APPENDIX G

Best Management Practices
(BMPs)

BEST MANAGEMENT PRACTICES[1]

Soil and Water

Land management activities have been recognized as potential sources of non-point water pollution. By definition, non-point pollution is not controllable through conventional treatment plant means. Containing the pollutant at its source or precluding delivery to surface water controls non-point pollution. Sections 208 and 319 of the Federal Clean Water Act, as amended, acknowledge land treatment measures as being an effective means of controlling non-point sources of water pollution and emphasize their development.

NEVADA STATE DIRECTION FOR BEST MANAGEMENT PRACTICES

In 1978 the Nevada Division of Conservation, the Conservation Commission, and the Nevada Division of Environmental Protection developed the first Handbook of Best Management Practices as part of the water quality management planning process for addressing nonpoint source pollution.

Best Management Practices (BMPs) can be utilized by an individual or agency to control a water quality problem caused by nonpoint source pollution. The BMP concept is based on the premise that individuals and agencies should take the most practical and feasible approach to prevent the release of pollutants into the surface and ground waters of the State. The diffuse and intermittent nature of nonpoint source pollution makes identification of these sources difficult at times. Section 445.203 of the Nevada Administrative Code defines diffuse source as:

1. Agricultural activity, including return flows from irrigation
2. Silvicultural activity
3. Mining activity
4. Construction of buildings, roads, dams, utility lines or other improvements of facilities
5. Runoff from roads, streets, and railroads
6. Construction or use of recreational trails
7. Modification of watercourses or stream channels
8. Runoff from urban areas

The Nevada Diffuse Source regulations were adopted in 1982. In 1987, the Federal Clean Water Act was amended to address nonpoint sources of pollution. The U.S. Environmental Protection Agency (EPA) has identified additional categories and subcategories of nonpoint sources of pollution, which encompass a wide range of activities. The following is a summary of the major activities recognized by the State and EPA with the potential for generating nonpoint source pollution in Nevada.

1. Construction
2. Hydrologic Modification
3. Habitat Modification
4. Irrigation and Drainage
5. Cropland
6. Livestock Grazing
8. Silviculture
9. Resource Extraction
10. Urban Runoff
11. Land Disposal
12. Waste Management Activities
13. Atmospheric Deposition

[1]Best Management Practices. http://ndep.nv.gov/bwqp/bmp/.

7. Feedlots/Animal Holding Units

Best Management Practices can effectively eliminate or reduce the introduction of pollutants into receiving waters when applied before, during, or after pollution producing activities. The main criteria, which should be considered when selecting BMPs to improve water quality, are the type of pollutant(s) being generated and the category of pollution generating activity; however, the following factors must also be considered: site-specific physical characteristics, cost-effectiveness, landowner acceptance, public interest and support, legal authority, and agency limitations.

Thus, the selection of BMPs for application to a particular nonpoint source (NPS) pollution problem will be site-specific and modifications may be required to tailor the BMPs to the characteristics of the problem area. However, some general guidelines for BMP selection can be provided based upon the activity, which is generating the pollution.

Below is a listing of BMPs. along with their purpose and expected effectiveness that would guide the projects associated with grazing management. To read the complete BMP and requirements refer to the Nevada Best Management Practices Handbook (http://ndep.nv.gov/bwqp/bmp/intorduction_rev.pdf).

BMP 1-3. ACCESS ROADS

Roads to provide needed access to an area should be constructed in such a way that the quality of runoff water is preserved.

PURPOSE: To provide a route for vehicle travel, for moving equipment, supplies and products, and for providing access for proper operation and management of conservation enterprises without disturbing the quality of runoff water.

EFFECTIVENESS: Proper installation and maintenance of access roads can be effective in reducing soil erosion and minimizing impacts to water quality.

BMP 2-13. WATER SPREADING

Diverting runoff from natural channels or gullies by means of a system of dams, dikes, or ditches and spreading it over relatively flat areas.

PURPOSE: To provide extra moisture for improved cover and forage production on rangeland, pastureland, native hayland, and reclamation projects and to disperse floodwaters to reduce sediment and damage to watershed areas.

EFFECTIVENESS: Properly installed water spreading systems will reduce sediment delivery by trapping sediment in the spreading area, are highly effective in improving vegetative cover, and forage production.

