99	99.6	55.88	90.2	43.39	66.0	-1.67	521.	2861.	3224.
C/W	SR	0.404	107.50	99.5	106.30	89.0	81.06	58.0	6.93	989.	5084.	5778.
	C	0.243	101.51	100.0	101.51	94.0	87.05	85.5	66.69	936.	4985.	5920.
	T	0.186	90.69	100.0	86.08	95.4	79.59	90.2	67.13	794.	4490.	5375.
C/S	SR	0.741	105.42	98.5	101.51	66.0	19.11	25.0	-85.18	959.	4307.	3692.
	C	0.445	98.06	99.4	96.47	87.3	65.85	46.3	-38.40	901.	4508.	4929.
	T	0.340	85.07	99.7	78.95	91.2	62.45	72.1	14.22	734.	3977.	4548.
S/W	SR	0.404	66.79	99.5	65.85	89.0	46.05	58.0	-12.11	614.	3082.	3422.
	C	0.243	60.48	100.0	60.48	94.0	49.13	85.5	33.17	558.	2922.	3432.
	T	0.186	49.34	100.0	44.73	95.4	40.59	90.2	30.86	412.	2395.	2837.
C/S/W	SR	0.472	99.43	99.3	97.78	86.1	67.21	37.1	-46.45	913.	4589.	4997.
	C	0.283	92.94	99.9	92.71	92.9	76.40	80.9	48.65	857.	4501.	5288.
	T	0.216	81.63	100.0	77.02	94.6	69.02	87.8	53.39	710.	3990.	4741.
C/CN	SR	0.741	96.22	98.5	91.88	66.0	0.41	25.0	-115.34	872.	3706.	2781.
	C	0.445	87.87	99.4	86.10	87.3	52.11	46.3	-63.60	806.	3921.	4143.
	T	0.340	73.89	99.7	67.69	91.2	48.80	72.1	-4.75	630.	3356.	3749.
W/CN	SR	0.404	57.58	99.5	56.50	89.0	33.76	58.0	-33.05	529.	2553.	2720.
	C	0.243	50.28	100.0	50.28	94.0	37.25	85.5	18.91	464.	2365.	2728.
	T	0.186	38.16	100.0	33.54	95.4	28.14	90.2	16.93	309.	1796.	2087.
CN/SB	SR	0.741	67.65	98.5	64.16	66.0	-9.31	25.0	-102.31	612.	2480.	1624.
	C	0.445	59.44	99.4	58.01	87.3	30.71	46.3	-62.24	545.	2574.	2623.
	T	0.340	45.59	99.7	39.56	91.2	25.40	72.1	-17.58	370.	1983.	2141.

TABLE 45. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES RANC.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
R	SR	0.005	25.11	100.0	25.11	100.0	25.11	100.0	25.11	232.	1296.	1589.

TABLE 46. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES ROSC.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.118	23.25	100.0	23.25	98.5	21.84	96.9	20.39	214.	1181.	1429.
S	SR	0.108	34.75	100.0	34.75	98.6	33.96	97.1	33.12	320.	1784.	2176.
W	SR	0.020	36.50	100.0	36.50	100.0	36.50	99.8	36.38	337.	1885.	2310.
R	SR	0.008	32.47	100.0	32.47	100.0	32.47	100.0	32.47	299.	1677.	2055.
C/W	SR	0.059	35.66	100.0	35.66	99.4	35.18	98.5	34.33	329.	1838.	2243.
C/S	SR	0.108	37.53	100.0	37.53	98.6	36.38	97.1	35.16	346.	1923.	2341.
S/W	SR	0.059	34.08	100.0	34.08	99.4	33.74	98.5	33.13	314.	1757.	2147.
C/S/W	SR	0.069	37.60	100.0	37.60	99.3	37.02	98.2	36.16	347.	1936.	2363.

