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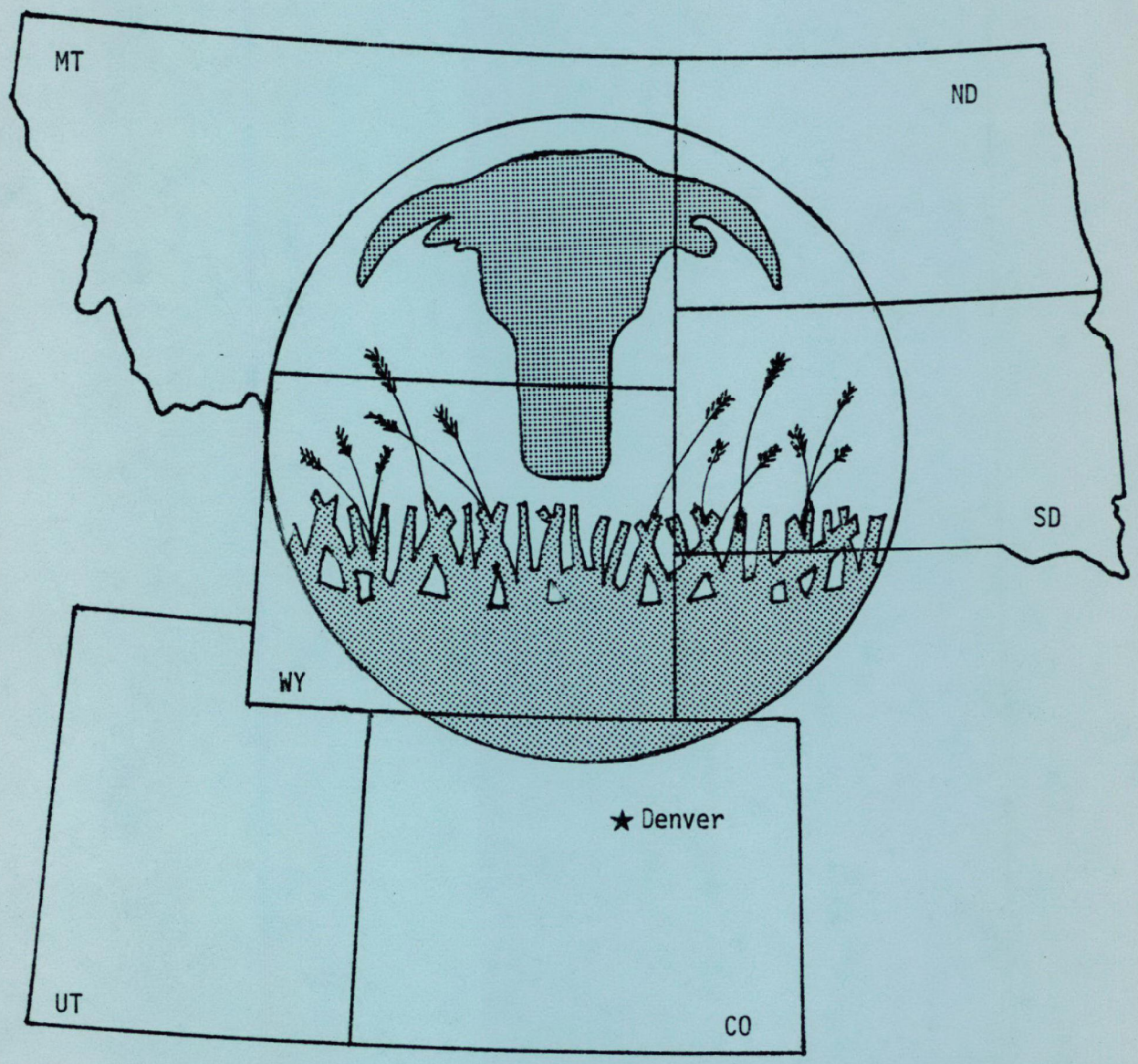
Agency

Region 8
1860 Lincoln Street
Denver, Colorado 80295

EPA

Grazing Nonpoint Source Control Strategy



GRAZING NONPOINT SOURCE CONTROL STRATEGY

Environmental Protection Agency, Region VI
1860 Lincoln Street
Denver, Colorado 80295

Prepared Under an Interagency Agreement

by

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Region VIII

I. PURPOSE

This Grazing Nonpoint Source Control Strategy provides guidance for the prevention and control of nonpoint source water quality degradation resulting from livestock grazing of rangeland. It describes procedures for identifying problem areas and those remedial measures which generally maintain water quality or reduce water pollution. It envisions appropriate water quality improvement programs carried out voluntarily at the local level by private land owners and land management agencies responsible for grazing management on federal and state grazing lands.