BMP 5-4. WETLANDS

Natural or constructed areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions; wetlands generally include swamps, marshes, bogs, and similar areas.

PURPOSE: To improve water quality, remove sediment, reduce soil erosion, and prevent flooding.

EFFECTIVENESS: Wetlands and riparian areas can play a critical role in reducing nonpoint source pollution by intercepting surface runoff and subsurface flow; however, a definite range of operational

conditions must be maintained in order for the wetland system to effectively remove pollutants and to prevent degradation of the system itself. When hydrologic changes or nonpoint source pollutants exceed the natural assimilative capacity of these systems, the wetland areas can become degraded or destroyed.

BMP 6-1. CRITICAL AREA PROTECTION

Protection of critical erosion areas from damaging use by grazing animals, people, and vehicular traffic.

PURPOSE: To manage the land use of critical erosion areas in a manner which reduces wind and water erosion and improves the quality of surface runoff waters.

EFFECTIVENESS: Protecting critical areas from overuse by grazing animals, people, and vehicular traffic will aid revegetation and stabilization of these areas and will result in reduced erosion and sediment delivery.

BMP 6-2. CRITICAL AREA STABILIZATION

Development of a plan of action to stabilize critical erosion sites. This includes natural sites as well as those created by man's activities.

PURPOSE: To stabilize and reclaim the surface disturbance area, reduce soil erosion, and control runoff and sediment delivery from critical erosion sites.

EFFECTIVENESS: Proper installation and maintenance of critical area stabilization is a highly effective method for reducing unnatural sediment loads in runoff waters from these sites and in reducing total runoff.

BMP 6-3. STREAM PROTECTION & STABILIZATION

Structural and vegetative treatments to stabilize stream channels and streambanks.

PURPOSE: To reduce erosion and sediment loads, improve fish and wildlife habitat, maintain channel capacity, and prevent damage to land, utilities, roads, buildings, or other facilities adjacent to the stream.

EFFECTIVENESS: Stabilization of stream channels and streambanks is an effective treatment to reduce sediment loading, and control erosion and land damage. Great care needs to be taken when using engineered structures so that these structures do not aggravate the situation. For example in flat alluvial settings, streams naturally meander and change courses. Trying to keep such a stream channel in one particular location may be futile and counter productive.

BMP 7-3. NATIVE MEADOWLAND IRRIGATION MANAGEMENT

A planned irrigation system where all necessary water control structures have been installed for the efficient distribution of irrigation water by surface means. Determining and controlling the rate and amount of irrigation water application to soils for crop water requirements in a planned and efficient manner.

PURPOSE: To effectively utilize available irrigation water in managing and controlling the moisture requirements of native hay and pastures, to promote the desired growth response, to minimize soil erosion and loss of plant nutrients, to control undesirable water loss, and to protect water quality.

EFFECTIVENESS: Irrigation management will maintain meadow production, control soil erosion, and improve water quality.

BMP 7-4. PASTURE AND HAYLAND MANAGEMENT

The use of haylands and pasturelands for improved forage production and management of soil and water resources.

PURPOSE: To provide for sustained forage production, protect the soil from erosion, and maintain or improve water quality.

EFFECTIVENESS: Using lands for production of hay or pasture under proper management will significantly decrease runoff and sediment delivery. Proper fertilizer practices will not adversely affect water quality.

BMP 7-5. SALINITY CONTROL

The design and implementation of land and water management practices with the objective of reducing salt concentration in surface runoff and ground water.

PURPOSE: To maintain soil conditions suitable for plant growth while preventing degradation of downstream surface and ground water quality by excessive salt concentration.

EFFECTIVENESS: The level of effectiveness will depend upon the extent that the practices are implemented. A high degree of downstream water quality control can be achieved by using all applicable practices at the specific site.

BMP 7-8. PLANNED GRAZING SYSTEM

A livestock/wildlife grazing system in which two or more grazing units are alternately deferred or rested from grazing in a planned sequence over a period of years. The rest period may vary in duration given the specifics of the grazing area (i.e., season, year, etc.).

PURPOSE:

- To maintain or improve plant cover, plant composition, and forage production while properly using the forage on all grazing units.
- To improve efficiency of grazing by uniform use of all parts of each grazing unit.
- To provide a supply of forage throughout the grazing season.
- To improve the quality of forage available to animals during specific seasons.
- To protect watersheds, reduce runoff and sedimentation for the improvement of surface and ground water quality.
- To improve wildlife habitat.