TABLE 47. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES ZL01.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.144	23.25	100.0	23.25	96.5	20.09	92.7	16.65	214.	1151.	1370.
S	SR	0.132	25.38	100.0	25.38	96.8	23.90	93.4	22.29	234.	1288.	1559.
W	SR	0.024	36.50	100.0	36.50	100.0	36.50	99.3	35.98	337.	1885.	2308.
R	SR	0.010	38.66	100.0	38.66	100.0	38.66	100.0	38.66	357.	1996.	2446.
C/W	SR	0.072	35.66	100.0	35.66	98.5	34.39	96.5	32.66	329.	1827.	2220.
C/S	SR	0.132	32.52	100.0	32.52	96.8	30.08	93.4	27.43	300.	1642.	1981.
S/W	SR	0.072	29.07	100.0	29.07	98.5	28.23	96.5	27.10	268.	1492.	1815.
C/S/W	SR	0.084	34.08	100.0	34.08	98.2	32.71	95.9	31.01	314.	1743.	2116.
IRRIGATED CROPS												
C	SR	0.144	152.72	100.0	152.72	96.5	141.85	92.7	130.02	1408.	7716.	9316.
S	SR	0.132	78.45	100.0	78.45	96.8	71.61	93.4	64.16	723.	3948.	4748.
W	SR	0.024	97.76	100.0	97.76	100.0	97.76	99.3	96.27	902.	5047.	6180.
CN	SR	0.132	107.39	100.0	107.39	96.8	97.28	93.4	86.28	990.	5393.	6477.
SB	SR	0.144	127.90	100.0	127.90	96.5	119.77	92.7	110.92	1180.	6477.	7833.
C/W	SR	0.072	147.12	100.0	147.12	98.5	143.00	96.5	137.41	1357.	7551.	9192.
C/S	SR	0.132	145.74	100.0	145.74	96.8	136.42	93.4	126.28	1344.	7384.	8928.
S/W	SR	0.072	85.57	100.0	85.57	98.5	82.52	96.5	78.38	789.	4385.	5327.
C/S/W	SR	0.084	132.98	100.0	132.98	98.2	128.13	95.9	122.07	1226.	6807.	8272.
C/CN	SR	0.132	152.64	100.0	152.64	96.8	141.93	93.4	130.27	1408.	7720.	9321.
W/CN	SR	0.072	92.47	100.0	92.47	98.5	88.77	96.5	83.74	853.	4734.	5745.
CN/SB	SR	0.132	117.65	100.0	117.65	96.8	108.90	93.4	99.37	1085.	5943.	7169.

TABLE 48. YIELD LOSS AND PER ACRE RETURN TO LAND AND MANAGEMENT FOR SOIL SERIES ZL13.

ROT	CP	% SOIL LCST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
C	SR	0.245	13.16	100.0	13.16	93.9	8.24	85.2	1.25	121.	592.	661.
	C	0.147	9.32	100.0	9.32	96.4	6.44	92.6	3.32	86.	436.	497.
S	SR	0.224	16.02	100.0	16.02	94.4	13.93	87.2	11.20	148.	791.	942.
	C	0.135	14.90	100.0	14.90	96.8	13.69	93.2	12.37	137.	751.	904.
W	SR	0.041	22.46	100.0	22.46	99.5	22.17	98.2	21.47	207.	1158.	1413.
	C	0.024	20.60	100.0	20.60	100.0	20.60	99.2	20.17	190.	1064.	1302.
R	SR	0.016	36.16	100.0	36.16	100.0	36.16	99.8	36.06	333.	1867.	2288.
C/W	SR	0.122	23.26	100.0	23.26	97.1	21.12	93.9	18.76	215.	1170.	1405.
	C	0.073	20.41	100.0	20.41	98.5	19.29	96.4	17.79	188.	1042.	1259.
C/S	SR	0.224	21.73	100.0	21.73	94.4	18.05	87.2	13.22	200.	1058.	1249.
	C	0.135	19.25	100.0	19.25	96.8	17.11	93.2	14.78	178.	962.	1150.
S/W	SR	0.122	17.74	100.0	17.74	97.1	16.42	93.9	14.98	164.	897.	1081.
	C	0.073	16.25	100.0	16.25	98.5	15.56	96.4	14.64	150.	831.	1009.
C/S/W	SR	0.143	22.37	100.0	22.37	96.6	20.20	92.8	17.84	206.	1121.	1346.
	C	0.086	20.12	100.0	20.12	98.1	18.94	95.8	17.48	186.	1024.	1238.
IRRIGATED CROPS												
C	SR	0.245	100.67	100.0	100.67	93.9	84.80	85.2	62.26	928.	4916.	5817.
	C	0.147	93.62	100.0	93.62	96.4	84.36	92.6	74.28	863.	4689.	5627.
S	SR	0.224	58.79	100.0	58.79	94.4	47.86	87.2	33.53	542.	2844.	3345.
	C	0.135	51.11	100.0	51.11	96.8	44.75	93.2	37.83	471.	2542.	3033.