The Clean Water Act (P.L. 95-217, 1977), Section 208(b)(2)(F), requires that various nonpoint sources of water pollution, including runoff from lands used for livestock production, be identified and, to the extent feasible, be controlled. Section 101(d) of the Clean Water Act designates the Environmental Protection Agency (EPA) as the administering federal agency for the Act. In this capacity EPA gave direction and funding support to the States in the development of area-wide or state-wide nonpoint source water quality management plans required by Section 208 of the Act. These plans have been completed and approved for all states in EPA Region VIII (Colorado, Utah, Wyoming, Montana, North Dakota, and South Dakota) except for one area-wide plan in Colorado which is under litigation.

Section 208 also provides for a continuing planning process by the States which documents existing problems arising from point and nonpoint sources of water pollution. Management procedures to eliminate problems and proper review to insure that remedial actions are carried out are an intergral part of the process.

Section 305(b) directs the states to report biennially to EPA on current water quality conditions, including a description of the nature and extent of nonpoint sources of water pollution and recommendations for control of each category of such sources.

Grazing was not a primary concern or a primary target in water quality management plans prepared to date. Therefore, water quality problems arising on grazing lands need to be addressed in the continuing planning process and the biennial updates as information becomes available and problem areas are identified.

Within this framework a viable, well-managed grazing program on private, state and federal lands is consistent with the goals of the Clean Water Act.

II. SCOPE

This strategy is applicable to management of rangelands in EPA Region VIII and applies to improved non-irrigated perennial grassland as well as native rangeland. Irrigated grazing lands are included as crop land in the Agricultural Nonpoint Source Control Strategy developed earlier. (Copies of that document are available from EPA Region VIII.)

Rangeland can be described as land producing native forage for animal consumption including land that has been revegetated naturally or artificially to produce a plant cover that is managed like native vegetation. Plant cover on these lands consists principally of grasses, grasslike plants, forbs and shrubs. It includes natural grasslands, savannahs, and certain shrub and forb lands and may be interspersed with scattered timber or woodlands. Except for brush control, rangeland is managed primarily by regulating grazing and protecting plant cover. Generally it is not cultivated, drained, irrigated or mechanically harvested.

III. BACKGROUND

1. Historic perspective

Domestic livestock were introduced to the southwestern United States by the Spanish in the 1600's and throughout the West with the coming of settlement in the mid-1800's. The early settlers found the western rangelands to be ideal, ready-made pasturage for their herds and flocks. Rangeland vegetation had evolved under the foraging of wild herbivores native to the region and was capable of withstanding a moderate amount of grazing. Therefore, foraging by domestic livestock was not a new component in the ecosystem, but heavy competitive grazing use over several decades, generally a concentration of use for too long and often at the wrong season of each year, did result in widespread deterioration of western rangeland in the late 1800's and early 1900's (U.S. Senate Document No. 199, 1936; Council for Agricultural Science and Technology, 1974). Basically, the problem was a general lack of understanding of the physiological requirements of forage plants under arid and semi-arid western conditions and the intensity of grazing that could be tolerated before serious damage to the vegetation occurred. Rangeland forage is a remarkable resource that grows back each year if range plants are not subjected to continuing physiological stress.

2. Acreage of Grazing Land

Rangelands comprise a large proportion of the land area of the states in Region VIII, ranging from 28% for North Dakota to 83.6% for Wyoming and averaging 65% for the Region (see Table 1). Because of the acreage involved, grazing is a major land use activity in Region VIII and a potentially signficant contributor to water quality degradation.

3. Economic importance of grazing

Consumption of plant materials by animals is a natural process that converts range forage, which is not directly useable by man, into high-quality meat and fiber suitable for consumptive use. Grazing lands are an important source of forage for livestock in Region VIII because of the vast size of the rangeland area. Agricultural statistics do not differentiate between farm feedlot livestock and range livestock, but a majority of cattle and nearly all sheep in the Region spend a part of each year foraging on rangeland.

Livestock production is a large part of the income for the agricultural community in the Region (see Table 2), ranging from 20% of agricultural products sold in North Dakota to 79% in Wyoming and averaging 51% for the Region. Rangeland grazing and ranching activities associated with it, often attain an importance economically, socially, and culturally that transcends its importance from a broader aspect.

4. Clean Water Act relationships

Administratively, nonpoint water quality management is a state and local responsibility. Section 208 of the Clean Water Act provides that states develop programs for controlling nonpoint sources of water pollution from all agricultural activities including lands used for livestock production. The Environmental Protection Agency is charged with oversight responsibility.

Federal agencies, such as the Bureau of Land Management and the U.S. Forest Service are responsible for the lands under their administration. The Governors of all six States in Region VIII have designated the Bureau of Land Management and the Forest Service as water quality management agencies for land under their control.

Ranching is a land use specialization which centers on livestock grazing of the vast rangeland areas of the Region. As such, individual ranchers are key participants in any water quality management program involving grazing lands and their full support is essential.

