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SNAKE RIVER BASIN

IDAHO AND WYOMING

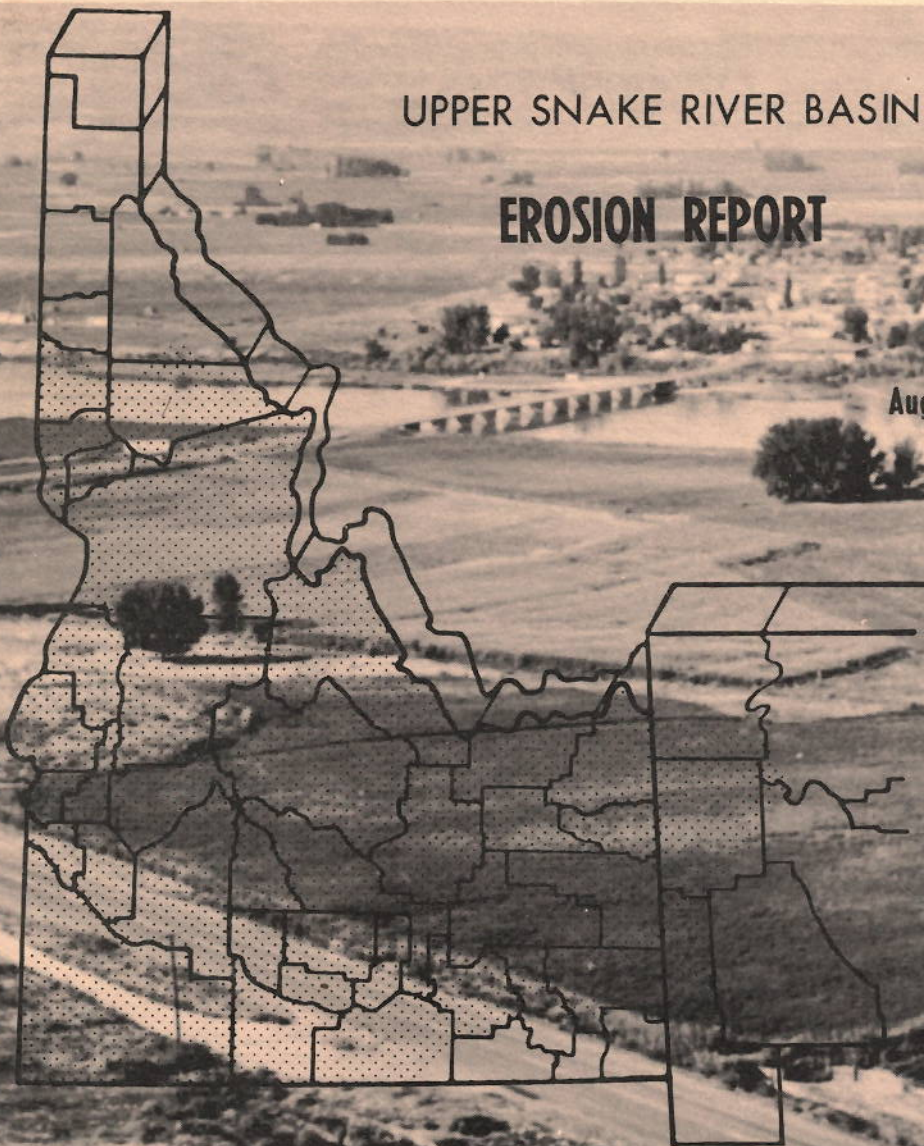
COOPERATIVE STUDY



UPPER SNAKE RIVER BASIN

EROSION REPORT

August 1979



UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ECONOMIC, STATISTICS, AND COOPERATIVES SERVICES
FOREST SERVICE

in
cooperation with
STATES of IDAHO, WYOMING
M7-L-23421



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EROSION REPORT

U.S. Department of Agriculture
Soil Conservation Service
Economics, Statistics, and Cooperatives Service
Forest Service
in
Cooperation with the
States of Idaho and Wyoming

August 1979

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FOREWARD

There has been considerable interest in improving the environmental aspects of the Upper Snake River Basin (USRB) including quality of water and particularly a reduction in agricultural pollution to streams and reservoirs. From the conservationist's standpoint, interest has been just as keen to find methods of installing conservation practices that will save the soil resource. The U.S. Department of Agriculture has emphasized a greater need for soil conservation for many years. An increasing population resulting in additional economic stresses has placed more and more importance on maintaining crop production and an anticipation of future needs. There is a limited quantity of economic cropland available and we cannot afford to waste it, let alone use it to cause environmental and economic damages downstream.

This report identifies areas of critical erosion and the types of remedial action needed for erosion control. Tabular data and maps were developed from 1975 data to show general locations of erosion and associated sediment problems in the study area. This is a cooperative study of the Soil Conservation Service (SCS); Economics, Statistics, and Cooperatives Service (ESCS); Forest Service (FS); Science and Education Administration (SEA) ^{1/}; U.S. Geological Survey (USGS); and Idaho Department of Water Resources (IDWR).

^{1/} Formerly Agricultural Research Service (ARS)

The Idaho portion includes a small part of Yellowstone National Park and all of Bannock, Bingham, Blaine, Bonneville, Butte, Camas, Caribou, Cassia, Clark, Fremont, Gooding, Jefferson, Jerome, Lincoln, Madison, Minidoka, Power, Teton, and Twin Falls counties for an area total of 17,837,610 acres or 27,870 square miles.

There are four categories of land use identified in the Basin: cropland, rangeland, forestland, and other lands. Almost four million acres, or 23 percent of the Basin, are used as cropland. Thirty-three percent of the cropland, or 1.3 million acres, are dry cropland; 67 percent, or 1.7 million acres, are surface irrigated; and the remainder, 1 million acres, is sprinkler irrigated.

Approximately 55 percent of the Basin's land area (11.4 million acres) is used for rangeland and pasture including 2 million acres of grassland within forested areas. Forestland comprises 22 percent of the Basin, or 4.5 million acres, of which 60 percent is classified as commercial forest. National Forests in Idaho include all or part of the Caribou, Targhee, Challis and Sawtooth Forests and the Bridger-Teton Forest in Wyoming. Other land uses include roads, railroads, farmsteads, urban and industrial areas plus rock outcrops which account for 19,000 acres or about 4 percent of the Basin.

Additional descriptive data of the Basin can be found in the Upper Snake River Basin Main Report.

EROSION WORKING MATERIALS REPORT
Upper Snake River Basin, Idaho and Wyoming
Howard R. Smith 1/

INTRODUCTION

This working materials report on erosion covers the Upper Snake River Basin (USRB) and is a supplement to the previously published Basin's Main Report.

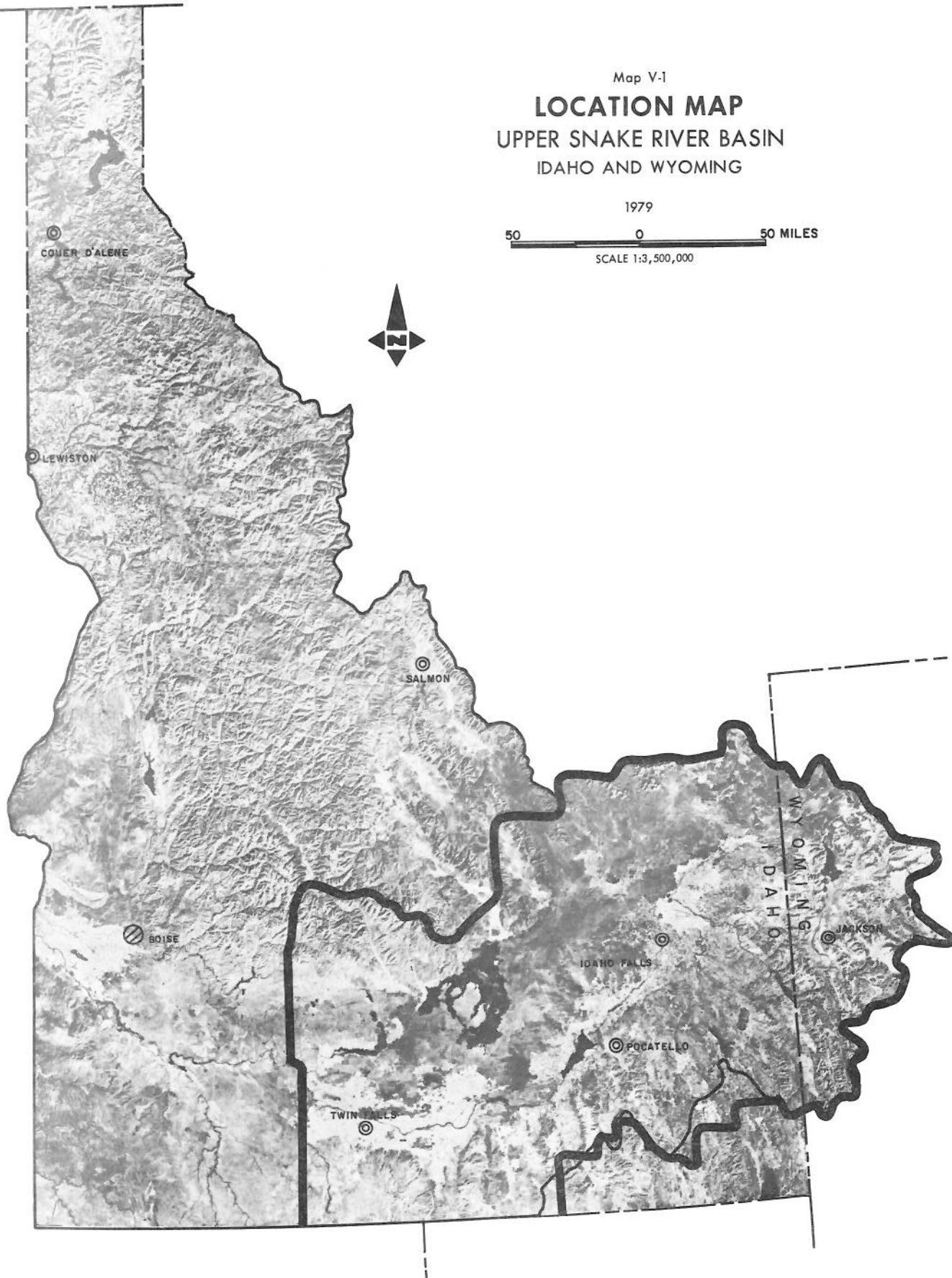
The total Snake River Basin includes portions of Wyoming, Idaho, Utah, Nevada, Oregon, and Washington. This area of study, however, as with the main report, deals only with those portions of the Snake River Basin in Wyoming and Idaho east of the Owyhee-Twin Falls, Gooding, and Camas-Elmore county lines; south of the northern boundaries of Camas, Blaine and Butte Counties; and the western county lines of Butte and Clark counties to the Montana-Idaho state line. On the north and east, the Basin boundary follows the drainage divide. In the southeastern sector, it follows the southern county lines of Caribou, Bannock, and Power counties and the eastern boundary of Cassia County which includes a small portion of the Bear River Basin. This study area is referred to as the Upper Snake River Basin and has a total of about 21,089,000 acres or 32,951 square miles.

The Wyoming portion includes parts of Teton, Fremont, Sublette and Lincoln counties; a part of Yellowstone National Park; and Grand Teton National Park. This constitutes about 3,251,390 acres or 5,080 square miles.

1/ Geologist, SCS, USDA, Boise, Idaho

Map V-1
LOCATION MAP
UPPER SNAKE RIVER BASIN
IDAHO AND WYOMING

1979
50 0 50 MILES
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SOIL EROSION IN THE BASIN

Excessive erosion 1/ has been a recognized problem for many years in the Basin. It is widespread and usually associated with cropland but also does occur on other lands when abused, disturbed, or unprotected from the elements. Erosion control is of particular interest to those who would like to reduce sediment damages and conserve soil. The soil resource and its ability to grow crops is limited in the Basin because of relatively shallow soils over gravels and resistant bedrock. Serious consideration should be given to conserve the amount remaining.

Natural Phenomena

Combinations of natural phenomena are believed to be important causes of excessive erosion in the Basin.

Winter Erosion

The period of greatest erosion in the Basin is generally during winter when snow melts and water runs over partially frozen soil. Rain on snow greatly accelerates melting and can cause destructive results. Soil removed to the plow-pan is not uncommon wherever there is concentrated flow. Sheet erosion and rill erosion are most serious on steeper slopes where greater runoff velocities occur.

1/ Excessive or critical erosion is defined as an erosion rate that exceeds the tolerable limit "T" for a soil. "T" is defined as the maximum erosion rate that allows for continued agricultural production. It has been designated as 5 tons per acre or less depending upon soil characteristics by SCS soil scientists.



Channel Erosion on Dry Cropland *SCS Photo*

Soils

Cropland soils in the Basin are predominantly silty and sandy, originating from wind-blown loess deposited during Pleistocene and Recent times following glacial epochs. Most are only slightly cohesive, light in weight, and easily transported by wind and water. Soils on steeper slopes (slopes over 10 percent) are particularly vulnerable and need maximum protection.

Summer Storms

Intense rainfall and high winds are often associated with summer storms that cause severe erosion on unprotected soils in localized areas of the Basin. Erosion damage is most severe on fallow fields that lack adequate protection from crop residue and terraces. One summer storm can erode away many times the soil lost during an average year.



Erosion on Dry Cropland *SCS Photo*

Fire

Scattered fires are common during hot, dry periods of the summer, particularly from convection storms accompanied by lightning. Vegetation removed by burning usually includes all soil cover, making the soil particularly vulnerable to raindrop impact and overland flow. Deliberate burning of straw has been a common practice in the past, destroying organic materials and rendering the soil vulnerable to eroding agents. Range and forestlands often need special land treatment and reseeding after burns to protect the soil and prevent excessive erosion.

Wind

There are areas of sandy soils in the Basin that are particularly vulnerable to wind erosion. They are most commonly located near the Snake River associated with alluvium and unconsolidated outwash materials. Drifting soil has caused problems in Bannock, Bonneville, Cassia, Bingham, Fremont, Gooding, Jerome, and Minidoka counties. These soils, when cultivated, are difficult to control because they are loose, friable, droughty, and low in humus.



Wind Erosion *SCS Photo*

Land Management

The elements of weather, soils, and topography must be taken into account in proper land-use planning for soil protection. Maintaining adequate crop residues, shortening the length of some field slopes, taking steep croplands out of production, selecting proper cropping practices, and using good water management on irrigated cropland will offer needed protection to cropland soils. Proper grazing and treatment of burned and logged areas, good construction practices, common sense

in use of off-road vehicles, and the application of practices that reduce the energy of runoff waters will provide opportunities for protection of rangeland, forestland, and other lands. Land use activities must be better tailored to combat natural elements that cause soil erosion. This study disclosed a general lack of adequate control measures on cropland.

A substantial reduction in soil loss can be accomplished by applying known technology to the land and results in reduced sediment damages to land, crop, water quality, and fish and wildlife. A greater awareness of erosion and sediment problems and their effect on present and future societies is needed as well as teamwork philosophy to implement present technology on the land. A reduction in erosion will conserve the soil resource for future generations and help stabilize crop yields.

Management practices and procedures considered important to reduce erosion in the Basin are:

On Cropland

- Maintain crop residues on the soil surfaces for protection during periods of runoff.
- Convert steep slopes to grass cover.
- Install terraces.
- Tillage, planting, and/or harvesting on or near the contour.
- Increase soil organic content.
- Proper application of water to achieve good irrigation water management.
- Proper protection for flood plains and channel areas.

On Rangeland

- Proper grazing
- Fire control
- Restrict off-road vehicles

On Forestland

- Fire control
- Properly constructed roads
- Protected logged-over land
- Restrict off-road vehicles

Other Lands

- Construction sites with erosion control measures
- Protect eroding channels
- Protect road cuts, fills and borrow areas
- Restrict off-road vehicles

There are logical reasons why soil conservation technology has not been better utilized to reduce erosion problems and can be summarized as lack of education, resistance to change, indifference, inconvenience and cost. Voluntary education and technical assistance have been available but enthusiasm and incentives for installing better management practices have been lacking. Inconvenience of making necessary management changes, equipment use and lack of financial incentives are perhaps the most predominant reasons.

A sense of apathy seems to exist with some farmers concerning soil erosion because the effects easily disappear and are forgotten. There is usually adequate soil remaining on most fields to continue farming for the duration of their careers and annual soil losses are slow enough to not appreciably affect annual cropland production. Visible erosion, which is normally greater than 5 tons per acre and therefore greater than the tolerable soil loss limit, often does not show after the first cultivation. Swollen streams carry soil away from the fields and is not seen again except for deposits along floodplains after runoff subsides or when reservoir water elevations are drawn down. Many land operators are most concerned about getting their crops planted, present farm prices, cost of new equipment and fuel, when to cultivate, how to kill the cheatgrass, and a myriad of other things other than the soil and fertilizer that left the farm by way of runoff. Farmers think more on the short-term because they are working with basic day-to-day activities. Activities to reduce erosion will probably cost extra time and money to obtain long-term benefits that are often of minor personal importance.

Many farmers are operating at least part of the time on low profits because of increased costs of machinery, energy, money, and land while crop prices lag behind the inflation rate. They generally do not feel they should spend money on management practices that render small returns; and some practices may not offer net returns for a number of years.

Many farmers could take more and greater positive steps toward soil conservation but they do not consider it all their responsibility. It is common to think in terms of greater availability of financial incentives to cover the extra costs of installing adequate conservation practices. An increase in application of these practices will also require increased financial support for technical assistance.

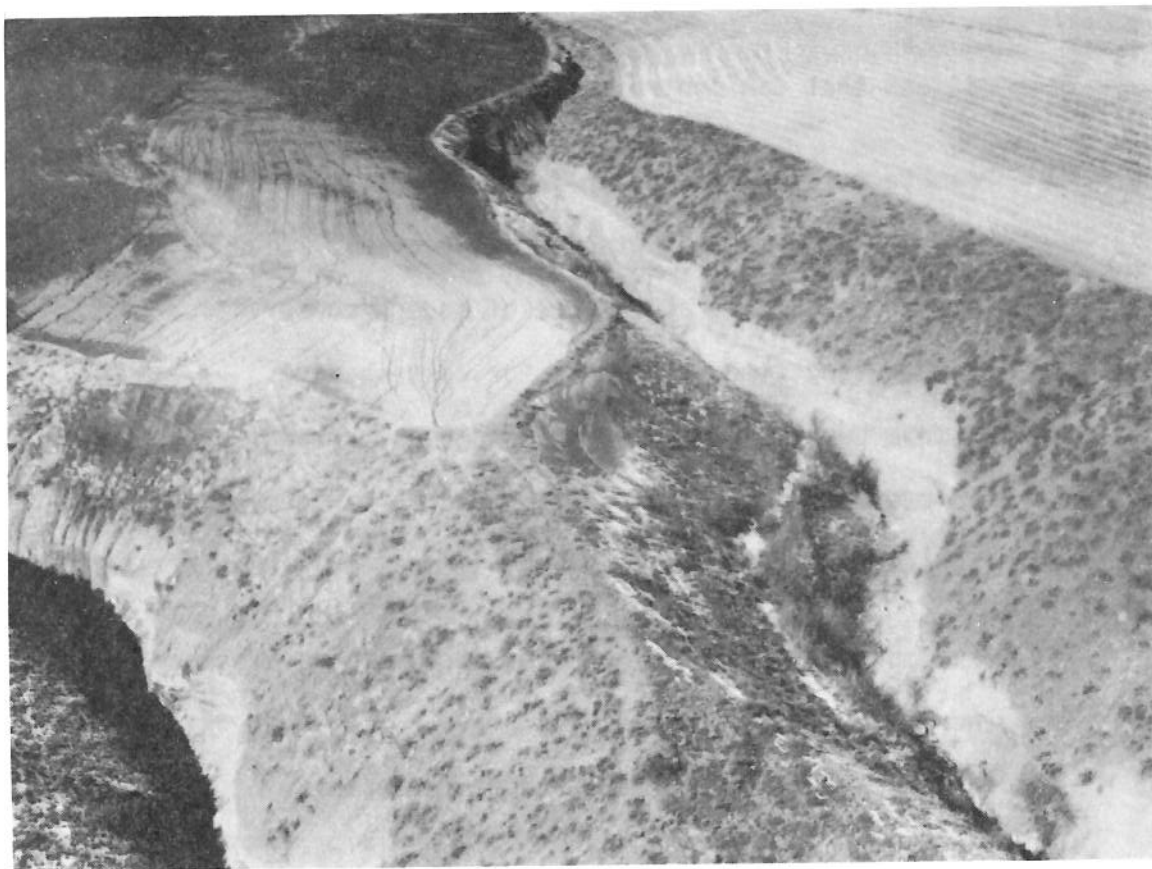
Some actions that can control critical erosion problems are:

- Promote more education and information.
- Develop programs to protect fragile areas.
- Promote change and acceptance of modern conservation technology.
- Promote long time agreements for cost-sharing.
- Promote beneficial water and land uses, present and future.
- Promote technology for proper resource management.
- Promote farmer interest in long-term as well as short-term goals.
- Make more capital available for implementing erosion controls.
- Increase cost-share funding.
- Increase percentage of cost-share to farmers.
- Increased economic returns would make it easier to pay for the cost of improvement practices and/or purchase of improved tillage equipment.

Erosion by Land Use

Dry Cropland

This study disclosed that Bonneville County has over 179,000 acres of excessive erosion on dry cropland, Power County over 151,000 acres, Cassia County over 100,00 acres and Bannock, Caribou, Madison



Sheet, Rill and Channel Erosion *SCS Photo*

and Teton Counties all have over 50,000 acres with erosion rates greater than the established "T" values (Table 1). All counties of the Basin have a total of 1,273,000 acres of excessive erosion, most of which occurs on steep slopes south of the Snake and Teton Rivers.

