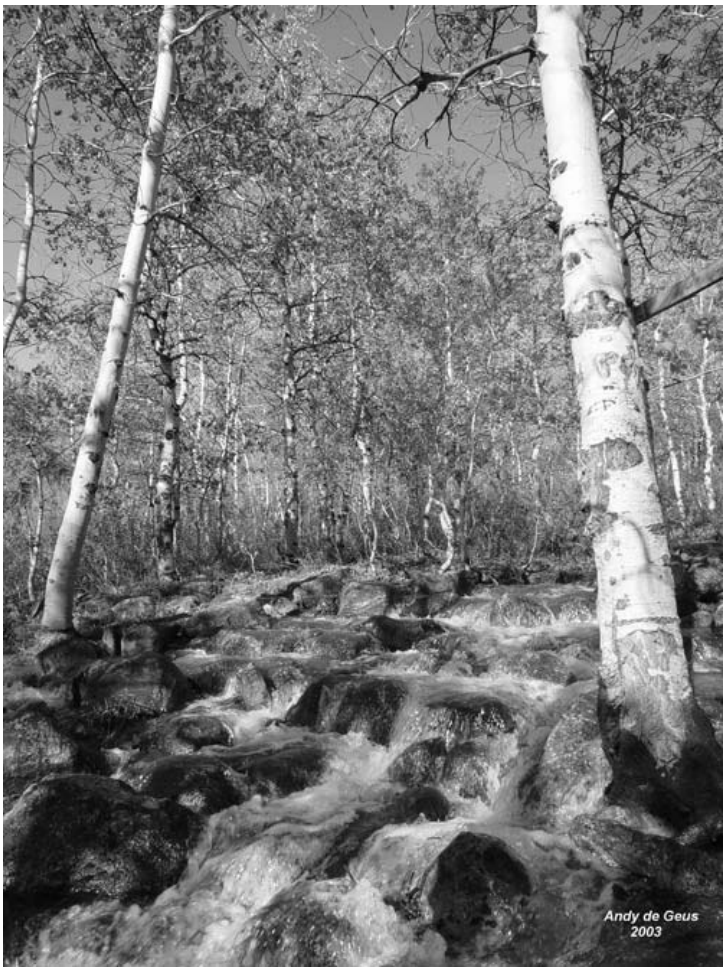
Martin Basin DEIS

Draft Alternative – 4



"An Integrated and Collaborative Management Approach"

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[August 11, 2004]

Acronyms

AMP – Allotment Management Plan
AOI – Allotment Operating Instructions (synonymous with AOP)
AOP – Annual Operating Plan (synonymous with AOI)
AUM – Animal Unit Month
BO – Biological Opinion
CWMA – Coordinated Weed Management Area
DEIS – Draft Environmental Impact Statement
DFC – Desired Future Conditions
DPC – Desired Plant Community
EIS – Environmental Impact Statement
ESA – Endangered Species Act
FLPMA – Federal Land Policy and Management Act
GAWS – General Aquatic Wildlife System
HCP – Habitat Conservation Plan
IDT – Interdisciplinary Team
LCT – Lahontan Cutthroat Trout
LAP – Local Area Plan
LPA – Local Planning Area
LRMP – Land and Resource Management Plans
MLRA – Major Land Resource Area
NAC – Nevada Administrative Code
NDEP – Nevada Division of Environmental Protection
NDOW – Nevada Department of Wildlife
NEPA – National Environmental Policy Act
NRCS – Natural Resources Conservation Service
NRST – National Riparian Service Team
PFC – Proper Functioning Condition
PNC – Potential Natural Community
PMU – Population Management Unit
RMO – Resource Management Objective
T, E, and S Species – Threatened, Endangered, and Sensitive Species
TRT – Technical Review Team
UNR – University of Nevada, Reno
USDA – United States Department of Agriculture
USFS – United States Forest Service
USFWS – Untied States Fish and Wildlife Service
WAFWA – Western Association of Fish and Wildlife Agencies

Attachments

Soil Survey of Humboldt County East Part I

Soil Survey of Humboldt County East Part II

User Guide to Assessing PFC and Supporting Science for Lentic Areas (TR 1737-16)

User Guide to Assessing PFC and Supporting Science for Lotic Areas (TR 1737-15)

Interpreting Indicators of Rangeland Health (TR 1734-6) – DRAFT

Evaluating and Rating Ecological Sites (600.0402 NRCS Range and Pasture Handbook)

Nevada Rangeland Monitoring Handbook

University of Idaho Stubble Height Study Report, University of Idaho, May 2004

Stubble Height & Utilization Measurements: Uses & Misuses, OR State University Experiment. Station, May 1998

1.0 Introduction

The purpose of this alternative is to provide the USFS with a valid and scientifically supported approach to managing grazing as it relates to the health and functionality of natural resources within the Santa Rosa Ranger District.

The framework employed in this alternative is a "collaborative" approach that embraces both the permittees and the USFS to manage grazing and natural resources for optimal health and functionality, while retaining the practices of sustainable and economical utilization of those resources.

Fundamental to this alternative is for the USFS and the allotment permittee to work directly and cooperatively with one-another to: 1) gain a common understanding of the resource issues on an allotment that relate to livestock grazing; 2) mutually explore, select and implement management actions to address the identified resource issues; and, 3) provide the necessary flexibility to practice adaptive management. Successful grazing management can only be developed and implemented when the resource managers and livestock managers work together on a site-specific basis to apply the following steps at the allotment level:

1. Identification of livestock-dependent resource issues;

2. Development of site-specific resource objectives;

3. Develop and implement a grazing management strategy to achieve the identified resource objectives; and,

4. Monitoring, evaluation and adjustments based on the documented trend toward the resource objectives under the applied grazing management.

Thoughtful and innovative application of these sequential steps, commonly referred to as ***"adaptive grazing management"***, leads to successful grazing management. This approach is the procedure most appropriate manner to develop allotment management plans (AMPs). It is also equally applicable for developing interim grazing management plans or annual operating plans (AOP's) by the resource manager and the livestock manager. It is a process that should be applied at some level to all USFS grazing allotments because of the flexibility utilized to make resource and grazing management decisions. Flexibility is the key to making applicable decisions in regards to the infinitely variable resource characteristics, conditions, and functionalities. Furthermore, Step #4 essentially makes this process a continuous or ongoing management activity.

Grazing management is seldom optimal or successful when unilaterally imposed. Currently, utilization has been taken from its intended use as a guiding parameter for management decisions (i.e. improvement needs, distribution problems and opportunities, etc.), which was the basis for its original conception and use, to a single limit or standard that controls management decisions on all time frames. Using utilization or any other indicator in this manner is a misuse of a

management tool. This results in a combination of detrimental effects from its improper use and beneficial effects from its proper application.

Successful, grazing management requires a partnership between the livestock manager and the resource manager. As the responsible parties for managing livestock grazing, the permittee and the USFS must recognize and concur with the identified resource problems and believe in the management actions that are implemented to resolve the problems. To achieve this buy-in the permittee and the USFS must necessarily be actively involved in ***all*** aspects of the planning process, including implementation and evaluation. A cooperative working relationship between the livestock manager and resource manager is a prerequisite to successful grazing management (Wirtz, et al., 1996).

The structure of this alternative is organized to parallel the format of the other alternatives that were presented in the Martin Basin DEIS. By utilizing a similar format the USFS can incorporate this alternative directly into the management structure set forth in the Martin Basin-Draft Environmental Impact Statement (DEIS). In addition, the range of alternatives that were presented in the Martin Basin DEIS encompass all practices and possibilities that are set forth in this alternative, so the schedule of the present National Environmental Policy Act (NEPA) process should be unaffected by the incorporation of this alternative into the Martin Basin DEIS.

The implementation of this alternative will establish a framework and process by which the USFS and the permittees can ***collaboratively*** manage resources in a professional, reasonable and sustainable manner, and collaboratively achieve desired objectives.

2.0 Allotment Configuration

Eight allotments currently exist within the Martin Basin, and livestock grazing will be authorized on all eight of the allotments. The permittees and the USFS will work collaboratively to reactivate closed allotments through the AMP development process. These allotments include:

- Martin Basin
- Indian
- Granite Peak
- Buttermilk
- Buffalo
- Bradshaw
- Rebel Creek
- West Side Flat Creek

While working through the AMP process to decide on an appropriate allotment configuration, the USFS and the permittees should consider the most appropriate and optimal way to manage the resources as well as the logistics involved in the proper-use of the allotment by the permittees. The most appropriate configuration of the allotments will provide:

- Flexibility of Use and Management Practices to Meet RMOs
- Congruence with Achievement of RMO's
- A Sustainable and Consistent Means of Utilizing the Forage Base on Each Allotment
- Economic Stability of Ranches and Local Communities.

Flexibility is essential because 1) all inventory and assessments are imperfect and subject to improvement with knowledge or measured attention when and if warranted and; 2) environmental condition changes through plant succession, weather/climate, disturbance (e.g. fire, insect infestation, etc.) are always occurring. Having flexibility in the plan recognizes the opportunity to improve resources, resource management, and grazing management through adaptation to improved knowledge, techniques, and changing conditions. An approach that incorporates the fact that adaptation and flexibility are required will be able to optimize the speed of progression toward Resource Management Objectives (RMO's).

Regular and dependable utilization of the forage base and economic stability are linked (Blasi et al., 1997). By utilizing the resource on a consistent and sustainable basis, the permittees can invest in their involvement and future on each particular allotment. This means that livestock with historical knowledge and physical suitability for particular range sites can be retained to work towards obtaining specific grazing management objectives. In addition, consistent use of forage will result in reduced fuels loads and fire risks. This is important for vegetation communities that are currently supporting sage grouse over landscapes infested with cheatgrass. To keep intact communities at reduced fire risk means that they will continue to provide sage

grouse and other wildlife habitat (Ypsilantis, 2003) as well as economic stability through a consistent and dependable forage base.

Through economic stability of the permittees and their operations, health and sustainability of the resource can be retained as a priority because of experience, knowledge, and vested future, with respect to the resources and issues on each allotment. The longer that a permittee can feasibly operate, the less energy and time has to be spent by the resource managers to build consensus and awareness of resource issues and RMO's on each allotment. The awareness of this valuable concept, as one of the keys to the success of the collaborative approach, is fundamental for both the permittee and the USFS.

3.0 Project Area Use Plan

Under this alternative, allotments will be managed to maintain or improve ecological health and condition, and to retain grazing as a sustainable use as mandated by the Federal Land Policy and Management Act (FLPMA, 1976). Permitted numbers (AUM's) and seasons of use would be adjusted (up/down and/or earlier/later) as necessary to meet management guidelines and objectives (Laycock, et al., 2004). The individual adjustments would be management unit-specific and would be addressed in the AMP for each respective allotment (Swanson, 1989). Requirements to meet current utilization levels and standards, as stated in the Humboldt-Toiyabe Forest Plan and all amendments, would be superceded by the newly written AMPs, which are based on site-specific evaluations and will address future management on their respective management units.

District-wide goals that would be incorporated into each AMP include:

- Proper Functioning of Riparian Areas
- Implementation of the Santa Rosa Population Management Unit Plan (Nevada State Sage Grouse Plan)
- Coordinated Weed Management Area (CWMA) Compliance
- Maintenance of Resilient Upland Vegetation Communities
- Compliance with NAC Water Quality Standards on All Streams

3.1 Allotment Management Plans

AMPs contain the pertinent livestock management direction from the project-level NEPA-based decision (sec. 92.23, para. 2). AMPs also refine direction in the project-level NEPA based decision deemed necessary by the authorized officer to implement that decision. AMPs should be developed concurrently with the completion of the site-specific analysis and project-level decision. Each AMP shall become a part of Part 3 of the grazing permit with a letter to the permittee(s) notifying them of this modification (USFS, 2004).

3.1.1 Allotment Management Plan Strategy

The grazing strategy portion of an Allotment Management Plan (AMP) would be developed, by each permittee in cooperation with the USFS, within three years from the signing of the Martin Basin EIS for their respective permitted allotments. USFS will coordinate with permittees and provide all necessary information to permittees for consideration and use in the formation and development of the grazing strategy. USFS will respond to a permittees initial request for AMP development information within 30 days of written request by the permittee. A permittee will submit a draft of the grazing strategy portion of the AMP to the USFS for consideration and conformity with all site-specific resource issues on the allotment. The USFS will collaborate with the permittee on any modifications to the grazing strategy that are required to bring the AMP into compliance with all relevant resource factors. The adaptive management strategy as outlined in Section 3.3 of this document shall be the basis of each AMP. If USFS and permittee cannot come to agreement on conformity of the AMP with all site specific resource issues, then

the parties will pursue a Section 8 review or mediation with the Nevada Department of Agriculture as established through alternate dispute resolution (USFS & NDOA, 1989).