TABLE 1

Area Grazed by Domestic Livestock
Region VIII

State	Non-federal Rangeland a/	Federal Rangeland b/	Total	Acreage of State c/	Proportion of Land Area Grazed
	*** 1,000 of Acres ***				
Colorado	23,801	23,739	47,540	66,486	71.5%
Montana	38,834	23,651	62,485	93,271	67.0%
N. Dakota	10,564	1,927	12,491	44,452	28.1%
S. Dakota	22,198	2,281	24,479	48,882	50.1%
Utah	9,385	30,730	40,115	52,697	76.1%
Wyoming	26,169	25,936	52,105	62,343	83.6%
Total	130,951	108,264	239,215	368,131	65.0%

a/ Source: U.S. Dept. of Agriculture, 1980. Soil, Water and Related Resources in the United States: Status, Condition, and Trends Appraisal, Part 1, Figure 36, p. 120.

b/ Source: U.S.D.A., Forest Service, 1980. An Assessment of the Forest and Range Land Situation in the United States. p. 261.

c/ Source: U.S. Dept. of the Interior Bureau of Land Management, 1979. Public Land Statistics, 1979. U.S. Government Printing Office, Washington, D.C. p. 9. (Does not include water.)

TABLE 2

Value of Agricultural Products Sold ($000)
Region VIII

State	Total Agricultural Products sold a/	Crops a/	%	Cattle & Calves b/	%	Sheep Lambs & Wool b/	%	Total Cattle, Sheep %
Colorado	$2,599,023	$ 575,973	22.2	$1,720,867	66.2	$ 88,793	3.4	69.6
Montana	1,184,597	490,292	41.4	596,283	50.3	22,531	1.9	52.2
N. Dakota	1,793,590	1,295,283	72.2	351,895	19.6	9,037	0.5	20.1
S. Dakota	1,906,006	567,418	29.8	874,851	45.9	39,646	2.1	48.0
Utah	468,195	102,608	21.9	165,919	35.4	30,775	6.6	42.0
Wyoming	534,434	91,114	17.1	376,205	70.4	46,307	8.7	79.1
Totals	$8,485,845	3,122,690	36.8	$4,086,020	48.2	$237,089	2.8	51.0

a/ Source: 1978 Census of Agriculture Vol. 1, Parts 6, 26, 34, 41, 44, 50. U.S. Dept. of Commerce, Bureau of the Census. p. IX.

b/ Source: ibid. p. 106.

Note: This tabulation does not itemize all agricultural products sold, therefore line items do not total.

The objective of good grazing management is a maximum forage cover on the rangeland for production of meat and other useable products. Maximum forage usually translates into maximum vegetative cover which in turn means reduced runoff, increased soil stability, and improved water quality. This conforms to goals of the Clean Water Act.

IV. CURRENT SITUATION

1. Range Condition

Rangelands provide water, energy, minerals, recreational opportunities, and habitat for wildlife in addition to grazing for domestic livestock. When properly managed, the renewable vegetative resource provides economical forage for the production of cattle and sheep and a protective soil mantle that holds the land in place. If misused and overgrazed, productive rangeland can become a wasteland where accelerated runoff may create massive erosion and turn dry channels and streams into silt-laden torrents, carrying tons of sediment to the lowlands and increasing flood damage to adjacent farm lands and urban areas. Plant physiologists are in general agreement that removal of plant tissue by grazing or other means is a physiologically destructive process to plants. Loss of leaf tissue disrupts the photosynthetic process which causes a decline in plant growth. Continued excessively heavy grazing depletes food reserves stored in plant tissue, the root system is weakened and dies back from the tips toward the root crown and eventually the plant dies. On the other hand, moderate grazing use (usually about 50% of current annual growth) is not damaging to range forage plants.

Grazing is a natural element of the ecosystem and, range plants which have evolved over the centuries under grazing have marvelous recuperative powers. When grazing use is managed to accommodate the physiological requirements of plants, a vigorous vegetative cover can be maintained. The above ground parts of plants give protection to the soil surface by reducing raindrop impact and overland flow, and their root systems serve as binders of the soil mantle. Plant litter and small fragmented rock (desert pavement) also protect the soil surface, and the addition of organic matter improves infiltration and decreases overland flow.

Erosion is a function of the amount of exposed soil and is further strongly influenced by the intensity and duration of rainfall and steepness of topography. Raindrop impact is the initiating force in surface movement of soil. Maintenance of a vigorous perennial plant cover, then, is vital to soil stability and becomes increasingly important as slope steepness increases. Soil texture is also a factor. Soils with a high content of fine sand or silt erode most readily.