EFFECTIVENESS: A properly operated grazing system provides for efficient use of forage and is an effective means of maintaining a plant cover that will reduce runoff and sediment delivery. How effective grazing management will be is dependent upon both the quality of the design in relation to the land and the skill utilized to implement, monitor, and adjust management to meet objectives.

BMP 7-9. PROPER GRAZING USE

Utilizing grazing practices at intensity, which will maintain enough cover to protect the soil and maintain or improve the quantity and quality of desirable vegetation.

PURPOSE: To improve or maintain the condition of a plant species or community; to improve vegetative ground cover; and to maintain or improve the quality of surface runoff water on upland areas.

In riparian areas, the purpose is to provide minimum vegetation stubble height to slow runoff, trap sediment, and ensure adequate root mass to hold banks during spring run off events.

EFFECTIVENESS: Proper grazing use will improve range production and vegetative cover to reduce runoff and sediment delivery.

BMP 7-10. RANGE IMPROVEMENTS

Improving the existing rangeland through specific treatments including seeding, planting, prescribed burning, and brush/weed management.

PURPOSE: To improve watershed quality, conserve soil and water resources, and reduce sediment delivery; produce forage for livestock and wildlife; improve plant species diversity; and improve recreation, wildlife, and the natural resource values of the land.

EFFECTIVENESS: Well established and managed range seedings protect watersheds from excessive runoff, reduce runoff, and reduce erosion and sediment delivery.

BMP 8-3. FUELS MANAGEMENT

Management and manipulation of vegetation by mechanical, chemical, or biological means, or by controlled burning on forestland, rangeland, native pasture, pastureland, and public or private land (includes reducing excess brush stands through selective and patterned control methods to protect the soil and maintain or improve the quality of runoff water).

PURPOSE: To maintain or reduce a level of vegetation to minimize the threat of wildland fire.

EFFECTIVENESS: Fuels management is effective in improving watershed conditions for better water infiltration, reduced runoff, and lower sediment delivery and for wildland fire protection.

USDA FOREST SERVICE REGIONAL DIRECTION FOR BEST MANAGEMENT PRACTICES

Regional direction for the use of Best Management Practices is located in the Forest Service Handbook, 2509.22 – Soil and Water Conservation Practices (SWCP) Handbook, R-1/R-4 Amendment NO. 1, which became Effective 05, 1988. Project specific direction is located in Chapter 10 of the Soil and Water Conservation Practices Documentation, in parts of Section 11 (Watershed Management) and entire Section 17 (Range) and are presented below.

PRACTICE 11.01 - Determination of Cumulative Watershed Effects

OBJECTIVE: To determine the cumulative effects or impacts on beneficial water uses by multiple land management activities. Past, present, or reasonably foreseeable future actions in a watershed are evaluated relative to natural or undisturbed conditions. Cumulative impacts are a change in beneficial water uses caused by the accumulation of individual impacts over time and space. Recovery does not occur before the next individual practice has begun.

EXPLANATION: The Northern and Intermountain Regions will manage watersheds to avoid irreversible effects on the soil resource and to produce water of quality and quantity sufficient to maintain beneficial uses in compliance with State Water Quality Standards. Examples of potential cumulative effects are: 1) reduced natural woody debris input to stream channels that may cause reductions in fish habitat; 2) excess sediment production that may reduce fish habitat and other beneficial uses; 3) water

temperature and nutrient increases that may affect beneficial uses; 4) compacted or disturbed soils that may cause site productivity loss and increased soil erosion; and 5) increased water yields and peak flows that may destabilize stream channel equilibrium.

IMPLEMENTATION: As part of the NEPA process, the Forest Service will consider the potential cumulative effects of multiple land management activities in a watershed which may force the soil resource's capacity or the stream's physical or biological system beyond the ability to recover to near-natural conditions. A watershed cumulative effects feasibility analysis will be required of projects involving significant vegetation removal, prior to including them on implementation schedules, to ensure that the project, considered with other activities, will not increase sediment or water yields beyond or fishery habitat below acceptable limits. The Forest Plan will define these acceptable limits. The Forest Service will also coordinate and cooperate with states and private landowners in assessing cumulative effects in multiple ownership watersheds.