In a case where a permittee does not complete the grazing strategy portion of an AMP, the AMP on file and all grazing management standards as of July 30, 2004 would be retained until the USFS chose to update the AMP. For those allotments without AMP's on file, the permittee and USFS will follow this strategy to create a new AMP for those allotments. Until an AMP is developed grazing management standards as of July 30, 2004 would be retained. USFS will be responsible for completing the remainder of the AMP's as they relate to site specific resource issues other than those which are directly related to grazing management and/or strategies. A permittee will not be penalized or held to prior utilization standards if the USFS does not act in a timely manner to the initial request for information or in completion of their portion of the AMP.

Each AMP grazing strategy developed by the permittee will be reviewed, in draft form, by the Santa Rosa Ranger District and returned, in-kind, with comments to the permittee within 60 days of the submittal date. The final draft would be submitted by the permittee within 120 days from the initial draft submittal date. This timeline is a guideline, and should be followed by both the USFS and the permittee. A change or departure from the above-listed timeline may be required due to workloads of both the USFS and the permittee. This change or departure must be reasonable and will be mutually agreed upon by the USFS and the permittee.

Table 1. Suggested Timeline for Expedited Approach to AMP Production (Grazing Strategy).

Time from Signing of Martin Basin EIS	Action	Responsible Party
3 years	Submittal of Draft-AMP grazing strategy for his/her allotment	Permittee
3 years and 60 days*	Draft-AMP grazing strategy returned to permittee with review questions and comments	USFS
3 years and 120 days*	Final AMP grazing strategy Submitted to USFS for Allotment File	Permittee

**time schedules can be adjusted, by mutual consent, to reasonably fit within work loads of both parties*

3.1.2 Allotment Management Plan Purpose

The AMP's specifically dealing with livestock grazing, should focus on and include these important features:

- Identifying needs for functioning of riparian and upland systems based on the individual attributes that each system contains and or has the capability of containing (Hall and Lindmuth, 1998).

- RMO's that specify Desired Future Conditions (DFC's) that occur or are capable of occurring on the ground, at a specific site within the management unit (Hall and Lindmuth, 1998).
- Designing a management strategy that will ensure the desired outcomes are based in sustainability and within the capability and potential of each individual management unit, which ultimately requires a monitoring plan or system (Swanson, 1989).

3.1.3 Allotment Management Plan Grazing Strategy Contents

The AMPs should follow USFS outline (USFS, 1986) and (USFS 2004):

3.1.3.1 Resource Management Objectives

AMP's will identify and develop specific and quantifiable RMO's for each allotment that are agreed upon by the USFS and the Permittee. These RMO's should be identified and set according to the present condition and trend of the resources and their specific capability. RMO's should also be achievable through reasonable management practices, especially as they relate to livestock grazing and the specific cause and effect relationships between grazing and the RMO's. They should also be multiple-use oriented, and have built-in consideration for all beneficiaries of the resource (e.g. fisheries, wildlife, permittees, and recreationists). The plans will identify the appropriate short-term movement triggers and endpoint monitoring indicators for the unique ecological site and vegetation community types within each pasture. The trigger and end-point indicators shall be based upon the best available criterion for the AMP or pasture. Until site-specific metrics can be established, use the suggested criterion in the literature (Clary and Leininger 2000) as interim criteria, and adjust through time as local monitoring results indicate. Monitor the short-term indicators annually and the long-term indicators as frequently as is appropriate for the specific indicator (e.g. Winward (2000) recommends that greenline vegetation be monitored on a 3 -5 year rotation). Where ESA-listed species are relevant, the appropriate and qualified specialists shall assist with the development and fine-tuning of short-term movement triggers and endpoint indicators, and shall be included in the annual review of monitoring results (U of I-SHRT, 2004). All RMO's will have full consideration and incorporation of multiple-use considerations within them as directed by Federal Land and Policy Management Act (FLPMA, 1976).

3.1.3.2 Required Livestock Management Practices

These consist of any management practice that manipulates the timing, distribution, duration, class, rotation or variation, and/or frequency of livestock use to meet the mutually agreed upon RMO's. These could include, but are not limited to:

- Use levels necessary to achieve RMO's
- Herding and riding upland and riparian areas
- Fencing to combine or create management units
- Rotation of Use (i.e. deferred, rest etc.)
- Seasons of use
- Age of livestock

- Class of livestock
- Length of time in pasture
- Number of animals in pasture
- Number of times grazed per season

The implementation of any management practice would be a cooperative effort between the permittee and the USFS, with the intent of sustaining or improving the ecological health and condition on a particular site.

3.1.3.3 Structural / Non-structural Improvements and Treatments Required

These are improvements that are necessary and have the potential to improve livestock distribution to achieve the most favorable forage utilization pattern and/or improve, or maintain, ecological health or state of the resource. Techniques and structures used to provide these two benefits will and should be scheduled for installation through the AMP/AOP. Flexibility will be retained so that the AMP and AOP can be modified to reflect the resulting changes in grazing strategy and management that might occur through time.

In the large pastures found within the arid and semi-arid areas, it is not un-common to find overgrazing near watering points and little if any used forage in portions of the grazing unit distant from water (Holechek et al., 2001). In this instance, improvements and/or treatments are necessary to encourage proper grazing management. Just placing an alternate or off-stream water source can relieve up to 90 percent of the time that cattle spend in the creeks and streams (UCCE and NRCS, 1995). For under-grazed or un-grazed rugged portions of a pasture, low moisture supplements and trace-mineral salts can be used to substantially increase the uniformity of utilization, and therefore reduce time spent in undesirable locations (Bailey et al., 2001) and (Porta et al., 2002). With these types of results and many others, improvements and treatments are very pertinent and should be expeditiously pursued, installed and/or developed.

Examples of improvements include but are not limited to (Holechek et al., 2001):

- Permanent Watering Points and Sources
- Portable (Non-permanent) Watering Points and Sources
- Spring and Seep Developments
- Fencing (Temporary and Permanent)
- Salt, Minerals, and Supplemental Feeds
- Trail Construction (Forest Plan, 1986)
- Armored Water Crossings
- Riparian Access Control Structures

Examples of treatments include but are not limited to (Holechek et al., 2001):

- Prescribed Burning
- Clearing, Mowing, or Thinning

- Seeding
- Changing Livestock Class or Types
- Specialized Grazing Systems
- Prescribed Grazing
- Herding/Riding
- Predator Control
- Fertilizing

Maintenance schedules and assignments for improvements and treatments will also be specified in the AMPs according to specific needs and requirements, especially as they relate to the continued pursuit of RMO's. Structural improvement needs will need an environmental analysis before approval and installation. The AMPs will specifically state Environmental Analysis, installation and project completion dates.

3.1.3.4 Appropriate Monitoring to Determine RMO Compliance and/or Adaptive Management Changes Required

Each year, or as often as is necessary to assess trend in key riparian/upland resource characteristics, monitoring results shall be used to assess the need to make changes in timing, intensity, and/or duration of grazing. Those changes shall be jointly agreed upon and incorporated into the subsequent year's Annual Operating Plan (AOP). In other words, repeated, failure to achieve short-term move-triggers or endpoint indicators may trigger required changes in a subsequent year's AOP, and could potentially result in re-initiation of consultation for the AMP if prolonged downward trends occur. If permittees repeatedly and willfully fail to follow AOP's, then appropriate actions, such as Permit Violation, may be taken so that non-compliance with the AMP does not result in changing what might be a satisfactory AMP. Failure to achieve the riparian/upland resource objectives, when AOPs are followed, applied, and implemented correctly, would likely result in re-initiation of consultation for the AMP. This approach should ensure no lag-time between monitoring observations and implementation of changes to the grazing strategy. Permit performance will then be based upon compliance with those annual grazing instructions. Annual grazing instructions may include site-specific triggers defining when livestock would be moved from each pasture (U of I-SHRT, 2004).

3.2 Annual Operating Plans

Annual Operating Plans (AOP's), used synonymously with Annual Operating Instructions (AOI's) in this document, specify those annual actions that are needed to implement the management direction set forth in the Martin Basin EIS and the AMPs.

3.2.1 Annual Operating Plan Strategy

The AOP will be developed in conformance with the Grazing Administration Handbook guidelines, requiring the USFS to develop the AOP with the permittee (USFS, 2004). The AOP would be re-written, to the extent that it will change or differ from the previous year's AOP to reflect the results of the previous year's grazing strategy on the resource conditions. The adaptive management process would be incorporated into every AOP. Short-term monitoring

will steer the direction and changes incorporated in the AOPs. Qualified and knowledgeable personnel shall review monitoring results annually and evaluate instances where changes to the AOPs are not required, and instances where and when recalcitrant repeat offenses occur, which could prompt a change to the subsequent year's AOP. Annual changes may include any appropriate modifications of the AOP contents as stated in Section 3.2.3 of his alternative.

3.2.2 Annual Operating Plan Purpose

AOP's shall clearly and concisely identify the obligations of the permittee and the USFS, and clearly articulate annual grazing management requirements, guidelines, and monitoring necessary to document compliance (USFS, 2004) with the Term Permit and the triggers and indicators specified within the AMP/AOP.

The result of this strategy will be an AOP that incorporates all inputs and needs, and will ultimately be a series of mutual decisions between the USFS and the permittee. The collaborative nature of the AOP will promote permittee motivation to reach RMO's and USFS support for jointly developed management actions that are being implemented on the ground level.

3.2.3 Annual Operating Plan Contents

The AOP's will be in conformance with the AMP and should include:

- The grazing use authorized on the allotment for the current grazing season and should specify numbers, class, type of livestock, and timing and duration of use.
- The planned sequence of grazing on the allotment, or the management prescriptions and monitoring that will be used to make changes.
- Structural and non-structural improvements to be constructed, reconstructed, or maintained and the responsible party for these activities.
- Authorized use or other guidelines (e.g. triggers and indicators) to be applied and followed by the permittee to properly manage livestock and grazing.
- Monitoring for the current season that may include, among other things, documentation demonstrating compliance with the terms and conditions in the grazing permit, AMP (sec. 94.1), and AOI. In addition, the permittee may be asked to provide information regarding livestock distribution or the condition of improvements. Where adaptive management prescriptions are being followed, this section of the AOI must provide details about those monitoring items and decision points needed to determine when a change is necessary and to guide the direction that those changes take (sec. 95).

3.3 Adaptive Management Process Incorporation

Building adaptive management principles and flexibility into resource management allows for timely decisions that are responsive to needed adjustments in the permitted grazing strategy, which would address changing conditions, newly acquired knowledge and unexpected results. Historically, management decisions have been too narrowly focused, such as deciding to

authorize a specific number, kind, or class of livestock with specific on- and off-dates under a specific type of grazing system (USFS, 2004). These kinds of decisions have restricted management flexibility in meeting desired conditions and project objectives. Planning documents should provide range conservationists with the flexibility to tailor turn out and exit dates to specific areas and permittee operations, rather than focusing on regulating allotment or district wide specifications and standards (Laycock et al., 2004).

The approach outlined in this document is the procedure most appropriately and successfully used in developing allotment management plans (AMPs). It is also equally applicable for developing interim grazing management plans or annual operating plans (AOP's) by the resource manager (USFS) and the livestock manager. It is a process that should be applied at some level to all forest grazing allotments (RCI, 1999).

The adaptive management process invites participation from rangeland users and other interested parties where feasible (USFS/PLC, 2003). To be successful, grazing management must represent a partnership between the livestock manager (permittee) and the resource manager. As the responsible party for managing livestock grazing, the permittee must recognize the resource problem and believe in the management actions that are implemented to resolve the problem. To achieve this buy-in the permittee must necessarily be actively involved in ***all*** aspects of the planning process, including implementation and evaluation. A cooperative working relationship between the livestock manager and resource manager (USFS) is a prerequisite to successful grazing management (RCI, 1999).