Table 1 -- Tolerable Soil Loss: Acreage by county, Upper Snake River Basin, Idaho and Wyoming portion, 1976

Counties	Acres of erosion - less than "T" 1/					Acres of erosion - greater than "T" 1/				
	Irrigated		Dry			Irrigated		Dry		
	Surface	Sprinkler	Range	Forest	Other	Surface	Sprinkler	Range	Forest	Other
	Thousands of Acres					Thousands of Acres				
Bannock	45.0	25.0	75.8	331.0	154.0	20.2	651.0			
Bingham	123.0	184.0	42.4	77.1	81.0	131.9	639.4			
Blaine	43.0	10.0	14.0	1,302.0	272.0	53.1	1,694.1			
Bonneville	61.6	85.5	16.6	385.6	349.8	64.8	963.9			
Butte	70.5	9.6	3.7	1,421.6	140.7	47.0	1,421.6			
Camas	18.0	6.0	98.0	356.0	183.8	13.0	674.8			
Caribou	6.3	51.5	102.7	432.0	436.0	14.0	1,042.5			
Cassia	158.0	60.3	6.0	1,035.5	183.0	19.4	1,462.2			
Clark	28.5	20.8	2.8	836.7	179.0	4.5	1,072.3			
Fremont	55.3	58.2	102.4	360.5	518.0	41.5	1,135.9			
Gooding	19.3	1.6		344.4		11.4	376.7			
Jefferson	201.0	36.2		420.0		12.5	669.7			
Jerome	48.1	57.0		188.0		22.5	315.6			
Lincoln	97.1	16.0		643.0		11.6	767.7			
Madison	47.7	2.5		66.0	46.0	12.7	174.9			
Minidoka	22.7	74.8		273.6		17.0	388.1			
Power	7.0	92.1	89.7	469.9	77.0	14.5	750.2			
Teton	9.1	48.5	7.3	66.4	99.4	6.4	237.1			
Twin Falls	245.5	20.0	6.0	912.8	29.0	15.0	1,228.3			
Wyoming	52.0	42.0	21.0	969.5	2,035.0	81.5	3,201.0			
TOTAL	1,358.7	901.6	588.4	10,620.1	4,783.7	614.5	18,867.0			

1/ "T" - Allowable soil loss limit



Gully Erosion *SCS Photo*

Surface Irrigation

There are substantial areas of serious erosion on surface irrigated lands in the Basin. Cassia, Minidoka, Gooding and Jerome Counties each have more than 50,000 acres of erosion with rates greater than "T", while Bonneville, Butte, Clark, Madison, Teton and Twin Falls Counties have between 5,000 and 50,000 acres each (Table 1). Excessive erosion occurs on over 348,000 acres of surface irrigated lands in the Basin.



Erosion on Irrigated Land *SCS Photo*

Sprinkler Irrigation

Excessive erosion occurs on over 148,000 acres of sprinkler irrigated land in the Basin, mostly on steeper slopes (Table 1). Madison County has the largest amount with 40,500 acres, followed by Jefferson with over 31,000 and Clark County with over 25,000 acres. Bonneville, Caribou, Cassia, Gooding and Jerome Counties each have over 5,000 acres while Power County has nearly 3,000 acres.

Rangeland

Erosion rates on rangeland are normally low except where the land has been disturbed. Most common disturbances are caused by overgrazing, fires, construction of roads and trails, channels, and off-road vehicles. The only large area identified as having critical erosion on rangeland was in Fremont County caused by wind erosion.

Forestland

Critical erosion on forestland normally occurs on areas disturbed by fire, timber harvest and road construction. Soil protecting vegetation makes rapid regrowth on areas where there is ample precipitation. Critical areas were not evaluated in this report because of the difficulty of locating specific problem areas which tend to be small and scattered.

Channels

Channel erosion is prevalent in the Basin with an estimated 1,684 bank miles of moderate and severe erosion producing about 300,000 tons of sediment annually. This is about 3 percent of the estimated total channels in the Basin. Channels having slight erosion were not evaluated.

Clark County has the largest amount of channel erosion with over 450 bank miles followed by Power and Cassia and Twin Falls counties in that order (Table 2). Much of this erosion can be traced to increased runoff from cropland. (See Channel Erosion Map.)



Channel Erosion *SCS Photo*



Channel Erosion on Dry Cropland *SCS Photo*

Table 2 -- Channel Erosion: Moderate and severe, by county, Upper Snake River Basin, Idaho and Wyoming portion, 1976.

Counties	Bank Miles		Total (tons)	
	Moderate <u>1/</u>	Severe <u>2/</u>	Moderate <u>1/</u>	Severe <u>2/</u>
Bannock	9.0		990	
Bingham	42.8	31.0	4,708	14,725
Blaine	34.5	5.0	3,795	2,375
Bonneville	7.0	49.5	770	25,413
Butte	--	6.0	--	2,850
Camas	24.5	--	2,695	--
Caribou	55.3	--	6,083	--
Cassia	200.0	81.0	22,000	38,475
Clark	430.0	30.5	47,355	14,488
Fremont	--	--	--	--
Gooding	8.0	20.5	880	9,738
Jefferson	3.9	3.4	429	1,615
Jerome	--	--	--	--
Lincoln	12.0	--	1,320	--
Madison	30.0	4.7	3,300	2,233
Minidoka	--	--	--	--
Power	212.0	93.0	23,320	44,175
Teton	77.0	12.0	8,470	5,700
Twin Falls	134.0	--	14,740	--
Wyoming	67.0	--	7,370	--
TOTAL	1,347.0	336.6	148,225	161,787
			310,012	

1/ 2/ See definition of Channel Erosion

SCS Field Data

INTERPRETATION OF RESULTS

Study results show that parts of 16 Idaho Counties in the Upper Snake River Basin have over one million acres with excessive erosion. Most of this soil loss occurs on dry and irrigated croplands (Table 1).

About 27,000 acres of cropland in the Basin should be returned to permanent grass cover to protect the soil resource where conservation practices cannot reduce erosion to satisfactory levels. Because of excessive erosion for too many years, much of this land is either not economically productive now or has a short life remaining. Technological advances in grain culture and farm equipment have maintained crop yields on severely eroded land that otherwise would have been retired from production by now, but when the soil becomes too thin it must go out of production and back to grass.

Farming Techniques

Crop Residue

A cover crop is usually the simplest and least expensive soil protection for all types of land uses. Vegetation is the natural protective soil cover, but on cropland there are periods during the year when vegetation is absent so residues from the previous crop must be substituted.

The period following harvest is the time of highest precipitation. When the soil surface is disturbed and a significant percentage of the crop residue is removed or buried during this period, conditions are

right for erosion to occur. Inadequate crop residue accounts for much of the critical erosion in the Basin. Fall cultivation, a common practice, disturbs and exposes the soil to the elements and buries part of the straw that would give protection from rainfall impact and overland flow from rain and melting snow over frozen soil during the winter months. Less erosion occurs when the first tillage of the fallow period is done in the spring allowing the soil to go through the winter undisturbed and with the crop residue remaining near the surface. Chiseling done in the fall, however, can be beneficial by increasing soil moisture storage and reducing runoff. Where possible, annual cropping offers more soil protection from increased residues.



Stubble Mulch *SCS Photo*

Research has shown 1,500 or more pounds of crop residue, which equals 50 percent soil cover, is needed to adequately protect soils from erosion by falling raindrops. Too much tillage or tillage by improper tillage equipment buries or destroys crop residues and reduces soil structure. Residue is also needed on the soil surface to trap water so that it does not run off readily. Good soil structure stabilizes soil particles against detachment and enables them to easily absorb water.

Steep sprinkler irrigated lands are vulnerable to erosion similar to dry cropland, but the application of water permits growth of a reliable supply of residue each year that can be used for soil protection. Some of the greatest erosion in the Basin is on steeply sloping sprinkler irrigated lands where residue is inadequate in the surface zone due to excessive or improper cultivation.

Tillage Direction

The direction of tillage has been shown to be another important factor on cropland erosion. Fields that have been tilled on the contour have about half the erosion of those tilled in an up-and-down-hill direction on slopes 10 percent or less (Table 4). Tillage equipment tends to make miniature furrows and, when on the contour, they trap precipitation and allow it to infiltrate into the soil instead of running off. Surface irrigated fields are particularly vulnerable to erosion because they are tilled, irrigated, and harvested on irrigation grade.



Stripcropping *SCS Photo*

When an erosion pattern develops on a field, channel erosion progresses to where void filling from surrounding areas becomes necessary to enable crossing with equipment. This borrowed soil has little compaction and easily erodes from the channel area again. When channel erosion occurs to the point where crossing with equipment is not possible, the field becomes divided. This results in increased up-and-down-hill tillage, increased erosion, and higher costs of operation.

Over-Irrigation

Most erosion taking place on surface irrigated land is caused by application of large heads of irrigation water that create critical velocities on disturbed and erosive soils. Irrigation water is relatively inexpensive in the Basin and in the interests of saving time, there is a general tendency to apply a head of water that is more than adequate to cover the field which results in erosion on the steeper portions.



Diversion Terrace *SCS Photo*

The locations of erosion on surface irrigated fields vary with field slopes but most irrigation induced erosion occurs either at the head or tail of the fields. Higher water velocities caused by water dropping from the head ditch can erode soil particles from the head of the field to be deposited further down slope as velocities decrease or pass off the tail of the field. An increase in flow velocity on any part of the field will increase erosion. Erosion on the tail end of the field occurs if water velocities increase where they drop into the tailwater systems. Increased velocities cause head cuts up the furrows or corrugations. The most serious erosion related to surface irrigation is the first application of water on annually cropped lands where soil particles are loose and easily dislodged and transported. Row crops such as potatoes, beans, sugar beets and corn are most susceptible to erosion during the first application of the season.

Good water management with sediment traps or pits at the ends of fields and pump-back systems are very effective in reducing soil loss and controlling sediment and pollution to streams. Grass strips can also catch and hold soil particles from irrigation waste water before it leaves the field or enters a waterway.

Farmers indicate a shortage of reliable farm labor contributes to over-irrigation. When adequate farm labor-help is not available, pressure is placed on irrigation schedules and application rates are apt to be too great for efficient irrigation resulting in increased erosion.

Soil between rows, subject to erosion from flowing irrigation water, is generally unprotected because of cultivation and lack of plant cover. Also, harvest equipment follows the rows and develops soil compaction in the furrows which reduces infiltration and promotes runoff and erosion during the fall and winter months.

Chiseling and rough tillage on the contour are good methods of breaking the up-and-down-hill pattern and thus reducing runoff and erosion during winter. When erosion cannot be controlled on surface irrigated land, it may be necessary to convert to sprinkler irrigation and perhaps also to close-growing crops and terraces.

Steep Slopes

Another major cause of erosion is farming steep slopes without a proper resource management system to adequately protect the soil. On steep slopes, intensive management may be necessary while practices can be selected to match local conditions. On dry cropland and sprinkler irrigated land these can be stubble mulching, cross-slope or contour tillage, stripcropping, terraces, diversions, and perhaps a selection of crop rotations that include grass and legumes to increase organic matter, tilth and soil structure. These management practices aid in soil improvement and protection.

Slopes satisfactory for dry cropland and sprinkler irrigated land are sometimes too steep to control erosion with surface irrigation. Management, irrigation methods and/or cropping practices should be changed where these conditions exist.



Terraces *SCS Photo*

Slope Length

The length of field slopes crossed by runoff water prior to reaching a channel can be a very important factor regarding erosion on cropland. Long flows have a tendency to channelize and greatly increase its eroding power. Cultivated soils tend to be unstable and particularly vulnerable to overland flow. Diversions and terraces can be useful soil management tools by shortening the path of overland flow by collecting runoff and sediment thus protecting the area below. Terraces can be built so they may be farmed and are compatible on both sprinkler irrigated and dry cropland fields. They act as basins to hold water allowing it to slowly percolate into the soil.

Soil Humus

A good stand of vegetation tends to provide large amounts of plant residue that cover and protect the soil. The decay of these plant residues takes place by microorganisms in the soil that feed on them and reduce them to plant nutrients and humus. Humus is the slow decaying form of plant residue that has a high moisture holding capacity, makes the soil friable and easy to till and absorbs a greater percentage of water that reaches the soil surface. Humus provides the positive aspects of maintaining fertility, reducing runoff and thereby reducing erosion and subsequent sediment damages.

Cultural practices that reduce or cause a rapid breakdown of plant residues by excessive cultivation reduce soil humus. On the other hand, the growing of tall varieties of grain, proper tillage equipment and minimum tillage are practices that facilitate the development of increased humus.

On many sites it would be advantageous to incorporate grass and alfalfa within a grain rotation to improve the humus, reduce erosion and increase soil fertility.

Wind Erosion

Wind erosion problems are associated with the cultivation of sandy soils in wind-swept areas. Formation of dunes may occur some distance from the source area and promote inundation problems.

Control of wind erosion is basically the art of reducing wind velocity on or near the soil surface. Narrow crop strips, wind breaks, keeping the soil surface rough or ridged and maintaining crop residue on the surface are practices that will protect soils from erosion by wind. Fences, shrubs, trees, or tall grass may be used but treatment must be continued after control is achieved.

Other Land Uses

Floodplains and Channels

There are farms in the Basin where present stream channels and floodplains are cropped because these areas often have the benefits of flatter slopes, greater soil moisture and thicker soil profiles. Tillage leaves these areas vulnerable to erosion where subject to flooding. Protection by planting to alfalfa or permanent grass is normally recommended.



Grassed Waterway *SCS Photo*

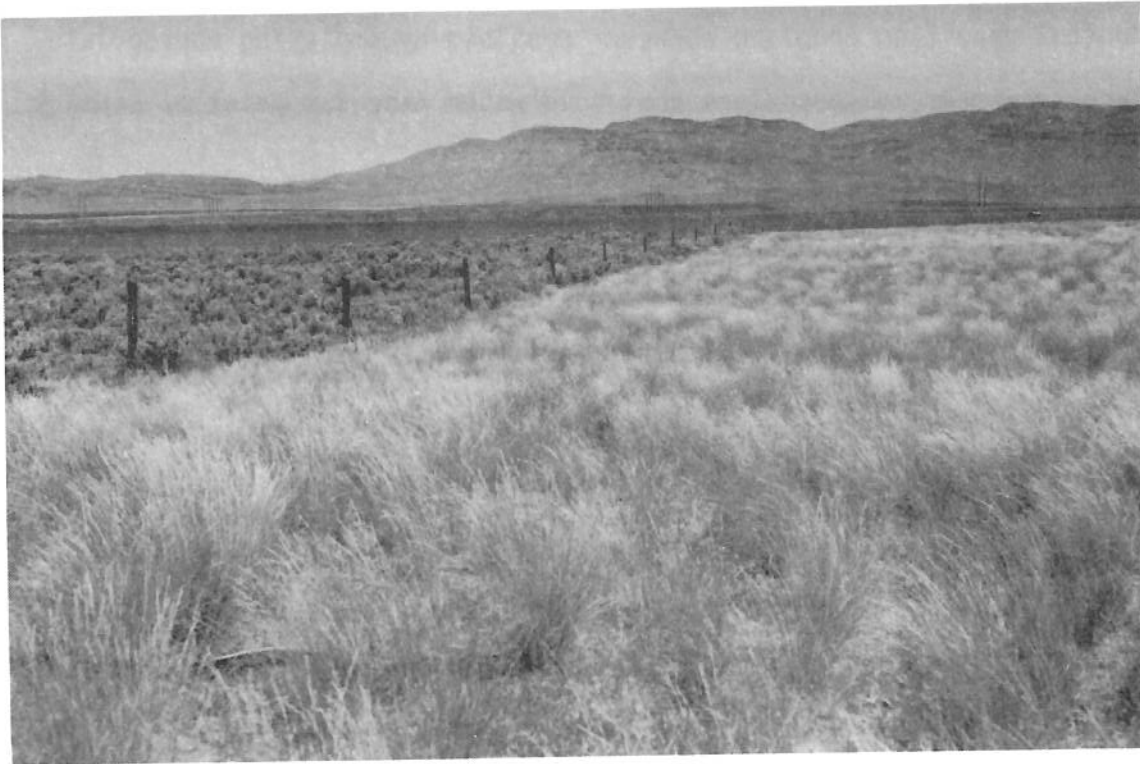
Channels that carry runoff from cropland usually show signs of accelerated erosion after summer storms, snowmelt, or improper discharge of irrigation water. Disturbed cropland soils limit infiltration of precipitation and promotes accelerated channel and gully erosion downstream. From an economic and conservation viewpoint it is best to control runoff on cropland whenever possible by employing appropriate land treatment and practices that hold water near its point of contact with the soil and reduce runoff.

Channels that have become entrenched from accelerated runoff will remain this way until upstream conditions change enough so they may become back-filled with sediment. This normally requires a change in watershed protection. Vegetation can return and protect the side slopes when stream flows are reduced. This can be seen in improved areas of Rockland Valley. However, if runoff remains unnaturally high, the channels will erode deeper and wider creating an enlarged channel cross-section to accommodate the additional flows. Properly reshaped channels can be seeded to grass for channel protection; particularly valuable on higher elevations of the watershed.

Degrading channels cause damage to farmland, roads, bridges, and other man-made structures and the eroded soil causes downstream sediment damages to channels, ditches, reservoirs, water quality, etc. Protection of these channels often requires expensive drop structures or rock rip rap.

Rangeland

Approximately 11 million acres, or 53 percent of the Basin, is used as rangeland with erosion rates estimated to average less than one ton per acre per year.



Improved Rangeland *SCS Photo*

Erosion on undisturbed rangeland is not excessive in the Basin in terms of allowable soil loss limits; but because of the large amount of rangeland, significant quantities of sediment are produced. Seven million acres need improved vegetative cover which would significantly reduce erosion, sedimentation, and increase vegetation production.

There has been a general reduction in soil erosion on rangeland in recent years but there was a long period after the turn of the century when overgrazing was common. This resulted in degradation of range conditions. Higher producing palatable plants were replaced with less productive short grasses, sage, and other less desirable invader plants. Some overgrazing is still evident where there is inadequate fencing, water facilities, and planned grazing systems. Livestock remain close to water and do not graze the more remote areas. The stocking of animals, on the basis of the entire area, results in heavy overgrazing around easily accessible areas, such as watering facilities.

Forestland

Erosion rates on forestland in the Basin are very low in undisturbed areas. Forested areas normally have adequate precipitation to sufficiently support soil protecting vegetation; however, after a fire or logging operations, when overgrazed, or when roads are built, soils are subject to severe erosion until vegetation can again become reestablished. There have also been erosion problems with lake and reservoir shorelines and abandoned roads. For the purpose of this report, forestland was considered basically undisturbed because disturbed areas are often relatively small and short lived and, except for roads, occur at different and scattered locations annually. There has been a general trend toward improvement in erosion control methods which is expected to continue, particularly on public lands.



Well Managed Forest and Rangelands *USFS Photo*

Water Quality

Sediment

This study did not address local sediment water quality problems, but a sediment yield map was made from available information (Map 5). Sedimentation is the deposition of eroded soil and rock fragments from suspension in water or air. Geologic erosion and the resulting sediment deposition are natural processes with generally low rates, but mans' activities have greatly accelerated these rates. An environmental quality goal would be the reduction of erosion rates to approximate the natural level to preserve the soil resource and reduce sediment damages

to land and water. Until then, damages will continue to be a significant problem. Associated sediment problem areas are usually downstream from eroded dry cropland, over-irrigated areas, areas of improper timber harvest, mountain road construction and wind erosion.

The cost of sediment removal from canals, ditches and fields can be very expensive while the cost of sediment removal from reservoirs may be prohibitive. Often the nutrients, herbicides, pesticides, etc., that accompany sediment in the streams can be very toxic to fish, wildlife and humans.



Sediment Deposition *SCS Photo*

Clean Water Act

The Federal Water Pollution Control Act as amended (PL 92-500) was enacted to "restore and maintain the chemical, physical and biological integrity of the nation's waters."

Section 208 of this Act provides for planning, implementation and coordination of measures to control point and nonpoint sources of pollution. A plan has been developed for Idaho to identify and control pollution problems (8).

Best management practices (BMP's) are installed for nonpoint pollution control. Differences in topography, climate, soils, and pollution sources require a variety of these practices to accomplish the goals.

An effective voluntary program is needed to accomplish the desired results, and an increase in funding, information, education, technical assistance, cooperation, and cost-sharing is also needed. This can result in a reduction in erosion and sediment damages. The Act also requires that a regulatory program serve as backup to the volunteer program.

METHODOLOGY

The Universal Soil Loss Equation (USLE) was used to estimate most of the sheet erosion rates in this study. This empirical equation employs factors that reflect field conditions and provides answers in tons of soil loss per acre per year from sheet and rill erosion. It is the product of over 40 years of research by ARS and SCS. More research is needed but continued use and refinement of factors have resulted in improved results and confidence.

The Universal Soil Loss Equation (USLE) is:

$$A = R_t K L S C P \quad (16)$$

Where:

- A - The computed average annual soil loss in tons per unit area (acres) from sheet and rill erosion.
- R_t - The rainfall and snowmelt (R+R_s=R_t) erosive index factor is the sum of the indices for erosive force of rainfall impact and runoff plus the erosive power of snowmelt. A state R_t Map has been developed.
- K - The soil erodibility factor is an index factor calculated for each soil that indicates vulnerability to erosion forces. A list of K factors has been developed and published for many Idaho soils (20)
- LS - A dimensionless factor that represents the combined effects of slope length and steepness. It can be calculated or taken from a chart.

- C - The cropping management factor relates to the amount of surface cover and protection compared to bare soil in a fallow condition, which has a value of 1.0. "C" values in this subregion range from 0.0002 on undisturbed woodland and rangeland in high rainfall areas to 1.0. C factors for cropland having rotating crops are calculated to obtain an average value over the period of the rotation.
- P - The erosion control practice factor is primarily for cropland. It is the ratio of soil loss from contour tillage, cross-slope farming and stripcropping compared to up-and-down-hill farming. The "P" factor also applies to other land uses whenever tillage is involved. Length of slope should be taken into consideration when selecting P values. Table 3 has been developed for contour farming and similar slope length values should be used for other practices listed in Table 4.

Table 3--P Values and Slope-Length Limits for Contouring

<u>Land Slope Percent</u>	<u>P Value</u>	<u>Maximum Length ^{1/}</u>
		Feet
1 to 2	0.60	400
3 to 5	.50	300
6 to 8	.50	200
9 to 12	.60	120
13 to 16	.70	80
17 to 20	.80	60
21 to 25	.90	50

^{1/} Limit may be increased by 25 percent if residue cover after crop seedlings will regularly exceed 50 percent.