REFERENCES: 40 CFR 1508.7; for portions of Montana, Montana Department of State Lands Cumulative Watrershed Effects Cooperative; for Idaho Forests, Idaho Forest Practices Water Quality Management Plan, 1987; R. N. Coats and T. O. Miller. 981. Cumulative Silvicultural Impacts on Watersheds: A Hydrologic and Regulatory Dilemma. Envir. Mgt. 5(2):147-160.

PRACTICE 11.02 - Soil and Water Resource Monitoring and Evaluation

OBJECTIVE: To determine effects of land management activities on soil productivity and beneficial water uses; to monitor baseline watershed conditions for comparison with state standards, forest plan standards, and estimation of long-term trends; to ensure the health and safety of water users; to evaluate SWCPs effectiveness; and to determine the adequacy of data, assumptions, and coefficients in the forest plans.

EXPLANATION: The Northern and Intermountain Regions will manage watersheds to avoid irreversible effects on the soil resource and to produce water of quality and quantity sufficient to maintain beneficial uses in compliance with State Water Quality Standards. Monitoring and evaluation are needed as feedback mechanisms to compare the results of management activities and SWCPs on soil and water resources with previous conditions, desired end-products, and state standards. To accomplish this, a comparison will be made, on a representative sample basis, of effects on soils and water over time. Previous monitoring and evaluating has included, for example:

a. Bulk density, soil disturbance, and/or tree growth to evaluate soil productivity.
b. Fecal coliform and pH to monitor swimming sites.
c. Sediment, turbidity, and water temperature to evaluate domestic water supplies.
d. Sediment, dissolved oxygen, water temperature, pH, cobble embeddedness, percent fines in substrate, and channel cross sections to monitor effects on fisheries.

IMPLEMENTATION: Forest plans will provide watershed monitoring plans that are focused on beneficial water uses such as domestic supplies, recreation, and fisheries, and on soil loss and productivity. Regionally approved monitoring techniques will be used. Specific monitoring plans will be coordinated among adjacent national forests and with state water quality agencies. Specific monitoring and evaluation plans will include such items as:

a. Monitoring objectives.
b. Review of existing data and information.
c. Location of monitoring sites.
d. Soil and water quality characteristics that are to be monitored and evaluated.
e. Type(s) or technique(s) of monitoring.
f. Intensity of monitoring (frequency and duration).
g. Responsibilities and roles of monitoring personnel. Methodology for analysis and evaluation.

i. Estimated cost.
j. Report preparation.

When changes and effects from management activity are detected, the Forest Service will evaluate their significance and determine appropriate action. Where project level activities will not meet forest plan or state standards, they will be redesigned, rescheduled or dropped.

The EPA computerized STORET system is the accepted repository for water quality data collected to monitor and evaluate Forest programs and management activities. Water quality data will be placed in this computer system for storage, manipulation and review.

REFERENCES: FSM 1922, 2525, 2532, and 2554; SWCP Handbook 10.40 Feedback Mechanism; FSH 1909.12, Land and Resource Management Planning Handbook, chapter 6; 36 CFR 219; Solomon, R. A. and Avers, P. E., 1987. A Water Quality Monitoring Framework to Satisfy Legal Requirements. AWRA Symposium on Monitoring, Modeling, and Mediating Water Quality. pp. 231-242; FSH 2509.18, Soil Monitoring Handbook, State Water Quality Standards; for Idaho Forests, Idaho Forest Practices Water Quality Management Plan, 1987; SWCP 12.02, 12.03, and 13.09; S. L. Ponce. 1980. Water Quality Monitoring Programs. USDA, Forest Service, WSDG Tech. Paper - 00002. 66 pp.; for R-4, R-4 Technical Guide for Preparing Water Quality Monitoring Plans, USDA, Forest Service, 1981.

PRACTICE 11.04 - Floodplain Analysis and Evaluation

OBJECTIVE: To protect floodplain values and avoid, where possible, the long and short-term adverse impacts to soil and water resources associated with the occupancy and modification of floodplains.