With severe over-grazing, plant density and plant cover are diminished, runoff increases and soil losses accelerate because of exposure of the soil surface. Sediments produced are carried to streams and lakes causing turbidity and sedimentation and general degradation of the aquatic habitat. Much of the semi-arid rangeland in Region VIII has shallow, poorly developed soil. If this thin topsoil is lost, serious deterioration of the land and reduced productivity occur. Much of the native rangeland in the West has been damaged to some extent. But most rangelands have not deteriorated to the point where improved grazing management, modern revegetation technology, and land treatment for erosion control can not restore them to a semblance of their original productivity. Much progress has been made during the last half century in improving vegetative cover and stabilizing soil conditions on western rangelands, but efforts need to be expanded and accelerated for the accrual of greatest benefits to watershed stability and water quality improvement and to the individuals dependent on these lands for their livelihood.

The technology for revegetating depleted rangeland and controlling excessive runoff and erosion is well-established, but application of these measures is costly. By far the most cost effective alternative is a preventative program of maintaining rangelands in good or improving condition by good grazing management.

Range condition is commonly considered to be the state and health of rangeland compared to what that rangeland is naturally capable of producing, taking into account existing climate, physiography and soils. Stated another way, it is an estimate of the degree to which the present vegetation and ground cover depart from that which is presumed to be the natural potential for the site, discounting natural catastrophies and man's impacts.

Range condition classification is based principally on density and quality of plant cover and the degree of soil stability. A range in good condition is producing all or nearly all of the high value perennial plants that it is capable of producing and the soil is stable and fully productive, showing little or no evidence of erosion. A range in poor condition has lost much of its vegetative cover and erosion is active because of the exposed soil surface. Much topsoil has been lost, rills and gullies are evident, and very few high value perennial plants remain. Low value annuals and perennial are dominant on the area. Even ranges in fair condition have begun to lose some vegetative cover and some active erosion is occurring. Only good condition rangelands are essentially free of serious erosion.

TABLE 3

RANGELAND CONDITION REGION VIII [a/]

State	Total [b/]	Good	%	Fair	%	Poor	%	Very Poor	%
	thousand acres								
Colorado	35,228	4,085	11.6	10,615	30.1	14,536	41.3	5,992	17.0
Montana	54,156	8,687	16.0	22,127	40.9	18,735	34.6	4,606	8.5
N. Dakota	12,296	4,048	32.9	4,253	34.6	2,837	23.1	1,159	9.4
S. Dakota	23,402	3,405	14.6	11,050	47.2	7,233	30.9	1,715	7.3
Utah	39,615	7,586	19.1	10,170	25.7	14,149	35.7	7,711	19.5
Wyoming	47,608	8,550	18.0	17,228	36.2	17,338	36.5	4,442	9.3
Totals	212,305	36,361	17.1	75,443	35.5	74,878	35.3	25,623	12.1

a/ Source: USDA, Forest Service, 1980. An Assessment of the Forest and Rangeland Situation in the United States. Table 5.1, p. 255.

b/ Total acreages do not agree with acreage of rangeland in Table 1 because range condition information was not available for all rangeland.

In the 1980 assessment of the forest and rangeland situation, the Forest Service used a range condition classification of good, 61-100% of the potential; fair, 41-60%; poor, 21-40%; and very poor, 20% or less 1/. Table 3 shows the percentage of rangeland in each condition class for the six states in Region VIII. About half is in the poor and very poor condition categories and less than 20% is in good condition. This would indicate that serious soil losses are occurring on about 100,000,000 acres of rangeland in the Region and that runoff is carrying sediments, dissolved solids and other contaminants into adjacent streams, lakes and reservoirs.

Table 4 lists the comparative soil losses from sheet and rill erosion in tons per acre per year for cropland and non-federal rangeland for the six states in Region VIII. These statistics were calculated by the U.S. Department of Agriculture by use of the universal soil loss equation. No comparable data is available for federal rangeland.

The Soil Conservation Service has established soil loss tolerance values for all soils. These range from 2 to 5 tons per acre per year. The soil loss tolerance value is the maximum average annual soil loss that can be tolerated indefinitely without interfering with sustained high production. (U.S. Department of Agriculture 1980. Soil, Water, and Related Resources in the U.S., 1980 appraisal Part 1, p. 39).

Table 4 shows that an average of 72% of the cropland and 79% of the non-federal rangeland in Region VIII are losing less than 2 tons of soil per acre per year, and that 7.7% of the cropland and 10.7% of the rangeland lose more than 5 tons per acre per year. The rate of soil loss does not differ substantially between crop and rangeland, but acreage of all rangeland (including federal) is three times greater than cropland acreage in the Region. Thus runoff from rangeland becomes an important consideration in water quality management.

2. Rangeland Pollutants

It is generally recognized that sediment produced by runoff is the most significant pollutant from rangeland, but chemical or bacteriological pollutants may originate on grazed lands also. These include dissolved minerals, alkalinity, nutrients (phosphates and nitrates), and fecal coliform and streptococcus organisms. Salt loading occurs in runoff from saline soils and may be intensified by excessive grazing during the spring period. Pesticides can become attached to sediments and be carried into stream channels.