3.3.1 Adaptive Management Steps/Adjustment Process

The adaptive management process involves several steps (U of I-SHRT, 2004), (RCI, 1999) and (USFS, 2004), which are needed to incorporate results of the past into management decisions used to reach objectives for the future.

3.3.1.1 Resource Problems and Issues Identification

- This process involves comparing the broad landscape descriptions contained in the Forest Plan with the site-specific conditions currently found within the allotment. It further requires field assessment and logically leads to the formulation of resource objectives and management actions.
- Field assessment methods or studies can be applied to assist in identifying resource problems. However, it is essential that the applied assessment methods are based on sound scientific principles, are accepted by the scientific community and are previously tested to produce consistent, repeatable and meaningful results.
- Problem identification involves a determination of cause and effect relationships. The relationship of the resource problem to livestock grazing or other land use activities is a fundamental first step to designing corrective management actions. For example, resource problems resulting from other uses and disturbances (e.g. wildlife or wild horse foraging, or the lack of recent fire, etc.) should be identified as such and not attributed to livestock use.

- It is important that natural variability in site potentials be recognized and properly considered in the identification of resource problems or issues. Hence the requirement under this alternative for site-specific evaluation and planning.

3.3.1.2 Define Resource Objectives

- Objectives for a grazing plan must identify not only the desired resource conditions but also the permittee objectives for livestock use. These objectives must be combined in a manner to be mutually compatible and attainable. It is important that the involved parties agree to these objectives. A prerequisite to such an agreement is the assurance that the objectives are reasonably attainable within the biological and economic constraints that are present (RCI, 1999). In other words, the resource and the grazing strategy must have the capability to produce the conditions specified in the objective and goals statements included in the AMP/AOP.
- Resource objectives must be site-specific, measurable and attainable statements of the desired resource conditions. These objectives should be quantitative statements of the desired plant community (DPC) and/or desired future conditions (DFC). DPC is defined as the quantitative expression of the specific vegetation, which exists or may exist on a specific site and for which management actions are designed to maintain or produce. The DPC must be within the site's documented, sustainable capacity (*capability*) to produce naturally, or through reasonably applied management actions. DFC is analogous to DPC but has a broader perspective including other measurable resource attributes or features in addition to the vegetation resource (e.g., channel width, width-depth ration, etc.).
- Since the success or failure of the applied grazing is determined by tracking resource changes over time, objectives for grazing management must be measurable attributes of the resource that are directly affected by livestock grazing. Plant species composition or structure is appropriate to describe a potential or existing plant community on a specific riparian or upland site. These resource attributes respond directly to livestock use and are sensitive to changes in grazing management. Likewise, stream channel characteristics such as width-depth ratios and degree of un-vegetated banks on a specific stream reach are resource attributes that can be directly affected by livestock use and respond to management changes. However, it is paramount that the selected resource objectives be site-specific and within each site's documented capabilities.
- Many quantitative resource attributes are indirectly related to livestock use or are most directly responding to other factors. Examples of indirect upland resource attributes include sagebrush canopy cover or wildlife population levels. Aquatic examples include fish densities, water temperature or flow volume, macro invertebrate population or sediment loads. While all of these attributes may represent important resource values worthy of monitoring, they are only indirectly related to livestock grazing and can be affected by numerous other factors. As such, indirect resource attributes are inappropriate, or at best inconclusive, measures of livestock management and should ***not*** be used as grazing objectives.

- Quantitative measures of livestock impacts, such as the degree of trampling or utilization, are inappropriate objectives because these are not resource attributes, nor are there any simple linear relationships between these livestock actions and changes in resource characteristics or attributes (RCI, 1999).

3.3.1.3 Develop a Grazing Plan to Accomplish Resource Objectives

With a common understanding of existing resource issues or problems and desired future resource conditions, development of a grazing plan then becomes a process of identifying and selecting management actions needed to attain the resource objectives. Due to the variability of rangelands, sustainable livestock grazing requires site-specific planning. This variability precludes a uniform or blanket prescription approach to livestock grazing management across a series of management units or larger single management units. Management plans should recognize the inherent variability of these natural systems and prescribe grazing management approaches appropriate to each allotment. Agency resource managers and the livestock managers should mutually develop allotment-specific plans that contain resource objectives (rather than uniform utilization objectives) and a management strategy for achieving those objectives. Such plans should also include monitoring to track progress toward attainment of the resource objectives and the flexibility to change in response to monitoring information and unforeseen events.

In developing allotment-specific grazing plans, there are many tools that should be considered. The following thought process should be sequentially applied to arrive at a suitable resolution to most grazing-related issues. Since the most common grazing issue on USFS allotments relates to riparian impacts due to uneven livestock distribution, this example is geared to this situation. However, the same thought process also applies to uplands.

- In most situations, the substantially greater area and forage resources associated with the uplands often provide the best opportunity for resolving riparian grazing issues. Grazing management techniques that shift grazing pressure to the upland and away from riparian areas may be the preferred initial management strategy in pertinent allotments and situations. Management techniques and improvements may include new water developments and salting distribution points on the uplands, herding, rotation grazing, adjusting the grazing season, changes in livestock class, changes in initial livestock entry location and distribution on the allotment, shortening the grazing period with increased stocking levels, upland forage improvements through vegetation manipulation and management.
- In some situations riparian pastures may be the preferred management action. Separating upland range from riparian zones provides better control of grazing use in the bottomlands and encourages livestock use and distribution in the uplands.
- All fence construction should be laid out to improve livestock distribution rather than create or encourage further animal concentration.

Proper grazing management results from innovative, site-specific application of the sound management techniques. Proper utilization levels are not necessarily indicative of good grazing

management, nor do they define proper management. Rather proper utilization of both riparian and upland forages is the result of good grazing management (RCI, 1999).

3.3.1.4 Identify Indicators, Implement Grazing Plan, and Monitor Indicators (Trigger and End-Point)

Within the grazing season or season of use, triggers and indicators must be observed and followed as specified by the AMP/AOP, in pursuit of the DFC and DPC objectives for the site. These triggers and indicators encourage sound management decisions based on an early warning system and can be adjusted to meet the resource objectives and opportunities as indicated through adaptive management.

- **Trigger** indicators are an opportunity and the responsibility for the permittees to make ongoing changes throughout the season to ensure that endpoint indicators (described below) are met. They define when livestock should be moved and, as such, are within-season tools, i.e., "Is it time to either ride harder to keep cows in the uplands away from the creek or move them to another area of the pasture or even completely remove them from the pasture?" They are used by permittees as indicators of allowable (authorized and sustainable) use in a given riparian area, and are designed to limit livestock effects to riparian vegetation and stream channels to acceptable levels. Hall and Bryant (1995) provide an excellent example of how a permittee can use stubble height as a warning of when to move livestock. Site variability ensures that a single trigger is not appropriate in all situations. Selection of trigger indicators is based on which one(s), will be most appropriate for a particular pasture. An Interdisciplinary Team (IDT) might select three triggers to start with, and as they gain experience find that only one or two are needed. When any one of the selected triggers is reached first, the permittee should take appropriate action to meet endpoint indicators (U of I-SHRT, 2004).
- **Endpoint indicators** are the responsibility of resource managers (USFS), as a means to assess resource impacts of current year's grazing. However, the permittees and, in the case of concern about listed species, the consulting agencies need to be involved in the annual grazing assessment. The appropriate time to measure and evaluate endpoint indicators is typically after the end of the growing and grazing season for the current year, but before the next high flow or winter precipitation event that may reach or exceed bankfull. The timing and location of these assessments must also be based on observations and discussions among the permittees, the action agency, and the consulting agencies. This process might involve the qualified resource team with the permittees and action agency manager in an annual meeting and/or field review. The purpose of the assessment is to determine if the actual grazing use in the current year's grazing season left the stream and associated riparian area in a condition which is likely to result in a desired trend towards meeting management objectives. As such, endpoint indicators are end-of-season tools. Most appropriate endpoint indicators for stream/riparian areas center on vegetation (herbaceous and/or woody riparian species) for protection and building of streambanks, and mechanical damage that leaves streambanks vulnerable to increased energies experienced during high flows (U of I-SHRT, 2004).

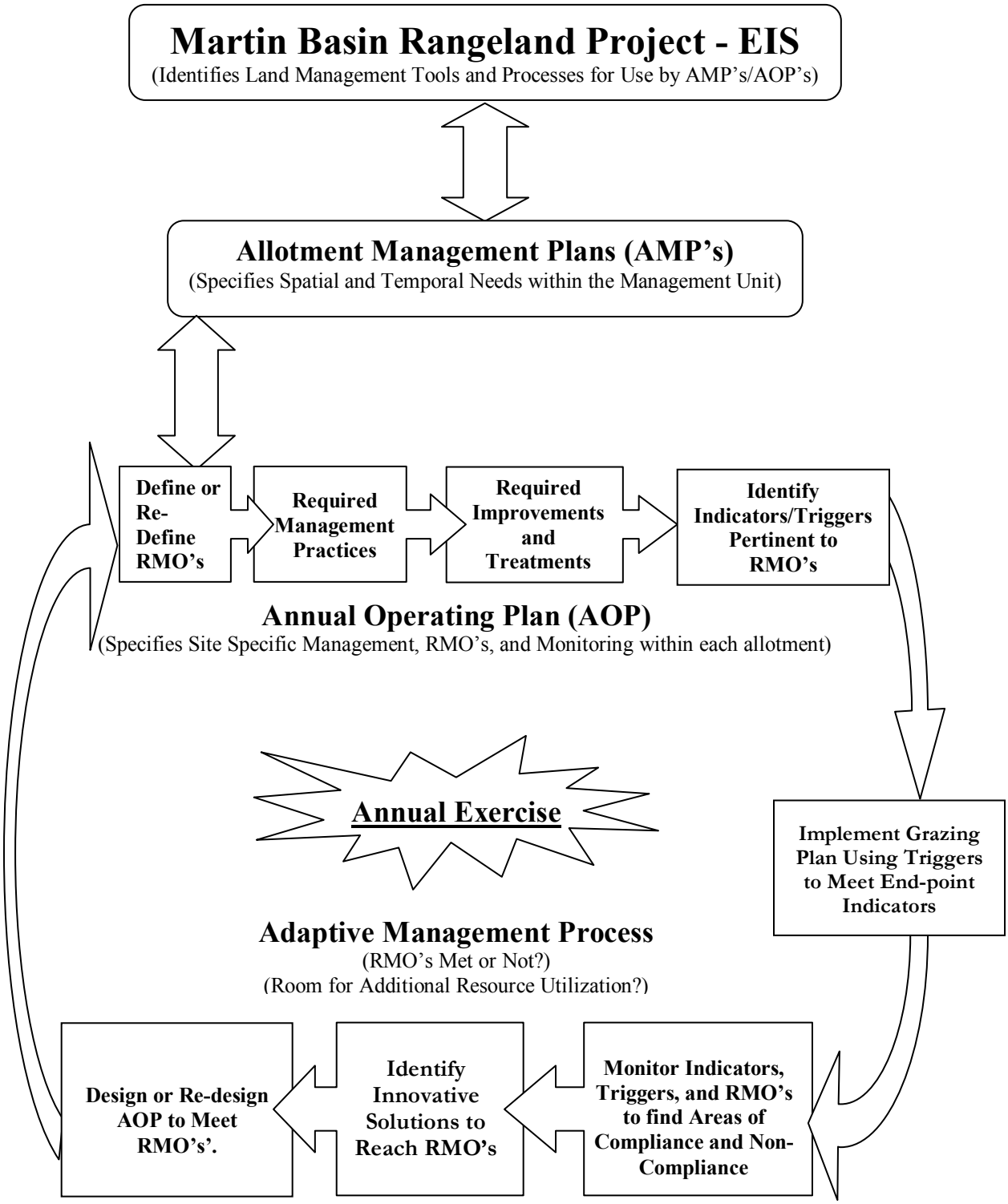
3.3.1.5 Monitoring, Evaluation and Adjustment

To evaluate management effectiveness, applied grazing plans must be monitored. Such monitoring needs to be applied at two distinct levels.