TABLE 48. CONTINUED.

ROT	CP	% SOIL LOST/YR	REMAINING YIELD (AS A % OF YEAR 1) AND PROFITS AT YR 1	YEAR 10		YEAR 100		YEAR 200		P.V. OF PRT STREAM TO YR 10	100	200
W	SR	0.041	61.02	100.0	61.02	99.5	60.18	98.2	58.11	563.	3146.	3837.
	C	0.024	56.08	100.0	56.08	100.0	56.08	99.2	54.81	517.	2895.	3543.
CN	SR	0.224	54.14	100.0	54.14	94.4	39.33	87.2	19.93	499.	2537.	2917.
	C	0.135	44.48	100.0	44.48	96.8	35.87	93.2	26.51	410.	2166.	2542.
SB	SR	0.245	81.16	100.0	81.16	93.9	69.77	85.2	53.58	748.	3988.	4738.
	C	0.147	74.39	100.0	74.39	96.4	67.74	92.6	60.50	686.	3737.	4494.
C/W	SR	0.122	99.23	100.0	99.23	97.1	92.52	93.9	85.14	915.	5025.	6070.
	C	0.073	93.24	100.0	93.24	98.5	89.73	96.4	85.01	860.	4775.	5799.
C/S	SR	0.224	105.42	100.0	105.42	94.4	91.29	87.2	72.77	972.	5196.	6186.
	C	0.135	98.06	100.0	98.06	96.8	89.84	93.2	80.90	904.	4938.	5945.
S/W	SR	0.122	58.52	100.0	58.52	97.1	53.30	93.9	47.57	540.	2945.	3540.
	C	0.073	52.21	100.0	52.21	98.5	49.48	96.4	45.82	481.	2666.	3225.
C/S/W	SR	0.143	93.98	100.0	93.98	96.6	86.16	92.8	77.66	867.	4731.	5697.
	C	0.086	87.49	100.0	87.49	98.1	83.23	95.8	77.98	807.	4465.	5411.
C/CN	SR	0.224	96.22	100.0	96.22	94.4	80.53	87.2	59.97	887.	4694.	5550.
	C	0.135	87.87	100.0	87.87	96.8	78.75	93.2	68.82	810.	4399.	5272.
W/CN	SR	0.122	49.31	100.0	49.31	97.1	43.29	93.9	36.66	455.	2458.	2933.
	C	0.073	42.01	100.0	42.01	98.5	38.86	96.4	34.63	387.	2135.	2568.
CN/SB	SR	0.224	67.65	100.0	67.65	94.4	55.05	87.2	38.53	624.	3273.	3848.
	C	0.135	59.44	100.0	59.44	96.8	52.11	93.2	44.14	548.	2958.	3529.

APPENDIX B

Major effects of given NPS control options for 10, 100 and 200 year planning horizons.

Table 49. Major economic consequences of NPS control options in Lower Running Draw watershed assuming farmers have a 10 year planning horizon.

