

# **A Practical Approach to Adaptive Management**

## **With a Specific Focus on Livestock Management NEPA Based Decisions**

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**Summary:** It has long been recognized that NEPA processes as historically applied in the Forest Service do not work well with livestock grazing decisions. In major part, this is related to the long-term “on-going” nature of the activity as opposed to the distinct beginning and end point associated with most other types of projects. In addition, it has become apparent that too many of the “decisions” made in livestock related NEPA decisions either did not substantially matter to management on the ground or could have been made as an administrative decision. At times, we were analyzing too many alternatives that did not substantially differ one from the other. We were also relying on textbook grazing systems without really understanding and defining just what it was that was desired on the ground and what specific management it would take to get there. Often, our processes were not fully interdisciplinary in nature. In addition, we were making hard and fast management decisions knowing full well that in dealing with natural ecosystems, management must often be flexible if it is to respond to changing conditions and uncertainty, and work on the ground over time.

Adaptive management as a principle has been around for some time. However, it seldom has been applied in a truly practical manner to on-the-ground management of specific resources. The process discussed in this guide is an evolving process designed to deal with the vagaries of natural resource management by building an adaptive management feedback loop into the NEPA process whereby an interdisciplinary team defines the desired conditions for a specific land area, defines the science based design criteria that are believed to be necessary to move resource conditions toward the desired condition, builds in adaptive flexibility to respond to changed conditions or applications that do not work out exactly as planned, and then develops a clean, simple, interdisciplinary monitoring program that will allow the team to determine if adaptive changes are needed over time and if so, which ones. It attempts to streamline the NEPA process by analyzing foreseeable feasible options to management thereby allowing the authorized officer to implement them without further NEPA requirements should the monitoring and feedback loop demonstrate the need to change management.

The process defined in this guide is specific to livestock grazing management decision making. However, with relatively minor modification, the basic process should be applicable to a wide range of resource areas and projects.

The bottom line is that practical adaptive management is an excellent tool to help an interdisciplinary team, working closely with their authorized officer, to make best use of science over time by providing mechanisms for feedback and adjustment. This approach will greatly facilitate the application of constantly improving management rather than focusing on rigid processes that can actually inhibit improvement of resource conditions.

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## **Introduction**

The following document is intended to provide a guide to interdisciplinary teams (IDT) and their authorized officers working through an adaptive management planning process for livestock grazing related decisions. With minor modifications, the same process may be followed for any of a number of other resource area projects.

This guide is based on the premise that the planning process will be conducted in a true interdisciplinary manner with close oversight and direction by the authorized officer. For the process to work well, it is critical that all team members understand the process and fully participate in the effort.

The interdisciplinary team will normally consist of: a) a relatively small (3-5 members) core team, e.g. those who must be involved throughout the process due to the types of issues, desired conditions, and so forth; and, b) the support team whose involvement can be limited to providing information or advice to the core team. The authorized officer is a critical part of the process. There are numerous decision points throughout the process where decisions must be made by the authorized officer. In addition, management of the team to ensure focus on the process and end product requires leadership. The team leader can provide part of this leadership but the authority and responsibility for a successful process and outcome rests with the authorized officer.

## **Principles of Adaptive Management**

A practical definition of Adaptive Management may be that it is “the process of making use of monitoring information to determine if management changes are needed, and if so, what changes, and to what degree.” It is a process that allows us to deal with uncertainty and changing conditions over time. It provides the authorized officer with “constrained flexibility” to adapt.

In terms of natural resource management, the focus is always on meeting or moving toward the desired condition objectives on the ground. This is a pretty major shift in how we think about planning in that the team needs to focus on what we want the ground to look like and what constraints are necessary to get there, rather than focusing on how many cattle to permit or which fence to build.