EXPLANATION: A flood hazard analysis and evaluation will be made prior to acquisition or exchange of land within floodplains. A floodplain analysis and evaluation will be made when sites within floodplains are being considered for structures, developments, or management activities. Environmental quality, ecological effects, and individual safety and health are considered. Flood frequencies, watershed conditions, climatic and environmental factors associated with past flood events, flood flow quantities, and specific flood boundaries are all evaluated.

IMPLEMENTATION: The Regional Forester is responsible for ensuring consideration of floodplain hazards and values in all NEPA planning processes. The Forest Supervisor, through use of technical staffs, is responsible for:

a. Determining if proposed facilities are within 100 and 500 year floodplain boundaries.
b. Determining if data currently exist about floodplain boundaries.
c. Documenting analysis of floodplain hazards and management options.
d. Requiring flood hazard evaluations prior to issuance of special use permits.
e. Ensuring that floodplain hazards, management considerations, and appropriate restrictions are included in authorizing documents.
f. Designing, constructing, or rehabilitating national forest real property in accordance with criteria outlined in the National Flood Insurance Program.
g. Providing for conspicuous marking of highest past and probable future flood heights, on permanent structures including those in developed recreation sites.

REFERENCES: EO 11988, Floodplain Management; FSM 2527; Maxwell, J. and LaFayette, R., 1986 Guidelines for Making Floodplain and Wetland Evaluations for Land Exchanges. USDA, Forest Service, Southwestern Region Hydrology Note No. 19a.

PRACTICE 11.05 - Wetlands Analysis and Evaluation

OBJECTIVE: To maintain wetlands functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands.

EXPLANATION: The Forest Service does not permit the implementation of activities and new construction in wetlands whenever there is a practical alternative. Through the NEPA process, a wetland analysis and evaluation will be made prior to acquisition or exchange of wetlands. Evaluation of proposed actions in wetlands will consider factors relevant to the proposal's effect on the survival and quality of the wetlands. Factors to be considered include water supply, water quality, recharge areas, flood and storm hazards, flora and fauna species, soil types, habitat diversity and stability, and hydrologic utility.

IMPLEMENTATION: The Regional Forester is responsible for insuring wetland values are considered and documented as an integral part of all planning process. The Forest Supervisor, through use of technical staffs, will determine whether proposed actions should be located in wetlands and, if so, whether there is a practicable alternative. If there are no viable alternatives, the Forest Supervisor must insure that all mitigating measures are incorporated into the plans and designs and that the actions maintain the function of the wetlands. Identification and mapping of wetlands are part of the forest planning process.

REFERENCES: EO 11990, Protection of Wetlands; FSM 2527; Maxwell, J. and LaFayette, R., 1986. Guidelines for Making Floodplain and Wetland Evaluations for Land Exchanges. USDA, Forest Service, Southwestern Region Hydrology Note No. 19a.

PRACTICE 11.06 - Public Supply Watershed Management

OBJECTIVE: To manage community and noncommunity public supply watersheds to comply with state water quality standards.

EXPLANATION: The Northern and Intermountain Regions will manage public supply watersheds for multiple use with special emphasis on providing water suitable for human consumption within the realm of State Water Quality Standards, water supply regulations, and forest plan standards.

IMPLEMENTATION: Watersheds identified by the states as public supply watersheds will be recognized in forest plans. Forest plans will include management goals and standards which will guide the management of the watershed and result in compliance with State Water Quality Standards. All project plans will be reviewed through the NEPA process which includes review by the appropriate state agency and by the water users and tiered to direction in the forest plan and EIS.

REFERENCES: FSM 2542; State Drinking Standards; State Public Water Supply Regulations; 36 CFR 251.

SECTION 17 - RANGE

Range management involves range and resource analysis, allotment management planning, and a grazing permit system. It includes controlling overall livestock numbers and season of use, improvements, providing for wildlife needs, and restoration of deteriorated range lands.

The historical use of National Forest System lands in the Northern and Intermountain Regions for grazing generally predates the actual establishment of individual forests. During this early period, grazing use was typically uncontrolled with generally an excessive number of animals using these lands and producing numerous soil and water resource problems. The current situation is much improved over that which existed historically. Most allotments maintain the productive status of the land and protect underlying soils. There are, however, some allotments where the range remains in a deteriorated

condition. These SWCPs are designed to restore deteriorated range an maintain all range in a productive state.