1/ USDA, Forest Service, 1980. An Assessment of the Forest and Rangeland Situation in the United States. p. 254.

TABLE 4

Sheet and Rill Erosion on Cropland and Nonfederal Rangeland
Region VIII

thousand acres

Cropland a/

Erosion, tons per acre per year

State	Total	Less than 2	%	2-4.9	%	5-13.9	%	14+	%
Colorado	11,093	6,942	62.6	3,115	28.1	805	7.2	231	2.1
Montana	15,355	13,351	86.9	1,440	9.4	503	3.3	61	0.4
N. Dakota	26,913	18,962	70.5	5,855	21.8	1,924	7.1	172	0.6
S. Dakota	18,156	11,617	64.0	4,605	25.4	1,580	8.7	354	1.9
Utah	1,815	1,721	94.8	73	4.0	21	1.2	---	---
Wyoming	2,970	2,347	79.0	435	14.7	125	4.2	63	2.1
Totals	76,302	54,940	72.0	15,523	20.3	4,958	6.5	881	1.2

TABLE 4 (con't)

Sheet and Rill Erosion on Cropland and Nonfederal Rangeland
Region VIII

thousand acres

Nonfederal Rangeland b/

State	Total	Erosion, tons per acre per year: Less than 2	%	2-4.9	%	5-13.9	%	14+	%
Colorado	23,801	15,659	65.8	3,867	16.2	2,586	10.9	1,689	7.1
Montana	38,834	32,088	82.6	3,609	9.3	2,110	5.4	1,027	2.7
N. Dakota	10,564	9,736	92.2	394	3.7	229	2.2	205	1.9
S. Dakota	22,198	19,496	87.8	1,489	6.7	947	4.3	266	1.2
Utah	9,385	7,271	77.5	1,090	11.6	646	6.9	378	4.0
Wyoming	26,169	19,547	74.7	2,670	10.2	2,779	10.6	1,173	4.5
Totals	130,951	103,797	79.3	13,119	10.0	9,297	7.1	4,738	3.6

a/ Source: U.S. Department of Agriculture, 1980. Soil, Water, and Related Resources in the United States: Status, Condition, and Trends, 1980 Appraisal Part 1, Table 22, p. 82 and 83.

b/ Source: ibid., Table 23, p. 84 and 85.

Indiscriminate use of streams by livestock on rangelands in Region VIII has caused serious deterioration of the riparian habitat in many instances. Cattle in particular prefer streamside areas for shade, more succulent vegetation, and drinking water and tend to congregate in these areas. Heavy streamside grazing results in breakdown of streambanks, cropping and trampling of shrubs that shade the stream, and disturbance of stream bottoms. The effects are streambank erosion, increased sedimentation, compaction of soil, reduced density of vegetation and quality of forage, increased width and decreased depth of channels, higher water temperatures, and direct deposition of animal waste. This is especially damaging to aquatic ecosystems.

V. COMPONENTS

1. Problem area identification

While grazing has been recognized as contributing to nonpoint source pollution in Water Quality Management Plans for all states in Region VIII, the degree of impact generally has not been determined nor have specific problem areas been identified in the management plan for each state. All existing legislation requires state water quality management agencies and federal land management agencies to identify nonpoint source water pollution problems and to develop and implement a water quality management plan for each state.

Identification of specific rangeland areas causing water quality degradation is the basic step in the development of remedial measures. These may be a watershed, portions of a watershed, or stream segments. The determination of principal cause, including natural conditions, and type or types of contaminants are important also. Sediment and salt yields and bacteria levels are most likely to be affected by livestock grazing.

Criteria that can be used include:

- impairment of use of receiving waters for specific purposes, e.g., municipal water supplies, fisheries.
- failure of receiving waters to meet established water quality standards.
- sediment loading that is widely disproportionate to land area of the drainage.
- fragile areas having erodible soils and steep slopes (badlands) where natural (geologic) erosion is occurring.

All states in Region VIII have water quality standards for dissolved solids and all except Colorado have standards which limit suspended solids and sediment or turbidity. Refer to individual state water quality standards for specific parameters.

Problem areas on federal rangelands are identified by federal land management agencies (BLM and Forest Service) in the course of ongoing resource inventories and the development of land use plans, which are required by the Federal Land Policy and Management Act. Information so developed should be provided annually to state water quality management agencies who have the lead in describing the nature and extent of nonpoint sources of pollutants and in making recommendations for control (Sec. 305(b)(1)(E) of the Clean Water Act). On federal lands as land use plans are developed, the federal agencies should identify the site, describe the problem and known causes and recommend a control program, including estimated costs and a time schedule for implementation.