In application, if a change is determined to be needed by monitoring, it will consist of certain pre-determined options. These options must be displayed and evaluated within the project level NEPA analysis. In defining options, the interdisciplinary team will carefully define the “if this – then that” scenarios. In other words, if some aspect of the planned management is shown by monitoring to not be effective or cannot be implemented as planned, then the team would determine from the NEPA document, those adaptive options that are available. The authorized officer would then select one or more options to implement. To the extent that these options have been evaluated in the NEPA analysis and decision, they may be implemented without further NEPA process.

## **Livestock Grazing Management Decision Making Processes via NEPA**

Livestock Grazing Management decisions made through NEPA have long had a traditional focus on two basic primary decision points. The first is to decide if livestock grazing should be permitted on the project area. If the answer is yes, we have traditionally focused the second part of the decision on numbers, kind and class of livestock, and grazing season to be permitted. In addition we have decided what traditional textbook grazing system should be implemented with what specific rangeland improvements.

This approach has a number of problems. First, because these decisions are very inflexible (e.g. they specify specific numbers, seasons, and so forth), and because the NEPA process requires us to implement the decision as written, implementation often becomes virtually impossible. In managing natural resources, it is impossible to effectively implement rigid decisions. Conditions change, relationships between resources and uses change, funding and personnel change – and scientific knowledge itself constantly changes. As an example, virtually all natural resource focused scientific literature contains a disclaimer that the applicability of the findings is specific to the area and conditions in the study and may not be directly applicable elsewhere. The second problem is that we too often attempt to make decisions in the NEPA arena that are more appropriately made under an administrative decision.

As an example of some of the problems associated with our traditional decision process consider the following. In our traditional NEPA process, we decide to permit 203 cattle, cow/calf pairs, for a season of 6/3 to 9/14, under a three pasture deferred rotation grazing system. However, within a short time an opportunity or need is presented to: shorten the season, or to run a mix of cow/calf and yearlings, or to use some electric fencing to create a riparian pasture in a problem area – or, we find through our monitoring that something isn't working or being implemented as we planned – or, something changes. We get new regulations, policies, Endangered Species Act (ESA) consultation findings, or whatever. So, the basic problem is that in a very short timeframe after our NEPA-based decision, something has changed which causes the authorized officer to want or to need to move in a direction different from that specified in the NEPA-based decision. This leaves us with the situation of either continuing existing management, knowing that it isn't meeting the current needs, or re-entering the NEPA process to re-evaluate new management practices and then to revise the existing NEPA-based decision. A major amount of work would potentially be needed, again with no guarantees that the new management will work perfectly either.

We propose that there is a better way. By designing and implementing an adaptive management approach, through the NEPA process, constrained flexibility can be provided that will allow the authorized officer to effectively deal with much of the uncertainty and changing conditions. While it would certainly be impossible to predict all potential changes, or to plan for dealing with all uncertainty, we can certainly do a better job than we have in the past.

## Ten Practical Steps in Implementing Adaptive Management

### Plan to Project

As taught in the Forest Service 1900-1 NEPA training course, there are three legs to the NEPA triangle. The first leg is called “plan-to-project” (or NFMA), the second is NEPA, and the third is implementation and monitoring. The premise is that the legs are somewhat flexible in that more intensive work on the NFMA side will likely lead to less work on the NEPA side. Of course, there are specific steps that are required to be completed on the NEPA side and we will discuss them later. First, let’s discuss the steps on the plan to project side of the triangle as they apply to adaptive management and our livestock grazing management decisions.

#### Step One: Define the Decision Area

Traditionally, our decision area has been defined by the established boundaries of a specific allotment. However, our primary objectives are that in our planning process we are trying to make better decisions with greater longevity, focus on landscape scales to improve our analysis of effects and improve our efficiency, and constrain our decision only to the degree that is really needed to ensure that management meets or moves toward our desired condition objectives.