- Short-term, annual (i.e., implementation) event monitoring documents the type of grazing and other events that occur each year on the allotment. Growing conditions, animal numbers, season of use, pasture rotation, fires, insect infestations, and use-patterns are examples of annual information that is required. This information is used to fine-tune the implemented grazing plan on an annual basis and is a prerequisite to interpret the cause and effect relationships involved in the documented trend record. By itself, annual monitoring results provide insufficient information to substantiate a permanent or long-term adjustment to the implemented grazing plan or permit authorization.
- Long term (i.e., trend or effectiveness) monitoring involves tracking changes in resource attributes or condition over time. Grazing management plans are designed to attain or maintain specific resource objectives. Periodically (every three to five years), resource attributes or characteristics identified in the resource objectives should be documented at specific study sites. At this point, the evaluation of management effectiveness and/or the identification of needed management adjustments are simply a matter of interpreting the trend record in relation to the annual event record (to establish cause and effect relationships) and progress toward attainment of the resource objectives. This evaluation determines the effectiveness of the applied grazing management and/or the appropriateness and attainability of the original resource objectives. All three of these circumstances should be critically considered during this evaluation.

Since the grazing objectives reflect measurable resource attributes, long term monitoring studies must involve quantitative methods that produce a direct measurement of the attribute in question. So as not to compare apples to oranges, long term monitoring studies must also be re-locatable, accurate and repeatable. The same specifications are required for long term monitoring studies as were previously identified under Step I adaptive management methods (RCI, 1999). See Section 8.0 *Monitoring Plan* for further explanation of the monitoring plan development, structure, and incorporation.

Figure 1. Project Area Use Planning Strategy.
(All steps within this process are a collaborative effort between the USFS and the Permittees).



4.0 Assessment of Resource Condition

4.1 Purpose of Condition Assessment

Range condition describes an evaluation of the current status of rangeland attributes (i.e. vegetation, hydrology, and soils). Condition assessments provide the framework to register information obtained by range inventories on the basic status of existing vegetation, and to gauge changes or range trend through monitoring (U of A, 2001). In addition, range condition is used to contribute to the development of meaningful and realistic grazing management objectives and RMO's.

4.2 Riparian Condition Assessment Approach

The condition assessments for the riparian areas on the Santa Rosa Ranger District would be performed using the Proper Functioning Condition (PFC) approach, as developed by the National Riparian Service Team, in accordance with the interagency Technical References (BLM, 1998a) and (BLM, 2003). All condition assessments would be performed in locations (key areas, reference areas, etc.) specified in the AMP.

4.2.1 Proper Functioning Condition

Proper functioning condition (PFC) is a qualitative method for assessing the condition of riparian-wetland areas based on hydrology, vegetation, and soils attributes and processes within the riparian-wetland areas. PFC is a state of resiliency that will allow a riparian-wetland area to hold together during normally high-flow events with a high degree of reliability. This resiliency allows an area to then produce desired values, such as fish habitat, neotropical bird habitat, good water quality, good water quantity and/or forage, over time. Riparian-wetland areas that are not functioning properly cannot produce these values at acceptable and sustainable levels.

The PFC assessment must be performed collaboratively by an Interdisciplinary Team (IDT) with local, on-the-ground experience in the kind of qualitative sampling techniques that support the PFC checklist (e.g. hydrologist, rangeland manager, permittee, biologist, soil scientist). If the IDT cannot come to a consensus on a resource issue or solution, then a Technical Review Team (TRT) consisting of personnel from various agencies and disciplines, on the National Riparian Service Team (NRST), the Nevada State PFC Cadre, or an agreed upon third party as in a Section 8 review, will be called in to assess the situation and resolve the disagreement (USFS and NDOA, 1989).

PFC is also an appropriate starting point for determining and prioritizing the type and location of quantitative inventory or monitoring necessary to determine trend.

Again, the method developed for assessing PFC is qualitative and is based on using a checklist to make a relatively quick determination of condition. This condition will not be used to establish trend, and is not relatable to any assessments done in the past or future. Trend may be assessed if historical and comparable quantitative data exists for the same site. It is an assessment of condition that is a point-in-time condition of the resources being assessed.

4.2.2 Fish Habitat Assessment

An IDT team of personnel from the USFS, and other agencies as needed, and the Permittee will collaboratively assess each creek using PFC as taught and supported by the Nevada State PFC - Cadre and the NRST. In addition, the NDOW - GAWS data will be used to establish which streams and creeks have the capability and potential to provide either LCT or other trout habitat.

Where LCT habitat exists or has the potential to exist, numerical statements from existing and updated NDOW – GAWS data would be used to monitor fish habitat. The streams would also be rated according to their potential and capability to reach the numerical qualities listed for optimal fish habitat.

Those creeks and streams that posses the capability and potential to provide LCT and other trout habitat RMO's will be incorporated into the AMPs for their respective allotments. The RMO's will specify goals for those attributes that are characterized by LCT and other trout habitats, and would be inherently incorporated into the grazing management scheme to the extent that grazing impacts the specified attributes of the RMO's (Platts, 1981).

4.3 Upland Condition Assessment Approach

Upland or rangeland condition assessment would be performed according to the NRCS approved approaches. All condition assessments would be performed in locations (key areas, reference areas, etc.) specified in the AMP. If condition assessments and locations where performed are in dispute then a third party review such as Section 8 can be initiated (USFS and NDOA, 1989).

There are three distinct tiers to the approach, which include trend, similarity indexes, and rangeland health. All three condition assessment approaches are performed within one specific ecological site at a time (NRCS, 1997).

Rangeland conservation planning assistance to rangeland managers and permittees includes the following (NRCS, 1997):

- Trend assessments (rangeland trend or planned trend) will be made, provided the appropriate plant communities are known and described in the ecological site descriptions, on the predominant rangeland ecological sites and key areas within the operating unit.
- Similarity index to the historic climax plant community, desired plant community, or plant communities at risk of crossing a threshold will be determined.
- If appropriate, rangeland health evaluations will also be made.
- State and transition concepts will be used and considered where applicable and when available.

Professional judgment, based on experience and knowledge of the rangeland ecosystems will be required to decide which rating techniques will be used on an individual management unit.

4.3.1 Trend

Trend determines the direction of change occurring on a site. It provides information necessary for an operational level of management to ensure the direction of change will enhance the site and meet the RMO's.

The plant community and the associated components of the ecosystem may be either moving toward or away from the historic climax plant community or some other desired plant community or vegetation state (rangeland trend or planned trend). At times, it can be difficult to determine the direction of change. The kind of trend (rangeland trend or planned trend) being evaluated must be determined. This rating indicates the direction of change in the plant community on a site. It provides information necessary for the operational level of management to ensure that the direction of change will enhance the site and meet the objectives of the managers (USFS and Permittee). The present plant community is a result of a sustained trend over a period of time. Trend is an important and required part of a rangeland resource inventory. It is significant when planning the use, management, and treatment needed to maintain or improve the resource. Trend should be considered when making adjustments in all resource management schemes (NRCS, 1997).

Trend assessments will be performed by the USFS in accordance with the NRCS Range and Pasture Handbook (NRCS, 1997).

4.3.2 Similarity Index

Similarity index is another method to evaluate an ecological site. This method compares the present plant community to the historic climax plant community for that site or to a desired plant community that is one of the site's potential vegetation states. The similarity index to the historic climax plant community is the percentage, by weight, of historic climax vegetation present on the site. Likewise, a similarity index to a desired plant community is the percentage, by weight, of the desired plant community present on the site. As the name implies, this method assesses the similarity of the plant community to the historic climax or desired plant community (NRCS, 1997). Species composition data used for similarity indices can also be used to assess the risk of crossing a threshold or transition to another plant community state. This practice can provide an indication of past disturbances as well as future management or treatment, or both, needed to achieve the RMO's.

It is important to recognize that similarity to the historic climax plant community and species composition in general may or may not be related to livestock grazing management. The data often indicate the history of disturbances such as fire or lack thereof. It may indicate a need for proactive vegetation management in combination with innovative livestock grazing management.

Similarity index assessments will be performed by the USFS in accordance with the NRCS Range and Pasture Handbook (NRCS, 1997).

4.3.3 Rangeland Health

Rangeland health determination procedures are being developed and tested at the time of this writing. The approach that should be used is currently in DRAFT form at this time, but is expected to be found in final print by the fall of 2004 (Pyke et al., 2004).

Rangeland Health is defined as:
"The degree to which the integrity of the soil, vegetation, water, and air as well as the ecological processes of the rangeland ecosystem are balanced and sustained. They defined integrity to mean maintenance of the functional attributes characteristic of a locale, including normal variability." (Pyke et al., 2004)

The rangeland health assessment procedure was developed for use by experienced, knowledgeable rangeland professionals. It is not intended that this assessment procedure be used by individuals that do not have experience or knowledge of the rangeland ecological sites they are evaluating. This procedure requires a good understanding of ecological processes, vegetation, and soils for each of the sites to which it is applied. It relies on the use of a qualitative (non measurement) procedures to assess the functional status of each indicator. An interagency team melded these concepts and protocols with the results from numerous field tests and numerous other comments to arrive at the process described herein. Along the way, this procedure has been termed rapid assessment, qualitative assessment of rangeland health, and visualization of rangeland health. (NRCS, 1997).

Rangeland health assessment is designed (Pyke et al., 2004) to:

- Be used only by knowledgeable, experienced people.
- Provide a preliminary evaluation of soil/site stability, hydrologic function, and integrity of the biotic community (at the ecological site level).
- Help landowners, managers, and users identify areas that are potentially at risk of degradation.
- Provide early warnings of potential problems and opportunities.
- Be used to communicate fundamental ecological concepts to a wide variety of audiences in the field.
- Improve communication among interested groups by focusing discussion on critical ecosystem properties and processes.
- Select monitoring sites in the development of monitoring programs.
- Help understand and communicate rangeland health issues.

Rangeland health assessment is not to be used (Pyke et al., 2004) to:

- Identify the cause(s) of resource problems.
- Make grazing and other management decisions.
- Monitor land or determine trend.
- Independently generate national or regional assessments of rangeland health.

Rangeland health assessments will be performed, as necessary by the USFS, in accordance with the Interpreting Indicators of Rangeland Health TR 1734-6 (Pyke et al., 2004).

4.3.4 State and Transition Concepts

There has recently been some description of states and transitions within ecological sites on Nevada Rangelands by the University of Nevada, Reno (UNR). The concepts currently drafted that are most useful for the Martin Basin EIS are for the following communities (Perryman and Swanson, 2004):

- Wyoming sagebrush (w/o trees, P-J)
- Mountain sagebrush (w/o trees, P-J)
- Mountain Mahogany (In Preparation)

These models are mainly conceptual, but will be applied to NRCS ecological site descriptions, which means that they have merit for site-specific issues and guidelines. These models should be used to recognize important transitions to new states. From this recognition, the importance of maintaining the abundance and diversity of perennial herbaceous understory species at a level needed for resilience after fire or continued use. This emphasizes the need for 1) periodic disturbance such as fire or vegetation management; 2) grazing management that keeps perennial herbaceous plants healthy and reproducing; 3) control of invasive weeds such as many of those on the state noxious weeds list; and 4) reseeding with adapted herbaceous perennials immediately after a fire where the residual perennial herbaceous vegetation was not abundant enough to revive and out-compete cheatgrass.

4.4 Condition Assessment Incorporation

Baseline assessments and data would be collected by experienced agency, rangeland specialists to assess the current state of each particular resource (e.g. riparian area, springs, seeps, and upland ecological sites). The baseline data would serve as an indicator of the present state, and possibly trend if historical and comparable quantitative data exists for the same specific resource areas within the allotments. The resulting status of condition will guide site specific RMO's, which are included in the AMP and AOP.

Monitoring will be used to supplement the AOP by establishing trends, which will help in refining the resource goals and objectives through the adaptive management process on a regular interval. In addition, using short and long-term monitoring, cause and effect relationships related to grazing and natural resource conditions and functionality could be established or disproved based on data taken in specific resource areas. This will ensure successful, site-specific resource management, and will ensure that livestock and grazing management can be tailored to each specific set of resources and associated issues.

4.5 Resource Validation

All sites chosen for assessment of condition or health must be within a single site and verified to that site in the field. The "vegetative groups" listed below are undoubtedly all vegetative groups, but are also located on many different soil types and ecological sites with different productivity potentials. To assign guidelines or standards based on simply the vegetation or "vegetative group" is not a scientifically based, site-specific resource management practice.