PRACTICE 17.01 - Range Analysis, Allotment Management Plan, Grazing Permit System, and Permittee Operating Plan

OBJECTIVE: To maintain and protect soil and water resources through sustained forage production and managed multiple use of range forage.

EXPLANATION: An analysis of potential and/or existing range is conducted by an interdisciplinary team to evaluate productive capabilities, inherent hazards, resource values, and uses. Based on this analysis, the Forest Service, in cooperation with the permittee and other users, prepares a written allotment management plan and issues a permit to authorize livestock grazing as per stipulations in the plan. These documents include measures to protect other resource values, such as water quality and riparian areas, and to coordinate livestock grazing with other resource uses. Specific methods for controlling when, where, amount of utilization, and numbers of livestock to be grazed are covered in the plan. Rangeland improvements and an implementation schedule are also included. Permittees are required to contribute a portion of the cost of new improvements and to maintain the existing improvements on an allotment.

A permittee operating plan is prepared, reviewed and revised annually to reflect direction in the allotment management plan, to account for current allotment conditions and trends, and to adjust for unexpected resource problems (such as drought). The amount of livestock use is determined primarily through measurement of vegetative utilization. Allowable use is determined by research, vegetative trends, and experience.

IMPLEMENTATION: The District Ranger is responsible for analysis of range allotments, completion of the environmental analysis, preparation of allotment management plans, and processing grazing applications. The Forest Supervisor approves allotment management plans and issues grazing permits with required stipulations and conditions. Most permits are issued for ten-year terms. Allotment management plans are revised as needed. Permittee operating plans are prepared or revised annually, to adjust for current allotment conditions and trends, and to incorporate seasonal instructions. The permittee carries out the plans under the direction and supervision of the District Ranger or Forest Service representative. Corrective action is taken if a permittee does not comply with grazing permit conditions designed to protect the soil and water resources.

REFERENCES: FSM 2203, 2204, and 2323.2 - 24; FSH 2209.12, Range Management Information System Handbook, FSH 2209.13, Grazing Permit Administration Handbook, and FSH 2209.14, Service-wide Range Analysis and Management Handbook; NEPA; SWCP 11.01, 11.02, 11.03, and 11.05.

PRACTICE 17.02 - Controlling Livestock Numbers and Season of Use

OBJECTIVE: To maintain and protect soil and water resources through management of livestock numbers and season of use.

EXPLANATION: In addition to the proper stocking rate and season of use specified in the grazing permit, annual field checks are made to identify needed adjustments in distribution, season of use, and livestock numbers. Analysis includes:

a. Range readiness evaluations to assure that the soil is not too wet and that sufficient forage growth has occurred.
b. Livestock counts to assure that only the permitted livestock enter the allotment.
c. Forage and browse utilization measurements to provide data for improved livestock distribution and stocking.

d. Periodic assessment of rangelands to verify soil and vegetative condition and trend.

Standard measurement techniques for allowable utilization have been established for key vegetative types. Specific standards and guidelines have been established prescribing proper utilization levels by vegetative type. Livestock numbers and season of use are adjusted to reflect the results of these field checks.

IMPLEMENTATION: Allotments are administered by the District Ranger or Forest Service representative. Permit provisions are carried out by the grazing permittee, as directed in the permit and annual operating plan. Appeals are made to the Forest Supervisor. Field checks and measurements are made periodically by the Forest Service. Numbers, seasons, and use patterns may be changed annually to reflect current allotment conditions and trends and, if necessary, the permit may be modified, cancelled, or suspended in whole or in part.

REFERENCES: FSM 2210, 2230, 2240, 2250, and 2323.25; FSH 2209.14, Service-wide Range Analysis and Management Handbook; FSH 2209.21, Range Analysis and Management Handbook; SWCP 11.02.

PRACTICE 17.03 - Controlling Livestock Distribution

OBJECTIVE: To maintain and protect soil and water resources including riparian areas through controlling livestock distribution.

EXPLANATION: Livestock use within allotments is typically not uniform due to variations in topography, water availability, vegetation type, and forage condition. Several techniques are used to achieve proper livestock distribution and reduce the impact on areas which are sensitive or naturally overused. These techniques include:

a. Construction of fences and implementation of seasonal or pasture systems of management.
b. Placing of water developments in areas that receive little use and closure of water developments when proper use has been achieved.
c. Riding and herding to shift livestock locations.
d. Placing salt or supplements away from water in forage areas with light grazing use to attract livestock.
e. Installation of range improvements such as construction of shade structures, fertilization, prescribed burning, or seeding.
f. Moving livestock when prescribed utilization levels are reached.