Source: Agriculture Handbook No. 537(26)

Table 4-- P Values for Erosion Control Practices

<u>Slope %</u>	<u>Up & Down Hill</u>	<u>Cross Slope Farming Without Strips</u>	<u>Contour Farming</u>	<u>Cross Slope Farming With Strips</u>	<u>Contour Strip- Cropping</u>
2.0- 7.0	1.0	.75	.50	.37	.25
7.1-12.0	1.0	.80	.60	.45	.30
12.1-18.0	1.0	.90	.80	.60	.40
18.1-24.0	1.0	.95	.90	.67	.45

Source: TN - Agronomy No. 19 (16)

Allowable soil loss tolerance (T) values, 1-5 tons per acre per year, were used to represent the permissible soil loss per year in the Basin. When erosion significantly reduces the thickness of the soil profile and effective root zone the soil loses effective water retention and soil thickness for plant growth.

The following criteria are used by soil scientists and other specialists for assigning soil loss tolerance values (T) to soil series:

1. An adequate rooting depth must be maintained in the soil for plant growth. For soils that are shallow over hard rock or other restrictive layers, it is important to retain the remaining soil; therefore, not much soil loss is tolerated. The soil loss tolerance should be less on soils shallow to impervious layers than for soils with good soil depth or for soils with favorable underlying soil materials that can be renewed by management practices.

Table 5--Guide for Assigning Soil Loss Tolerance Values (T) to Soils Having Different Rooting Depths

Rooting Depth	Soil Loss Tolerance Values (Annual Soil Loss--Tons/Acre)	
INCHES	RENEWABLE SOIL <u>1/</u>	NON-RENEWABLE SOIL <u>2/</u>
0-10	1	1
10-20	2	1
20-40	3	2
40-60	4	3
60+	5	5

1/ Soils with favorable substrata that can be renewed by tillage, fertilizer, organic matter, and other management practices.

2/ Soils with unfavorable substrata such as rock or gravel that cannot be renewed by economical means.

Source: TN - Agronomy No. 19 (16)

2. Soils that have significant yield reduction when the surface layer is removed by erosion are given lower soil loss tolerance values than those where erosion effects yield very little.

Besides conserving the soil resource for future generations, the maximum of 5 tons of soil loss per acre per year has been selected for the following reasons:

1. Soil losses in excess of 5 tons per acre per year affect the maintenance, cost and effectiveness of water-control structures such as open ditches, ponds, and other structures affected by sediment.
2. Excessive sheet erosion is accompanied by gully formation in many places causing added problems to tillage operations and to sedimentation of ditches, streams and waterways.
3. Loss of plant nutrients. The average value of nitrogen and phosphorus in a ton of soil is about \$2-\$4. The value of all nutrients may easily exceed \$5.00. Plant nutrient losses of more than \$10 per acre per year may be considered to be excessive.
4. Numerous practices are known that can be used successfully to keep soil losses below 5 tons per acre per year.

Soils

Additional soil survey information was needed for complete county coverage. As a result, a generalized soil map was made for the state of Idaho (20) and the Wyoming portion of the Snake River Basin. Over 270 soils were listed with selected features and interpretations. Each soil map unit is a unique landscape entity that has a distinctive pattern of soils, relief, and drainage features. It usually represents one or more soils of major extent plus other minor soils and is commonly named for the major soils. Weighted K factors were calculated for those soils and permitted complete county-wide erosion calculations (see Tables). Soil numbers in Appendix B tables are described and located in this publication.

Erosion Rates on Range and Forestlands

Trial erosion rates for range and forestlands were calculated (by USLE) using "C" factors suggested in guidelines for varying percentages of vegetative soil cover. These calculated rates, however, were much higher than actual rates determined from measurements. It was evident one or more factors of the USLE equation needed modifying to calculate more reliable erosion rates on range and forestlands in the Basin. "C" values were selected for change, and the values developed were based on rainfall (R_t) rather than percent of cover because of limited data on vegetative cover. Vegetation and precipitation are closely interrelated and precipitation data was available.

Approximate "C" values (Table 6) were developed from erosion rates determined from known sediment yields. The application of delivery ratios converted sediment yield to an erosion rate. The USLE was then solved for "C" with other values known.

Table 6--"C" Values for Range and Woodland Snake River Basin Study

	Rt	Idaho			
		North	Central	South	Southwest
RANGE	20	.015	.017	.02	.025
	25	.06	.01	.015	.02
	30	.045	.008	.012	.015
	35	.035	.007	.01	.014
	40	.025	.005	.007	.013
	45	.002	.004	.006	.012
	50	.001	.003	.005	.01
	55	.0009	.0025	.004	.009
	60	.0007	.002	.003	.008
	65	.0005	.0015	.002	.007

WOODLAND	20	.00055	.01	.015	.02
	25	.0005	.005	.01	.015
	30	.00045	.003	.005	.01
	35	.00035	.001	.002	.01
	40	.00025	.0006	.001	.004
	45	.00015	.0005	.0008	.002
	50	.0001	.0004	.0006	.0006
	55	.00009	.0003	.0005	.0005
	60	.00007	.0002	.0004	.0004
	65	.00005	.0002	.0003	.0003

Range - High poor or better condition

Woodland - Undisturbed for at least two years

Sediment yields were determined from SCS measurements of stock ponds, irrigation reservoirs, and stream sediment loads sampled by the Science and Education Administration (SEA) and U.S. Geological Survey (USGS). Sediment has been measured for a long enough duration in many places to establish average annual rates.

Erosion and sediment yield data were utilized from various locations in the state for calculation of the "C" factor. In northern Idaho, range and forest erosion rates and "C" factors were determined using USGS sediment sampling on the Clearwater River (3). This sediment yield data was converted to an average annual rate using flow and sediment records to fit USLE requirements by using sediment delivery ratios. The "C" values developed for undisturbed range and forest lands on the upper Clearwater River are very low and are in agreement with work done by the U.S. Forest Service on forest lands in the Idaho Batholith of western Idaho (11).

Erosion rates in Wyoming were estimated separately from Idaho using sediment yield data, Universal Soil Loss Equation and general knowledge by SCS personnel.

Calculations Using the USLE

The USLE can be used to calculate present sheet erosion and also as an aid to effectively reduce erosion by substituting values for possible practices. Assigning the "T" value for A, unknown factor values can be solved that correspond to improved cropping practices, slope length changes, residue management, vegetative cover, cropping practices and/or slope lengths to fit farmers' preferences.

EXAMPLES

- Given:
1. Wheat-Fallow Operation
 2. Rainfall ($R_t=40$)
 3. Lanarck Silt Loam ($K=.37$)
 4. Slope 10%
 5. " T "=5T/ac/yr

- Variables:
1. Straw residue 200-500 pounds per acre at planting time. First operation in the spring. ($C=0.26$)
 2. And cross-slope farming practice ($P=0.8$)
 3. Slope length 300' ($LS=2.3$)

1. $R_t=40$, $K=0.37$, $LS=2.3$, $C=.26$, $P=0.8$

$$A = 40 \times .37 \times 2.3 \times .26 \times .8 = 7.1 \text{ T/ac/yr}$$

2. This is excessive erosion, so to solve for a C value that will keep erosion to 5 T/ac.

$$C = \frac{A}{R_t K LS P} = \frac{5}{40 (.37)(2.3)(.8)} = 0.18$$

Table 7 shows more than 500 pounds of residue is needed with first tillage in Spring or 1000 pounds of residue needed with Fall tillage to satisfy C value 0.18.

3. (a) An alternative to keeping ample residue is to construct terraces to shorten the slopes. With 200-500 pounds of residue at planting time, first operation in the Spring and contour tillage:

$$LS = \frac{A}{R_t K C P} = \frac{5}{40(.37)(.26)(.6)} = 2.2$$

LS chart shows 2.2 is equivalent to 250 foot spacing, so 250 feet or less would be adequate terrace spacing on 10% slope.

- (b) To illustrate the benefits of crop residue, when 1000-1500 pounds are present, the C value becomes 0.13.

$$LS = \frac{5}{40(.37)(.13)(.6)} = 4.4$$

On LS chart 4.4 on 10% slope (with contour tillage) shows terrace spacing can be expanded to 1000 feet and maintain erosion within tolerable limits.

4. To calculate maximum slope and remain within tolerable soil loss limits using:

1. First tillage in Spring
2. Residue 1000-1500 pounds at harvest time
3. Slope length 200' (can be terrace spacing)
4. Contour tillage

$$(a) \quad LS = \frac{5}{RT K C P} = \frac{5}{40(.37)(.13)(.6)} = 4.4$$

from LS Chart = 17% slope

- (b). With 300 foot slope length, table shows maximum slope = 15%.

This is the maximum slope to stay within tolerable soil loss limits in the Basin unless the slope length is shortened, if there is more residue at planting time, if Rt value is less than 40, or K value is less than 0.37.

However, if rainfall factor is greater
if "T" factor is less
if K value is greater
if there is less residue
if first tillage in the Fall
if slope length is greater
if tillage is not on the contour

then permissible slopes must be less (than 17% or 15% in examples) to keep erosion to within tolerable soil loss limits.

Mulch Rates Required for Erosion Control on Steep Slopes¹

L. D. MEYER, W. H. WISCHMEIER, AND G. R. FOSTER²

ABSTRACT

The erosion-reducing effectiveness of six rates of straw mulch was tested on slopes averaging 15%. Mulch rates of only 0.56 and 1.12 metric tons/ha reduced soil losses to less than one-third of those from unmulched areas during a series of intense simulated rainstorms. A 2.24-metric tons/ha rate decreased soil loss to only 18% of that from no mulch, and the 4.48- and 8.96-metric tons/ha rates reduced it to less than 5%.

Runoff velocity for the 0.56-metric tons/ha rate was one-half that for no mulch, but heavier rates decreased velocity only slightly more. The reduced velocity due to mulching accounted for much of the resulting decrease in soil erosion.

Although the small mulch rates greatly reduced erosion, more mulch was required to fully control erosion than was required on the less-steep, more permeable soil conditions tested in earlier studies.

Additional Key Words for Indexing: plant residues, soil conservation, sediment yield, simulated rainfall, infiltration, runoff, runoff velocity.

PAST RESEARCH and field experience have shown that crop residues used as surface mulches are usually very effective for reducing soil erosion. However, studies of mulching effectiveness have generally involved relatively large rates of material, permeable soil conditions, and/or gentle slopes (1, 3, 4, 7, 9, 10, 11, 12). Yet, the erosion hazards caused by intensive tillage of cropland or by massive land reshaping are particularly serious on the steeper slopes.

The generally recommended straw-mulch rates of around 5 metric tons per hectare are frequently difficult to obtain and may adversely affect crop growth (2, 6). Research in Indiana showed that mulch rates of 0.56 and 1.12 metric tons per hectare greatly reduced erosion from intense simulated storms on tilled, permeable soils of 3 and 5% slopes, and 2.24 metric tons cut soil losses to very low levels (7, 10). Recent laboratory studies with simulated soils in an adjustable soil bed confirmed the effectiveness

of small mulch rates on short, gentle slopes but indicated that heavier rates would be required to control erosion on steeper slopes (5). Therefore, a simulated rainfall study was made to determine the relative effectiveness of several rates of straw mulch on a steeply sloping soil of low permeability.

PROCEDURE

Research was conducted on a moderately eroded Fox loam soil (Typic Hapludalf) with a permeability classified as moderate to slow. All the loose stubble was raked from the plot areas following the harvest of an oats (*Avena sativa* L.) crop, and the remaining above-ground residue was removed with a tractor scraper-blade. The plot surface was then scratched about 1 inch deep with a spiked-tooth harrow drawn upslope to break the surface crust. Wheat (*Triticum aestivum* L.) straw mulch was uniformly applied by hand on two replications at five mulch rates: 0, 0.56, 1.12, 2.24, and 4.48 metric tons per hectare (0, 1/4, 1/2, 1, and 2 English tons per acre.) One replication also included a sixth rate: 8.96 MT/ha (4 tons/acre). The replication with six treatments averaged 17% slope; the other averaged 13%.

The plots were 3.7 m across slope by 10.7 m long and were separated by 1.8-m border areas. All treatments in a replication were tested during the same day. Simulated rain was applied at an intensity averaging approximately 6.35 cm (2.5 in) per hour (8). The initial simulated storm (or run) lasted 60 min. Two 30-min runs, separated by 15 min, were made the following day.

Rainfall intensity, runoff, and soil loss were evaluated in the standard manner for rainulator runs (8). Runoff velocity measurements were obtained by adding a few drops of green food coloring to the runoff and timing its movement downslope. Residue cover was determined from photographs and by the point-quadrant method.

The data were adjusted for slight deviations from the design application intensity of 6.35 cm/hr. Runoff values were increased or decreased by the amount that the actual application differed from 6.35 cm for the initial run and from 3.17 cm for the two succeeding runs. Soil losses were adjusted by the ratio of (6.35)² to the square of the actual intensity. The data were also adjusted to a 15% slope, using the ratio of the LS factors of the Universal Erosion Equation (13). Although the plots had quite uniform slopes, the adjustments were based on the steepness of the lower 4.6 m of each plot, as suggested by previous research (14).

RESULTS

In analysis of variance, treatment effect on soil loss was highly significant (1% level). Results of Duncan range tests for individual treatment differences are given in Table

¹ Presented at the Annual Meeting of the American Society of Agronomy, Nov. 10, 1969. Contribution of the Corn Belt Branch, Soil and Water Conservation Research Division, ARS, USDA, in cooperation with the Purdue Agr. Exp. Sta. Journal Paper no. 3959. Received Apr. 27, 1970. Approved Sept. 3, 1970.

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- fluenced by mulches of crop residues. Int. Congr. Soil Sci. Trans. 7th (Madison, Wis.) I: 629-637.
7. Mannering, J. V., and L. D. Meyer. 1963. Effects of various rates of surface mulch on infiltration and erosion. Soil Sci. Soc. Amer. Proc. 27:84-86.
 8. Meyer, L. D. 1960. Use of the rainulator for runoff plot research. Soil Sci. Soc. Amer. Proc. 24:319-322.
 9. Meyer, L. D., and J. V. Mannering. 1963. Crop residue mulches for controlling erosion on sloping land under intensive cropping. Trans. ASAE. 6:332, 333, 337.
 10. Meyer, L. D., and J. V. Mannering. 1967. Tillage and land modification for water erosion control. Proc., ASAE-ASA-SCSA Tillage Conf. pp. 58-62.
 11. Swanson, N. P., A. R. Dedrick, H. E. Weakly, and H. R. Haise. 1965. Evaluation of mulches for water-erosion control. Trans. ASAE 8:438-440.
 12. Taylor, R. E., O. E. Hayes, C. E. Bay, and R. M. Dixon. 1964. Corn stover mulch for control of runoff and erosion on land planted to corn after corn. Soil Sci. Soc. Amer. Proc. 28:123-125.
 13. Wischmeier, W. H., and D. D. Smith. 1965. Predicting rainfall-erosion losses from cropland. US Dept. Agr. Handbook. No. 282. 47 p.
 14. Young, R. A., and C. K. Mutchler. 1969. Effect of slope shape on erosion and runoff. Trans. ASAE. 12:231-233, 239.

Table 7--"C" Values for Farm Practices and Residue Management on Cropland, Upper Snake River Basin

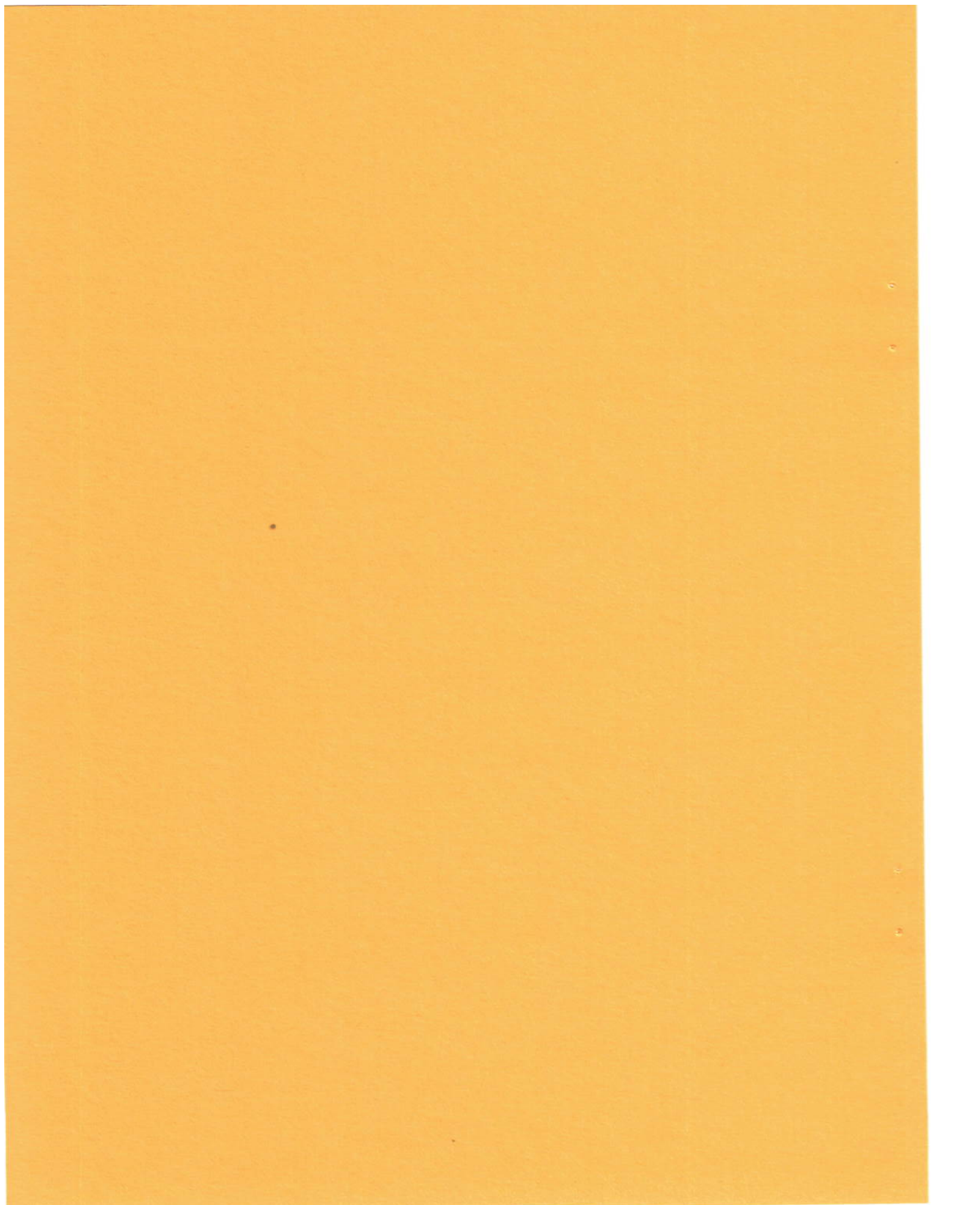
Cropping Sequence	Mgt Practices		"C" Values			
			Minimum Tillage		Pounds of Residue	
	1st Oper. in Spring 1/	1st Oper. in Fall	Moldboard Plow	No Residue	200-500	500-1000 1000-1500
Winter Wheat and Fallow	X	X	.32 .52		.26 .34	.17 .24 .13 .14
Winter Wheat-Spring Grain - Fallow	X	X	.24 .46		.21 .27	.15 .20 .12 .13
Continuous Small Grain 2/	X	X	.32 .41		.26 .32	.17 .23 .12 .13
Grass 8 yrs - Spring	X					
Grain-Winter Wheat-Spring Grain		X				.12 .13

1/ Chiseling done in Fall

2/ Where precipitation allows

Source: TN - Agronomy No. 19 (16)

APPENDIX - A
DEFINITIONS and REFERENCES



APPENDIX - A

DEFINITIONS

CHANNEL -

A waterway or sloping depression that collects overland flow from adjacent lands and may also accomodate upstream flow.

Except for the few perennial streams in the Basin, waterways are usually dry and only collect water after rains, from irrigation or snowmelt.

CHANNEL EROSION -

Slight - The banks have some bare soil that appears fresh and ragged in a few places. It would be difficult to measure bank recession over a period of one or two years. Annual recession rates are less than 0.05 foot/year, or less than 1.0 foot recession in 20 years. These channels were not evaluated.

Moderate - These are active eroding banks; annual lateral bank recession estimated at .05 - 0.2 foot per year.

- Greater than 75% of banks eroding; eroding banks less than 5 feet high, channel bed not actively eroding.
- Greater than 50% of banks eroding; eroding banks over 5 feet high, channel bed not actively eroding.
- Less than 50% of banks eroding; eroding banks over 5 feet high, channel bed may be actively eroding.

Serious -

- Greater than 50% of banks eroding; eroding banks over 5 feet high, channel bed actively eroding. Lateral bank recession in excess of 0.2 foot/year.

CONTOUR STRIPCROPPING -

Growing crops in systematic arrangements of strips or bands on the contour. Strips of grass or close-growing crops can be alternated with strips of clean-tilled crops or fallow, or grass alternated with close-growing crops.

CROP RESIDUE USE -

Use of plant residues to protect cultivated fields during periods of critical erosion.

DIVERSIONS -

A channel with a supporting ridge on the lower side and located near the contour across the slope. A protective outlet must be provided.

GRASSED WATERWAY -

A natural or constructed waterway covered with erosion-resistant grasses, used to conduct surface water from cropland.

GULLY -

An eroding channel that flows only after a rain or melting snow. Normally it occurs on a hillside above natural channels. The banks are often raw and unstable, and too large to be removed by cultivation.

CONSERVATION TILLAGE -

A form of non-inversion tillage that retains protective amounts of residue on the soil throughout the year.

POTENTIAL EROSION -

Erosion that could occur if the vegetative cover is disturbed or removed.

RILL EROSION -

Soil removed in linear patterns like miniature stream channels. They are small enough to be removed by cultivation.

SEDIMENT -

Material originating from eroding land carried by air or water and deposited at different locations.

SEDIMENT DELIVERY RATIO -

The ratio or percentage of sediment reaching a specified location in a stream system compared to total erosion.

SHEET EROSION -

Soil eroded from the surface of the soil profile in a nearly uniform amount.

SLOPE -

Steepness of land expressed in percent. Usually a weighted average for the area under consideration.

SLOPE LENGTH -

Distance from the point of origin of the slope to either (1) the point where the slope decreases adequately to permit sediment deposition or (2) the point where there is a marked increase in slope or (3) the point where runoff enters a well-defined natural channel or a constructed channel such as a terrace.

STUBBLE MULCHING -

Managing plant residues on a year-around basis in such a way that the soil surface remains protected.