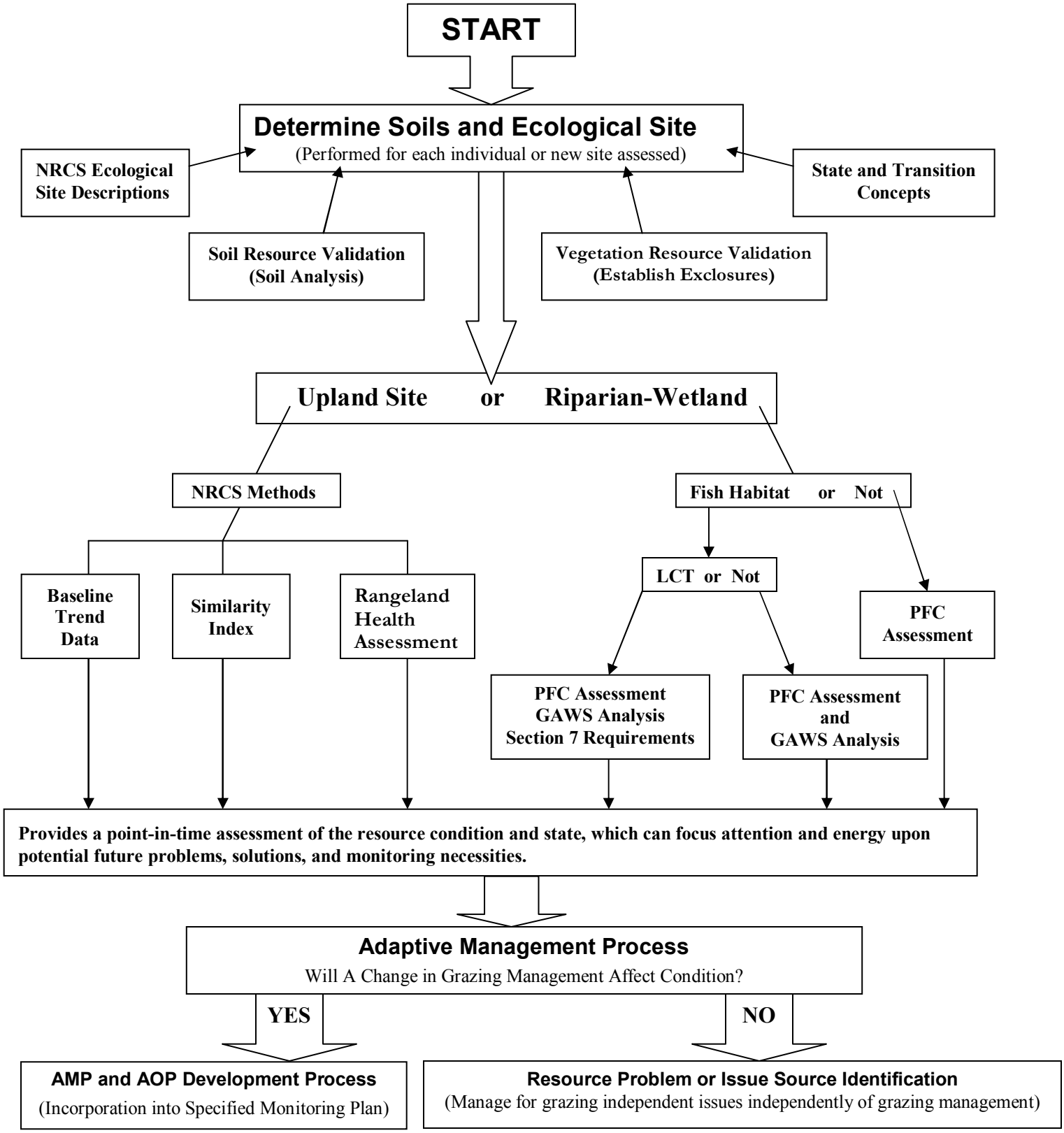
- Aspen
- Cottonwood
- Wet Meadows
- Moist to Dry Meadows
- Wyoming big sagebrush
- Mountain big sagebrush
- Mountain brush
- Lotic Riparian Areas
- Lentic Riparian Areas

The locally produced USDA-NRCS Humboldt County – East soil survey will be used to correlate the ecological sites to specific sites on the ground. From the Major Land Resource Area (MLRA) ecological sites, the PNC and all of the associated vegetation community attributes will be available to assess the condition of the resource. PNC and DFC may be two different things, which means that each RMO needs to identify and be based on one or the other.

Soil analysis should be performed if there is a discrepancy between the soil mapping unit and what the site characteristics are displaying. The confirmation of the ecological site description and the soils that exist on the site is a procedure that is used to validate each particular ecological site.

Exclosures should be established, when necessary in riparian areas, based on their representation of a single ecological site and/or key area depending on the objectives of the establishment of the exclosure. Exclosure sites would be verified by soil and rangeland scientists for complete agreement on the site potential and capability. Riparian exclosures will be used to track the ecological development of small, representative areas under a no-grazing scheme. They will also be used to verify potential natural communities (PNC's) for key areas and ecological sites as a whole. The permittee, USFS, soil scientist, and range scientists will work together to identify those areas that are suitable for exclosures.

Figure 2. Condition Assessment Process and Purpose.



5.0 Key Management Considerations and Guidelines

Guidelines will be established on the specific grazing, livestock, and rangeland management principles and practices that are needed to obtain the RMO's stated in the AMP/AOP. There is no simple definitive index, guideline, or standard for proper management of livestock grazing, so resource managers using management strategies that revolve around a single standard or guideline, for regional or national use are not practicing good resource or grazing management (Burkhardt, 1997) and (Rhodes et al., 1995).

All guidelines developed for the AMPs and AOP's should be in accordance with the Nevada Rangeland Monitoring Handbook, First Edition and all subsequent editions as they become available (NRSTG, 1984).

5.1 Riparian Area Grazing

Riparian grazing plans should be site-specific and based upon the best research and empirical evidence available (U of I, 1997). The following guidelines should be followed to apply ground level grazing management plans for obtaining RMO's (U of I, 1997):

- Determine critical grazing periods on each riparian area and graze outside of the critical periods of time to the extent possible.
- Limit or deter cattle access to the surface waters to the extent feasible and possible. Fencing of entire riparian areas for this purpose would be inappropriate unless a riparian pasture is needed.
- Schedule grazing so that periodic grazing promotes increased tiller densities, or seed ripening (at least once every 4 years) for vegetation population reproduction and maintenance.
- Create smaller riparian pastures as needed so that homogeneous sites can be utilized according to each of their potentials and production. Adjusting timing, frequency, and intensity of grazing on individual pastures is more important than adopting a formalized grazing system.
- Off-stream watering sites should be pursued by the USFS and permittees to draw livestock away from the streambanks. Herding and salt and/or mineral supplement placement should also be promoted for this purpose.
- Livestock congregation areas (e.g. salting, supplement, and watering areas) should be placed away from the riparian zone so that fecal and urine deposition is buffered by upland and riparian vegetation.

Earlier turn out dates combined with exit dates prior to soil moisture depletion and hot temperatures could be more appropriate with respect to plant health and vigor and also improve animal distribution, reducing riparian impacts that generally occur during the hot season. This approach would also provide the potential to return for a late season grazing period after seed set. Managers may also need to adjust animal numbers up or down to achieve distribution and utilization goals since earlier turn outs will probably have an affect on foraging behavior (Laycock et al., 2004).

Again, it should be emphasized that riparian grazing plans should be site-specific. These guidelines are principally useful for indicating what the water quality and resource condition maintenance functions of riparian areas are, and some basic information that the grazing manager should consider. Given the high degree of variability across the Santa Rosa Ranger District, neither of these nor any other guidelines could singly indicate or dictate specific dimensions of an appropriate grazing management plan (U of I, 1997).

5.2 Utilization

In recent times, there has been an increasing effort to manage livestock grazing on the basis of utilization standards or limits. This is a deceptively simple concept that may provide simple and efficient grazing policy setting, but does not result in effective grazing management (Rhodes et al., 1995). Utilization limits were developed to manage growing-season-long grazing systems, so using utilization levels as a single deciding factor in management decisions could be considered somewhat out of context as it relates to the potential carrying capacity and health of the land. Furthermore, utilization standards as recently used by the land management agencies are subjective both spatially and temporally. Rangeland grazing does not occur uniformly across the landscape or through time, so there is a chance that an unrepresentative area for monitoring utilization could be chosen inadvertently or intentionally by a manager, and therefore would misrepresent the true nature of the use or utilization that is occurring across the whole management unit (Burkhardt, 1997).

Another major dilemma with the ocular "measurement" of utilization is the fact that it is subjective. The total removed material and total production on the site must be estimated to determine percent use. Monitoring practices like these can be variable among or can differ between observers, so a more reliable approach would be preferred. True measurements such as stubble height and browsed twigs are directly measurable and do not require any estimation subject to bias or personal influence and alternative methods. They are also more repeatable between observers and require less training to keep personnel monitoring and measuring in a consistent fashion (Rasmussen, 1998), (Laycock, 1998) and (BLM, 1996).

5.2.1 Utilization Strategy

When considering utilization standards and guidelines, the following should be kept in mind (Smith, 1998):

- Utilization by accepted definitions cannot be measured under most practical grazing management situations, especially when grazing is not coincident with the growing season.
- Relative or seasonal use can be measured whenever livestock are removed from a pasture, but utilization standards developed from studies using standard definitions cannot be applied.
- Utilization of individual species has little or no relevance to the subsequent growth or reproduction of the plant unless the phenological stage of growth when use occurs is

specified. Timing of use has more impact than amount of use as far as the physiology of the plant is concerned.

- Utilization standards for key species that are based on the grazing tolerance of the plant have no direct relevance to standards of utilization or residual vegetation aimed at wildlife or soil cover, sediment capture, or other non-grazing effects.

Standards and guidelines related to utilization will be used as an indicator, but not solely to dictate or serve as the reasoning behind a change in management. Utilization would be used for several purposes along with other designated monitoring indicators as follows (Hall and Lindmuth, 1998):

- As a warning sign to prevent livestock damage to soil or vegetation (Hall and Bryant, 1995)
- A means to develop vegetation structure
- A means to determine livestock distribution across the landscape and carrying capacity of the management unit via determination of use in key areas and subsequent production of use-pattern maps for the management unit.

Since establishing utilization standards will not guarantee obtaining DFC's, DPC's, PNC's, or RMO's (Burkhardt, 1997):

1. Utilization guidelines will be developed to meet RMO's on a management unit and/or site-specific basis through the AMP/AOP process.

2. Would be specified in the AMP and would be used as one of the guidelines and indicators for management scheme implementation/alteration and/or adaptive management system inputs, but not as a sole indicator or trigger for pasture closure or livestock removal.

3. In the case that an AMP was not produced by a permittee for an allotment within the previously stated time period, the USFS would develop AMPs with utilization standards necessary to meet RMO's.

Methods and means for long-term monitoring of riparian areas, such as key area, photographs, greenline, and stream survey data would be used along with utilization guidelines to prompt consideration for a management alteration and for establishing resource area specific data sets to improve the understanding of the processes and principles that must be identified for optimal management of health and condition of the resources in the Martin Basin Rangeland Project Area.

5.3 Herbaceous Stubble Height

Since stubble height is a true measurement that can be physically accounted for throughout the season, it should play as large of a role, as an indicator, as any other measurable parameter (Hall and Lindmuth, 1998). It is also favorable because of the measurement simplicity and

repeatability among observers (BLM, 1996). The application of the results have to be approached with caution due to contrasts in the effects of different heights on altering the functionality of riparian zones. It has been noted that each stage of channel succession is independent of the previous or future stages (Skinner, 1998), so the spatial and temporal variability and specificity, even within the same drainage, has to be taken into account before any alteration to the AMP or AOP guidelines occurs. This makes it imperative for the manager to require flexibility in the application of the stubble height analysis in defining RMO's with the AMP/AOP. Stubble height should not replace utilization measurements, nor should it become a management objective or sole means of adjusting grazing management, it must be used in the context of the AMP/AOP and RMO's.

The measurement of stubble height should be used to do the following (Skinner, 1998):

- Determine the ability of the vegetation to trap sediment/ build banks.
- Determine the ability of the current banks to alter toward a functional channel configuration.
- Determine the ability of the current banks to maintain the current stage of channel configuration (if suitable or desired).
- Determine the effect of grazing on the physiological health of the individual plants.
- how managers can best alter desired changes between the different stages of channel succession (e.g. bank building).