Open herding, limiting trailing, and use of new bed grounds nightly are additional techniques used for goats and sheep. Developing sufficient watering places is one way to limit the amount of trailing. Livestock distribution needs are determined through evaluations of range conditions and trends, including utilization studies.

IMPLEMENTATION: Livestock distribution practices are carried out by the permittee under supervision of the District Ranger or Forest Service representative. Direction is incorporated into the allotment management plan and the annual operating plan. The annual operating plan becomes an integral part of the grazing permit and provides current Forest Service instructions. These instructions reflect current allotment conditions and vegetative trends.

REFERENCES: FSM 2210, 2230, 2240, 2250, and 2323.25; FSH 2209.14, FSH Service-wide Range Analysis Handbook; and FSH 2209.21, Range Analysis and Management Handbook; SWCP 11.02.

PRACTICE 17.04 - Rangeland Improvements

OBJECTIVE: To maintain and protect soil and water resources through the use of rangeland improvements.

EXPLANATION: Rangeland improvements are used to improve management and restore or improve forage quality, quantity, or availability. These may consist of providing rangeland rest and/or deferment through rotation grazing, fencing, or lighter grazing use by changing the grazing season, kind, class, or permitted number of livestock. Other measures may include stream channel stabilization efforts such as riprapping, gully plugging, planting, or mechanical treatments such as pitting, chiseling, or furrowing. Reseeding and/or fertilization may be done individually or in conjunction with any of these measures. Water developments are often included in rangeland improvement projects. Improvement efforts are directed at increasing the ability of the range to produce forage and protect and provide for other resources at a specified ecological serial stage. Practices used for improvement of watershed conditions, which may include the exclusion of livestock, are described in SWCPs 11.03 (Watershed Improvement Planning and Implementation) and 11.09 (Management by Closure to Use). All range water improvements constructed should protect the water quality of both surface and ground water sources.

IMPLEMENTATION: The permittee is a cooperator in rangeland improvements and may complete the work under Forest Service direction. Implementation may also be done by Forest crews. Range improvement needs are recognized in the Range Allotment Planning Process and are scheduled for implementation in the allotment management plan. An interdisciplinary team provides consultation and help in the development of improvement programs.

REFERENCES: FSM 2210, 2240, 2250, and 2323.26; FSH 2209.22, Structural Range Improvement Handbook; FSH 2209.23, Nonstructural Range Improvement Handbook; SWCP 11.02, 11.03, and 11.09.

Noxious Weeds

USDA Forest Service Regional direction for the use of Best Management Practices is located in the Forest Service Manual, 2080 – Noxious Weed Management, R-4 Supplement No. 2000-2001-1, which became effective May 7, 2001. Project specific direction is presented below.

2081.2 - Prevention and Control Measures

1. Recommended Practices. Stop the spread of existing noxious weeds and prevent invasion of new sites or new noxious weeds by applying prevention and control mitigation measures where applicable and appropriate. Potential practices to consider:

i. Domestic Grazing Activities. Ensure noxious weed prevention and control are considered in management of all grazing allotments. Consider the following:

(1) Annual Operating Instructions for every grazing allotment should include noxious weed prevention monitoring and reporting direction, and provisions for annual inspection of areas where livestock concentrate, which results in overuse and/or soil scarification. If noxious weeds become established, they should be inventoried and scheduled for treatment.

(2) For each grazing allotment containing noxious weed infestations, include direction in the Annual Operating Instructions (AOI) for prevention and control of noxious weeds. Items to be

addressed in the AOI might include: season of use, exclusion, minimizing ground disturbance, noxious weed seed transportation, maintaining healthy vegetation, control methods, revegetation, monitoring, reporting, and education.

Include ways to minimize ground disturbance and bare soil caused by livestock operations (for example: salt licks, watering sites, yarding/loafing areas, corrals, and other heavy use areas) in Allotment Management Plans (AMPs) and/or Annual Operating Instructions.

Minimize transport of noxious weed seed into and within allotments by considering the following:

(a) Avoid driving, walking, riding, and/or herding through noxious weed infestations.