"T" -

The tolerable or maximum allowable average annual soil loss rate established for each soil. It is the maximum rate that will allow continued agriculture production. At the present time, this value is 5 tons per acre per year, or less.

TERRACES _

Earth embankments or ridges and channels across the slope at designated spacings. They may require a protective outlet.

REFERENCES

1. Curtis, N.M., Darrach, A.G. and Sauerwein, W.J. 1977.
Estimating Sheet-Rill Erosion and Sediment Yield on
Disturbed Western Forest and Woodlands, USDA Technical
Note, Woodland - Number 10.
2. Darrach, A.G., Curtis, N.M., Sauerwein, W.J. 1978. Estimating
Sheet-Rill Erosion and Sediment on Rural and Forest
Highways, Woodland - Number 12.
3. Emmett, W.W. and Seitz, H.R. 1974. Suspended and Bedload
Sediment Transport in the Snake and Clearwater Rivers in
the Vicinity of Lewiston, Idaho, March 1972 - July 1974,
Basic Report.
4. Flaxman, E.M. and Habba, R.L. 1955. Some Factors Affecting
Rates of Sedimentation in the Columbia River Basin. Trans.
Am. Geophysical Union, Vol. 36, No. 2.
5. Flaxman, E.M. 1966. Some Variables which Influence Rates of
Reservoir Sedimentation in Western U.S. Symposium on Lakes
and Reservoirs International Association of Scientific
Hydrology Lake Garda, Italy.
6. Flaxman, E.M. 1972. Predicting Sediment Yield in Western U.S.
Journal Hydraulics Division ASCE Meeting Reprint 1605.
7. Flaxman, E.M. 1974. Some Erosion - Sediment Delivery Ratio
Concepts for the Western States, SCS, TSC Advisory ENG-
P0-16.
8. Idaho Soil Conservation Commission, 1978. Agricultural Pollution
Abatement Plan.

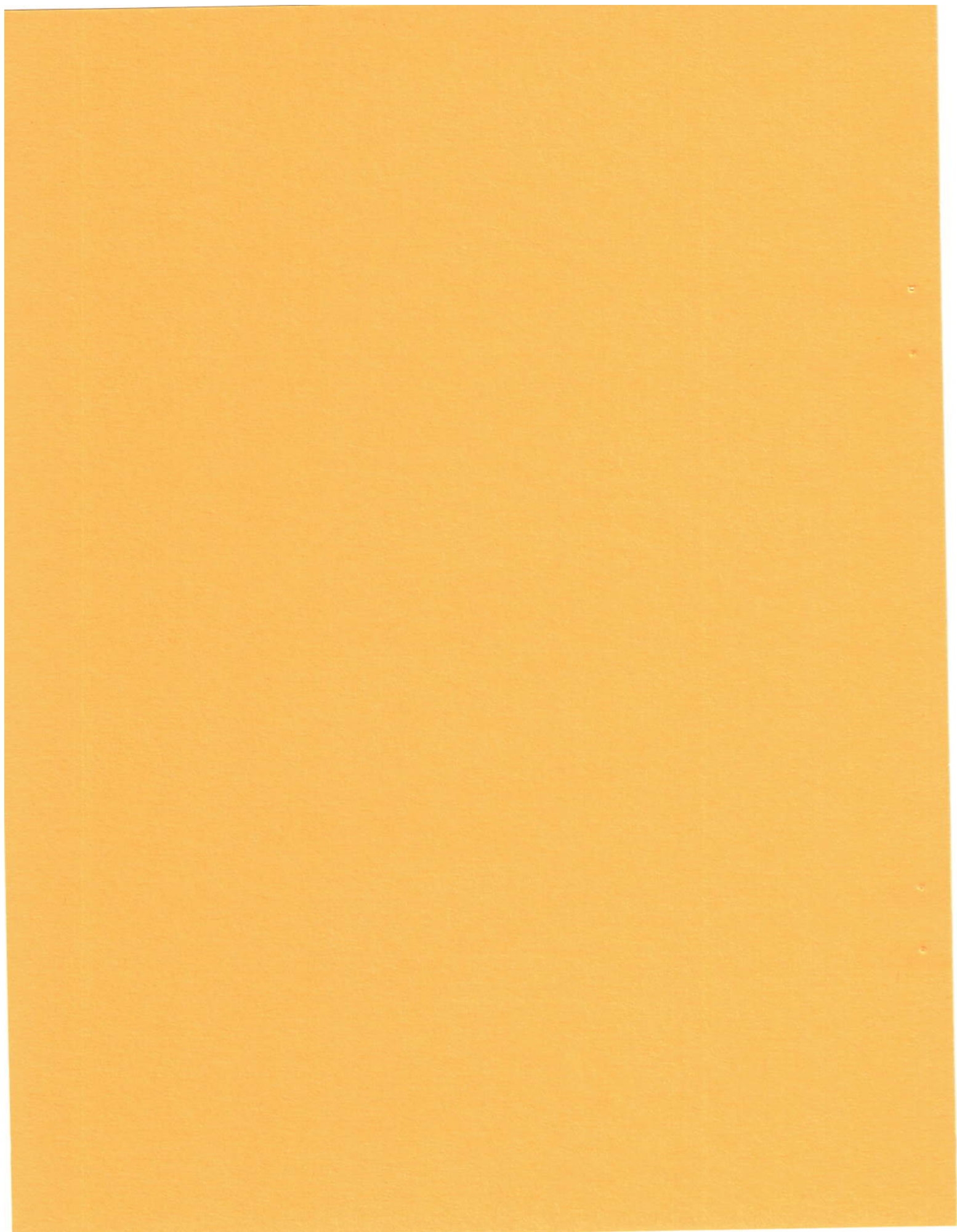
9. Johnson, C.W., Stephenson, G.R., Hanson, C.L., Engleman, R.L., and Englbert, C.D. 1974. Sediment Yield from Southwest Idaho Rangeland Watersheds. Paper 74-2505 American Society of Agricultural Engineers.
10. Johnson, C.W., Hanson, C.L. 1976. Sediment Sources and Yields from Sagebrush Rangeland Watersheds. Proceedings of Third Interagency Sedimentation Conference, Denver, Colorado.
11. Megahan, W.F. and Kidd, W.J. 1972. Effect of Logging Roads on Sediment Production Rates in the Idaho Batholith USDA. Forest Service Research Paper INT-123.
12. Skidmore, E.L., Woodruff, N.P. 1968. Wind Erosion Forces in the U.S. and their use in Predicting Soil Loss USDA Agric. Handbook, No. 346.
13. Strahler, A.N. 1957. Quantitative Analysis of Watershed Geomorphology. Transactions, American Geophysical Union.
14. USDA, SCS 1968. Procedure, Sediment Storage Requirements for Reservoirs. Technical Release, No. 12 (Rev.).
15. USDA, SCS, ESCS, FS in cooperation with states of Idaho and Wyoming 1974. Plan of Work Snake River Basin, Idaho and Wyoming.
16. USDA, SCS 1975. Universal Soil Loss Equation for Idaho. Technical Note - Agronomy, No. 19.
17. USDA, SCS 1975. Universal Soil Loss Equation. Conservation Agronomy - 32.

18. USDA, SCS 1975. Procedures for Computing Sheet and Rill Erosion on Project Areas. Technical Release - 51 (Rev.).
19. USDA, SCS 1977. Determining Soil Loss in Rangeland and Woodland, Technical Note Agronomy No. 19 Supplement.
20. USDA, SCS, ESCS, FS 1976. General Soil Map of Idaho. River Basin Type IV Survey.
21. USDA, SCS, ESCS, FS in cooperation with states of Idaho and Wyoming 1976. Cooperative Study Land Resource Data, Snake River Basin, Idaho and Wyoming.
22. USDA, SCS, ESCS, FS in cooperation with states of Idaho and Wyoming 1979. Upper Snake River Basin Main Report.
23. Wischmeier, W.H. and Smith, D.D., 1965. Predicting Rainfall - Erosion Losses from Cropland East of the Rocky Mountains. Agricultural Handbook Number 282, ARS 1/ - USDA.
24. Wischmeier, W.H. 1975. New Developments in Estimating Water Erosion. Advisory RES - 2.
25. Wischmeier, W.H. 1976. Use and Misuse of the Universal Soil Loss Equation, Jour. Soil and Water Cons., Jan. - Feb.
26. Wischmeier, W.H. and Smith, D.D. 1978. Predicting Erosion Losses - A Guide to Conservation Planning. Agriculture Handbook No. 537.

1 Now Science and Education Administration (SEA)

APPENDIX - B

TABLES



APPENDIX - B

TABLES

Erosion rates (sheet and rill) shown in tables and on maps were originally calculated by field personnel using the best available data and experience. These were calculated by land use and soil association, ^{1/} plotted on county maps at scale $\frac{1}{2}$ inch per mile. Mapped data including erosion rates, land use, land ownership, soils, "T" values, vegetation and subregion boundaries were digitized and transferred to the RAP computer in Fort Collins, Colorado. This computer was used to make comparative analyses of these data and provided printouts for development of the tables included.

Data developed is displayed for the Basin as follows:

County Data

- Table B-1 Land Use and Ownership
- Table B-2 Sheet and Rill Erosion Rates by Land Use
- Table B-3 Sheet and Rill Erosion Rates by Land Ownership
- Table B-4 Sheet and Rill Erosion Rates by Soil Association
- Table B-5 Land Use by Soil Association

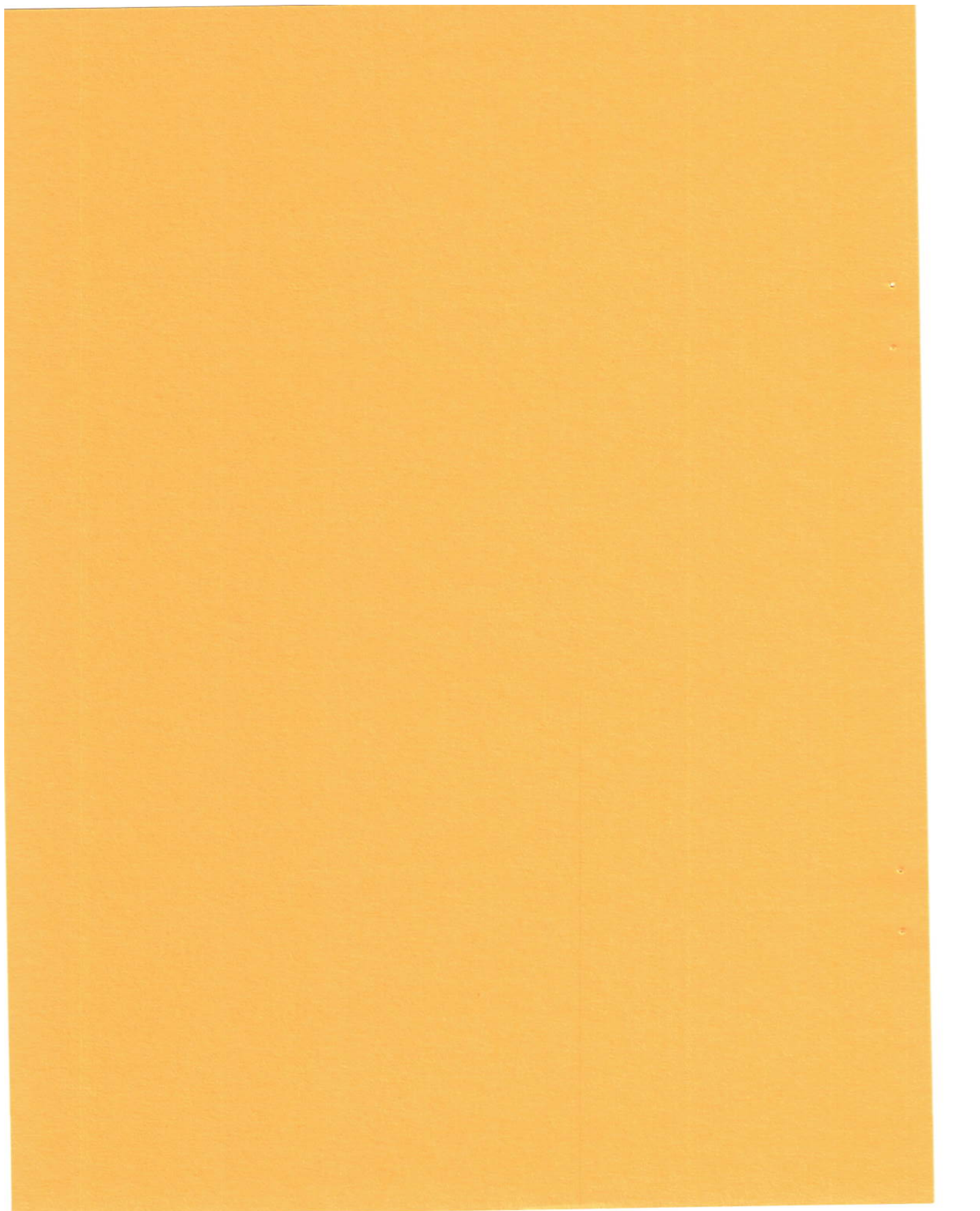
Summary Data

- Table B-6 Soil Association Acreage by County
- Table B-7 Vegetative Types by County
- Table B-8 Erosion Acreage by County
- Table B-9 Soil Loss Tolerance Values by Soil Association

^{1/} Soil associations are described in publication reference No. 20, Page 55.

APPENDIX B - TABLES

COUNTY DATA



BAINOCK County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)
Thousands of Acres						
Irrigated Cropland	70.0					
Surface	45.0	41.5				3.5
Sprinkler	25.0	24.8				0.2
Dry Cropland	143.0	131.0	2.0			10.0
Range	331.0	195.4	7.3	2.9	63.0	62.4
Forest	154.0	74.0	9.0		50.0	21.0
Urban and Built-Up	14.0	6.6		7.0		0.4
Other	6.2	2.2	0.7	2.0	1.3	
Total Land	718.2	475.5	19.0	11.9	114.3	97.5
Water and Wetland	22.9					
Total County	741.1					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	45.0	10.9			32.0	2.2
Sprinkler	25.0				25.0	
Dry Cropland	143.0				56.0	11.7
Range	331.0	1.0	330.0			
Forest	154.0	152.0	2.0			
Urban and Built-Up	14.0	11.3	2.7			
Other	6.2	6.0	0.2			
Total Land	718.2	170.3	345.7		113.0	11.7

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
Thousands of Acres						
Private	475.5	72.1	216.7		105.7	11.7
State	19.0	9.5	7.5		0.8	1.2
National Forest	114.3	56.3	58.0			
National Resource (BLM)	97.5	20.5	63.5		6.5	7.0
Other Federal	0.0					
County and Municipal	11.9	11.9				
Total Land	718.2	170.3	345.7	0.0	113.0	11.7

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
33	24.7	9.4			15.3		
82	6.6	3.2	1.0		2.4		
131	34.5	3.7	30.1		0.4	0.3	
145	118.3	36.6	76.0			4.2	1.5
154	129.6	55.9	73.7				
174	38.6	8.6	10.4		1.1	15.2	3.3
188	25.9		7.0		18.9		
225	5.7	0.7	2.3		2.7		
230	0.5		0.5				
233	21.4	1.4	2.2		17.8		
234	31.6	2.8	18.0		8.5	2.3	
236	0.7		0.7				
238	24.7	17.0	3.0		4.7		
239	23.1		14.5		8.6		
241	9.6		7.6		0.9		1.1
247	127.3	8.1	26.2		31.7	55.5	5.8
249	38.1	8.5	29.6				
253	23.3		23.3				
258	2.3		2.3				
265	8.6	8.6					
266	16.3	3.5	12.8				
275	6.8	2.3	4.5				
Total	718.2	170.3	345.7	0.0	113.0	77.5	11.7

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
Thousands of Acres								
33	24.7	14.5	1.4		2.7		6.1	
67	6.6		2.9		2.5	1.2		
131	34.5			2.8	18.5	13.3		
145	118.3			2.4	82.5	33.4		
154	129.6			2.5	41.6	80.7		4.8
174	38.6		0.4	20.2	16.5	1.5		
188	25.9	3.5	1.6	10.2	9.4	1.2		
225	5.7			2.5	2.2	1.0		
230	0.5						0.5	
233	21.4	7.6	5.2	7.5	6.1			
234	31.6	2.4	1.4	4.1	27.4		1.8	0.5
236	0.7				0.7			
238	24.7	0.5	5.8	4.1	10.1		3.3	0.9
239	23.1			10.2	8.8	4.1		
241	9.6			4.2	5.4			
247	127.3	7.5	5.8	72.3	40.2	1.5		
249	38.1			3.5	21.7	12.9		
253	23.3				21.2	2.1		
258	2.3				2.3			
265	8.6				8.6			
266	16.3	9.0	0.5	1.5	3.0		2.3	
275	6.8				5.7	1.1		
Total	718.2	45.0	25.0	143.0	331.0	154.0	14.0	6.2

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)
Thousands of Acres						
Irrigated Cropland						
Surface	123.0	120.2	2.5			2.3
Sprinkler	184.0	182.8	0.9			0.3
Dry Cropland	43.0	41.5	0.5			1.0
Range	77.1	313.4	91.8	1.1		300.8
Forest	81.0	55.6	15.3			10.1
Urban and Built-Up	6.5	6.2	0.3			
Other	125.4	34.2	8.2	15.1		65.9
Total Land	1,333.9	753.9	119.5	16.2	0.0	378.4
Water and Wetland	17.8					
Total County	1,351.7					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	123.0				123.0	
Sprinkler	184.0				184.0	
Dry Cropland	43.0				43.0	
Range	771.0	110.9	660.1			
Forest	81.0	12.6	68.4			
Urban and Built-Up	6.5	2.5	4.0			
Other	125.4	122.1	3.3			
Total Land	1,333.9	248.1	735.8	0.0	350.0	0.0

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
Thousands of Acres						
Private	753.9	70.4	339.0		344.5	
State	119.5	31.0	84.6		3.9	
National Forest	0.0					
National Resource (BLM)	378.4	141.1	235.7		1.6	
Other Federal	65.9	0.6	65.3			
County and Municipal	16.2	5.0	11.2			
Total Land	1,333.9	248.1	735.8	0.0	350.0	0.0

Table B-4 - Erosion Rates: Acreage by Soil Association

Tons/Acre/Year							
Soil Association	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
16	123.0	18.0	105.0				
17	14.0		14.0				
30	54.6	1.6	18.8		34.2		
31	327.7	22.3	195.3		110.1		
32	3.1	0.3	2.8				
33	87.4	4.8	10.7		71.9		
82	94.6	42.2	17.4		35.0		
133	39.9	4.3	35.6				
138	12.6		12.4		0.2		
150	78.7	33.4	43.4		1.9		
154	168.2	4.0	163.6		0.6		
237	3.5		3.5				
245	104.9	1.7	74.5		28.7		
252	13.2	4.0	4.1		5.1		
265	12.7	10.3	2.4				
268	84.0	12.7	9.0		62.3		
275	111.8	88.5	23.3				
Total	1,333.9	248.1	735.8	0.0	350.0	0.0	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-up	Other
<i>Thousands of Acres</i>								
16	123.0				106.1			16.9
17	14.0				14.0			
30	54.6	2.2	20.4	11.7	20.3			
31	327.7	12.0	96.6	1.5	211.1			6.5
32	3.1				3.1			
33	87.4	38.4	30.4		14.3		1.8	2.5
82	94.6	16.1	16.6	0.6	60.6			0.7
133	39.9				20.7	19.2		
138	12.6			0.2	10.6	1.8		
150	78.7			2.9	65.3	10.5		
154	168.2			0.8	137.0	30.4		
237	3.5				3.5			
245	104.9	3.2	3.5	25.3	66.4	6.5		
252	13.2	4.8	0.5		6.9			1.0
265	12.7				12.7			
268	84.0	46.3	16.0		0.9	12.6	4.7	3.5
275	111.8				17.5			94.3
Total	1,333.9	123.0	184.0	43.0	771.0	81.0	6.5	125.4

Upper Snake River Basin, Idaho 1976

BLAINE County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						Other Federal
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	
	Thousands of Acres						
Irrigated Cropland							
Surface	43.0	33.1	1.9			8.0	
Sprinkler	10.0	7.6	0.4			2.0	
Dry Cropland	14.0	10.1	1.3			2.6	
Range	1,302.0	329.7	56.2		251.0	665.1	
Forest	272.0	13.0	6.2		235.0	17.8	
Urban and Built-Up	13.9	11.7	0.2	2.0			
Other	39.2		13.1	3.0			23.1
Total Land	1,694.1	405.2	79.3	5.0	486.0	695.5	23.1
Water and Wetland	14.0						
Total County	1,708.1						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Irrigated Cropland							
Surface	43.0		42.8		0.2		
Sprinkler	10.0		10.0				
Dry Cropland	14.0		14.0				
Range	1,302.0	353.0	949.0				
Forest	272.0	272.0					
Urban and Built-Up	13.9	13.9					
Other	39.2	39.2					
Total Land	1,694.1	678.1	1,015.8	0.0	0.2	0.0	0.0

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Private	405.2	27.5	377.7				
State	79.3	34.2	45.1				
National Forest	486.0	330.0	156.0				
National Resource (BLM)	695.5	263.2	432.1		0.2		
Other Federal	23.1	18.2	4.9				
County and Municipal	5.0	5.0					
Total Land	1,694.1	678.1	1,015.8	0.0	0.2	0.0	0.0