So, our project area could continue to consist of a single allotment, or we could look at multiple allotments sharing some similar characteristics (maybe all allotments within a given landscape, or maybe all sheep allotments). By working on a landscape scale, we achieve better linkage with other resources. We are better able to evaluate and respond to effects on species whose occurrence is across a landscape rather than on a single site. We achieve efficiencies by handling similar situations in one analysis document rather than repeating much of the same work in multiple documents. We improve management efficiency by looking outside of existing allotment boundaries for opportunities to intensify or improve management. And, we can make better use of inventories and monitoring work completed by other resource areas such as forested vegetation inventories, stream surveys, terrestrial ecological unit inventories (a.k.a. soil surveys), and so forth.

By working on a landscape scale, and by minimizing focusing on an artificial constraint such as a defined allotment boundary, we expand our ability to deal with concerns and to respond to opportunities. We can modify boundaries, expand or reduce allotment configuration, incorporate two or more allotments into a more logical management unit, make best use of vacant allotments (maybe to incorporate with other allotments, or to close the allotment to livestock, or to use the area as a forage reserve, and so forth), and even potentially make use of areas not currently within existing allotments. We can evaluate the tradeoffs associated with all of these potential actions and decide what constitutes the best mix. We

cannot do this if we artificially constrain our decision space to one allotment, or only to established allotment boundaries.

The determination of the project area is a decision point for the authorized officer. The recommendations of the interdisciplinary team should be weighed as a significant part of the decision and this decision should be made before the team process moves on.

### **Step Two: Establish the Existing Condition**

One of the first steps that the IDT should accomplish is to begin to pull together what is known about the existing conditions within the project area. Keep in mind that this is not an all-inclusive data set. The existing conditions should relate to the project – that is, past, present and potentially future livestock grazing management. There does not need to be a direct correlation between livestock grazing effects and the existing condition for something to be considered relevant. If for example, there were old road beds in a riparian area that have caused riparian or stream condition problems, this information can relate to livestock grazing if the livestock effects on the riparian and streams combine with the old road effects to create or affect the current conditions.

The IDT, along with the authorized officer will need to determine what specific types and amounts of information are relevant to the project. When compiling existing condition information, keep in mind that there are many existing sources of available information. This can include existing allotment files, corporate databases (Terra, Fauna, Water, INFRA, and so forth), historic inventory and monitoring records, existing inventories from other resource areas such as stream survey, forest vegetation inventory, terrestrial ecological unit inventories (e.g. soil surveys), other project surveys for TES species or MIS data sets, and so forth. As a team, always look to existing information before deciding that new or supplemental information is needed (see also the section on data needs).

The IDT will further need to compile the information and then as a team, to analyze the information. This analysis should be conducted as a team effort and should focus on determining cause and effect relationships between the existing condition and past and present livestock grazing management. The focus must not be on laying blame, but on determining if there are resource conditions that are not meeting or moving toward desired condition objectives, determining why this situation may exist, and then working as a team to resolve those problems. Team leadership is crucial in this step to ensure a proper focus. This is a complex process, as rangelands are, and have been subject to many varied impacts over time. Ultimately, the team should arrive at conclusions regarding the status of key resources and at least a general consensus regarding the cause and effect relationships relative to livestock grazing.

This determination of existing conditions is an important step in that it forms the basis for several steps that follow. It should be well done but not over done.

As part of the determination of existing condition, the team should develop a list of all Past, Present, and Reasonably Foreseeable Activities whose continuing or projected effects relate to this project. This list will be valuable later in the NEPA process when analyzing cumulative effects.