Control Option	Change in Annualized Farm Income ($1000)	Gov't Cost (-) or Revenue (+) ($1000)	Change in Gross Soil Loss (1000 T)	Offsite Sediment Damages Abated ($1000)	Net Social Benefits Excluding Administrative Costs ($1000)
SL < T	-61.44	0.0	14.59	2.60	-58.85
SL < 2	-1869.46	0.0	218.65	36.40	-1833.05
SL < 4	-346.51	0.0	106.74	18.48	-328.03
SL < 6	0.0	0.0	0.0	0.0	0.0
TR 50	0.0	0.0	0.0	0.0	0.0
TR 100	0.0	0.0	0.0	0.0	0.0
C 50	0.0	0.0	0.0	0.0	0.0
C 100	2.52	-46.33	11.34	2.02	-41.78
IT 50	0.0	0.0	0.0	0.0	0.0
IT 100	0.0	0.0	0.0	0.0	0.0
SL < T, TR 50	-45.73	-36.21	14.71	2.62	-79.32
SL < T, C 50	-55.87	-5.57	14.59	2.60	-58.85
SL < T, IT 50	-61.44	0.0	14.59	2.60	-58.85
SL < 2, TR 50	-1835.87	-58.68	219.12	36.47	-1858.08
SL < 2, C 50	-1841.89	-36.31	215.71	35.95	-1842.25
SL < 2, IT 50	-1865.55	-37.96	218.65	36.40	-1867.10
TX 4	-13.52	13.52	0.0	0.0	0.00
TX 6	-20.27	20.28	0.0	0.0	0.00
TX 8	-27.04	27.04	0.0	0.0	0.00
TX 10	-33.79	33.79	0.0	0.0	0.00
TX 12	-40.55	40.55	0.0	0.0	0.00
TX 16	-54.07	54.07	0.0	0.0	0.00
TX 20	-67.58	67.59	0.0	0.0	0.00
TX 4, 50 T&C	-13.52	13.52	0.0	0.0	0.00
TX 6, 50 T&C	-20.27	20.28	0.0	0.0	0.00
TX 8, 50 T&C	-27.04	27.04	0.0	0.0	0.00
TX 10, 50 T&C	-33.79	33.79	0.0	0.0	0.00
TX 12, 50 T&C	-40.55	40.55	0.0	0.0	0.00
TX 16, 50 T&C	-54.07	54.07	0.0	0.0	0.00
TX 20, 50 T&C	-67.58	67.59	0.0	0.0	0.00

Table 50. Percent of acreage in each crop by control option for Lower Running Water Draw watershed assuming farmers have a 10 year planning horizon.

	Dryland Crops		Irrigated Crops				
	Crops	Range	Cotton	Grain Sorghum	Small Grains	Corn	Soy-Beans
Benchmark	0.3	28.1	33.6	19.5	10.7	5.0	2.8
SL < T	0.3	28.7	34.3	19.9	11.0	3.1	2.9
SL < 2	0.3	28.8	16.2	1.3	53.6	0.0	0.0
SL < 4	0.3	28.1	34.6	3.0	29.1	2.2	2.8
SL < 6	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TR 50	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TR 100	0.3	28.1	33.6	19.5	10.7	5.0	2.8
C 50	0.3	28.1	33.6	19.5	10.7	5.0	2.8
C 100	0.3	28.1	33.6	19.5	10.7	5.0	2.8
IT 50	0.3	28.1	33.6	19.5	10.7	5.0	2.8
IT 100	0.3	28.1	33.6	19.5	10.7	5.0	2.8
SL < T, TR 50	0.3	28.1	33.6	19.5	10.7	5.0	2.8
SL < T, C 50	0.3	28.7	34.3	19.9	11.0	3.1	2.9
SL < T, IT 50	0.3	28.7	34.3	19.9	11.0	3.1	2.9
SL < 2, TR 50	0.3	28.1	15.9	1.2	52.3	2.2	0.0
SL < 2, C 50	0.3	28.8	17.2	2.2	51.6	0.0	0.0
SL < 2, IT 50	0.3	28.8	16.2	1.3	53.6	0.0	0.0
TX 4	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 6	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 8	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 10	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 12	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 16	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 20	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 4, 50 T&C	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 6, 50 T&C	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 8, 50 T&C	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 10, 50 T&C	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 12, 50 T&C	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 16, 50 T&C	0.3	28.1	33.6	19.5	10.7	5.0	2.8
TX 20, 50 T&C	0.3	28.1	33.6	19.5	10.7	5.0	2.8

Table 51. Extent and cost of terracing and contouring by control option for Lower Running Water Draw watershed assuming farmers have a 10 year planning horizon.