2. Problem Area Priority Setting

Because funding and human resources are limited, statewide priorities need to be established for correcting water quality problems on rangelands so that resources can be used efficiently as they become available. Priority schedules should become a part of the water quality management program developed by each state.

Nearly half of the rangeland in Region VIII is under federal administration (see Table 1), and consultation and coordination between federal land management agencies and state water quality management agencies is a necessity in setting priorities and developing a remedial program. As land use plans are developed and problem areas are identified on federal rangelands, the BLM and the Forest Service can develop a remedial program within the framework of their overall program responsibilities and available funding and suggest priorities for implementation to state water quality agencies. The state can then meld these into the statewide plan.

Many ranch operations in the Region are dependent on both public and private rangelands. Therefore, the input and full cooperation of the land user is essential in a water quality management program for these lands.

The following criteria are suggested for establishing priorities for rangeland nonpoint problem areas:

a. Severity of the water quality impact and degree of water use impairment. Consider the extent to which receiving waters violate state or federal water quality standards, public health is endangered, or water uses are impaired. Comparative quantification among sites may be difficult, and relative indices based on professional judgment may be the best information available. In some cases, such as salinity, the costs of each added increment of pollution can be quantified in dollar terms.

b. Technical effectiveness of available Best Management Practices (BMP's). Are BMP's available that would significantly correct or mitigate the identified problem? Are they economically feasible?

c. Relative cost-effectiveness of BMP's. Cost-effectiveness is expressed as cost per increment of improvement in some water quality parameter where costing analysis are available. In actual practice, such figures are seldom available and it is necessary to make relative estimates of cost-effectiveness based on professional judgement.

d. Readiness to go. Federal agencies have mandated management responsibilities on federal rangelands that involve actions not directly related to water quality control. It is conceivable that the BLM or the Forest Service could be planning a management action on an area which in itself or with minimal supplemental funding could alleviate an otherwise low priority water quality problem. This could be true on private lands as well. Situations involving readiness to take action should be given special consideration.

e. Public and landowner support. The degree of local enthusiasm and general support is an important consideration. A remedial program for rangelands often involves both federal and private grazing lands and in some instances state lands. Because of the dependence of grazing use on lands in several ownerships, it is highly desirable that all actions be supported by all parties, but downstream considerations could be overriding.

3. Best Management Practices (BMP's)

Best Management Practices are those measures which, together or singly, mitigate the adverse affects of livestock grazing on rangeland vegetation, maintain or enhance watershed stability, or reduce or eliminate water quality degradation originating on grazed rangeland. In most situations a number of alternatives or combinations of alternatives are available for correcting water quality problems. All would have some effect, direct or incremental, on water quality. The single most important grazing management objective relating to water quality control is the maintenance or development of optimum vegetative ground cover to protect the watershed from excessive runoff and erosion.

Selection of BMP's is guided by management objectives, water quality requirements and specific site conditions relating to soils, vegetation, geology, topography, climate and proximity to receiving water bodies. Economic considerations may be important also. A discussion of best management practice for rangeland is treated in more detail in Livestock Grazing Mangement and Water Quality Protection (EPA Doc. 910/9-79-67, 1979) pages 13-19.

On public rangelands the required grazing environmental impact statement will analyze the resource base and consider management alternatives. The subsequent land use plan will develop the site specific grazing management program (grazing system or allotment management plan) including selection of BMP's and an implementation schedule.

Application technology for best management practices for rangelands is well known and understood by professional range managers and range conservationists and will not be discussed in great detail here. If needed, assistance on private lands is available from the Soil Conservation Service and state extension range management specialists.

BMP's for rangeland fall into three general categories: grazing management, installation of management facilities, and land treatment.

a. Grazing management. Good animal distribution and control of the amount, intensity and season of grazing is basic to any grazing management system. Grazing management includes the use of any one or any combination of the following practices to fit a given situation and meet management objectives:

- Adjustment in numbers of livestock.
- Adjustment in season of use, frequency or intensity of livestock use.
- Improved distribution of livestock use.
- Deferment of livestock use.
- Rotation of livestock use.
- Rest from livestock use.
- Changing class of livestock, i.e. sheep, cattle, horses.
- Removal of livestock, temporarily or permanently, where livestock grazing is or has been detrimental to the site, e.g., steep, fragile sites where disturbance of the surface produces excessive soil erosion and sedimentation; critical watersheds used for municipal and domestic water supply; critical riparian zones; highly saline sites adjacent to watercourses.