(b) Entry units grazed by livestock transported onto the Forest from noxious weed-infested areas should be inspected annually for new noxious weeds. If noxious weeds become established, they should be inventoried and scheduled for treatment.

(5) Maintain healthy desirable vegetation that is resistant to noxious weed establishment by considering the following:

(a) Manage forage utilization to maintain the vigor of desirable plant species as described in the Allotment Management Plan.

(b) Minimize and/or exclude grazing on restoration areas until vegetation is well established.

(6) Promote noxious weed awareness and prevention efforts among livestock permittees by considering the following:

(a) Use education programs and/or Annual Operating Instruction direction to increase noxious weed awareness and prevent noxious weed spread by permittees' livestock and/or management activities.

(b) Encourage permittees who are certified herbicide applicators to participate in allotment and Cooperative Weed Management Area noxious weed control programs. (Also see item b. Ground Disturbing Activities above).

Humboldt-Toiyabe National Forest direction for the use of Best Management Practices is located in the Forest Service Manual, 2080 – Noxious Weed Management, H-T Supplement No. 2000-2004-1, which became effective September 10, 2004. Project specific direction is presented below.

2081.2 – Prevention and Control Measures

Use the following guidance for noxious weed prevention and control on the Humboldt-Toiyabe National Forest:

9. Grazing Permit Administration Noxious Weed Prevention Guidelines. Livestock are possible carriers of noxious weed seeds and have the potential to stress ecosystems, which can result in weed establishment. The following measures will limit weed infestations caused by livestock grazing:

a. Ensure noxious weed prevention and control are considered in management of all livestock on National Forest System lands.

b. Annual Operating Instructions (AOI) for every grazing allotment should include noxious weed prevention monitoring and reporting direction, and provisions for annual inspection of areas where livestock concentrate, which results in overuse and/or soil scarification. If noxious weeds become established, they should be inventoried and scheduled for treatment.

c. For each grazing allotment containing noxious weed infestations, the Annual Operating Instructions must address prevention and control measures. Items to be addressed in the AOI might include: season of use, exclusion, minimizing ground disturbance, noxious weed seed transportation, maintaining healthy vegetation, control methods, revegetation, monitoring, reporting, and education.

d. Encourage permittees to place livestock on a weed-free diet for 72-hours prior to placing the animals on National Forest. If animals are coming from known weed infested areas, a control pasture should be considered when the animals enter the Forest and ensure the permittee feeds the animals weed free hay for 72-hours.

e. In pastures that support known weed infestations, adjust the season of use, when feasible, to graze before the noxious weed species flowers.

f. Manage livestock grazing within the Forest Plan standards and guidelines to avoid creating disturbed sites upon which noxious weeds can become established.

g. Include ways to minimize ground disturbance and bare soil caused by livestock operations (for example: salt licks, watering sites, yarding/loafing areas, corrals, and other heavy use areas) in Allotment Management Plans (AMPs) and/or Annual Operating Instructions.

h. Minimize transport of noxious weed seed into and within allotments by considering the following:

(1) Avoid driving, walking, riding, and/or herding through noxious weed infestations.

(2) Entry units grazed by livestock transported onto the Forest from noxious weed-infested areas should be inspected annually for new noxious weeds. If noxious weeds become established, they should be inventoried and treated.

i. Maintain healthy desirable vegetation that is resistant to noxious weed establishment by considering the following:

(1) Manage forage utilization to maintain the vigor of desirable plant species as described in the term grazing permit.

(2) Minimize and/or exclude grazing on restoration areas until vegetation is well established.

j. Promote noxious weed awareness and prevention efforts among livestock permittees by education programs and/or Annual Operating Instruction direction.

k. Participate in Cooperative Weed Management Areas when available.

l. Brush all pack and saddle stock and clean their hoofs prior to entering the National Forest.

m. Clean vehicles and equipment used in weed-infested areas with special emphasis on the undercarriage, frame and front grill, prior to entering National Forest lands.

n. Plant certified, weed-free and Forest Service approved seed mixes used on National Forest lands as part of range improvement construction or maintenance when needed to rehabilitate surface disturbance.

o. When wildland fires increase the occurrence of noxious weeds determine the need to extend the minimum two years rest guidelines.