Control Option	Terracing		Contouring	
	Acres (1000)	Cost ($1000)	Acres (1000)	Cost ($1000)
Benchmark	0.0	0.0	0.0	0.0
SL < T	0.0	0.0	1.582	11.142
SL < 2	1.525	32.665	8.286	49.641
SL < 4	0.0	0.0	5.495	43.341
SL < 6	0.0	0.0	0.0	0.0
TR 50	0.0	0.0	0.0	0.0
TR 100	0.0	0.0	0.0	0.0
C 50	0.0	0.0	0.0	0.0
C 100	0.0	0.0	5.804	46.326
IT 50	0.0	0.0	0.0	0.0
IT 100	0.0	0.0	0.0	0.0
SL < T, TR 50	2.388	72.421	1.582	11.142
SL < T, C 50	0.0	0.0	1.582	11.142
SL < T, IT 50	0.0	0.0	1.582	11.142
SL < 2, TR 50	4.338	117.368	8.170	48.946
SL < 2, C 50	1.525	32.665	11.816	72.624
SL < 2, IT 50	1.525	32.665	8.286	49.641
TX 4	0.0	0.0	0.0	0.0
TX 6	0.0	0.0	0.0	0.0
TX 8	0.0	0.0	0.0	0.0
TX 10	0.0	0.0	0.0	0.0
TX 12	0.0	0.0	0.0	0.0
TX 16	0.0	0.0	0.0	0.0
TX 20	0.0	0.0	0.0	0.0
TX 4, 50 T&C	0.0	0.0	0.0	0.0
TX 6, 50 T&C	0.0	0.0	0.0	0.0
TX 8, 50 T&C	0.0	0.0	0.0	0.0
TX 10, 50 T&C	0.0	0.0	0.0	0.0
TX 12, 50 T&C	0.0	0.0	0.0	0.0
TX 16, 50 T&C	0.0	0.0	0.0	0.0
TX 20, 50 T&C	0.0	0.0	0.0	0.0

Table 52. Major economic consequences of NPS control options in Lower Running Water Draw watershed assuming farmers have a 100 year planning horizon.

Control Option	Change in Annualized Farm Income ($1000)	Gov't Cost (-) or Revenue (+) ($1000)	Change in Gross Soil Loss (1000 T)	Offsite Sediment Damages Abated ($1000)	Net Social Benefits Excluding Administrative Costs ($1000)
SL < T	-18.37	0.0	14.59	2.60	-15.77
SL < 2	-1395.94	0.0	218.07	36.30	-1359.64
SL < 4	-95.71	0.0	106.74	18.48	-77.24
SL < 6	0.0	0.0	0.0	0.0	0.0
TR 50	0.0	0.0	0.0	0.0	0.0
TR 100	26.17	-182.68	33.04	5.85	-150.66
C 50	10.04	16.51	8.32	1.48	-4.99
C 100	54.28	-123.57	25.38	4.50	-64.78
IT 50	0.0	0.0	0.0	0.0	0.0
IT 100	0.0	0.0	0.0	0.0	0.0
SL < T, TR 50	-12.35	-30.03	14.71	2.62	-39.77
SL < T, C 50	-11.16	-10.14	17.35	3.09	-18.21
SL < T, IT 50	-18.37	0.0	14.59	2.60	-15.77
SL < 2, TR 50	-1375.31	-48.03	218.54	36.37	-1386.97
SL < 2, C 50	-1370.95	-25.14	218.05	36.30	-1359.79
SL < 2, IT 50	-1395.24	-37.96	218.07	36.30	-1396.90
TX 4	-13.49	13.49	0.0	0.0	0.00
TX 6	-20.23	20.23	0.0	0.0	0.00
TX 8	-26.99	26.99	0.0	0.0	0.00
TX 10	-33.74	33.74	0.0	0.0	0.00
TX 12	-40.48	40.48	0.0	0.0	0.00
TX 16	-53.97	53.98	0.0	0.0	0.00
TX 20	-67.47	67.47	0.0	0.0	0.00
TX 4, 50 T&C	-3.12	3.35	8.32	1.48	-4.98
TX 6, 50 T&C	-9.70	3.23	8.32	1.48	-4.98
TX 8, 50 T&C	-16.28	9.81	8.32	1.48	-4.99
TX 10, 50 T&C	-22.86	16.40	8.32	1.48	-4.99
TX 12, 50 T&C	-29.44	22.98	8.32	1.48	-4.99
TX 16, 50 T&C	-42.50	30.57	10.86	1.93	-10.00
TX 20, 50 T&C	-55.57	43.63	10.86	1.93	-10.00