The following table displays one potential means of portraying existing condition, trends, and status of Benchmark Areas:

**Table 1-3 Existing Condition, Trends, and Status of Benchmark Areas**

<b>Allotment</b>	<b>Existing Condition</b>	<b>Benchmark Area Not Meeting or Moving Toward Desired Conditions</b>
<b>Badger East</b>	<b>Grassland</b> - Portions of this allotment were burned in the Hayman fire of 2002. Many introduced species of perennial grass. Weeds prevalent - mostly Canada thistle, musk thistle and yellow toadflax. Upland grasses decadent. Percentage of bare ground increasing. No surface water, but some meadow conditions in shallow drainages at Platte Springs, Bit Spring and Home Spring. Rusted since 2001. Fair condition. Recent downward trend.	<ul style="list-style-type: none"> <li>● <b>Tappan Mtn.</b> - moving toward</li> <li>● <b>Tappan Gulch</b> - not meeting</li> <li>● <b>Platte Springs</b> - not meeting</li> </ul>
<b>Badger West</b>	<p><b>Stream/Riparian</b> - Undefined channels present in Marksbury Gulch with remnant willows, riparian areas shrinking in extent. Fair to Good condition. Upward trend.</p> <p><b>Grassland</b> - excessive bare soil on benches. High percentage of forbs and early to mid-seral stage. Upland grasslands underused. Fair-Poor condition. Upward trend.</p> <p><b>Mesic Meadow</b> - riparian and upland graminoids present but with a high percentage of forbs. Need to increase water-holding capabilities and expand extent of wetted soils. Fair - Good condition. Static trend.</p>	<ul style="list-style-type: none"> <li>● <b>Matukat</b> - moving toward</li> <li>● <b>Badger Gulch</b> - moving toward</li> <li>● <b>Round Mtn</b> - moving toward</li> <li>● <b>Hayman</b> - moving toward</li> <li>● <b>Badger Mtn</b> – meeting</li> <li>● <b>Marksbury Gulch</b> - not meeting</li> <li>● <b>South Tappan Gulch</b> - not meeting</li> </ul>

### **Step Three: Define the Desired Condition Objectives**

The definition of desired condition objectives is a critical and often poorly done part of the process. Too often the team simply brings the forest plan desired condition objectives verbatim into the project planning document. To be meaningful to the project, desired condition objectives should derive from the forest plan but must be brought down to the project level. This means that where there are broad, general desired condition objectives in the forest plan, those general statements need to be



tailored to fit the characteristics and needs at a local scale. That is, they must be made site-specific, measurable, attainable, and must contain a specific timeframe for accomplishment.

The following table shows one means of portraying the forest plan level desired conditions:

**Table 1-4 Desired Conditions for Resource Ecosystems**

<b>Resource Ecosystem Community Type</b>	<b>Desired Condition</b>
<b>Ponderosa/Limber/Bristlecone Pine Forest</b>	<i>Forests with diverse age structure, old growth communities, openings, standing snags and down woody debris across forested areas; vigorous understory of native grasses and forbs where light allows. Achieve or maintain satisfactory range condition on all forested rangeland in this community type.</i>
<b>Aspen</b>	<i>Perpetuate aspen communities with diverse age structures including old growth communities, regeneration, openings, standing snags and down woody debris across aspen areas; vigorous and diverse native grass and forb understory present. Use of aspen regeneration as browse is limited to light use (up to 40%) as defined by the Range Analysis and Management Training Guide.</i>
<b>Shrublands (excluding willow)</b>	<i>Vigorous growth and regeneration of mid-late seral shrub species interspersed with a variety of native grasses and forbs. Achieve or maintain satisfactory range condition on all rangeland in this community type.</i>
<b>Grassland</b>	<i>Mixed native grass and forb communities provide a mosaic of plants with species diversity, a variety of vegetative structures and sufficient amounts of litter; principle grass species may include Arizona Fescue, Mountain Muhly, Parry's Oatgrass, Blue Grama, Spike Trisetum or Bog Sedge. Bare ground less than 30%. Grasses communities show vigor.</i>
<b>Mesic Meadow</b>	<i>Diverse mix of upland and riparian graminoids and forbs present with significant proportions of riparian species relative to moisture availability: riparian species to include at least two of the following: Bluejoint Reedgrass, Tufted Hairgrass, Wiregrass, Spikerush, Meadow Foxtail, Nebraska/Aquatic/Beaked/Woolly/Smallwing Sedge. Bare ground less than 30%. Graminoid communities show vigor.</i>
<b>Streams &amp; Riparian areas</b>	<i>Properly functioning water, soil and vegetation cycles; perpetuating and reproducing riparian plant communities, at least 80% of the potential vegetative cover along streams, provide and maintain stable, defined channels with appropriate width/depth ratios for stream type, less than 20% of streambank actively eroding, balanced erosion/deposition levels. Maintain at least 80% of potential ground cover within 100' from the edges of all perennial streams, or to the outer margin of the riparian ecosystem, where wider than 100 feet. Plant species may include sedges, rushes, tufted hairgrass, reedgrass, shrubby cinquefoil, willow, alder, birch, cottonwood or spruce of mixed age class. In woody systems, riparian shrub cover of at least 35% to include a variety of species.</i>