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
Thousands of Acres						
16	16.7	4.4	12.3			
17	196.2	40.0	156.0		0.2	
26	36.9	0.4	36.5			
29	40.4	0.8	39.6			
31	60.5	26.9	33.6			
55	4.4	3.6	0.8			
91	10.7	1.0	9.7			
92	4.6	4.2	0.4			
124	24.5	23.8	0.7			
132	15.3	8.4	6.9			
140	4.8	0.6	4.2			
160	78.7	7.0	71.7			
161	141.9	40.8	101.1			
162	58.4	6.9	51.5			
173	80.3	4.4	75.9			
207	147.6	19.4	128.2			
208	55.5	4.3	51.2			
209	19.6	5.6	14.0			
217	47.9	1.8	46.1			
261	197.3	145.5	51.8			
275	140.1	132.3	7.8			
276	126.3	79.7	46.6			
278	185.5	116.3	69.2			
Total	1,694.1	678.1	1,015.8	0.0	0.2	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
----- Thousands of Acres -----								
16	16.9				16.9			
17	196.2				193.2			3.0
26	36.9		4.0		32.9			
29	40.4	16.0	1.9	0.4	22.1			
31	60.5				50.0			10.5
55	4.4				2.0	2.4		
91	10.7				10.7			
92	4.6				3.0	1.6		
124	24.5				8.2	16.3		
132	15.3				10.0	3.3		2.0
140	4.8				4.8			
160	78.7	1.5		1.4	75.8			
161	141.9	1.4	0.3		106.9	28.0	5.3	
162	58.4	6.5		5.0	42.1	3.3	0.5	1.0
173	80.3	0.8	0.3	1.3	76.5	1.4		
207	147.6	4.0		1.3	128.4	12.7		1.2
208	55.5	9.3	1.9	1.6	28.8	2.9	7.5	3.5
209	19.6	2.8	1.6	1.0	14.2			
217	47.9			1.0	46.3	0.6		
261	197.1				76.5	117.5	0.6	2.5
275	140.1			0.4	126.2			13.5
276	126.3	0.7		0.6	125.0			
278	185.5				101.5	82.0		2.0
Total	1,694.1	43.0	10.0	14.0	1,302.0	272.0	13.9	39.2

Upper Snake River Basin, Idaho 1976
BONNEVILLE County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
<i>Thousands of Acres</i>							
Irrigated Cropland							
Surface	82.0	80.3	1.5			0.2	
Sprinkler	96.6	93.9				2.7	
Dry Cropland	196.0	180.2	12.3			3.5	
Range	385.6	106.9	64.5		128.8	77.5	7.9
Forest	349.8	10.5	4.2		333.5	1.6	
Urban and Built-Up	22.0	22.0					
Other	42.8			5.9	20.4		16.5
Total Land	1,174.8	493.8	82.5	5.9	482.7	85.5	24.4
Water and Wetland	36.7						
Total County	1,211.5						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
Irrigated Cropland							
Surface	82.0				61.6	1.4	19.0
Sprinkler	96.6	1.1	0.8		83.6	7.5	3.6
Dry Cropland	196.0				16.6	43.4	136.0
Range	385.6	97.0	288.6				
Forest	349.8	34.4	315.4				
Urban and Built-Up	22.0	22.0					
Other	42.8	8.6	34.2				
Total Land	1,174.8	163.1	639.0	0.0	161.8	52.3	158.6

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
Private	493.8	17.8	123.5		150.1	43.8	158.6
State	82.5	8.8	59.9		7.9	5.9	
National Forest	482.7	67.5	415.2				
National Resource (BLM)	85.5	44.6	34.5		3.8	2.6	
Other Federal	24.4	18.5	5.9				
County and Municipal	5.9	5.9					
Total Land	1,174.8	163.1	639.0	0.0	161.8	52.3	158.6

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
9	300.9	7.5	277.5		6.3	9.6	
16	16.7	2.7	2.5		4.4	7.1	
31	118.0	2.2	38.1		54.7	23.0	
82	3.2				3.2		
93	11.8		11.8				
100	5.6	3.2	0.7				1.7
105	37.9	6.8	31.1				
107	79.0	2.7	76.3				
112	3.4	2.3			1.1		
118	7.1	5.5			1.6		
133	56.7	4.0	45.2		7.5		
136	0.5	0.3	0.2				
138	64.7	5.7	22.3		5.1		31.6
140	6.0	0.5	1.0		4.5		
143	42.8	38.9	3.9				
147	20.9	2.7	18.2				
148	23.0	0.2	5.2			1.6	15.8
150	52.0	2.0	47.4		2.6		
200	42.4	9.8	11.8		20.8		
245	139.8		25.0		9.2	3.6	102.0
268	53.2	9.6	6.8		36.8		
274	25.2		10.5			7.2	7.5
275	64.0	56.5	3.5		4.0		
Total	1,174.8	163.1	639.0	0.0	161.8	52.3	158.6

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
Thousands of Acres								
9	300.9	1.0		13.0	94.6	188.5		3.8
16	16.7	0.8	10.6		4.9			0.4
31	118.0	6.1	77.6		29.0		2.3	3.0
82	3.2	2.1			1.1			
93	11.8				2.2	9.6		
100	5.6	1.3			0.4	3.9		
105	37.9				0.7	36.6		0.6
107	79.0				3.0	76.0		
112	3.4	0.8			2.6			
118	7.1	0.6		0.8	5.4	0.3		
133	56.7			9.1	40.4	7.2		
136	0.5				0.5			
138	64.7	1.0	1.3	43.7	18.7			
140	6.0	4.0	0.2		1.3	0.2	0.3	
143	42.8				2.4	14.9		25.5
147	20.9				13.9	5.2		1.8
148	23.0	2.2		15.3	4.4	1.1		
150	52.0	1.3		1.6	45.0	4.1		
200	42.4	20.4		3.0	8.2		9.8	1.0
245	139.8	11.5	0.2	102.0	25.6			0.5
268	53.2	28.9	1.0		11.7		9.6	2.0
274	25.2		1.7	7.5	13.8	2.2		
275	64.0		4.0		55.8			4.2
Total	1,174.8	82.0	96.6	196.0	385.6	349.8	22.0	42.8

Upper Snake River Basin, Idaho 1976
BUTTE County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
Thousands of Acres							
Irrigated Cropland							
Surface	83.5	80.2	1.3			2.0	
Sprinkler	9.6	9.6					
Dry Cropland	3.7	3.7					
Range	1,148.6	104.3	35.4		136.7	557.4	314.8
Forest	140.7	1.4	0.5		134.4	4.4	
Urban and Built-Up	5.0	2.7		2.3			
Other	42.0						42.0
Total Land	1,433.1	201.9	37.2	2.3	271.1	563.8	356.8
Water and Wetland	0.5						
Total County	1,433.6						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Irrigated Cropland							
Surface	83.5				82.0	1.5	
Sprinkler	9.6		3.4		6.2		
Dry Cropland	3.7		3.7				
Range	1,148.6	592.8	555.8				
Forest	140.7	117.7	23.0				
Urban and Built-Up	5.0	3.0	2.0				
Other	42.0	37.4	4.6				
Total Land	1,433.1	750.9	592.5	0.0	88.2	1.5	0.0

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Private	201.9	70.8	44.7		84.9	1.5	
State	37.2	14.5	21.4		1.3		
National Forest	271.1	106.5	164.6				
National Resource (BLM)	563.8	246.8	315.0		2.0		
Other Federal	356.8	310.3	46.5				
County and Municipal	2.3	2.0	0.3				
Total Land	1,433.1	750.9	592.5	0.0	88.2	1.5	0.0

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
6	9.2	1.8	6.8		0.6		
16	256.0	172.0	82.9		1.1		
22	9.6	3.4	0.9		5.3		
31	136.6	57.4	79.2				
34	44.5	29.2	15.3				
35	50.0	44.9	3.1		2.0		
54	6.4	1.2			5.2		
62	19.3	15.4	3.9				
70	77.6	52.9			24.7		
72	104.2	68.6	23.7		11.9		
77	20.9	2.7	18.2				
91	74.8	4.5	70.3				
93	120.7	71.8	48.9				
115	2.5	2.5					
124	3.4	3.4					
140	194.4	23.7	169.5		1.2		
141	11.4		9.9			1.5	
149	16.8	6.4			10.4		
173	12.9	1.6	11.3				
199	30.4	5.3	22.3		2.8		
201	6.7	6.7					
248	20.7	8.0	5.9		6.8		
257	25.7	19.0			6.7		
268	8.8	2.1			6.7		
275	127.7	121.7	6.0				
278	41.9	24.7	14.4		2.8		
Total	1,433.1	750.8	592.5	0.0	88.2	1.5	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
<i>Thousands of Acres</i>								
6	9.2				9.2			
16	256.0	1.1		0.3	254.6			
22	9.6	5.5			4.1			
31	136.6				136.6			
34	44.5				44.5			
35	50.0	2.4			47.2		0.4	
54	6.4	4.2			1.2		1.0	
62	19.3				19.3			
70	77.6	19.2	3.1		54.8		0.5	
72	104.2	11.5			92.7			
77	20.9				20.9			
91	74.8				67.3	7.5		
93	120.7				16.1	104.6		
115	2.5	2.5						
124	3.4	0.7			2.7			
140	194.4	0.5			164.3	28.6	1.0	
141	11.4	1.5			9.9			
149	16.8	11.9			3.8		1.1	
173	12.9				12.9			
199	30.4	2.3	5.5	3.4	18.9		0.3	
201	6.7				6.7			
248	20.7	4.9	1.0		14.8			
257	25.7	9.8			15.5		0.4	
268	8.8	5.5			3.0		0.3	
275	127.7				85.7			42.0
278	41.9				41.9			
Total	1,433.1	83.5	9.6	3.7	1,148.6	140.7	5.0	42.0

CAMAS County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
Thousands of Acres							
Irrigated Cropland							
Surface	18.0	16.3	1.2			0.5	
Sprinkler	6.0	6.0					
Dry Cropland	98.0	94.6	1.0			2.4	
Range	356.0	81.0	13.5	0.3	154.9	106.3	
Forest	183.8	14.4	2.1		164.3	3.0	
Urban and Built-Up	3.5	1.2	0.5	1.8			
Other	9.5		1.8	0.2	2.5	5.0	
Total Land	674.8	213.5	20.1	2.3	321.7	117.2	0.0
Water and Wetland	3.6						
Total County	678.4						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Irrigated Cropland							
Surface	18.0	2.5	15.5				
Sprinkler	6.0	1.0	5.0				
Dry Cropland	98.0	3.3	94.7				
Range	356.0	30.4	325.6				
Forest	183.8	154.8	29.0				
Urban and Built-Up	3.5	3.5					
Other	9.5	5.0	4.5				
Total Land	674.8	200.5	474.3	0.0	0.0	0.0	0.0

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Private	213.5	30.2	183.3				
State	20.1	2.4	17.7				
National Forest	321.7	159.4	162.3				
National Resource (BLM)	117.2	6.2	111.0				
Other Federal	0.0						
County and Municipal	2.3	2.3					
Total Land	674.8	200.5	474.3	0.0	0.0	0.0	0.0

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
Thousands of Acres						
79	78.1	51.9	26.2			
91	105.5	61.7	43.8			
121	10.2	7.1	3.1			
124	12.0	4.6	7.4			
157	55.0	5.7	49.3			
159	1.1		1.1			
160	7.7		7.7			
163	71.2	7.3	63.9			
202	66.7	0.5	66.2			
203	1.3	1.0	0.3			
204	52.8	7.7	45.1			
206	0.5		0.5			
207	45.3	7.1	38.2			
217	89.0	20.2	68.8			
276	0.4	0.4				
278	78.0	25.3	52.7			
Total	674.8	200.5	474.3	0.0	0.0	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-up	Other
Thousands of Acres								
79	78.4				24.5	53.9		
91	106.2				43.5	62.7		
121	10.2			7.1	3.1			
124	12.0				8.8	3.2		
157	55.2	10.4	1.0	33.3	3.5		3.5	3.5
159	1.1				1.1			
160	7.4		0.6	1.8	5.0			
163	69.7			7.6	62.1			
202	66.4			2.7	63.7			
203	1.3			1.0	0.3			
204	53.0	2.8	1.2	31.8	17.2			
206	0.5				0.5			
207	45.5	2.2	3.2	6.4	6.2	21.5		6.0
217	89.3	2.6		6.3	63.4	17.0		
276	77.4				51.9	25.5		
278	1.2				1.2			
Total	674.8	18.0	6.0	98.0	356.0	183.8	3.5	9.5

Upper Snake River Basin, Idaho 1976
CARIBOU County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
Thousands of Acres							
Irrigated Cropland							
Surface	7.0	5.2	0.8			1.0	
Sprinkler	60.0	59.0				1.0	
Dry Cropland	172.9	164.0	2.0			2.2	4.7
Range	427.5	233.9	56.7		101.9	35.0	
Forest	436.0	96.8	53.0		278.0	8.2	
Urban and Built-Up	3.5	3.5					
Other	10.5	7.7		2.8			
Total Land	1,117.4	570.1	112.5	2.8	379.9	47.4	4.7
Water and Wetland	23.1						
Total County	1,140.5						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Irrigated Cropland							
Surface	7.0		1.0		5.3	0.7	
Sprinkler	60.0		13.4		37.5	8.5	0.6
Dry Cropland	172.9				140.1	28.9	3.9
Range	427.5	50.5	371.9	5.1			
Forest	436.0	86.0	350.0				
Urban and Built-Up	14.0	10.0	4.0				
Other	0.0						
Total Land	1,117.4	146.5	740.3	5.1	182.9	38.1	4.5

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Private	570.1	48.1	302.8	2.0	178.4	34.3	4.5
State	112.5	10.8	97.8		1.8	2.1	
National Forest	379.9	76.2	303.7				
National Resource (BLM)	47.4	6.7	33.2	3.1	2.7	1.7	
Other Federal	4.7	2.9	1.8				
County and Municipal	2.8	1.8	1.0				
Total Land	1,117.4	146.5	740.3	5.1	182.9	38.1	4.5

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
	Thousands of Acres					
9	68.1	19.7	48.4			
111	0.5				0.5	
112	57.4	14.0	26.0		17.0	0.4
127	31.5	22.4	7.8		0.9	0.4
128	224.1	3.6	219.2		1.1	0.2
131	14.7	5.3	9.4			
133	35.4	5.6	22.0	5.1	2.1	0.6
134	17.2	1.4	9.6		6.2	
137	30.2	3.4	21.9		4.9	
138	195.2	2.4	146.1		43.6	2.6
145	25.8	12.7	13.1			
146	2.2		0.2		2.0	
150	7.6	6.3	0.5		0.8	
151	19.1	0.4	13.0		1.7	4.0
154	143.8	32.1	104.2		1.7	5.1
166	8.5		6.0		2.5	
167	14.7		6.7			6.1
176	1.9		0.7		1.2	
181	21.0	0.2	9.0		9.7	1.5
182	79.0	0.7	6.5		59.0	12.8
227	35.6	15.7	14.0		5.9	
237	28.3	0.6	20.5		2.0	4.4
238	19.9		8.4		11.5	
245	17.3		17.3			
247	1.0		0.6		0.4	
266	11.6		6.8		4.8	
272	5.8		2.4		3.4	
Total	1,117.4	146.5	740.3	5.1	182.9	38.1

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Rangeland	Forest	Urban and Built-Up	Other
	Thousands of Acres							
9	68.1			0.3	24.1	43.7		
111	0.5			0.1	0.4			
112	57.4	2.2		10.3	31.2	7.0	6.7	
127	31.5		0.3	0.4	1.5	29.3		
128	224.1			0.7	66.4	157.0		
131	14.7				5.7	9.0		
133	35.4		0.5	2.9	21.7	10.3		
134	17.2		1.0	2.3	12.3	1.7		
137	30.2		0.1	2.8	22.5	4.8		
138	195.2		4.6	25.7	88.2	72.9	3.8	
145	25.8					25.8		
146	2.2		0.3	0.6	1.3			
150	7.6			1.0	6.6			
151	19.1		1.1	6.8	7.1	4.1		
154	143.8			13.7	69.3	60.8		
166	8.5		5.3	3.2				
167	14.7		6.1	8.3	0.3			
176	1.9		0.1	0.4	1.3	0.1		
181	21.0		2.7	13.2	4.9	0.2		
182	79.0		23.8	45.7	2.9	3.1	3.5	
227	35.6	2.0	0.6	4.6	23.2	5.2		
237	28.3		1.2	11.7	14.2	1.0		
238	19.9		4.6	10.1	5.2			
245	17.3				17.3			
247	1.0		0.6	0.2	0.2			
266	11.6	1.6	5.2	4.0	0.8			
272	5.8	1.2	1.9	2.5	0.2			
Total	1,117.4	7.0	60.0	172.9	427.5	436.0	14.0	

Upper Snake River Basin, Idaho 1976

CASSIA County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)
Thousands of Acres						
Irrigated Cropland						
Surface	210.0	201.7	2.1		0.1	6.1
Sprinkler	73.0	71.1	0.8			1.1
Dry Cropland	108.0	101.2	1.1		1.2	4.5
Range	1,034.5	255.3	40.1		298.2	440.9
Forest	183.0	11.0	12.6		93.0	66.4
Urban and Built-Up	10.5	8.7		1.8		
Other	8.9					8.9
Total Land	1,627.9	649.0	56.7	1.8	392.5	519.0
Water and Wetland	10.5					
Total County	1,638.4					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	210.0				166.5	11.8
Sprinkler	73.0				69.2	1.0
Dry Cropland	108.0			2.6	22.7	70.0
Range	1,034.5	108.5	901.9		24.1	
Forest	183.0	87.4	82.8	12.8		
Urban and Built-Up	10.5	8.2	2.3			
Other	8.9	8.9				
Total Land	1,627.9	213.0	987.0	15.4	282.5	82.8

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
Thousands of Acres						
Private	649.0	48.8	237.9	4.6	231.8	82.8
State	56.7	15.6	37.7	1.3	2.1	
National Forest	392.5	43.2	322.9	5.0	21.4	
National Resource (BLM)	519.0	94.7	388.5	4.5	27.2	4.1
Other Federal	8.9	8.9				
County and Municipal	1.8	1.8				
Total Land	1,627.9	213.0	987.0	15.4	282.5	82.8

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
14	8.9	1.4	4.8		2.7		
17	65.0	53.0	1.9	5.6	1.6	2.9	
22	30.4	16.0	4.1		10.3		
30	103.3		44.5		49.5	1.0	8.3
33	79.3		15.5		61.6		2.2
63	207.5	8.0	139.9		18.7	39.1	1.8
66	97.7	4.4	87.8		6.5		
71	15.6		6.6		0.5		8.5
91	355.0	68.1	276.4		9.4		1.1
113	83.5	31.8	15.4		36.3		
144	3.0		3.0				
168	284.9	19.8	218.9	9.8	35.4	1.0	
172	17.7		17.7				
174	1.0						1.0
207	38.5		20.2		16.2		2.1
225	25.7		24.9			0.8	
235	12.2		2.0		6.5	2.4	1.3
242	4.3		2.8				1.5
247	50.8		23.7		6.0		21.1
250	24.5		2.2		22.3		
254	119.1	10.5	74.7				33.9
Total	1,627.9	213.0	987.0	15.4	282.5	47.2	82.8

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Land Sprinkler	Dry Cropland	Range	Forest	Urban and Built-up	Other
Thousands of Acres								
14	8.9	2.5	0.8		2.0		3.6	
17	65.0	0.7	2.1	2.4	56.0			3.8
22	30.4	1.0	9.3		16.3			3.8
30	103.3	33.8	19.0	10.3	39.2			1.0
33	79.3	45.6	12.4	2.3	17.6		1.4	
63	207.5	35.7	15.9	9.4	143.3	1.7	1.5	
66	97.7	13.4			79.7	3.5	1.1	
71	15.6			8.5	7.1			
91	355.0	2.4	0.5	5.5	245.9	100.7		
113	83.5	40.5	2.9	1.2	37.8		0.8	0.3
144	3.0				0.4	2.6		
168	284.9	5.2			221.4	58.3		
172	17.7	1.8			14.7	1.2		
174	1.0			1.0				
207	38.5	5.0	1.4	7.5	24.6			
225	25.7	1.0			22.7	2.0		
235	12.2	4.5	2.4	2.9	2.4			
242	4.3			0.9	3.4			
247	50.8	1.8	1.0	22.8	25.2			
250	24.5	15.1	5.3		2.0		2.1	
254	119.1			33.3	72.8	13.0		
Total	1,627.9	210.0	73.0	108.0	1,034.5	183.0	10.5	8.9

Upper Snake River Basin, Idaho 1976
CLARK County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM) Other Federal
Thousands of Acres						
Irrigated Cropland						
Surface	34.9	32.3	0.6		0.1	1.9
Sprinkler	46.0	45.5	0.2			0.3
Dry Cropland	19.4	17.6	0.5			1.3
Range	836.7	219.5	82.2	1.6	186.4	333.0
Forest	179.0	1.8	3.5		172.1	1.6
Urban and Built-Up	4.5	3.0	1.5			
Other	0.0					
Total Land	1,120.5	319.7	88.5	1.6	358.6	338.1
Water and Wetland	1.0					14.0
Total County	1,121.5					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	34.9		1.2		28.0	5.7
Sprinkler	46.0		5.7		15.1	25.2
Dry Cropland	19.4				6.6	12.8
Range	836.7	110.4	726.3			
Forest	179.0	179.0				
Urban and Built-Up	4.5	0.4	4.1			
Other	0.0					
Total Land	1,120.5	289.8	737.3	0.0	49.7	43.7

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Private	319.7	8.9	222.2		44.9	43.7
State	88.5	5.5	81.7		1.3	
National Forest	358.6	234.9	123.7			
National Resource (BLM)	338.1	35.6	299.0		3.5	
Other Federal	14.0	3.5	10.5			
County and Municipal	1.6	1.4	0.2			
Total Land	1,120.5	289.8	737.3	0.0	49.7	43.7

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						More than 10.0
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	
		Thousands of Acres					
25	46.4	4.9	40.2				1.3
32	63.8	2.9	54.0		3.5		3.4
34	41.7	18.7	6.3		1.7		15.0
35	45.1	1.2	37.9		2.4		3.6
93	58.4	30.3	28.1				
100	123.3	74.1	45.3		3.9		
112	41.0	17.2	10.9		12.9		
122	104.2	56.9	41.7		3.1		2.5
132	9.6		8.1		1.5		
136	89.7	33.6	56.1				
139	100.3	6.8	91.9		1.6		
140	115.0	8.7	103.4		2.9		
141	36.1		33.7		2.4		
142	24.3		20.8		3.5		
147	5.5	5.5					
227	10.4	2.3	8.1				
246	25.2		25.2				
248	10.9	3.6	0.7				6.6
260	57.4	5.7	48.6		1.2		1.9
267	80.8	4.7	61.6		5.1		9.4
269	7.1		3.1		4.0		
274	20.4	9.7	10.7				
276	3.9	3.0	0.9				
Total	1,120.5	289.8	737.3	0.0	49.7	43.7	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
	Thousands of Acres							
25	46.4		1.3		45.1			
32	63.8	1.9	1.2	1.5	58.8		0.4	
34	41.7	4.8	11.7	1.6	23.6			
35	45.1	4.3	5.6		35.2			
93	58.4				12.4	46.0		
100	123.3		19.3			104.0		
112	41.0	14.9			17.2	7.6	1.3	
122	104.2	1.2	1.0		97.2	4.5	0.3	
132	9.6	0.2			9.3		0.1	
136	89.7	1.0			87.6	1.0	0.1	
139	100.3	0.3			94.2	5.5	0.3	
140	115.0	1.0			106.1	8.9		
141	36.1	1.6			34.5			
142	24.3	0.5			23.8			
147	5.5				5.5			
227	10.4				10.4			
246	25.2				25.2			
248	10.9	1.1	5.1	1.9	1.5		1.3	
260	57.4	0.5		2.2	54.7			
267	80.8	1.1	0.8	9.4	68.8		0.7	
269	7.1			2.8	4.3			
274	20.4	0.5			19.9			
276	3.9				2.4	1.5		
Total	1,120.5	34.9	46.0	19.4	836.7	179.0	4.5	0.0