Table 53. Percent of acreage in each crop by control option for Lower Running Water Draw watershed assuming farmers have a 100 year planning horizon.

	Dryland Crops		Irrigated Crops				
	Crops	Range	Cotton	Grain Sorghum	Small Grains	Corn	Soy-Beans
Benchmark	0.3	28.1	32.6	19.5	10.7	6.0	2.8
SL < T	0.3	28.7	33.3	19.9	11.0	4.1	2.9
SL < 2	0.3	28.8	16.2	1.3	53.6	0.0	0.0
SL < 4	0.3	28.1	33.5	3.0	29.1	3.2	2.8
SL < 6	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TR 50	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TR 100	0.3	28.1	32.6	19.5	10.7	6.0	2.8
C 50	0.3	28.1	32.6	19.5	10.7	6.0	2.8
C 100	0.3	28.1	32.6	19.5	10.7	6.0	2.8
IT 50	0.3	28.1	32.6	19.5	10.7	6.0	2.8
IT 100	0.3	28.1	32.6	19.5	10.7	6.0	2.8
SL < T, TR 50	0.3	28.1	32.6	19.5	10.7	6.0	2.8
SL < T, C 50	0.3	28.7	33.3	19.9	11.0	4.1	2.9
SL < T, IT 50	0.3	28.7	33.3	19.9	11.0	4.1	2.9
SL < 2, TR 50	0.3	28.1	15.9	1.2	52.3	2.2	0.0
SL < 2, C 50	0.3	28.8	16.2	1.3	53.5	0.0	0.0
SL < 2, IT 50	0.3	28.8	16.2	1.3	53.6	0.0	0.0
TX 4	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 6	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 8	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 10	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 12	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 16	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 20	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 4, 50 T&C	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 6, 50 T&C	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 8, 50 T&C	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 10, 50 T&C	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 12, 50 T&C	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 16, 50 T&C	0.3	28.1	32.6	19.5	10.7	6.0	2.8
TX 20, 50 T&C	0.3	28.1	32.6	19.5	10.7	6.0	2.8

Table 54. Extent and cost of terracing and contouring by control option for Lower Running Water Draw watershed assuming farmers have a 100 year planning horizon.

Control Option	Terracing		Contouring	
	Acres (1000)	Cost ($1000)	Acres (1000)	Cost ($1000)
Benchmark	0.0	0.0	0.0	0.0
SL < T	0.0	0.0	1.582	11.142
SL < 2	1.525	25.903	8.286	49.641
SL < 4	0.0	0.0	5.495	43.341
SL < 6	0.0	0.0	0.0	0.0
TR 50	0.0	0.0	0.0	0.0
TR 100	7.782	182.684	0.0	0.0
C 50	0.0	0.0	4.029	33.016
C 100	0.0	0.0	16.137	123.569
IT 50	0.0	0.0	0.0	0.0
IT 100	0.0	0.0	0.0	0.0
SL < T, TR 50	2.388	60.068	1.582	11.142
SL < T, C 50	0.0	0.0	3.107	20.278
SL < T, IT 50	0.0	0.0	1.582	11.142
SL < 2, TR 50	4.338	96.054	8.170	48.946
SL < 2, C 50	1.525	25.903	8.372	50.274
SL < 2, IT 50	1.525	25.903	8.286	49.641
TR 4	0.0	0.0	0.0	0.0
TX 6	0.0	0.0	0.0	0.0
TX 8	0.0	0.0	0.0	0.0
TX 10	0.0	0.0	0.0	0.0
TX 12	0.0	0.0	0.0	0.0
TX 16	0.0	0.0	0.0	0.0
TX 20	0.0	0.0	0.0	0.0
TX 4, 50 T&C	0.0	0.0	4.029	33.016
TX 6, 50 T&C	0.0	0.0	4.029	33.016
TX 8, 50 T&C	0.0	0.0	4.029	33.016
TX 10, 50 T&C	0.0	0.0	4.029	33.016
TX 12, 50 T&C	0.0	0.0	4.029	33.016
TX 16, 50 T&C	0.0	0.0	5.496	43.341
TX 20, 50 T&C	0.0	0.0	5.495	43.341