5.3.1 Herbaceous Height and Sage Grouse

It has also become somewhat common for certain groups and agencies to use stubble and/or herbaceous height on upland situations when referring to guidelines in sage grouse habitat management.

There has been much consternation and confusion over the "seven-inch stubble height" issue. The sage grouse guidelines (Connelly et al., 2000) do not use the term "stubble height", but are talking about perennial herbaceous cover. These two terms, stubble height and perennial herbaceous cover, are not the same.

The scientific literature summarized in (Connelly et al., 2000) indicates that sagebrush canopy cover and composition, as well as the cover and diversity of perennial herbaceous species in the understory are significantly important to sage grouse nesting success (NDOW, 2002).

Furthermore, in a recent review of the 13 studies that were cited in the Western Association of Fish and Wildlife Agencies (WAFWA) guidelines (Connelly et al., 2000) for sage grouse habitat, there were no statistically significant relationships found between nest success and grass height alone. There was, in fact, a slight negative correlation that should not be over interpreted. Results from simple linear and multiple regressions performed on grass height and nest success suggest that grass height as a single parameter is a poor indicator and should not be used individually or exclusively to assess or monitor sage grouse habitat quality (Schultz, 2004).

Establishing guidelines and especially standards may be spatially or temporally inappropriate. Ecological site potentials vary considerably in Nevada sagebrush communities. Furthermore, the plant communities and/or soils in many areas have crossed an ecological threshold to new communities of plant species (states) that will not relinquish their domination without focused investment. And, it must considered that understory (excluding seed stalks) height characteristics of seven-inches or more may not be possible or practicable in all ecological sites or habitat areas. Therefore, the broad application of understory height objectives is not recommended across all sites and areas where sagebrush once grew (NDOW, 2002).

However, with the application of local ecological knowledge, data, or research, and use of the ecological site descriptions, an understory height objective often provides focus for management. This is especially so, for those areas likely to provide the majority of nesting habitat (NDOW, 2002).

Guidelines for stubble heights should be established within the AMP's, as needed to address habitat issues that are affecting the population viabilities within each PMU that the allotment falls within. If guidelines are established, they should be set in accordance with the NDOW Information Leaflet #1 (NDOW, 2002) and the Santa Rosa Population Management Unit Plan (Nevada State Sage Grouse Plan).

See Section 7.2 *Sage Grouse Considerations* for more sage grouse considerations.

5.4 Key Areas

Key areas are a way to measure the effectiveness of management being implemented on the land. These areas also contribute to general management decisions made across the land (Holechek, 2001).

5.4.1 Key Area Strategy

Key areas will be used in accordance with the Humboldt-Toiyabe Forest Supervisor's request (Vaught, 2004) and/or the NRCS definition and recommendations. The key areas will be representative of important RMO's and representative of the management practices and principles used to obtain the RMO's. All key areas will be established through a collaborative effort between the USFS and permittee (Vaught, 2004).

Key areas should not be established in areas that are remote from water sources, excessively steep, or areas that are poorly accessible due to physical barriers (Holechek, 2001). Likewise, key areas should not be located too close to water sources, fences or other physical barriers or areas that tend to congregate livestock and/or wildlife.

Key areas will be established in each area of concern to represent important stream reaches or ecological sites. The utility and RMO characteristics incorporated in these key areas will be:

- Achievable with the planned management
- Measurable with the planned monitoring
- Worthy of the cost of the planned management and monitoring

The following are some criteria that should be considered in selecting key areas. A key area (UACE, 2001) will:

- Represent the overall range type in which it is located.
- Be located within a single ecological site and plant community (i.e., not in a transitional zone).
- Contain the key species of interest (key species are generally an important component of the plant community, serve as indicators of change, and usually are forage species).
- Be capable of and likely to show a response to management actions. This response should be indicative of the response that is occurring across the range type that the key area is intended to represent.
- Comparison areas (livestock exclosures) can be very valuable if paired with similar grazed sites within the same management unit. Wildlife exclosures are more difficult to maintain, but are also of great value where utilization by wildlife is a management concern.
- Key areas should not be selected completely at random. Rather, the monitoring sites should be selected based on known attributes (i.e. soil, vegetation, etc.) that are linked to management objectives and proximity to supplement feeding areas, watering points, and/or other range improvements.
- Have a location should have high potential for measuring desired vegetation changes that are tied to RMOs.

Triggers will be developed for the key areas to indicate the need for the permittee to make mid-season adjustments or moves and end-point indicators will be developed to assess the success of the grazing management in each year.

Through time, the linkage of these indicators to the RMO's will be assessed. Each year, the endpoint indicators will be assessed after the grazing and growing seasons, but before winter precipitation. These indicators will be used to adjust the AOP to obtain the RMO's using all of the grazing management tools (e.g. timing, intensity, kind and class, stocking rate, frequency, present range improvements, and future range improvements). See Section 3.3 *Adaptive Management Plan Incorporation* for further explanation of this process.

Validation of the key area's capability and potential will be verified accordingly:

- Upland key areas will be verified through the practice of use-pattern mapping and ecological site validation.
- Riparian key areas will be verified through use-pattern mapping, NDOW-GAWS data, and small exclosures as a last resort.

5.5 Exclosures

Exclosures should be established based on their representation of an area comparable to the associated uplands and\or riparian areas. Exclosure sites would be verified by soil and rangeland scientists for complete agreement that the site potential and capability is comparable to the associated uplands/riparian areas before establishing the permanent status of the exclosure. The permittee and the USFS will work together to identify those areas that are suitable for exclosures.

Riparian exclosures will be used to track the ecological development of small, representative areas under a no-grazing scheme. They will also be used to verify potential natural communities (PNC's) and/or DFC's for key areas or ecological sites where managers need better information regarding response potential. Maintenance and installation of the exclosures is addressed in Section 6.2 Structure and Improvement Installation / Maintenance of this document.

5.6 Riparian Pastures

Riparian pastures may be used to manage the intensity, timing, duration, and class of livestock that utilizes the forage within an area that is prone to unacceptable impacts due to the lack of alternative grazing management options. These pastures will be established through a cooperative effort between the USFS and the permittee, and should comply with the management scheme set forth in the AMP/AOP, which is indicative of the collaboratively identified RMO's.

Riparian pastures are particularly useful where forage resources are particularly difficult to harvest and when riparian concentration/distribution problems occur in mid to late summer. Riparian pastures should be used after all of the other (e.g. salting, supplementing, additional water developments, etc.) have been considered and evaluated for feasibility and practicality.

5.7 Water Quality and Quantity

The water quality and quantity within the basin is highly dependent on many factors. The Nevada Division of Environmental Protection (NDEP) is the regulatory authority for Nevada water quality and will determine water quality standards and the association between water quality and quantity that affect the regulatory status of each stream. Water quality standards enacted through the Nevada Administrative Code (NAC) will be followed and retained as one of the RMO's listed in the AMPs for each allotment.

Nevada State water quality standards vary according to whether the stream is named on the State 303(d)) list and stream class or designation. The Santa Rosa Ranger District will use water quality, following standards listed in the NAC, as an indicator and tool to make management decisions. The process and standards within the basin are as follows (NDEP, 2004):

- Martin Creek and the South Fork Quinn River are Class A waters and have specific numeric standards listed in NAC445A.124.
- All surface waters not specifically identified by name in regulation are subject to the narrative standards listed in NAC445A.121 and do not have numeric standards.

- In the event of abnormally high or low flows, NAC445A.121.8 would be followed as it pertains to the water quality standards for all surface waters in the Martin Basin.
- Listing of impaired streams (streams exceeding NAC water quality standards) will be listed via the NDEP 303(d) listing and would be monitored by the NDEP thereafter.

6.0 Associated Management Measures

Management actions will be modified as necessary to meet management guidelines and RMO's.

6.1 Riparian Grazing Management

"Stream channel form and bank stability are important both for stream function and the biotic community structure of riparian ecosystems (Olsen-Rutz and Marlow, 1992) and (Prichard et al., 1993). Stream form and structure not only dictates habitat for fish and other aquatic organisms (Bauer and Burton, 1993) and (Platts, 1979), but also regulates erosion, flow regime and groundwater recharge (Skinner, 1994) and (Heede, 1980). Consequently, stream channel stability has become a fundamental component of the USFS or Bureau of Land Management preferred management alternative described in the *Rangeland Reform '94 Final Environmental Impact Statement* (BLM, 1994)." (Rhodes et al., 1995)

"The public land management agencies intend to promulgate national guidelines and standards to achieve a 27 percent improvement in riparian function on Bureau of Land Management lands, and a 7 percent improvement on USFS lands (BLM, 1994). It is intended these guidelines would become the framework for state and local standards (BLM, 1994b)." (Rhodes et al., 1995)

"However, one recent federal riparian management manual (Chaney et al., 1993), and an earlier scientific journal article (Myers and Swanson, 1991) both arrive at the same general conclusion: that each watershed, stream, stream reach and riparian area has unique characteristics that must be accounted for in developing a grazing strategy. This poses a significant challenge to the development of national standards, because land managers must assume that all rangeland and riparian sites within the same region and forest will respond in a similar manner. If streams, or even stream reaches, react differently to grazing, then the application of national standards and guidelines may accomplish little more than prolonging the controversy over livestock use of riparian areas." (Rhodes, et al., 1995)

"Results from a long-term riparian and rangeland monitoring project conducted under a cooperative agreement between the USFS, Matador Cattle Company and the Montana Agricultural Experiment Station (Matador and MFWP, 1991), it can be concluded that: widespread use of the same set of grazing standards over large areas and entire grazing allotments can not be considered a reliable basis for monitoring efforts because of the natural variation occurring within and between streams in the same watershed. The use of forest-wide or national standards may not be beneficial to either the natural resource base or local economic uses." (Rhodes et al., 1995)

"Stream channel monitoring and management efforts should be directed toward specific areas of concern, rather than the grazing unit (allotment) as a whole. To work well in this context, riparian grazing standards (or guidelines) must be developed for the specific reach or stream conditions. However, care should be taken because management at one critical location could lead to development of another problem at a different location, or create different problems at a later date (Heede, 1980)." (Rhodes et al., 1995)

6.2 Structure and Improvement Installation / Maintenance

- The permittees are responsible for maintenance of all structures and improvements within and including the permitted boundaries of the allotment.
- Responsibility for specific structures and maintenance schedules will be identified and listed in the Term Permit and the individual AMPs.
- The Santa Rosa Ranger District will pursue, support, allow, and/or implement all reasonable improvements that are required to obtain specific RMO's as named in the AMP/AOP including, but not limited to, spring development, pipelines, troughs, fences, upland vegetation treatments, etc.

6.3 Fire & Fuels

Fire and Fuels continue to be a large concern within the Great Basin, and especially in Nevada. Fire can have some extremely detrimental effects on the condition and function of rangeland and riparian vegetation and the resiliency of the communities to invasive plants following the occurrence of fire. In some cases, fire would reduce fuels and promote a more diverse and resilient vegetation community, but the local presence of cheatgrass makes it imperative to assess each case site-specifically in respect to potential for invasion following prescribed or prescribed natural fires. Related to this issue is mandatory resting periods following fire occurrences. Any proposed rest-periods and the length of the rest-periods should be evaluated, cooperatively by the USFS and Permittee, on a site-specific basis to establish the suitability of the site to handle livestock grazing without negatively affecting the rehabilitation and re-establishment of perennial species (Sanders, 2000).

Landscape scale continuous fuels, both woody and herbaceous, increase fire risks and subsequent risk of ecological change because of the threat of landscape scale wildfires. These large fires are equally detrimental to wildlife (mule deer, pronghorn, sage grouse, fish, neotropical migrant birds etc.), recreation and aesthetics (hunting, fishing, hiking, etc.), water function, and livestock production due to the loss of habitat, water quality, and upland and riparian native perennial vegetative cover.

As mentioned previously, consistent use of forage, in all cases, will result in reduced continuous herbaceous fuels loads and fire risks, which is important for vegetation communities that currently support sage grouse and other sagebrush obligate species among landscapes covered with cheatgrass to all degrees. To keep these intact communities at reduced fire risk means that they will continue to provide sage grouse, other wildlife habitat (Ypsilantis, 2003), and continued forage production.