FREMONT County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM) Other Federal
Thousands of Acres						
Irrigated Cropland						
Surface	55.3	55.1				0.2
Sprinkler	58.2	57.7	0.3			0.2
Dry Cropland	106.0	101.8	4.2			
Range	414.0	145.4	70.4		60.7	137.5
Forest	518.0	6.6	3.2		465.3	3.4
Urban and Built-Up	5.5	5.5				39.5
Other	36.0	10.2	25.2	0.6		
Total Land	1,193.0	382.3	103.3	0.6	526.0	141.3
Water and Wetland	27.5					
Total County	1,220.5					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	55.3		41.4		13.9	
Sprinkler	58.2				58.2	
Dry Cropland	106.0				102.6	3.4
Range	414.0	56.2	304.3		53.5	
Forest	518.0	518.0				
Urban and Built-Up	5.5	4.3	1.2			
Other	36.0	32.0	4.0			
Total Land	1,193.0	610.5	350.9	0.0	228.2	3.4

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Private	382.3	36.4	168.7		171.0	3.4
State	103.3	14.3	79.5		9.5	
National Forest	526.5	504.1	22.4			
National Resource (BLM)	141.3	14.1	80.3		46.9	
Other Federal	39.5	39.5				
County and Municipal	0.1	0.1				
Total Land	1,193.0	610.5	350.9	0.0	228.2	3.4

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
1	0.4				0.4		
12	24.6	1.4	22.0		1.2		
32	1.6		1.6				
55	85.7	85.7					
100	451.1	387.8	55.3		8.0		
101	64.9	58.9	1.3		1.3	3.4	
112	17.7	12.2	5.5				
123	50.7	46.7	4.0				
136	140.6		140.6				
140	4.6	3.6	1.0				
143	8.7	5.8	2.9				
147	7.6	6.9	0.7				
148	73.6		3.4		70.2		
215	6.8		6.8				
220	12.5		9.8		2.7		
229	63.0		3.5		59.5		
234	10.7	1.5	9.2				
246	82.8		79.5		3.3		
259	31.9		3.8		28.1		
277	53.5				53.5		
Total	1,193.0	610.5	350.9	0.0	228.2	3.4	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land		Dry Cropland	Range	Forest	Urban and Built-Up	Other
		Surface	Sprinkler					
Thousands of Acres								
1	0.4			0.4				
12	24.6	21.2		0.2	0.7		0.7	1.8
32	1.6				1.6			
55	85.7				4.0	81.7		
100	449.2	1.2	1.4	4.8	77.5	361.3		3.0
101	64.9	3.7		3.0	5.3	52.9		
112	17.7				15.9	1.8		
123	50.7				41.7	9.0		
136	137.9			2.8	135.1			
140	4.6				4.6			
143	8.7				2.3	6.4		
147	7.6				1.5	4.9		1.2
148	73.4		6.3	60.4	3.7			3.0
215	8.2			2.0	6.2			
220	12.5	8.5	1.8		0.2		0.5	1.5
229	63.0	4.8	36.7	15.5	1.5		2.0	2.5
234	10.7	7.4	1.0				2.3	
246	82.8	2.8	2.4	2.4	75.2			
259	31.9	4.7	8.6	14.5	4.1			
277	56.9	1.0			32.9			23.0
Total	1,193.0	55.3	58.2	106.0	414.0	918.0	5.5	36.0

Upper Snake River Basin, Idaho 1976
GOODING County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
Thousands of Acres							
Irrigated Cropland							
Surface	93.5	89.8	1.1			2.6	
Sprinkler	11.5	11.5					
Dry Cropland	0.0						
Range	344.4	88.1	8.5			247.8	
Forest	0.0						
Urban and Built-Up	11.4	6.6	4.0	0.8			
Other	0.0						
Total Land	460.8	196.0	13.6	0.8	0.0	250.4	0.0
Water and Wetland	3.2						
Total County	464.0						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Irrigated Cropland							
Surface	93.5				60.4	10.6	20.5
Sprinkler	11.5				1.1	8.0	4.4
Dry Cropland	0.0						
Range	344.4	55.3	283.5		5.6		
Forest	0.0						
Urban and Built-Up	11.4	10.0	1.4				
Other	0.0						
Total Land	460.8	65.3	284.9	0.0	67.1	18.6	24.9

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Private	196.0	27.5	60.5		64.5	18.6	24.9
State	13.6		12.5		1.1		
National Forest	0.0						
National Resource (BLM)	250.4	37.2	211.7		1.5		
Other Federal	0.0						
County and Municipal	0.8	0.6	0.2				
Total Land	460.8	65.3	284.9	0.0	67.1	18.6	24.9

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
	Thousands of Acres						
18	26.5	7.2	5.2				14.1
21	16.4		7.5		8.9		
22	72.0	49.0	3.0		20.0		
26	16.8				3.8	13.0	
43	32.1		26.1		6.0		
47	22.0	4.8	5.2		12.0		
48	72.6	0.6	59.0		13.0		
66	25.7		9.3			5.6	10.8
160	60.4	0.9	59.5				
202	22.8		22.8				
206	40.6		40.6				
250	4.8		4.6		0.2		
275	7.5	1.1	6.2		0.2		
276	40.6	1.7	38.9		3.0		
Total	460.8	65.3	284.9	0.0	67.1	18.6	24.9

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land		Dry Cropland	Range	Forest	Urban and Built-Up	Other
		Surface	Sprinkler					
Thousands of Acres								
18	26.5	12.2	1.9		11.1		1.3	
21	16.4	8.9			6.9		0.6	
22	72.0	19.3	0.7		50.0		2.0	
26	16.8	13.5			1.3		2.0	
43	32.1	2.7	0.9		28.5			
47	22.0	12.0			6.6		3.4	
48	72.6	12.9			58.2		1.5	
66	25.7	8.4	8.0		9.3			
160	60.4				60.4			
202	22.8				22.8			
206	40.6				40.6			
250	4.8	0.2			4.6			
275	7.5	0.4			7.1			
276	40.6	3.0			37.0		0.6	
Total	460.8	93.5	11.5	0.0	344.4	0.0	11.4	0.0

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
	Thousands of Acres						
Irrigated Cropland							
Surface	201.0	190.0	4.4			1.9	4.7
Sprinkler	68.0	59.3	1.1			6.0	1.6
Dry Cropland	0.0						
Range	420.0	75.3	17.2			186.0	141.5
Forest	0.0						
Urban and Built-Up	2.0	2.0					
Other	10.5	10.1		0.4			
Total Land	701.5	336.7	22.7	0.4	0.0	193.9	147.8
Water and Wetland	8.3						
Total County	709.8						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
	Thousands of Acres						
Irrigated Cropland							
Surface	201.0				201.0		
Sprinkler	68.0		7.2		47.0	13.8	
Dry Cropland	0.0						
Range	419.2	179.5	239.7				
Forest	0.8	0.8					
Urban and Built-Up	2.0	2.0					
Other	10.5	3.0	7.5				
Total Land	701.5	185.3	254.4	0.0	248.0	13.8	0.0

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
	Thousands of Acres						
Private	336.7	32.1	50.2		240.6	13.8	
State	22.7	9.1	11.0		2.6		
National Forest	0.0						
National Resource (BLM)	193.9	36.9	152.2		4.8		
Other Federal	147.8	106.8	41.0				
County and Municipal	0.4	0.4					
Total Land	701.5	185.3	254.4	0.0	248.0	13.8	0.0

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
13	26.1	13.6	1.5		11.0		
16	195.0	94.0	85.3		15.7		
31	78.8	1.3	38.9		38.6		
32	79.5	8.7	56.3		10.7	3.8	
35	40.2	3.9	26.6		9.7		
62	126.7	52.3	10.5		63.2	0.7	
77	12.1	3.9			8.2		
140	0.5		0.5				
141	1.1		1.1				
246	30.2		20.9			9.3	
251	43.0	4.0			39.0		
257	30.4	1.3	3.0		26.1		
268	24.7	0.5			24.2		
274	1.2	0.9	0.3				
275	8.4	0.4	8.0				
276	3.6	0.5	1.5		1.6		
Total	701.5	185.3	254.4	0.0	248.0	13.8	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Land Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
----- Thousands of Acres -----								
13	26.1	12.6	1.5		7.8		0.1	4.1
16	195.0	1.4	3.1		190.5			
31	78.8	10.9	29.1		38.8			
32	79.5	8.5			67.7			3.3
35	40.2	9.6	10.0		20.6			
62	126.7	58.5	15.9		50.2		0.1	2.0
77	12.1	10.5	1.6					
140	0.5				0.5			
141	1.1				1.1			
246	30.2		6.8		23.4			
251	43.0	39.3			2.7		1.0	
257	30.4	24.5			4.5		0.7	0.7
268	24.7	24.2					0.1	0.4
274	1.2				0.4	0.8		
275	8.4				8.4			
276	3.6	1.0			2.6			
Total	701.5	201.0	68.0	0.0	419.2	0.8	2.0	10.5

Upper Snake River Basin, Idaho 1976
JEROME County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM) Other Federal
Thousands of Acres						
Irrigated Cropland						
Surface	107.0	98.4	0.1			8.5
Sprinkler	63.0	52.8	0.3			9.9
Dry Cropland	0.0					
Range	188.0	52.0	5.0			131.0
Forest	0.0					
Urban and Built-Up	16.5	16.2		0.3		
Other	6.0	0.9	2.0	2.2		0.9
Total Land	380.5	220.3	7.4	2.5	0.0	150.3
Water and Wetland	2.9					0.0
Total County	383.4					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	107.0				58.0	27.0
Sprinkler	63.0				55.1	5.9
Dry Cropland	0.0					
Range	188.0	16.1	171.9			
Forest	0.0					
Urban and Built-Up	16.5		16.5			
Other	6.0		6.0			
Total Land	380.5	16.1	194.4	0.0	113.1	32.9

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Private	220.3	1.2	68.3		95.1	32.9
State	7.4	5.1	2.3			
National Forest	0.0					
National Resource (BLM)	150.3	9.8	121.3		18.0	1.2
Other Federal	0.0					
County and Municipal	2.5		2.5			
Total Land	380.5	16.1	194.4	0.0	113.1	32.9

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
17	90.9	0.3	74.8		15.8		
18	15.0		4.2				10.8
22	37.7	14.8	4.8				18.1
26	31.5		4.9		26.6		
30	191.0		98.6		68.4	24.0	
66	4.4		0.4				4.0
274	10.0	1.0	6.7		2.3		
Total	380.5	16.1	194.4	0.0	113.1	24.0	32.9

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land		Dry Cropland	Range	Forest	Urban and Built-up	Other
		Surface	Sprinkler					
17	90.9	6.1	7.3		76.4		0.5	0.6
18	15.0	8.7	3.4		1.5		1.4	
22	37.7	2.1	3.1		30.4			2.1
26	31.5	16.4	6.4		7.2		0.9	0.6
30	191.0	70.3	40.8		67.1		11.3	1.5
66	4.4	2.2	1.9				0.3	
274	10.0	1.2	0.1		5.4		2.1	1.2
Total	380.5	107.0	63.0	0.0	188.0	0.0	16.5	6.0

Upper Snake River Basin, Idaho 1976
LINCOLN County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM) Other Federal
Thousands of Acres						
Irrigated Cropland						
Surface	99.0	98.5				0.5
Sprinkler	16.0	15.7				0.3
Dry Cropland	0.0					
Range	643.0	44.4	26.7			571.9
Forest	0.0					
Urban and Built-Up	1.6	1.6				
Other	10.0	0.4	4.4	0.1		5.1
Total Land	769.6	160.6	31.1	0.1	0.0	577.8
Water and Wetland	0.3					0.0
Total County	769.9					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	99.0				99.0	
Sprinkler	16.0	1.7	14.3			
Dry Cropland	0.0					
Range	643.0	155.5	487.5			
Forest	0.0					
Urban and Built-Up	1.6	1.6				
Other	10.0	10.0				
Total Land	769.6	168.8	501.8	0.0	99.0	0.0

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Private	160.6	7.7	54.4		98.5	
State	31.1	6.0	25.1			
National Forest	0.0					
National Resource (BLM)	577.8	155.0	422.3		0.5	
Other Federal	0.0					
County and Municipal	0.1	0.1				
Total Land	769.6	168.8	501.8	0.0	99.0	0.0

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
	<i>Thousands of Acres</i>						
17	33.3		33.3				
22	80.6	71.6	6.4		2.6		
26	113.5		81.3		32.2		
30	54.8		41.0		13.8		
47	102.3		57.6		44.7		
48	17.2		15.1		2.1		
66	13.5	9.3	2.9		1.3		
160	35.2	1.0	33.3		0.9		
202	3.4		3.4				
206	32.0		31.6		0.4		
271	7.0		7.0				
275	45.1	25.5	19.2		0.4		
276	218.6	61.4	156.6		0.6		
278	13.1		13.1				
Total	769.6	168.8	501.8	0.0	99.0	0.0	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land		Dry Cropland	Range	Forest	Urban and Built-Up	Other
		Surface	Sprinkler					
Thousands of Acres								
17	33.3	0.4			32.9			
22	80.6	2.0	1.1		77.5			
26	113.5	27.0	7.5		77.0		1.0	1.0
30	54.8	11.1	5.3		38.4			
47	102.3	48.2	0.6		52.9		0.6	
48	17.2	3.5			13.7			
66	13.5	2.9	1.3		9.3			
160	35.2	2.7			32.5			
202	3.4				3.4			
206	32.0				32.0			
271	7.0				7.0			
275	45.1	0.5			41.6			3.0
276	218.6	0.7	0.2		211.7			6.0
278	13.1				13.1			
Total	769.6	99.0	16.0	0.0	643.0	0.0	1.6	10.0

MADISON County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)
Thousands of Acres						
Irrigated Cropland						
Surface	54.0	53.5				0.5
Sprinkler	43.0	41.4	1.0			0.6
Dry Cropland	81.0	50.6	28.7			1.7
Range	66.0	34.3	12.5	1.0	3.8	14.4
Forest	46.0	5.0	3.4		37.6	
Urban and Built-Up	12.7	11.7		1.0		
Other	0.0					
Total Land	302.7	196.5	45.6	2.0	41.4	17.2
Water and Wetland	3.2					
Total County	305.9					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	54.0		0.2		47.5	6.3
Sprinkler	43.0				4.9	38.1
Dry Cropland	81.0					81.0
Range	66.0	7.2	58.8			
Forest	46.0	38.0	8.0			
Urban and Built-Up	12.7	2.6	10.1			
Other	0.0					
Total Land	302.7	47.8	77.1	0.0	52.4	125.4

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
Thousands of Acres						
Private	196.5	6.6	43.3		38.5	108.1
State	45.6	9.4	7.6		11.3	17.3
National Forest	41.4	28.6	12.8			
National Resource (BLM)	17.2	2.2	12.4		2.6	
Other Federal	0.0					
County and Municipal	2.0	1.0	1.0			
Total Land	302.7	47.8	77.1	0.0	52.4	125.4

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
	Thousands of Acres					
12	4.7		4.2		0.5	
16	7.4		7.4			
100	37.2	26.4	9.3			1.5
105	8.1	8.1				
107	8.0		8.0			
147	0.2	0.2				
148	72.6	4.8	6.5		2.0	59.3
220	6.3		3.8		2.5	
221	10.1				10.1	
229	81.7	2.6	13.0		1.5	65.6
246	7.9		7.5		0.4	
257	32.4	3.1	5.8		23.5	
268	17.0	1.2	6.2		9.6	
274	4.3	1.4	2.7		0.2	
276	4.8		2.7		2.1	
Total	302.7	47.8	77.1	0.0	52.4	125.4

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land		Dry Cropland	Range	Forest	Urban and Built-Up	Other
		Surface	Sprinkler					
Thousands of Acres								
12	4.7	3.7	1.0					
16	7.4				7.4			
100	37.2			1.5	9.3	26.2	0.2	
105	8.1					8.1		
107	8.0					8.0		
147	0.2					0.2		
148	72.6		7.6	51.7	12.8	0.3	0.2	
220	6.3	5.0			0.3		1.0	
221	10.1	7.5	0.8				1.8	
229	81.7	4.9	30.5	27.8	16.5		2.0	
246	7.9	0.4			7.5			
257	32.4	23.5			3.0		5.9	
268	17.0	8.7	0.9		5.8		1.6	
274	4.3		0.4		0.7	3.2		
276	4.8	0.3	1.8		2.7			
Total	302.7	54.0	43.0	81.0	66.0	46.0	12.7	0.0

MINIDOKA County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
Thousands of Acres							
Irrigated Cropland							
Surface	114.6	114.6					
Sprinkler	74.8	74.8					
Dry Cropland	0.0						
Range	273.6	43.3	4.8			213.5	12.0
Forest	0.0						
Urban and Built-Up	4.0	4.0					
Other	13.0	7.0	2.5	3.5			
Total Land	480.0	243.7	7.3	3.5	0.0	213.5	12.0
Water and Wetland	2.6						
Total County	482.6						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Irrigated Cropland							
Surface	114.6			14.0	18.7	70.3	11.6
Sprinkler	74.8				74.8		
Dry Cropland	0.0						
Range	273.6	124.7	148.9				
Forest	0.0						
Urban and Built-Up	4.0	4.0					
Other	13.0	13.0					
Total Land	480.0	141.7	148.9	14.0	93.5	70.3	11.6

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
Thousands of Acres							
Private	243.7		54.3	14.0	93.5	70.3	11.6
State	7.3		7.3				
National Forest	0.0						
National Resource (BLM)	213.5	134.0	79.5				
Other Federal	12.0	4.9	7.1				
County and Municipal	3.5	2.8	0.7				
Total Land	480.0	141.7	148.9	14.0	93.5	70.3	11.6

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
Thousands of Acres						
14	28.8	5.4	5.3		18.1	
17	87.4	37.2	50.2			
22	35.9	8.3	23.6		4.0	
26	73.5	2.5	9.2		47.7	11.6
30	106.1	3.3	19.4		15.6	67.8
33	20.3	2.2	4.1	14.0		
66	12.5	2.8	1.6		8.1	
271	7.2		7.2			
275	82.2	80.0	2.2			
276	26.1		26.1			
Total	480.0	141.7	148.9	14.0	93.5	70.3

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
Thousands of Acres								
14	28.8	18.1			5.3		2.5	2.9
17	87.4				87.4			
22	35.9	4.0			31.1			0.8
26	73.5	14.6	47.2		9.2			2.5
30	106.1	55.8	27.6		19.4			3.3
33	20.3	14.0			4.1		0.5	1.7
66	12.5	8.1			1.6		1.0	1.8
271	7.2				7.2			
275	82.2				82.2			
276	26.1				26.1			
Total	480.0	114.6	74.8	0.0	273.6	0.0	4.0	13.0

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
<i>Thousands of Acres</i>							
Irrigated Cropland							
Surface	7.0	6.7	0.3				
Sprinkler	95.0	94.7	0.3				
Dry Cropland	241.0	231.5	7.0			2.5	
Range	469.9	231.3	32.0		26.8	179.8	
Forest	77.0	14.4	7.0		9.2	46.4	
Urban and Built-Up	6.1	3.9		2.2			
Other	8.4	1.6	1.3	1.0			4.5
Total Land	904.4	584.1	47.9	3.2	36.0	228.7	4.5
Water and Wetland	25.5						
Total County	929.9						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
Irrigated Cropland							
Surface	7.0				7.0		
Sprinkler	95.0				93.8		1.2
Dry Cropland	241.0				104.9	81.1	55.0
Range	469.9	47.3	326.6	37.7	58.3		
Forest	77.0	77.0					
Urban and Built-Up	6.1	3.5	2.6				
Other	8.4	2.5	5.9				
Total Land	904.4	130.3	335.1	37.7	264.0	81.1	56.2

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
Private	584.1	17.8	203.4	17.8	224.1	73.4	47.6
State	47.9	9.0	15.8	5.2	8.8	5.5	3.6
National Forest	36.0	8.7	22.4	4.9			
National Resource (BLM)	228.7	93.7	86.9	9.8	31.1	2.2	5.0
Other Federal	4.5		4.5				
County and Municipal	3.2	1.1	2.1				
Total Land	904.4	130.3	335.1	37.7	264.0	81.1	56.2

Table 8-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
Thousands of Acres						
17	67.4		67.4			
30	21.3		18.5		2.8	
32	13.9		10.5		3.4	
33	59.3	8.3	19.4		31.6	
67	59.5		7.5		52.0	
69	60.4		29.0		31.4	
71	45.9		26.9		8.8	1.8
73	8.8		4.5		1.9	2.4
144	43.9	31.3	11.2			1.4
145	14.8			13.6		1.2
155	61.9	23.6	35.7			2.6
224	41.0		4.0		32.2	4.8
229	55.1	3.4	16.5		24.1	11.1
230	57.8	0.3	12.2	9.3		20.0
235	2.3				2.3	
236	38.6		10.1		1.9	23.3
240	7.8		7.6			0.2
242	27.5		2.6	5.1		16.1
243	17.5	2.7	1.8			12.5
244	67.1		6.8		60.3	
249	6.4	1.9		4.5		
252	8.2		3.6		4.6	
253	6.9	0.9	0.2	5.2		0.6
254	47.6	10.6	30.6			6.4
266	6.9		1.3		5.6	
271	7.7		6.7			1.0
275	48.9	47.3	0.5		1.1	
Total	904.4	130.3	335.1	37.7	264.0	81.1