Table 55. Major economic consequences of NPS control options in Lower Running Water Draw watershed assuming farmers have a 200 year planning horizon.

Control Option	Change in Annualized Farm Income ($1000)	Gov't Cost (-) or Revenue (+) ($1000)	Change in Gross Soil Loss (1000 T)	Offsite Sediment Damages Abated ($1000)	Net Social Benefits Excluding Administrative Costs ($1000)
SL < T	-2.16	0.0	2.53	0.42	-1.74
SL < 2	-1197.55	0.0	112.69	18.05	-1179.50
SL < 4	-8.40	0.0	7.86	1.31	-7.09
SL < 6	0.0	0.0	0.0	0.0	0.0
TR 50	0.0	0.0	0.0	0.0	0.0
TR 100	41.41	-210.02	23.79	3.94	-164.67
C 50	12.66	-21.67	-3.97	-0.66	-9.47
C 100	69.18	-123.57	10.56	1.76	-52.62
IT 50	0.0	0.0	0.0	0.0	0.0
IT 100	0.0	0.0	0.0	0.0	0.0
SL < T, TR 50	-2.16	0.0	2.53	0.42	-1.74
SL < T, C 50	7.98	-10.14	2.53	0.42	-1.74
SL < T, IT 50	-2.16	0.0	2.53	0.42	-1.74
SL < 2, TR 50	-4183.69	-17.81	113.04	18.10	-1183.41
SL < 2, C 50	-1172.58	-25.14	112.68	18.05	-1179.67
SL < 2, IT 50	-1196.98	-37.96	112.69	18.05	-1216.88
TX 4	-9.22	9.22	0.0	0.0	0.00
TX 6	-13.83	13.83	0.0	0.0	0.00
TX 8	-18.45	18.45	0.0	0.0	0.00
TX 10	-23.06	23.05	0.0	0.0	0.00
TX 12	-27.66	27.66	0.0	0.0	0.00
TX 16	-36.88	36.88	0.0	0.0	0.00
TX 20	-46.11	46.11	0.0	0.0	0.00
TX 4, 50 T&C	3.43	-12.23	-3.97	-0.66	-9.47
TX 6, 50 T&C	-1.29	-7.51	-3.97	-0.66	-9.47
TX 8, 50 T&C	-6.02	-2.80	-3.97	-0.66	-9.48
TX 10, 50 T&C	-10.73	1.60	-3.86	-0.65	-9.78
TX 12, 50 T&C	-15.44	6.31	-3.86	-0.65	-9.78
TX 16, 50 T&C	-24.80	8.05	-0.95	-0.16	-16.92
TX 20, 50 T&C	-34.13	17.36	-0.95	-0.16	-16.92

Table 56. Percent of acreage of each crop by control option for Lower Running Water Draw watershed assuming farmers have a 200 year planning horizon.