6.3.1 Fire and Fuels Management Strategies

Since fuel loads and fire risks are continually dynamic, fuels management strategies and plans should be addressed at the AMP/AOP level. Potential impacts, results, and long-term outcomes should be analyzed and compared between addressing and management of the issues and risks and not addressing and non-management of the issues and risks. This analysis should be performed before or during the formation of the fire and fuels management strategies and plans.

These strategies and plans should consider goals and condition objectives, priority and/or high-risk areas, fuel level and risk evaluation frequencies, management considerations, management and implementation techniques and methods, and potential outcomes and impacts of fuels management activities. The plans should be constructed with all natural resource values considered and represented within the targeted objectives.

7.0 Additional Mitigation Requirements

7.1 Use Schedules

Hard and fast dates are inappropriate and inadequate for responsible and proper resource management. Specific sites will be available for responsible and healthy grazing at different times of the year than others. In and out dates will be determined the ability of the resource to sustain and support the specified grazing timing, intensity, and duration within the specified management unit. This approach will help the range managers, permittees, and other public land users and interests maintain a flexible system that can and will be adjusted based on the trend towards or away from the stated RMOs. Each individual AMP/AOP will state the use schedules for their respective management units.

7.2 Sage Grouse Considerations

Sage grouse issues have prompted other public land management agencies to take a generalist approach for managing all uses in accordance with some non-specific goals and statements related to sage grouse habitat and habitat management. In this alternative, site-specific management will determine if certain habitat objectives are practical, feasible, and possible to manage for based on the site potential and capability. It is recognized that plant community resilience is the goal for sage grouse habitat across the range of the sage grouse, and maintenance of the site resilience means that adequate habitat will be provided in perpetuity (less uncontrollable and/or un-mitigated large site altering disturbances).

Under this alternative, the resource use coordination and management will incorporate those recommendations and guidelines for sage grouse habitat management that are published in the Nevada State Sage Grouse Conservation Plan specific to the Local Planning Area (LPA) and Population Management Units (PMU's), which are located within the Santa Rosa Ranger District. This will ensure that the resource is being utilized and managed according to a population or management unit with specific goals and objectives pertinent to the site-specific characteristics that exist.

7.2.1 AMP Level Sage Grouse Strategy

Ecological site potentials vary considerably in Nevada sagebrush communities. Furthermore, the plant communities and/or soils in many areas have crossed an ecological threshold to new communities of plant species (states) that will not relinquish their domination without focused investment. Appropriate and proven methods for identifying nesting areas will be employed to locate and designate nesting areas as they occur across each allotment. The AMPs will incorporate and address the nesting area objectives if there is a legitimate designation of nesting habitat within the respective allotment.

To develop habitat objectives for nesting habitat areas, consider the sage grouse habitat guidelines listed in the Santa Rosa PMU Conservation Plan, present vegetation, and site potential based on the ecological site description and other relevant factors such as legally authorized land uses and the habitat needs of other species. Then, develop desired plant community composition and structure objectives consistent with the multiple uses and values.

Where habitat condition objectives are not being met, including habitat areas where utilization levels are too high for their season or type of use, local groups should consider adjusting livestock grazing seasons, periods of use, periods of rest and/or deferment, stocking rates, kind and class of livestock, and distribution of use (by adjusting salting and watering locations, livestock handling techniques, season of use, pasture creation, fencing, etc.). The habitat management guidelines should not affect or pertain to any other management unit than the ones that have designated habitat within them and shall utilize the Santa Rosa PMU Conservation Plan as the basis for sage grouse conservation.

In areas where management actions are implemented to achieve specific habitat objectives, monitoring strategies for adaptive management must be implemented (Macnab 1983) and (Gratson et al. 1993) for validation of objective attainment success or failure. Monitoring of perennial herbaceous cover objectives could emphasize key areas within important and representative nesting or potential nesting habitat. Furthermore, in a local key area, the monitoring of herbaceous cover could be done by monitoring residual forage levels set as appropriate for the health of the local plant community and habitat objectives.

The application of the above recommendations is most appropriately applied at a site-specific planning level (e.g. district level land use planning effort) and specifically the AMP in this alternative. Due to the considerable effort and contribution of time and experience of local individuals, agencies, permittees and other and resource experts, the local Santa Rosa PMU Conservation Plan should, at a minimum, be adopted as the strategy or process for applying the above recommendations at the AMP level.

7.3 Hot Season Grazing

Hot season grazing can be accomplished without affecting resource integrity and condition if livestock management, vegetation and precipitation conditions are properly considered, managed and monitored. However, with hot season grazing particular care must be taken by the permittee to recognize and mitigate the problematic tendency for livestock to congregate at watering points or along riparian areas in general. This activity, if prolonged, can potentially have ecological consequences for the resource, and can restrict the use of the management units that are affected from these types of activities. Livestock distribution is more often than not the problem and the solution to riparian impact mitigation of hot season grazing.

To reduce the negative effects of hot season grazing livestock managers should 1) closely monitor and manage the duration and frequency of grazing according to the capacity of the resource, 2) encourage livestock to move out of the riparian zones, and 3) manage the time and timing of grazing to allow for adequate re-growth of the vegetation.

The approach to developing indicators that would be used for avoidance of potential damage from hot-season grazing is listed under the *Key Management Considerations and Guidelines* section 5.0 of this alternative.

7.3.1 Hot Season Grazing Management Strategy

A variety of grazing systems have proven effective and successful in hot season grazing, therefore appropriate grazing systems will be employed based upon site-specific and annual conditions within all allotments. Duration of grazing events within each management unit will vary greatly depending on riparian vegetation, stream type (BLM and USFS, 1997), management practices, and improvements that are presently employed or established.

Season of grazing use should be determined by site elevation, mean annual precipitation, seasonal precipitation occurrence, aspect, and other site-specific conditions that alter site potential. Higher elevation, cool, mesic sites may respond well to summer grazing. Low elevation, hot, dry sites, however, may respond better to early or late applications within the rotation schedule (Masters et al., 1996).

Each management unit will be utilized according to the productive potential and capability of that resource, which may occur within, or outside, the time of year that is considered to be "hot season". Additionally, it should be recognized that annual conditions, i.e. precipitation timing and amount, growing season, temperature, etc. varies significantly from year to year, thus producing different vegetation conditions and animal behavior on each site from year to year. The decision or establishment of the resource capability will be addressed and management actions specified on a site-specific basis through the AMP and AOP process to reach RMO's.

7.4 Section 7 Consultations

All ESA consultations and conferences will be conducted in accordance with the Endangered Species Act Consultation Handbook (USFWS, 1998) and Section 7 of the Endangered Species Act (ESA, 1973).

7.4.1 Agency Collaboration

The USFS and the United States Fish and Wildlife Service (USFWS) shall consult with the Secretary on any prospective agency action at the request of, and in cooperation with, the prospective permit or license applicant if the applicant has reason to believe that an endangered species may be present in the area affected by his/her project and that implementation of such action will likely affect such species (ESA, 1973).

The USFS will notify holders of, or applicants for, contracts, permits, licenses, or other written instruments issued by the agency that authorize the use or occupancy of National Forest System lands at or near the beginning of the consultation process, of the opportunity to request application designation under the ESA (Bosworth, 2004).

Written requests for applicant designation will be routinely granted by the USFS if the individual can demonstrate that the use that has been authorized (or applied for) and will be directly affected by the results of a consultation. Once a request to be an applicant has been received, the USFS must submit to the appropriate regulatory agency a written request to initiate early consultation (50 CFR 402.11 (c)) (Bosworth, 2004).

Once applicant status has been conferred by the action agency, the applicant must be informed by the action agency of the estimated length of any extension of the 180-day timeframe for preparing a biological assessment, along with a written statement of the reasons for the extension (Bosworth, 2004).

7.4.2 Permittee / Applicant Collaboration

Requests for applicant status under the ESA must be made in writing and should be made as early in the environmental analysis process as possible (50 CFR 402.11(b)). Written requests for applicant status should be sent to (Noriega, 2004):

District Ranger
Santa Rosa Ranger District
1200 East Winnemucca Blvd
Winnemucca, NV 89445

In order to maximize the value of the applicant participation, requests should be made prior to completion of a biological assessment or biological evaluation (Bosworth, 2004).

Once applicant status has been conferred by the action agency, applicants should be aware that (Bosworth, 2004):

1. They are entitled to submit information for consideration during the consultation.

2. They must be informed by the action agency of the estimated length of any extension of the 180-day timeframe for preparing a biological assessment, along with a written statement of the reasons for the extension.

3. They must concur with any decisions to extend the 60-day timeframe to conclude a formal consultation.

4. They are entitled to review draft biological opinions (BO's) received from the action agency and to provide comments on the draft BO to the action agency.

5. They are entitled to have the Services discuss the basis of the biological determination with them and to have the Service seek the applicants' expertise in identifying reasonable and prudent alternatives to the action if likely jeopardy or adverse modification of critical habitat is determined.

6. They are entitled to have the Service provide a copy of the Final BO to them.

As outlined above, applicants should participate in the early consultation process under both informal consultations (items 1 and 2) and formal consultation (items 3-6) (Bosworth, 2004).

7.5 Cultural Resources

As appropriate, avoidance, data recovery, exclusion from individual sites, or other mitigation practices would be implemented when and where significant cultural resources would be affected by actions promoted by this alternative. Cultural resource management strategies will always be conceived and implemented on a site-specific basis and would consider all other legal uses of land according to FLPMA (FLPMA, 1976).

Data recovery and mitigation plans will be in compliance with applicable laws, regulations and supplementary Advisory Council guidelines (Forest Land and Resource Management Plan 1999: IV-22).

Identification and implementation of appropriate grazing and cultural resource management and conservation strategies will be addressed, on a site-specific basis, through each AMP.

7.6 T, E, and S – Species

The economic growth of the State of Nevada has been attended with some serious and unfortunate consequences. Nevada has experienced the extermination or extirpation of some of the native species of flora. Serious losses have occurred and are occurring in other species of flora with important economic, educational, historical, political, recreational, scientific and aesthetic values. The people of the State of Nevada have an obligation to conserve and protect the various species of flora, which are threatened with extinction. Through the NRS codes, a program is provided for the conservation, protection, restoration and propagation of selected species of flora and for the perpetuation of the habitats of such species (NRS, 1969a).

A species or subspecies of native flora shall be regarded as threatened with extinction when the State Forester Firewarden, after consultation with competent authorities, determines that its existence is endangered and its survival requires assistance because of overexploitation, disease or other factors or because its habitat is threatened with destruction, drastic modification or severe curtailment. Any species declared to be threatened with extinction shall be placed on the list of fully protected species, and no member of its kind may be removed or destroyed at any time by any means except under special permit issued by the State Forester Firewarden (NRS, 1969b).

7.6.1 Un-surveyed Areas

All un-surveyed areas will be surveyed for populations of T, E, and S species before management strategies are considered or implemented to conserve T, E, and S species habitat or populations within these areas.

Identification and implementation of appropriate grazing, habitat, and population management and conservation strategies will be addressed, on a site-specific basis, through each AMP

7.6.2 Known Populations

Known populations of sensitive plant populations will be protected if negative effects are occurring, and proven to reduce known populations or severely limit or impair their reproductive

capability. Surveys will be performed in potential habitat. If populations of sensitive plant species are found, monitoring will be used to determine if livestock grazing is causing a negative impact on the population. If livestock grazing is causing a negative impacts, the site will be recognized and protected through the AMP and AOP process described herein.

Identification and implementation of appropriate grazing, habitat, and population management and conservation strategies will be addressed, on a site-specific basis, through each AMP. Local collaborative planning processes will be used where existent or whenever possible.

7.6.3 Workshops/Field Tours

Training would be provided with field tours for appropriate personnel to familiarize them with the Rare and Sensitive plants and their habitat. Reports would be placed in the projects file and would contain such information as the training provided, surveys performed, monitoring results, and management activities as appropriate.

8.0 Monitoring Plan

Monitoring can determine whether the project-level decision is being implemented as planned (implementation monitoring) and if so, whether the objectives are being achieved in a timely manner (effectiveness monitoring) (U of I-SHRT, 2004).