Table 8-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
Thousands of Acres								
17	67.4				67.4			
30	21.3			2.8	18.5			
32	13.9		1.1	2.3	10.5			
33	59.3	2.9	31.1	0.3	16.7		5.3	3.0
67	59.5		4.4		50.9			4.2
69	60.4		17.1	14.5	28.5		0.3	
71	45.9		0.8	10.3	34.8			
73	8.8			4.3	4.5			
144	43.9			1.4	7.2	35.3		
145	14.8			2.1	12.2		0.5	
155	61.9			2.6	41.6	17.7		
224	41.0		2.4	33.4	4.2			1.0
229	55.1		2.1	31.0	18.5	3.5		
230	57.8			34.4	23.1	0.3		
235	2.3			2.2				0.1
236	38.6		2.3	26.2	10.1			
240	7.8			0.2	7.6			
242	27.5			17.8	9.7			
243	17.5		2.8	10.5	1.5	2.7		
244	67.1		27.3	33.0	6.8			
249	6.4				4.5	1.9		
252	8.2	2.1	2.3	0.2	3.6			
253	6.9			0.6	5.2	1.1		
254	47.6			6.4	26.6	14.5		0.1
266	6.9	2.0	1.3	2.3	1.3			
271	7.7			1.0	6.7			
275	48.9			1.2	47.7			
Total	904.4	7.0	95.0	241.0	469.9	77.0	6.1	8.4

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM) Other Federal
<i>Thousands of Acres</i>						
Irrigated Cropland						
Surface	15.6	15.6				
Sprinkler	48.5	45.6	2.9			
Dry Cropland	58.1	56.4	1.7			
Range	64.4	53.5	2.3		8.2	0.4
Forest	99.4	17.7			76.1	5.6
Urban and Built-Up	1.0	0.8		0.2		
Other	5.4	0.8	0.6		4.0	
Total Land	292.4	190.4	7.5	0.2	88.3	6.0
Water and Wetland	1.4					0.0
Total County	293.8					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
<i>Thousands of Acres</i>						
Irrigated Cropland						
Surface	15.6				15.6	
Sprinkler	48.5		0.2	0.2	48.1	
Dry Cropland	58.1				10.8	47.3
Range	64.4	48.5	15.9			
Forest	99.4	99.4				
Urban and Built-Up	1.0	1.0				
Other	5.4	5.4				
Total Land	292.4	154.3	16.1	0.2	74.5	47.3

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
<i>Thousands of Acres</i>						
Private	190.4	63.3	11.1	0.2	69.4	46.4
State	7.5	0.3	1.2		5.1	0.9
National Forest	88.3	84.5	3.8			
National Resource (BLM)	6.0	6.0				
Other Federal	0.0					
County and Municipal	0.2	0.2				
Total Land	292.4	154.3	16.1	0.2	74.5	47.3

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
1	11.2	7.3	0.5		3.4		
100	25.3	15.6	3.5			6.2	
105	69.5	63.6	3.0		1.8	1.1	
109	27.8	25.3	1.5		1.0		
132	72.7	16.5	2.8	0.2	53.2		
143	0.6	0.5	0.1				
147	10.7	10.5	0.2				
148	74.6	15.0	4.5		15.1	40.0	
Total	292.4	154.3	16.1	0.2	74.5	47.3	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land		Dry Cropland	Range	Forest	Urban and Built-up	Other
		Surface	Sprinkler					
1	11.2	0.2	0.2	1.7	0.4	8.7		
100	25.3			0.7	3.3	21.3		
105	69.5	0.7	0.9	0.8	4.4	61.7		1.0
109	27.8	1.1	0.8	1.8	24.1			
132	72.7	13.1	34.2	10.8	14.0		0.6	
143	0.6				0.1	0.5		
147	10.7					6.3		4.4
148	74.6	0.5	12.4	42.3	18.1	0.9	0.4	
Total	292.4	15.6	48.5	58.1	64.4	99.4	1.0	5.4

Upper Snake River Basin, Idaho 1976
TWIN FALLS County

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership						
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM)	Other Federal
<i>Thousands of Acres</i>							
Irrigated Cropland							
Surface	263.0	262.3	0.1			0.6	
Sprinkler	20.0	17.5	0.5			2.0	
Dry Cropland	6.0	6.7				0.3	
Range	912.8	263.4	29.7		68.1	551.6	
Forest	29.0	1.4	0.2		24.6	2.8	
Urban and Built-Up	15.0	11.8		3.2			
Other	0.0						
Total Land	1,245.8	562.1	30.5	3.2	92.7	557.3	0.0
Water and Wetland	8.6						
Total County	1,254.4						

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
Irrigated Cropland							
Surface	263.0				255.1	7.9	
Sprinkler	20.0				20.0		
Dry Cropland	6.0				6.0		
Range	913.0	3.5	836.1	73.4			
Forest	29.0	26.5	2.5				
Urban and Built-Up	14.8	7.8	7.0				
Other	0.0						
Total Land	1,245.8	37.8	845.6	73.4	281.1	7.9	0.0

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
<i>Thousands of Acres</i>							
Private	562.1	3.1	265.5	8.0	255.1	7.9	
State	30.5	0.8	27.9	1.2	0.6		
National Forest	92.7	24.6	25.0	43.1			
National Resource (BLM)	557.3	6.8	526.5	21.1	2.9		
Other Federal	0.0						
County and Municipal	3.2	2.5	0.7				
Total Land	1,245.8	37.8	845.6	73.4	281.1	7.9	0.0

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	More than 10.0
	Thousands of Acres					
30	467.9	2.1	345.5		112.4	7.9
39	160.5	6.7	31.2		122.6	
43	119.5		90.5	1.9	27.1	
124	12.8	6.1	6.7			
188	48.2	3.4	44.8			
162	131.4	3.6	127.8			
168	83.6	10.9		71.5	1.2	
172	37.9	0.7	35.2		2.0	
207	32.4	0.8	30.2		1.4	
213	47.0	1.9	45.1			
235	15.4		15.4			
273	35.2	1.6	33.6			
274	54.0		39.6		14.4	
Total	1,245.8	37.8	845.6	73.4	281.1	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Land Surface	Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
	Thousands of Acres							
30	467.9	117.2		3.1	344.0	1.5	2.1	
39	160.5	113.0		9.6	25.2		12.7	
43	119.5	18.7		4.8	3.6			
124	12.8				6.7	6.1		
168	48.2				44.8	3.4		
223	131.4				127.8	3.6		
229	83.6	0.5		0.7	71.5	10.9		
235	37.9	1.0		1.0	35.9			
275	32.4			1.4	31.0			
284	47.0				45.1	1.9		
313	15.4				15.4			
363	35.2				33.6	1.6		
364	54.0	12.6		1.8	39.6			
Total	1,245.8	263.0	20.0	6.0	913.0	29.0	14.8	0.0

Table B-1 - Ownership: Acreage by Land Use

Land Use	Land Ownership					
	Total	Private	State	County & Municipal	National Forest	National Resource (BLM) Other Federal
Thousands of Acres						
Irrigated Cropland						
Surface	52.0	52.0				
Sprinkler	42.0	42.0				
Dry Cropland	21.0	21.0				
Range	969.5	69.4	7.6		882.3	10.2
Forest	2,035.0	18.0	1.4		1,311.7	2.8
Urban and Built-Up	6.0	6.0				
Other	75.5				75.5	
Total Land	3,201.0	208.4	9.0		2,269.5	13.0
Water and Wetland	50.0					
Total County	3,251.0					

Table B-2 - Erosion Rate: Acreage by Land Use

Land Use	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Irrigated Cropland						
Surface	52.0	14.6	35.5		1.9	
Sprinkler	42.0	1.0	30.7	4.7	5.6	
Dry Cropland	21.0		2.3		18.7	
Range	969.5	523.9	445.6			
Forest	2,035.0	1,590.9	444.1			
Urban and Built-Up	6.0	6.0				
Other	75.5	74.2	1.3			
Total Land	3,201.0	2,210.6	959.5	4.7	26.2	

Table B-3 - Erosion Rate: Acreage by Land Ownership

Land Ownership	Tons/Acre/Year					
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0 More than 10.0
Thousands of Acres						
Private	208.4	55.2	122.3	4.7	26.2	
State	9.0	1.2	7.8			
National Forest	2,269.5	1,478.5	791.0			
National Resource (BLM)	13.0	6.9	6.1			
Other Federal	701.1	668.8	32.3			
County and Municipal	0.0					
Total Land	3,201.0	2,210.6	959.5	4.7	26.2	

Table B-4 - Erosion Rates: Acreage by Soil Association

Soil Association	Tons/Acre/Year						
	Total	Less than 0.1	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	More than 10.0
-----Thousands of Acres-----							
1	35.1	33.1	2.0				
2	45.9	45.9					
3	730.3	655.0	75.3				
4	1,269.4	711.8	553.1		4.5		
5	169.4	73.5	95.9				
9	10.4	8.8	1.6				
51	17.7	14.2	3.5				
52	106.6	20.6	73.8		12.2		
55	267.9	267.9					
57	69.8	13.5	54.7		1.6		
100	61.7	61.7					
101	8.9	8.9					
105	35.3	31.9	3.4				
107	78.6	50.1	20.6		7.9		
110	7.2	5.7	1.5				
112	16.4	15.2	1.2				
129	48.1	39.2	8.9				
130	44.6	16.6	28.0				
132	8.0	0.6	2.7	4.7			
138	15.4		15.4				
143	3.6	2.3	1.3				
279	150.7	134.1	16.6				
Total	3,201.0	2,210.6	959.5	4.7	26.2	0.0	0.0

Table B-5 - Land Use: Acreage by Soil Association

Soil Association	Total Land	Irrigated Surface	Land Sprinkler	Dry Cropland	Range	Forest	Urban and Built-Up	Other
Thousands of Acres								
1	35.1		0.4		2.0	32.7		
2	45.9				10.7	35.2		
3	730.3				262.3	447.3		20.7
4	1,269.4	1.4	4.0	3.1	355.6	902.4	0.5	2.4
5	169.4				58.0	110.4		1.0
9	10.4				1.8	8.6		
51	17.7	0.8			14.4	1.6	0.9	
52	106.6	31.3	31.7	8.9	19.4	11.7	3.6	
55	267.9				28.6	239.3		
57	69.8	4.1			34.1	31.6		
100	61.7				7.2	54.5		
101	8.9					8.9		
105	35.3				5.3	30.0		
107	78.6	4.3	1.2	7.8	11.2	54.1	0.4	
110	7.2	0.4			6.4			
112	16.4			1.2	1.1	14.1		
129	48.1	2.2			41.4	4.5		
130	44.6	7.5			30.0	6.5	0.6	
132	8.0		4.7		3.3			
138	15.4				15.4			
143	3.6				1.3	2.3		
279	150.7				60.0	39.3		51.4
Total	3,201.0	52.0	42.0	21.0	969.5	2,035.0	6.0	75.5

APPENDIX B - TABLES

SUMMARY DATA

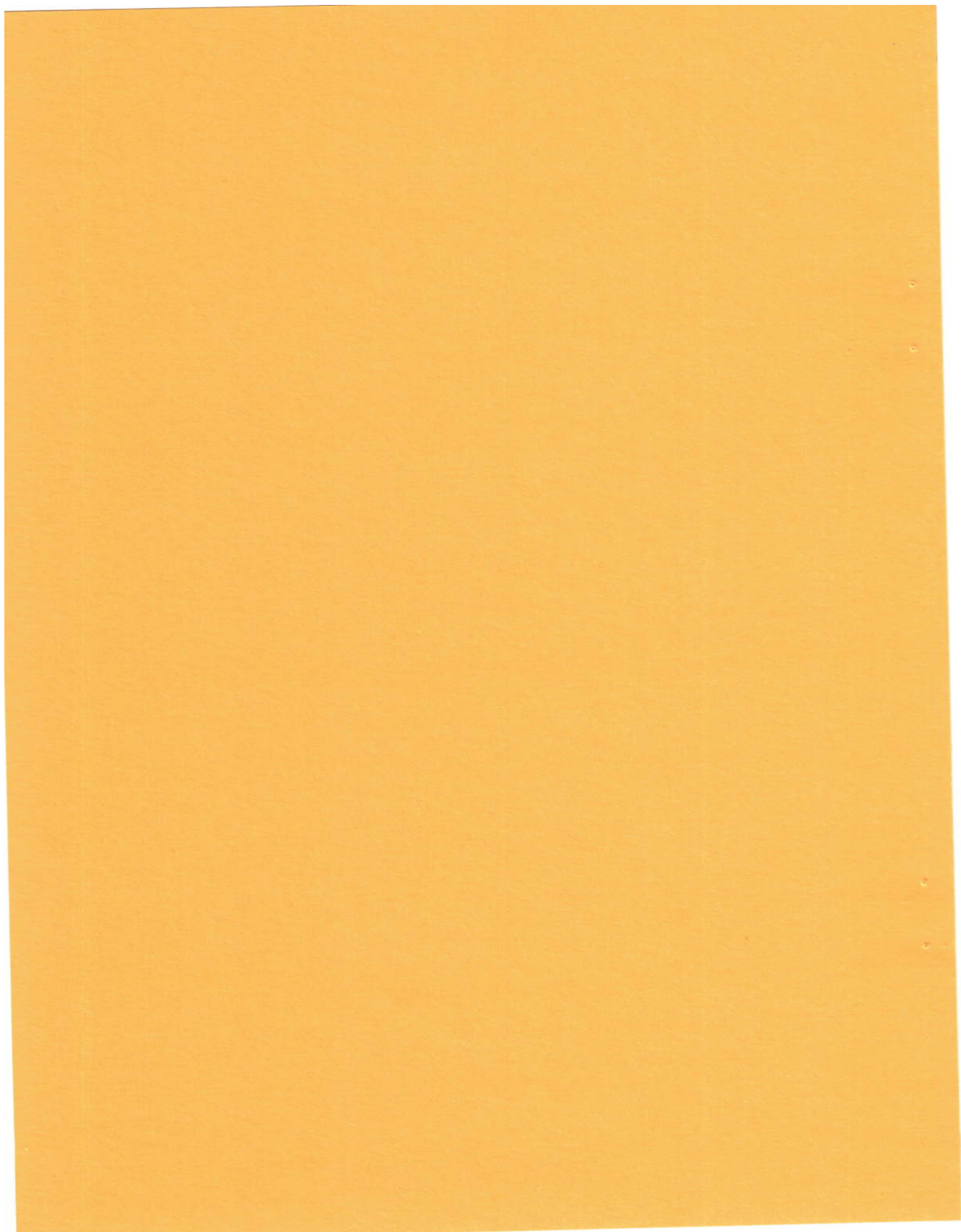


Table B-6 - Soil Associations: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Soil Associations	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming Portion
(1)	46.7										0.4								11.2		35.1
(2)	45.9																				45.9
(3)	730.3																				730.3
(4)	1269.4																				1269.4
(5)	169.4																				169.4
(6)	9.2					9.2															169.4
(9)	379.4				300.9			68.1													10.4
(12)	29.3										24.6					4.7					
(13)	26.1												26.1								
(14)	37.7								8.9												
(16)	615.0		123.0	16.9	16.7	256.0							195.0			7.4	28.8				
(17)	554.2		14.0	196.2					65.0					90.9	33.3		87.4	67.4			
(18)	41.5											26.5		15.0							
(21)	33.2											33.2									
(22)	266.2					9.6			30.4			72.0		37.7	80.6		35.9				
(25)	46.4									46.4											
(26)	723.3			36.9										31.5	113.5		73.5			467.9	
(29)	40.4			40.4																	
(30)	637.6		54.6					103.3						191.0	54.8		106.1	21.3		106.5	
(31)	721.6		327.7	60.5	118.0	136.6							78.8								

Table B-6 - Soil Associations: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Soil Associations	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming Portion
(32)	161.9	3.1								63.8	1.6		79.5					13.9			
(33)	390.5	24.7	87.4						79.3								20.3	59.3		119.5	
(34)	86.2					44.5				41.7											
(35)	135.3					50.0				45.1			40.2								
(43)	32.1											32.1									
(47)	124.3											22.0			102.3						
(48)	89.8											72.6			17.2						
(51)	17.7																				17.7
(52)	106.6																				106.6
(54)	6.4					6.4															
(55)	358.0			4.4																	267.9
(57)	69.8										85.7										69.8
(62)	146.0					19.3							126.7								
(63)	207.5								207.5												
(66)	153.8								97.7			25.7		4.4	13.5		12.5				
(67)	59.5																	59.5			
(69)	60.4																	60.4			
(70)	77.6					77.6															
(71)	61.5						15.6											45.9			
(72)	104.2					104.2															
(73)	8.8																	8.8			

Table B-6 - Soil Associations: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Soil Associations	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming Portion
(77)	33.0					20.9							12.1								
(79)	78.4						78.4														
(82)	104.4	6.6	94.6		3.2																
(91)	559.5			10.7		74.8	106.2		355.0												
(92)	4.6			4.6																12.8	
(93)	190.9				11.8	120.7			58.4												
(100)	702.3				5.6				123.3	449.2						37.2			25.3		61.7
(101)	73.8									64.9											8.9
(105)	150.8				37.9											8.1			69.5		35.3
(107)	165.6				79.0											8.0			27.8		78.6
(109)	27.8																				
(110)	7.2																				7.2
(111)	0.5																				
(112)	135.9				3.4			0.5													
(113)	83.5							57.4		41.0	17.7										
(115)	2.5								83.5												
(118)	7.1				7.1	2.5															
(121)	10.2						10.2														
(122)	104.2																				16.4
(123)	50.7								104.2												
(124)	39.9			24.5		3.4	12.0				50.7										

Table B-6 - Soil Associations: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Soil Associations	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming Portion
(127)	31.5							31.5													
(128)	224.1							224.1													
(129)	48.1																				48.1
(130)	44.6																				44.6
(131)	49.2	34.5						14.7													
(132)	105.6			15.3						9.6									72.7		8.0
(133)	132.0		39.9		56.7			35.4													
(134)	17.2							17.2													
(135)	48.2																			48.2	
(136)	228.1				0.5					89.7	137.9										
(137)	30.2							30.2													
(138)	287.9	12.6			64.7			195.2													15.4
(139)	100.3									100.3											
(140)	325.3			4.8	6.0	194.4				115.0	4.6		0.5								
(141)	48.6					11.4				36.1			1.1								
(142)	24.3									24.3											
(143)	55.7				42.8						8.7								0.6		3.6
(144)	46.9								3.0									43.9			
(145)	158.9	118.3						25.8										14.8			
(146)	2.2							2.2													

Thousands of Acres

Table B-6 - Soil Associations: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Soil Associations	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming Portion
(147)	44.9				20.9					5.5	7.6						0.2		10.7		
(148)	243.6				23.0						73.4						72.6		74.6		
(149)	16.8					16.8															
(150)	138.3		78.7		52.0			7.6													
(151)	19.1							19.1													
(154)	441.6	129.6	168.2					143.8													
(155)	61.9																				
(157)	55.2																	61.9			
(159)	1.1																				
(160)	181.7			78.7																	
(161)	141.9			141.9																	
(162)	189.8			58.4																	
(163)	69.7																			131.4	
(166)	8.5																				
(167)	14.7																				
(168)	368.5																				
(172)	55.6																				
(173)	93.2			80.3		12.9														83.6	
(174)	35.2	34.2																		37.9	
(176)	1.9							1.9													

Table B-6 - Soil Associations: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Soil Associations	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming Portion
(229)	199.8																				
(230)	58.3	0.5														81.7		55.1			
(233)	21.4	21.4																57.8			
(234)	42.3	31.6																			
(235)	53.2	23.3																			
(236)	39.3	0.7							12.2		10.7										
(237)	31.8		3.5					28.3										2.3		15.4	
(238)	44.6	24.7					19.9											38.6			
(239)	23.1	23.1																			
(240)	7.8																				
(241)	9.6	9.6																7.8			
(242)	31.8																				
(243)	17.5																	27.5			
(244)	67.1								4.3									17.5			
(245)	262.0		104.9		139.8			17.3										67.1			
(246)	146.1																				
(247)	179.1	127.3						1.0	50.8	25.2	82.8		30.2			7.9					
(248)	31.6																				
(249)	44.5	38.1			20.7					10.9											
(250)	29.3								24.5										6.4		
(251)	43.0											4.8									
													43.0								

Table B-6 - Soil Associations: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Soil Associations	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming
(252)	21.4	13.2																8.2			
(253)	6.9																	6.9			
(254)	166.7								119.1									47.6			
(257)	88.5					25.7							30.4			32.4					
(258)	2.3	2.3									31.9										
(259)	31.9									57.4											
(260)	57.4																				
(261)	197.1			197.1																	
(265)	21.3	8.6	12.7															6.9			
(266)	34.8	16.3						11.6													
(267)	80.8									80.8											
(268)	187.7		84.0			53.2	8.8						24.7			17.0					
(269)	7.1									7.1					7.0			7.2	7.7		
(271)	21.9																				
(272)	5.8							5.8													
(273)	35.2																			35.2	
(274)	115.1					25.2															
(275)	642.5	6.8	111.8	140.1	64.0	127.7						7.5	8.4	1.2	10.0	4.3		82.2	48.9		
(276)	497.4			126.3			77.4			20.4		40.6	3.6			4.8	26.1				
(277)	56.9										56.9										
(278)	245.6			185.5		41.9	1.2			3.9					13.1						
(279)	150.7																				150.7

1/ Selected features and interpretations of General Soil Map of Idaho, USDA August 1976

Table B-7 - Vegetative Types: Acreage by county, Upper Snake River Basin, Idaho

Vegetative Types	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Mfnodoka	Power	Teton	Twin Falls
1/	Thousands of Acres																			
Annual Grasslands	210.6	9.9						5.7	4.0			42.4		87.5	41.1		11.7		8.3	
Perennial Grasslands	1179.8	20.0	163.1		25.1	19.6	103.5	150.9	267.3	63.2	29.9	17.5			105.0		2.9	38.9	16.6	156.3
Tall Sagebrush	5543.3	88.7	671.1	807.4	200.4	664.3	199.6	217.6	584.6	230.0	215.1	209.0	189.1	74.3	360.4	27.1	152.5	135.7	17.9	498.5
Low Sagebrush	1200.6			14.5	52.3	312.4		1.8		544.3	20.9	30.2	92.0		5.2	16.4		57.7	11.6	41.3
Salt Desert Shrub	33.1					3.4			29.7											
Bitterbrush Shrub Steepe	401.2	26.8			31.1			135.1		19.4	65.8	3.6					5.8	111.5		2.1
Mixed Shrub Steepe	173.9	19.6					5.3	88.3			18.7				37.8					4.2
Mtn. Mahogany Woodland	191.5	63.2		2.0		70.9				36.7								18.7		
Juniper Mtn. Mahogany Woodland	93.7	53.1		6.6				9.8										24.2		
Juniper Woodland	156.2	1.3			4.9			2.3	137.8									9.9		
Escarpment Shrub	77.8	2.9	5.8		21.3															
Aspen	414.9	6.1	33.5		111.2	5.5	4.8	151.2	13.9	7.7	58.0			9.0						
Ponderosa Pine Bunchgrass	0.3																			
Ponderosa Pine Mixed Shrub	137.2	125.0					12.2									8.0			9.6	5.4
Lodgepole Pine	706.0			131.3	55.1			27.2	18.0	18.7	380.6					15.8			28.7	30.6
Douglas-fir	1016.0	9.9	24.5	147.1	192.5	48.6	151.0	88.3	28.1	108.5	101.2					8.0		72.8	34.8	0.7

1/ Idaho Fish and Game data, adjusted. Not available for Wyoming.