	Dryland Crops		Irrigated Crops				
	Crops	Range	Cotton	Grain Sorghum	Small Grains	Corn	Soy-Beans
Benchmark	0.3	28.7	33.3	2.1	28.7	4.1	2.9
SL < T	0.3	28.7	33.3	2.1	28.7	4.1	2.9
SL < 2	0.3	28.8	16.2	1.3	53.6	0.0	0.0
SL < 4	0.3	28.7	34.2	3.0	29.7	1.3	2.9
SL < 6	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TR 50	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TR 100	0.3	28.1	32.6	2.1	28.2	6.0	2.8
C 50	0.3	28.1	32.6	2.1	28.2	6.0	2.8
C 100	0.3	28.1	32.6	2.1	28.2	6.0	2.8
IT 50	0.3	28.7	33.3	2.1	28.7	4.1	2.9
IT 100	0.3	28.7	33.3	2.1	28.7	4.1	2.9
SL < T, TR 50	0.3	28.7	33.3	2.1	28.7	4.1	2.9
SL < T, C 50	0.3	28.7	33.3	2.1	28.7	4.1	2.9
SL < T, IT 50	0.3	28.7	33.3	2.1	28.7	4.1	2.9
SL < 2, TR 50	0.3	28.7	16.2	1.3	53.4	0.3	0.0
SL < 2, C 50	0.3	28.8	16.2	1.3	53.5	0.0	0.0
SL < 2, IT 50	0.3	28.8	16.2	1.3	53.6	0.0	0.0
TX 4	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TX 6	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TX 8	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TX 10	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TX 12	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TX 16	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TX 20	0.3	28.7	33.3	2.1	28.7	4.1	2.9
TX 4, 50 T&C	0.3	28.1	32.6	2.1	28.2	6.0	2.8
TX 6, 50 T&C	0.3	28.1	32.6	2.1	28.2	6.0	2.8
TX 8, 50 T&C	0.3	28.1	32.6	2.1	28.2	6.0	2.8
TX 10, 50 T&C	0.3	28.1	32.6	2.1	28.2	6.0	2.8
TX 12, 50 T&C	0.3	28.1	32.6	2.1	28.2	6.0	2.8
TX 16, 50 T&C	0.3	28.1	32.6	2.1	28.2	6.0	2.8
TX 20, 50 T&C	0.3	28.1	32.6	2.1	28.2	6.0	2.8

Table 57. Extent and cost of terracing and contouring by control option for Lower Running Water Draw watershed assuming farmers have a 200 year planning horizon.

	Terracing		Contouring	
	Acres (1000)	Cost ($1000)	Acres (1000)	Cost ($1000)
Benchmark	0.0	0.0	1.641	9.953
SL < T	0.0	0.0	3.107	20.278
SL < 2	1.525	25.632	8.286	49.641
SL < 4	0.0	0.0	3.107	20.278
SL < 6	0.0	0.0	1.641	9.953
TR 50	0.0	0.0	1.641	9.953
TR 100	9.248	210.022	0.0	0.0
C 50	0.0	0.0	5.495	43.341
C 100	0.0	0.0	16.137	123.569
IT 50	0.0	0.0	1.641	9.953
IT 100	0.0	0.0	1.641	9.953
SL < T, TR 50	0.0	0.0	3.107	20.278
SL < T, C 50	0.0	0.0	3.107	20.278
SL < T, IT 50	0.0	0.0	3.107	20.278
SL < 2, TR 50	1.956	35.628	8.170	48.946
SL < 2, C 50	1.525	25.632	8.372	50.274
SL < 2, IT 50	1.525	25.632	8.286	49.641
TX 4	0.0	0.0	1.641	9.953
TX 6	0.0	0.0	1.641	9.953
TX 8	0.0	0.0	1.641	9.953
TX 10	0.0	0.0	1.641	9.953
TX 12	0.0	0.0	1.641	9.953
TX 16	0.0	0.0	1.641	9.953
TX 20	0.0	0.0	1.641	9.953
TX 4, 50 T&C	0.0	0.0	5.495	43.341
TX 6, 50 T&C	0.0	0.0	5.495	43.341
TX 8, 50 R&C	0.0	0.0	5.495	43.341
TX 10, 50 T&C	0.0	0.0	5.581	43.975
TX 12, 50 T&C	0.0	0.0	5.581	43.975
TX 16, 50 T&C	0.0	0.0	7.546	58.443
TX 20, 50 T&C	0.0	0.0	7.546	58.443

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