There are two project-level scales at which desired condition objectives should be developed. They are: a) the landscape scale for relatively broad desired condition objectives (for example: the desire to have a mix of seral or structural stages for certain plant communities across the landscape with value ranges set for each stage); and b) the site-specific scale for local desired condition objectives (for example: the desire to have a specific riparian area reach contain a certain cover percent of willow species, or having the sedge/rush component of a given riparian area expand by some degree over a defined timeframe). Note how these desired condition objectives relate to the existing condition. The existing condition defines where we are with regard to certain parameters while the desired condition defines where we want to be. Often there is a disparity between the two but also at times the existing condition and the desired condition may be the same.

Landscape Scale desired conditions need to be defined in terms of values that are meaningful across a landscape. For example, these could include a desired condition of having certain percentages of sagebrush communities across the landscape in each of the defined seral stages (for example, early, mid, late, PNC). This indicates that it isn't necessarily critical that a specific stand be in a specific seral stage but that what is desired is some specified mix of seral stages across a given landscape, perhaps even with some desired spatial distribution (e.g. the early seral stages are scattered across the landscape in some manner rather than being clustered all in one site). This type of desired condition objective is normally focused on attainment of some historic range of variability, or of providing varied habitat conditions for certain wildlife species. In most instances, these desired conditions would be stated in terms of seral stages, structural stages, rangeland health objectives, or in the case of riparian areas, maybe in terms of proper functioning conditioning status. At times, the determination of landscape scale desired condition objectives may be difficult, especially if there are no ecological classifications available to assist with the process. If this is the situation, the team may need to resort to building these desired condition objectives based on comparison with conditions inside exclosures or in areas excluded from livestock grazing (reference areas). This is not a perfect solution but may be the best answer available.

Keep in mind that if you establish a landscape scale desired condition, the monitoring protocol must provide a tool for evaluating progress over time. This monitoring can be expensive and time consuming if the full landscape must be re-evaluated. The team should carefully consider whether monitoring could consist of some less time consuming form of stratified sampling over time.

Site-Specific Scale desired conditions are a little easier to deal with. In practice, the IDT would designate a number of benchmark sites across the landscape. There is no set number that is needed nor is there a requirement that every pasture contain a benchmark. The number and type must be determined by the IDT as being at least the minimum number necessary to evaluate progress toward meeting the desired conditions.

These benchmark sites will be selected based on concerns identified by the IDT based in part on the existing condition evaluation (and will be refined based on public issues). They will be selected to represent key resource concerns and they need to be capable of responding to management and therefore of showing trends over time. Normally there will be at least one benchmark area per major management unit. They will often be located on riparian areas, but if there are concerns with resource conditions in uplands, they are certainly appropriate in those situations as well. Often benchmark sites will fall within the same general areas as implementation monitoring key areas but this will not always be true nor is it necessary.