To be successful, a system of grazing management must be designed for a specific site and provide for the continuing physiological needs of the desired vegetation on that site, giving full consideration to limitations of climate, soils and topography.

b. Installation of management facilities. Supportive facilities for management of livestock are essential for achieving control and distribution of livestock on the area to be grazed. These include:

- water developments
- fencing
- corrals
- stock trails
- distribution of salt
- shelters.

c. Land Treatment. Land treatment measures are designed to improve vegetative cover, induce infiltration, and control or reduce runoff to acceptable levels. These include:

- rangeland seeding
- control of undesirable brush
- prescribed burning
- fertilization
- pitting, ripping, chiseling, deep plowing
- contour furrowing, plowing, trenching
- waterspreading
- water and erosion control structures.

Land treatment measures are effective only in combination with good grazing management and a comprehensive watershed management plan.

4. Application to federal, state and private lands

The principles of good grazing management and best management practices apply equally well to rangelands in all ownerships, but management objectives may differ. Federal lands involve a multiplicity of uses as directed by law, state lands are generally managed to derive maximum revenues as directed by state constitutions, and the private land owner is perhaps most interested in net economic returns. Generally the paramount consideration is sustained forage yield consistent with watershed stability. Because of intermingled ownerships of rangelands in Region VIII, the importance of consultation and coordination in all actions can not be overemphasized.

5. Management agencies

Generally Conservation Districts, the State Conservation Commission, or counties have been designated as management agencies for private sector lands. Conservation Districts are implementation agencies at the local level. Conservation Districts have the authority, commitment, access to technical expertise, and knowledge of local conditions to carry out an effective voluntary erosion control program on private lands.

In accordance with Section 208 of the Clean Water Act, the state governors have designated the BLM and the Forest Service as official water quality management agencies for lands under their jurisdiction. Interagency agreements between the states and the federal agencies addressing program responsibilities have been consummated in Montana, Wyoming, Utah, and South Dakota. Litigation has delayed completion of the interagency agreement with Colorado, and the minor acreage of scattered federal land in North Dakota has been included in the state water quality management program.

Federal agencies have the staff resources, technical expertise, knowledge of lands under their administration, and legislative authority to implement a water quality management program within the framework of their land use planning. Action programs are in place that include water quality mangement as part of a larger total resource management program for federal rangelands and commitment is strong to carry out the program. Where indicated, water quality monitoring has been initiated in the overall watershed management program. Additional components can be added as funding becomes available. Furthermore, the Clean Water Act Section 313(a) requires that all actions on federal lands meet the substantive and procedural water pollution control and abatement requirements of the state in the same manner and to the same extent as nongovernmental entities. Consultation and coordination among all agencies and individuals is vital to a successful water quality management program for rangelands.

6. Technical and financial assistance

Nonpoint implementation programs in all states in Region VIII are heavily dependent on limited federal cost-share and technical assistance programs. These generally relate to cost-share funds from the Agricultural Conservation Program (ACP), Rural Clean Water Program (RCWP) and Great Plains Conservation Program (GPCP). But federal aid to these programs is being reduced or eliminated. Identified needs far exceed available resources and state funding sources should be encouraged.

Federal agencies are expected to finance remedial measures to correct water quality problems originating on federal rangelands. Generally these best management practices would be part of an allotment management plan developed in consultation with the range user following preparation of a grazing environmental statement and a land use plan. Funding for specific items is included in the annual budget submitted for the administrative unit.

Section 304(k) of the Clean Water Act authorizes funding to implement priority water pollution control projects on federal lands consistent with state water quality management plans. To date no funds have been appropriated under this authority.

The private land owner is reluctant to finance a practice for his land that is not economically feasible. If public values are involved, cooperative programs will be necessary. Technical assistance on private lands is available through the Soil Conservation Service, and Extension Services can provide information on grazing management through the Extension Range Management Specialist in each state.

7. Actions

It is of paramount importance that all actions be coordinated among federal, state and private entities, because of the highly interdependent nature of grazing activities in Region VIII on lands of mixed ownership.

a. State water quality management agencies

Within the framework of the state water quality management plan:

- Identify water quality problem areas on rangelands throughout the state.
- Establish control priorities statewide among identified water quality problem areas.
- Establish a list of best management practices suitable for application on rangelands.
- Consult and coordinate with federal land management agencies and other interested parties on relevant phases of water quality management programs.
- Coordinate water quality monitoring statewide.
- Incorporate input from federal land management agencies into the state water quality management plan.
- Develop and update interagency agreements for implementation of water quality management plans where needed.
- Report biennially to EPA on water quality conditions within the state, including the nature and extent of nonpoint sources of pollutants, recommendations for control and estimated costs (305(b) report).

b. Federal agencies

On federal rangelands:

- In the course of land use planning, identify water quality problem areas stemming from grazing activities.
- Set priorities for implementing remedial measures for identified water quality problem areas.
- Select best management practices for correcting water quality problems and a schedule for application including estimated costs.

- Include water quality considerations where appropriate in site specific management plans, e.g., allotment management plans.

- Consult and coordinate on an ongoing basis with state water quality management agencies and other interested parties on relevant water quality management planning and implementation activities.