Table B-7 - Vegetative Types: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Vegetative Types	Total	Bannock	Bingham	Blaine	Bonneville	Butte	Camas	Caribou	Cassia	Clark	Fremont	Gooding	Jefferson	Jerome	Lincoln	Madison	Minidoka	Power	Teton	Twin Falls	Wyoming-Portion
Thousands of Acres																					
Sub-alpine	115.7		40.0	21.2	42.1	1.2													11.2		
Alpine	195.3	20.9		101.6	15.0	25.0				1.5	11.5					6.5			13.3		
Wet Meadows	31.1		1.4	6.0				15.8		5.4		1.0						1.5			
Dry Meadows	105.6		9.6																		
Cottonwood	78.0		28.8	11.5		2.9			3.9		4.9		19.2			6.8					
Willow	116.1	9.3	24.1		5.3	6.4		28.8	7.4							12.4		22.4			
Other Riparian	471.6	34.5	11.5	89.6		28.8	30.8	9.8	39.8			28.0		35.4	10.9	6.1	30.3	10.8	9.2	96.1	
Marsh and Swamp	79.3		4.0		8.7			9.8			8.1	0.5	25.1			4.9	0.3	1.6	16.3		
Barren	839.3			274.5	58.9	122.1		14.0			37.0		105.1		92.6		93.8	41.3			
Amelanchier Shrub Steep	3.4								3.4												
2/																					
Water	213.3	22.9	17.8	14.0	36.7	0.5	3.6	23.1	10.5	1.0	27.5	3.2	8.3	2.9	0.3	3.2	2.3	25.5	1.4	8.6	50.0
Urban and Built-Up	144.6	14.0	6.5	1.0	22.0	5.0	3.5	14.0	10.5	4.5	5.5	11.4	2.0	4.3	1.6	12.7	4.0	6.1	1.0	15.0	6.0
Cropland Irrigated	2721.8	70.0	307.0	53.0	169.0	91.6	24.0	67.0	282.0	66.6	113.5	105.0	269.0	170.0	115.0	97.0	179.0	102.0	64.1	283.0	94.0
Dry	1303.2	143.0	43.0	14.0	196.0	3.7	98.0	168.4	108.0	16.0	106.0					81.0		241.0	58.1	6.0	21.0

2/ SCS Data

Table B-8 - Erosion Rates: Acreage by county, Upper Snake River Basin, Idaho and Wyoming, 1976

Counties	Total Acres	Tons/Acre/Year					
		Less than 0.1	0.2 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0	Greater than 10.0
<i>Thousands of Acres</i>							
Bannock	718.2	170.3	345.7		113.0	77.5	11.7
Bingham	1,333.9	248.1	735.8		350.0		
Blaine	1,694.1	678.1	1,015.8		0.2		
Bonneville	1,174.8	163.1	639.0		161.8	52.3	158.6
Butte	1,433.1	750.9	592.5		88.2	1.5	
Camas	674.8	200.5	474.3				
Caribou	1,117.4	146.5	740.3	5.1	182.9	38.1	4.5
Cassia	1,627.9	213.0	987.0	15.4	282.5	47.2	82.8
Clark	1,120.5	289.8	737.3		49.7	43.7	
Fremont	1,193.0	610.5	350.9		228.2	3.4	
Gooding	460.8	65.3	284.9		67.1	18.6	24.9
Jefferson	701.5	185.3	254.4		248.0	13.8	
Jerome	380.5	16.1	194.4		113.1	24.0	32.9
Lincoln	769.6	168.8	501.8		99.0		
Madison	302.7	47.8	77.1		52.4	125.4	
Minidoka	480.0	141.7	148.9	14.0	93.5	70.3	11.6
Power	904.4	130.3	335.1	37.7	264.0	81.1	56.2
Teton	292.4	154.3	16.1	0.2	74.5	47.3	
Twin Falls	1,254.8	37.7	860.7	58.4	281.1	7.9	
Wyoming Portion	3,201.1	2,210.6	959.5	4.7	26.2		
Total	20,826.4	6,628.7	10,251.5	135.5	2,775.4	652.1	383.2

Table B-9 - Soil Loss Tolerance Values: by Soil Association, Snake River Basin, Idaho and Wyoming, 1976

Soil Loss Tolerance Values			Soil Loss Tolerance Values		
Soil Associations	Cropland	Range and Forest	Soil Associations	Cropland	Range and Forest
Tons/per acre/per year -----			Tons/per acre/per year -----		
ABCa-1 (1)	5	2	DOLb-1 (28)	5	4
ABCa-2 (2)	3	2	DOLc-1 (29)	2	2
ABCa-3 (3)	2	1	DOLf-1 (30)	4	1
ABCa-4 (4)	3	2	DOLi-1 (31)	5	2
ABCa-5 (5)	3	2	DOLi-2 (32)	4	2
ABCe-1 (6)	5	4	DOLi-3 (33)	4	1
ABCe-2 (7)	3	1	DOLi-4 (34)	5	1
ABCe-3 (8)	5	4	DOLi-5 (35)	5	3
ABCe-4 (9)	4	3	DRDa-1 (36)	1	1
ADHb-1 (10)	5	5	DRDd-1 (37)	5	2
AXHa-1 (11)	5	5	DRDf-1 (38)	3	1
DOA1-1 (12)	2	1	DRHa-1 (39)	2	2
DOAb-1 (13)	5	5	DRHa-2 (40)	2	2
DOAb-2 (14)	5	5	DRHa-3 (41)	4	1
DOAi-1 (15)	2	2	DRHm-1 (42)	1	1
DOAK-1 (16)	2	1	DRHs-1 (43)	5	2
DOAK-2 (17)	3	1	DRHs-2 (44)	5	5
DOAo-1 (18)	5	2	DRHs-3 (45)	5	2
DOAo-2 (19)	2	2	DRHs-4 (46)	3	2
DOAo-3 (20)	3	3	DRHs-5 (47)	4	1
DOAo-4 (21)	5	4	DRPf-1 (48)	3	2
DOAo-5 (22)	4	3	DRPg-1 (49)	2	2
DODd-1 (23)	2	2	EAFa-1 (50)	5	2
DODd-2 (24)	2	1	EFCa-1 (51)	5	5
DODd-3 (25)	3	2	EFCa-2 (52)	5	5
DODd-4 (26)	5	5	EFHa-1 (53)	5	2
DODh-1 (27)	5	5	EOCa-1 (54)	2	1

Table B-9 - Soil Loss Tolerance Values: by Soil Association, Snake River Basin, Idaho and Wyoming, 1976

Soil Loss Tolerance Values			Soil Loss Tolerance Values		
Soil Associations	Cropland	Range and Forest	Soil Associations	Cropland	Range and Forest
Tons/per acre/per year			Tons/per acre/per year		
EOCa-2 (55)	5	1	EPXa-1 (83)	5	5
EOCa-3 (56)	4	1	EPXa-2 (84)	5	3
EOCa-4 (57)	5	2	EPXb-1 (85)	5	5
EOCe-1 (58)	2	1	HHBj (86)	5	5
EOHa-1 (59)	5	5	HSBa-1 (87)	5	5
EOHa-2 (60)	2	1	IACj-1 (88)	5	5
EOHa-3 (61)	1	1	IACj-2 (89)	5	3
EOHa-4 (62)	5	5	IAHa-1 (90)	5	2
EOHa-5 (63)	3	3	IMCa-1 (91)	3	1
EOHh-1 (64)	4	1	IMCa-3 (92)	5	5
EOHk-1 (65)	5	5	IMCc (93)	5	5
EOHk-2 (66)	5	5	IMCd-1 (94)	1	1
EOHk-3 (67)	4	2	IMFa-1 (95)	5	5
EOHk-4 (68)	3	2	INCb-1 (96)	4	3
EOHk-5 (69)	5	5	IOCa-1 (97)	4	4
EOHk-6 (70)	5	1	IOCa-2 (98)	5	3
EOHk-7 (71)	5	5	IOCa-3 (99)	5	5
EOHk-8 (72)	2	1	IOCa-5 (100)	5	5
EOHk-9 (73)	5	5	IOCa-6 (101)	5	5
EOXa-1 (74)	4	3	IOCe-1 (102)	3	1
EOXa-2 (75)	3	2	IOCe-2 (103)	4	4
EOXa-3 (76)	4	3	IOFa-1 (104)	5	5
EOXa-4 (77)	4	3	IOXa-1 (105)	1	1
EOXa-5 (78)	2	1	IOXi-1 (106)	2	2
EoXd-1 (79)	1	1	IOXi-2 (107)	5	2
EPCa-1 (80)	3	3	IOYb-1 (108)	5	2
EPCb-1 (81)	5	2	MACa-1 (109)	2	2
EPHe-2 (82)	5	5	MACa-2 (110)	3	2

Table B-9 - Soil Loss Tolerance Values: by Soil Association, Snake River Basin, Idaho and Wyoming, 1976

Soil Loss Tolerance Values			Soil Loss Tolerance Values		
Soil Associations	Cropland	Range and Forest	Soil Associations	Cropland	Range and Forest
Tons/per acre/per year			Tons/per acre/per year		
MACd (111)	5	5	MBCh-4 (138)	5	5
MACE-1 (112)	3	3	MBCK-1 (139)	5	5
MAHa-1 (113)	5	4	MBCK-2 (140)	5	5
MAHa-2 (114)	2	2	MBCK-3 (141)	4	1
MAHd-1 (115)	5	5	MBCK-4 (142)	5	5
MAHd-2 (116)	5	5	MBCm-1 (143)	3	1
MAHf-1 (117)	4	1	MBCo-1 (144)	4	1
MALa-1 (118)	5	5	MBCo-2 (145)	3	1
MBAa-1 (119)	2	1	MBCo-3 (146)	4	3
MBAa-2 (120)	2	1	MBCo-4 (147)	5	5
MBAf-1 (121)	2	2	MBCo-5 (148)	5	2
MBCa-1 (122)	5	5	MBHd-1 (149)	3	1
MBCa-2 (123)	3	1	MBPb-1 (150)	5	5
MBCa-4 (124)	2	1	MBPb-2 (151)	5	5
MBCa-5 (125)	2	1	MLAf-1 (152)	5	3
MBCa-6 (126)	5	5	MLAf-2 (153)	5	3
MBCa-7 (127)	3	1	MRRb-1 (154)	2	1
MBCa-8 (128)	4	3	MRRb-2 (155)	4	1
MBCa-9 (129)	3	3	MXAa-1 (156)	4	3
MBCa-10 (130)	4	3	MXAa-2 (157)	2	1
MBCf-1 (131)	2	1	MXAa-3 (158)	3	1
MBCf-2 (132)	2	2	MXAa-4 (159)	3	2
MBCf-3 (133)	3	1	MXAa-5 (160)	3	2
MBCg-1 (134)	4	1	MXAa-6 (161)	2	2
MBCh-1 (135)	2	2	MXAa-7 (162)	2	1
MBCh-2 (136)	4	3	MXAa-8 (163)	2	1
MBCh-3 (137)	5	5	MXAa-9 (164)	5	3

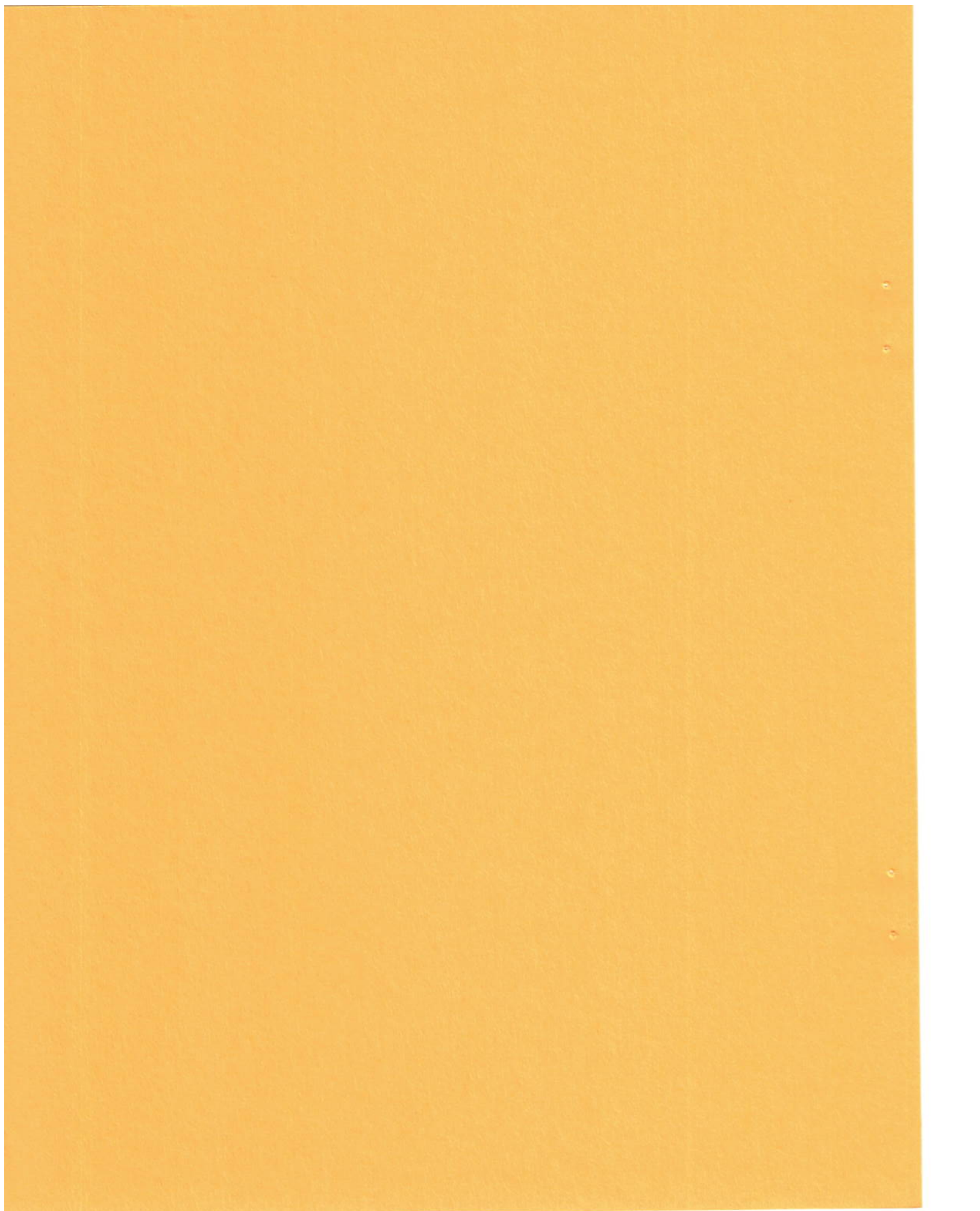
Table B-9 - Soil Loss Tolerance Values: by Soil Association, Snake River Basin, Idaho and Wyoming, 1976

Soil Loss Tolerance Values			Soil Loss Tolerance Values		
Soil Associations	Cropland	Range and Forest	Soil Associations	Cropland	Range and Forest
Tons/per acre/per year -----			Tons/per acre/per year -----		
MXAa-10 (165)	2	2	MXAh-3 (194)	5	2
MXAa-11 (166)	3	1	MXAh-4 (195)	2	2
MXAa-12 (167)	2	1	MXAh-5 (196)	3	1
MXAa-13 (168)	4	2	MXAh-6 (197)	4	3
MXAe-1 (169)	5	5	MXAj-1 (198)	5	5
MXAe-2 (170)	5	5	MXAj-2 (199)	2	2
MXAf-1 (171)	2	1	MXAj-3 (200)	5	5
MXAf-2 (172)	2	1	MXAj-4 (201)	2	2
MXAf-3 (173)	5	5	MXAm-1 (202)	2	1
MXAf-4 (174)	5	5	MXAm-2 (203)	5	3
MXAf-5 (175)	4	1	MXAm-3 (204)	3	1
MXAf-6 (176)	4	2	MXAo-1 (205)	1	1
MXAf-7 (177)	3	1	MXAo-2 (206)	1	1
MXAf-8 (178)	3	1	MXAo-3 (207)	1	1
MXAf-9 (179)	3	1	MXAq-1 (208)	5	1
MXAf-10 (180)	3	3	MXAq-2 (209)	2	2
MXAf-11 (181)	5	2	MXAq-3 (210)	5	2
MXAf-12 (182)	5	3	MXDa-1 (211)	2	2
MXAf-13 (183)	3	1	MXDb-1 (212)	2	2
MXAf-14 (184)	3	2	MXDb-2 (213)	2	2
MXAf-15 (185)	2	2	MXDc-1 (214)	2	2
MXAf-16 (186)	1	1	MXDc-2 (215)	2	1
MXAf-17 (187)	4	3	MXDd-1 (216)	2	2
MXAf-18 (188)	5	5	MXHa-1 (217)	2	2
MXAf-19 (189)	5	5	MXHa-2 (218)	2	2
MXAg-1 (190)	3	2	MXHa-3 (219)	3	2
MXAg-2 (191)	3	2	MXHb-1 (220)	5	5
MXAh-1 (192)	5	5	MXHb-2 (221)	4	3
MXAh-2 (193)	3	2	MXHd-1 (222)	3	3

Table B-9 - Soil Loss Tolerance Values: by Soil Association, Snake River Basin, Idaho and Wyoming, 1976

Soil Loss Tolerance Values			Soil Loss Tolerance Values		
Soil Associations	Cropland	Range and Forest	Soil Associations	Cropland	Range and Forest
Tons/per acre/per year			Tons/per acre/per year		
MXHd-2 (223)	5	5	MXHk-1 (251)	5	5
MXHf-1 (224)	5	5	MXHk-2 (252)	4	3
MXHf-2 (225)	5	5	MXHn-1 (253)	2	1
MXHf-3 (226)	5	5	MXHn-2 (254)	3	1
MXHf-4 (227)	5	3	MXHn-3 (255)	3	1
MXHf-5 (228)	3	2	MXHn-4 (256)	1	1
MXHf-6 (229)	5	5	MXHo (257)	5	2
MXHf-7 (230)	5	5	MXHq-1 (258)	5	5
MXHf-8 (231)	5	5	MXHq-2 (259)	3	2
MXHf-9 (232)	2	2	MXHq-3 (260)	5	3
MXHf-10 (233)	3	1	MXHs-1 (261)	2	2
MXHf-11 (234)	4	1	MXLa-1 (262)	4	3
MXHh-1 (235)	5	5	MXLa-2 (263)	5	5
MXHh-2 (236)	5	5	MXLa-3 (264)	4	1
MXHh-3 (237)	5	5	MXLb-1 (265)	3	1
MXHh-4 (238)	4	2	MXLb-2 (266)	5	5
MXHh-5 (239)	5	5	MXLc-1 (267)	5	1
MXHh-6 (240)	4	3	MXLc-2 (268)	5	2
MXHh-7 (241)	5	5	MXLc-3 (269)	4	2
MXHh-8 (242)	5	5	MXLc-4 (270)	3	1
MXHh-9 (243)	5	4	MXLd-1 (271)	4	1
MXHh-10 (244)	5	4	MXNa-1 (272)	3	3
MXHh-11 (245)	5	5	MXPa-1 (273)	2	2
MXHh-12 (246)	5	5	X-1 (274)	1	1
MXHh-13 (247)	5	2	X-2 (275)	1	1
MXHh-14 (248)	5	5	X-3 (276)	2	1
MXHi-1 (249)	5	1	X-4 (277)	1	1
MXHj-1 (250)	4	2	X-5 (278)	1	1
			X-6 (279)	3	1

MAPS



Maps developed for this report were compiled from detailed county soils and erosion maps. They show:

Erosion (Sheet and Rill)

Critical Erosion

Channel Erosion

Potential Erosion

Sediment Yield

Erosion Map

The Upper Snake River Basin erosion map at scale of 1:900,000 shows areas of calculated sheet and rill erosion notes by land use and soil associations taken from the SCS, General Soils Maps of Idaho and Wyoming (20). At this scale the mapped areas had to be relatively large and include areas of varying erosion rates. The rate assigned represents an average for the area.

Critical Erosion Map

The critical erosion map at scale of 1:900,000 shows mapped areas that have erosion rates in excess of established allowable loss rates ("T"). These are the critical areas that need remedial practices to save the soil resource. These areas were mapped by soil association and represents an average situation as mentioned previously. (All of the areas do not necessarily have erosion rates greater than T. Conversely, there will be limited areas with erosion greater than T in areas not designated as critical areas.)

Potential Erosion Map

The potential erosion map of the Idaho and Wyoming portion at scale of 1:1,500,000 was developed from the Idaho SCS General Soil Map, 1973 and Wyoming's, 1975. With the aid of the Universal Soil Loss Equation, erosion rates were developed that show comparative erosion when vegetative cover is removed from the soil. Local conditions are variable so rates may vary from the average rate designated.

Channel Erosion Map

This map at scale of 1:700,000 shows mapped channels that have moderate to severe erosion in the Upper Snake River Basin. The definitions of channel erosion are included in the Glossary.

Sediment Yield Map

This map at scale 1:1,480,000, represents average annual sediment that reaches specified points in the stream systems. These yields are general in nature and cannot represent exact quantities at specific localities. Therefore, these rates should not be used to represent local conditions for detailed planning.