On the benchmark site, desired condition objectives need to be specific to the resources and conditions of the specific site. They must be meaningful, measurable, attainable, and time specific. Some examples of objectives that might be in a site specific desired condition statement could include: percent cover of specific desirable (normally native) species, percent effective ground cover, density or frequency of certain species or groups of species, extent of area occupied by certain communities in a riparian area, and so forth.

As an example, consider the following site-specific desired condition objective statement: Within 10 years, the deer creek benchmark site will show: a mix of woody species age classes of willows with no more than 60% mature, 5 % decadent/dead, and at least 10% young; at least three species of willow will be present with no more than 50% of the line intercept by coyote willow; greenline line intercept cover of willow will range from 45 to 65%; wetland obligate herbaceous communities will increase in extent by 15%....and so forth. These would not be arbitrary objectives. They must be attainable and measurable. Determining whether a site is capable of achieving a certain desired condition can potentially be aided by comparison of the benchmark site with similar areas excluded from grazing or where only light grazing has occurred (and there are similar types and intensities of other impacts). Often historic photo point records may prove valuable in this exercise.

Keep in mind that you need to be capable of monitoring the things described in your statement. This means that you need to have the process as simple and do-able as possible while using accepted protocols. It helps to have protocols in mind when the team is writing these statements so that they know that tools are available to monitor each situation and how simple or complex such monitoring may be.

The following table is a potential example of one used to portray the site specific desired conditions. In this example, the same table displays existing conditions. By comparing existing conditions with desired conditions, the need for action is also derived and displayed. (Note that for this paper, the same table is therefore also used as an example in the section defining the Need – in practice, one table would suffice for multiple sections of the document, with appropriate references).

**Table 1-5 Allotment Specific Desired Condition Objectives, Existing Condition, and Need for Action based on specific areas not meeting or moving toward desired conditions in an acceptable timeframe.**

<b><u>Allotment:</u></b> <b>Pasture</b> <b>● Benchmark</b>	<b>Desired Conditions (DC)</b> <b>(see Table 1-4)</b>	<b>Existing Conditions</b>	<b>Need for Action</b>
<b><u>Badger East:</u></b>  <b>Tappan Mtn</b> ■ <b>Home Spring</b>  <b>Tappan Gulch</b> ■ <b>Bit Spring</b>  <b>Platte Springs</b> ■ <b>Platte Spring</b>	<b>Manage for Grassland desired conditions</b>  <b>Home Spring:</b> <i>By 2015 achieve at least 60% effective ground cover, with species composition dominated by native grass and forb species; upland litter cover of between 30% and 60%.</i>  <b>Bit Spring:</b> <i>By 2015 achieve at least 50% effective ground cover, with species composition of at least 25% native grass and forb species; upland litter cover of between 40% and 75%.</i>  <b>Platte Spring:</b> <i>By 2015 achieve at least 60% effective ground cover, with species composition of at least 40% native grass and forb species; upland litter cover of between 40% and 75%.</i>	<b>Grassland - Portions of this allotment were burned in the Hayman fire of 2002. Many introduced species of perennial grass. Weeds prevalent - mostly Canada thistle, musk thistle and yellow toadflax. Upland grasses decadent. Percentage of bare ground increasing. No surface water, but some meadow conditions in shallow drainages at Platte Springs, Bit Spring and Home Spring. Rested since 2001. Fair condition. Recent downward trend.</b>	<ul style="list-style-type: none"> <li>● <i>Effective ground cover and native forb and perennial native grass species compositions are all less than desired on key area sites.</i></li> <li>● <i>Upland litter cover levels are higher than desired.</i></li> <li>● <i>Percentage of bare ground is higher than desired.</i></li> </ul>

**Step Four: Define the IDT Resource Concerns**

The next step involves defining the IDT resource concerns. These are basically an evaluation by the IDT as to what concerns they are aware of on the project area and what issues they believe they may hear from the public. This step is often poorly done in livestock grazing NEPA processes (and most others as well). The tendency is to develop broad, general issue statements - an example being: “the project area has unsatisfactory fish habitat.” The problem with an issue statement of this nature is that it isn’t specific enough that the team can really understand the problem, much less plan actions to resolve it. From this statement, the team doesn’t know specifically where the problem occurs, specifically what the problem is (e.g. sediment, temperature, bank stability, etc.), or how it relates to the project decision space (e.g. associated with livestock grazing).