- Monitor results to meet water quality management objectives and modify program if water quality objectives are not being achieved.

- Provide input to the biennial water quality progress report of the state water quality management agency.

- Provide information as it becomes available to the state water quality management agency for use in the continuing planning process for water quality management.

- Update interagency agreements as needed.

c. EPA Region VIII

- Give direction to the identification of water quality problem areas on rangelands in each state.

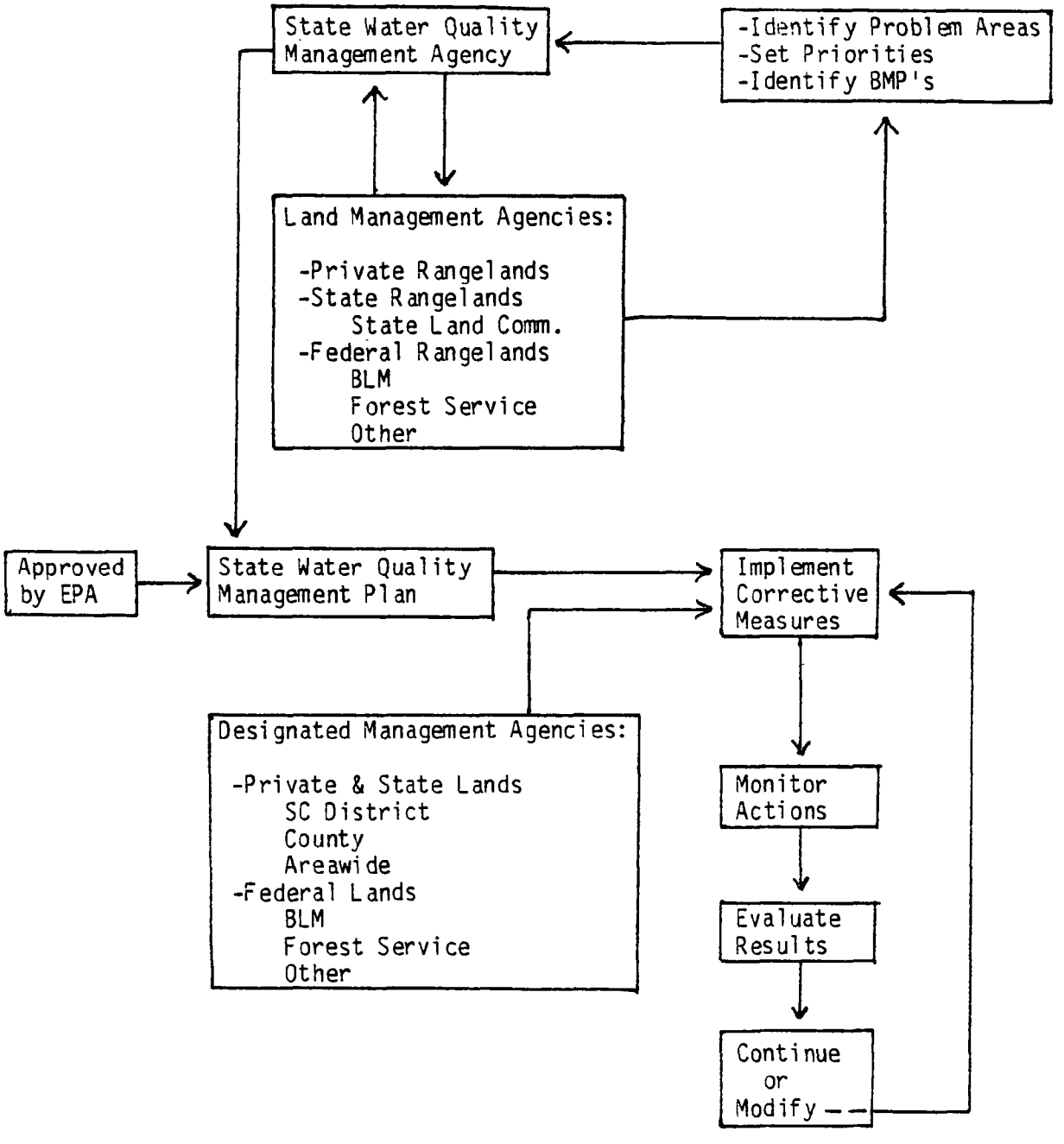
- Give direction to the setting of priorities for identified problem areas in each state.

- Assist state water quality management agencies and federal land management agencies in the development and updating of interagency agreements for implementation of water quality management plans where needed.

- Assist state water quality management agencies in obtaining funding for implementation of water quality management plans.

- Assist state water quality management agencies in correcting program deficiencies and implementing water quality management plans for water quality problem areas on rangelands.

Processes Flow Chart, State Water Quality
Management Program for Rangelands



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