Since "rules of thumb" and simplistic guides, such as utilization standards, are not an acceptable substitute for experienced, on-the-ground management, based on sound, long-term range trend information, monitoring and conclusions derived from monitoring should:

- Emphasize measuring indicators of the RMO's stated within the AMP/AOP (Sanders, 1998).
- Be specified by the AMP/AOP, and will be scaled to the management unit and the RMO's named therein.
- Be performed in accordance with the Nevada Rangeland Monitoring Handbook, First Edition or subsequent versions as they become available (NRSTG, 1984).

8.1 Development Considerations

The following items will be considered when jointly developing a monitoring plan with the permittee (USFS/PLC, 2003):

- Site-specific characteristics and conditions (Rhodes et al., 1995).
- The monitoring plan will be considered a dynamic document, which will be reviewed and modified as necessary when new information becomes available.
- The monitoring plan will be a part of the AMP, and be reviewed on an annual basis during permittee meetings and development of the AOP.
- The monitoring plan will be focused on and scaled to the RMO's set forth in the AMP and AOP.

8.2 Development Process

The following outlines the process of the monitoring plan formation (USFS/PLC, 2003):

- State clearly the resource objectives that will serve as the basis for selecting the attributes to be monitored. Resource objectives will include those found in the Forest's Land and Resource Management Plan (LRMP), Biological Opinions (BO's), and AMP, etc.
- Describe and agree upon the locations, timing, attributes to be measured, and protocols to be used for both short-term (implementation) and long-term (effectiveness) monitoring. Items to consider:
    a. Utilization or Residual Production/Biomass/ Stubble Height Measurements
    b. Erosion indicators
    c. Ground cover

d. Species composition
e. Livestock use patterns
f. If available, incorporate information from Ecological Site Descriptions.

- State the grazing and other resource standards/guidelines that are required to be met, and make clear which monitoring protocols, such as reading transects, will be used to measure the standards/guidelines.
- If available, include a summary of prior inventories, monitoring data, stocking records, climatic records, photographs, livestock use patterns, etc.
- Plan for monitoring data to be collected in a manner that is repeatable and as quantitative as practical.

8.3 Short Term Monitoring (Implementation Monitoring)

Stubble height, streambank disturbance, woody stem use, etc. are all short-term indicators of grazing effects on meeting long-term RMO's (e.g. green-line vegetation composition, streambank stability). Each can be used in the appropriate situation, as indicators of good management, and as a target to achieve in the AOP, with the objective of achieving the long-term RMO's. It is also inappropriate to use stubble height numeric values as the sole means to manage toward achieving the long-term resource objectives (U of I-SHRT, 2004). Therefore, it is equally inappropriate to use utilization standards (numeric values) as the sole means to manage toward achieving the long-term resource objectives.

Annual event monitoring documents the type of grazing and other events that occur each year on the allotment. Growing conditions, animal numbers, season of use, pasture rotation, fires, utilization intensity and distribution are examples of annual information that is required (RCI, 1999). Short-term or annual event data should be taken according to the monitoring protocol set forth in each AMP. The frequency and timing of data collection could include, but is not limited to pre-turnout, mid-season, and post outdate and growing season. These collections would provide quantitative and qualitative data for establishment of the processes that are occurring within the allotment throughout the term of a year. The information would be used to fine-tune the implemented grazing plan on an annual basis and is a prerequisite to interpreting the cause and effect relationships involved in the documented trend record. By itself, annual monitoring results provide insufficient information to substantiate a permanent or long-term adjustment to the implemented grazing plan or permit authorization (RCI, 1999).

The responsibility for short-term monitoring falls to both the permittee and the USFS. Generally triggers are detected by the permittee and end-point indicators are assessed by the agency personnel in conjunction with the permittee. Restrictions based on time and finances may preclude the USFS to perform this monitoring as needed. Permittees will be trained in each of the various approaches to monitoring the indicators and triggers. They will then perform the monitoring, record all data, and provide a copy to the USFS as available. The USFS and the permittee will work together on the analysis and conclusions drawn from the data, which will be the basis for the adaptive management process to produce the next year's AOP.

- Compliance with terms and conditions in the Term Permits including AOP's would be monitored annually.
- Herbaceous and browse utilization and stubble height and other designated resource attribute observations would be conducted on areas selected by agency and permittees in mutual agreement, both annually and seasonally. The selected areas will best represent the general ecological site or stream and channel class/type that is being monitored and the utilization that is occurring within that specific type of ecological site.

8.3.1 Monitoring Tools

The following monitoring could take place, as applicable, in pre-season, mid season, and/or post-growing season. These tools and the timing of their use should be tailored specifically to aid in achieving the RMO's.

- Herbaceous utilization
- Woody species utilization
- Stubble heights
- Vegetation vigor
- Actual Use
- Use pattern mapping

8.4 Long Term Monitoring (Effectiveness Monitoring)

Emphasis should be placed on long-term monitoring of trend to determine whether RMO's are being met or not. Long-term monitoring of vegetation composition on the greenline, streambank stability and regeneration of woody species are the true measures of whether riparian management objectives are being met or not. Annual indicators, such as stubble height, are only useful for interpretation of why trend is not satisfactory and for use in adaptive management (U of I-SHRT, 2004) and not for trend establishment or analysis.

Long-term data collection will continue to occur over set time intervals so that a trend can be established in regards to vegetation community cover, composition, etc.

Long term monitoring involves tracking changes in resource attributes or condition over time. Grazing management plans are designed to produce or maintain specific resource objectives. Periodically, resource attributes or characteristics identified in the resource objectives should be documented at specific study sites. At this point, the evaluation of management effectiveness and/or the identification of needed management adjustments is simply a matter of interpreting the trend record in relation to the annual event record (to establish cause and effect relationships) and progress toward attainment of the resource objectives. This evaluation determines the effectiveness of the applied grazing management and/or the appropriateness and attainability of the original resource objectives. All three of these circumstances should be critically considered during this evaluation (RCI, 1999).

The USFS, in cooperation with the permittee, will be responsible for the collection and analysis of long-term data. The USFS will accept, consider, and share the data and the analysis with the permittee, and vice-versa, so that adaptive management processes are understood by both parties and can occur as intended. Both the USFS and the Permittee will then formulate the results and solutions, and the AOP/AMP will be changed as appropriate to meet realistic RMO's.

- A detailed monitoring protocol describing methods, time frames, locations and a key to identify the ecological sites would be included in the AMP's. This protocol will guide the effectiveness monitoring.
- A monitoring schedule would be established as the ecological sites on each allotment are categorized. Monitoring would normally occur on a five year schedule. The schedule could be shortened or lengthened if changing resource conditions indicate a need.
- Streams identified with current or recently existing LCT populations would normally be monitored according to the schedule set forth in the Section 7 requirements.
- Key Areas would be established in representative ecological sites. Monitoring would measure the selected attributes to determine trends and changes in functionality and ecological condition. Monitoring would follow current USFS, NRCS and Nevada State Rangeland Monitoring Handbook methodologies.

8.4.1 Upland Monitoring Tools

- Permanent photograph points will be established at each reference area.
- Permanent Transects should be established to determine:
  - Cover by species
  - Vegetation density
  - Vegetation Frequency
  - Gap intercept
  - Belt transect measurement

8.4.2 Riparian Monitoring Tools

Riparian areas should be monitored using the following practices and procedures (Winward, 2000):

- Permanent photograph points would be established at each reference area.
- Vegetation cross-section composition
- Woody species regeneration
- Greenline

Figure 3. Monitoring Plan Development, Implementation, and Incorporation.

Please insert Figure 3 here.

Terms

Assessment: The process of estimating or judging the value or functional status of ecological processes (e.g. rangeland health) in a location during a moment in time.

Adaptive management: An interdisciplinary planning and implementation process that identifies desired resource conditions, defines criteria for modifying grazing operations when progress towards achieving the desired conditions is not being made, and specifically defines the monitoring strategy and protocols.

Capability (Capable): The highest ecological status that a resource can attain given the political, social, and economic constraints.

Composition: The proportions of various plant species in relation to the total on a given area; it may be expressed in terms of cover, density, weight, etc. Syn. species composition. (SRM, 1999)

Cover: The plant or plant parts, living or dead, on the surface of the ground. Vegetative cover or herbage cover is composed of living plants (including biological crusts), and the litter cover of dead parts of plants (SRM, 1999).

Desired plant community: Of the several plant communities that may occupy a site, the one that has been identified through a management plan to best meet the plan's objectives for the site. It must protect the site as a minimum (SRM, 1999).

Ecological processes: Ecological processes include the water cycle (the capture, storage, and redistribution of precipitation), energy flow (conversion of sunlight to plant and animal matter), and nutrient cycle (the cycle of nutrients such as nitrogen and phosphorus through the physical and biotic components of the environment). Ecological processes functioning within a normal range of variation will support specific plant and animal communities.

Ecological site: A kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management. Apparently synonymous with ecological type used by USDA
Forest Service. Syn. rangeland ecological site. (SRM, 1999).

Ecological site description: Description of the soils, uses, and potential of a kind of land with specific physical characteristics to produce distinctive kinds and amounts of vegetation.

Exclosure: An area fenced to exclude animals (SRM, 1999).

Functioning: Refers to the rangeland health attributes where the majority (see definition of "preponderance of evidence") of the associated indicators are functioning properly relative to the ecological site description and/or ecological reference area given the normal range of variability associated with the site and climate (Pyke et al., 2004).

Guidelines: Guidelines provide for, and guide the development and implementation of, reasonable, responsible, and cost-effective management actions at the site-specific level, which move rangelands toward resource management objectives or maintain existing desirable conditions, and therefore, the management actions they engender, are based on sound science and past and present management experience.

Indicator: Components of a system whose characteristics (e.g., presence or absence, quantity, distribution) are used as an index of an attribute (e.g., rangeland health) that are too difficult, inconvenient, or expensive to measure.

Key Area: A relatively small portion of a range selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management over the range. (USDOI, 1996)

Lentic Riparian-Wetland: Standing water habitat such as lakes, ponds, seeps, bogs, and meadows. (BLM, 1993)

Lotic Riparian-Wetland: Running water habitat such as rivers, streams and springs. (BLM, 1993)

Monitoring: The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives. The process must be conducted over time in order to determine whether or not management objectives are being met (SRM, 1999).

Potential: The highest ecological status that a resource can attain without any political, social, or economic constraints.

Qualitative: Observational type data that is recorded but not measured.

Quantitative: Collection of data by measuring vegetation or soil characteristics.

Range condition: The present status of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site (SRM, 1999).

Rangeland: Land on which the indigenous vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs and is managed as a natural ecosystem. If plants are introduced, they are managed similarly. Rangelands include natural grasslands, savannas, shrublands, many deserts, tundra, alpine communities, marshes, and wet meadows (SRM, 1999).

Range Readiness: The point in the plant growth cycle at which grazing may begin without permanent damage to the vegetation and soil. (Heady and Child, 1994)

Rangeland Health: The degree to which the integrity of the soil, vegetation, water, and air as well as the ecological processes of the rangeland ecosystem are balanced and sustained. They defined integrity to mean maintenance of the functional attributes characteristic of a locale, including normal variability (Pyke et al., 2004)

Riparian Pasture: A pasture that is created from a larger management unit, so that the timing, intensity, distribution, and duration of livestock use can be controlled on a site specific basis because the resource requires a different management style or scheme than adjacent resource types.

Similarity index (rangeland): The present state of vegetation and soil protection on an ecological site in relation to the historic climax plant community. Syn. range condition. (SRM, 1999).

Species composition: The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc. (SRM 1999).

Soil Survey: The systematic examination, description, classification, and mapping of soils in an area, which are classified according to the kind and intensity of field examination (SSSA, 1997).

Stable state: A condition of an ecological site's characteristics; as characteristics change, there is a transition to a new state (USDA 1997).

Threshold: A transition boundary that an ecosystem crosses resulting in a new stable state that is not easily reversed without significant inputs of resources.

Transition: A shift in plant composition that results in relatively stable states, as reflected in composition and structure. These shifts can occur by natural forces or as a result of human actions.

Unhealthy rangelands: Rangelands on which degradation has resulted in the loss of ecological processes which function properly and the capacity to provide values and commodities to a degree that external inputs are required to restore the health of the land (NRC 1994).

Well-managed rangelands: Rangelands that have properly functioning ecological processes, biotic integrity, and soil stability associated with human uses of the land.

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