A much better statement would be something like: In the lower one third mile of Beaver Creek, there is an inadequate amount of residual herbaceous vegetation to trap sediments from fall-spring runoff, and livestock intensity and timing are believed to

be contributing factors. Another example: riparian hardwoods in the area of Duck Creek from one quarter mile above the 215 road to one half mile below are not reproducing adequately to ensure that replacement exceeds loss, and livestock use plus big game (timing and intensity for both) are believed to be factors.

Both of these statements: indicate specifically what the concern is in terms that can be measured and monitored over time to see how effective management is in resolving the issue, specify as precisely as possible where the problem occurs (e.g. not all riparian areas just the specific one(s) noted), and relate the concern to our project (e.g. livestock, specifically timing and intensity are part of the problem). This kind of statement gives the IDT something that they can work to resolve.

All issue (and IDT concern) statements need to be accompanied by “indicators.” What the indicators do is to provide a means of evaluating each alternative to see how well it resolves the issue. In this context, indicators need to be very clear, specific to the decision space (e.g. livestock grazing in our project), and measurable or at least capable of being evaluated and compared.

The following are some examples of resource concern statements (or in the NEPA process, of issue statements) and their associated indicators. From the standpoint of displaying issues in a NEPA document, these statements would work well. However, as discussed above, from the standpoint of an IDT needing to really understand specifically what the concern is, where it is found, and how it relates to the decision space so that the team can deal with the concern through the development of design criteria, these statements would need to be much more specific. The concerns expressed in greater specificity would need to be tracked in the project record.

- ★ *Changes in livestock management may detrimentally impact the financial well-being of permittees and the local economy.*
  - *Indicators:*
    - *AUMs under Term Grazing Permit*
    - *Number of allotments under Term Grazing Permit*
    - *Economic costs to permittees to implement alternatives*
    - *Income to the County*
- ★ *Livestock grazing may negatively impact natural ecosystems, especially riparian areas across the project area, through trampling, vegetation loss, reductions in water quality, and increases in erosion potential.*
  - *Indicators:*
    - *Allowable use standards met.*
    - *Riparian hardwood cover*
    - *Upland native perennial grass cover*
    - *Effective ground cover in riparian areas*
- ★ *Livestock grazing management may impact, or be impacted by recreational activities such as hiking, biking, camping, fishing and Off-Highway-Vehicle (OHV) use. These impacts are found throughout the project area, but are especially prevalent in wilderness and around developed recreation sites. Livestock leave manure, interrupt the quiet, block roads and trails, disturb fish, and eat flowers. Recreationists leave*

*gates open, harass livestock, damage soil and vegetation,, and occasionally harm livestock. Conflicts with livestock during the summer increase as recreation and number of recreationists in the forest increases.*

○ *Indicators:*

- *Number of complaints from forest visitors*
- *Livestock excluded from developed recreation sites*
- *Signs posted at wilderness trailheads and entrances to inform of livestock use*
- *Numbers of cattleguards for trails and roads*
- *Limits on authorized season of livestock grazing in certain areas*

### **Step Five: Define the Purpose and Need**

The purpose and need statements can be combined into one statement or may be stated separately. For our project related to livestock grazing, it is a given that a decision will be made regarding whether or not to authorize livestock grazing. Interpretation by various courts has determined that livestock grazing is a discretionary action and as such, a NEPA-based decision to permit livestock grazing must precede any authorization. Congress, through the Rescissions Act (and other legislation) has provided direction that livestock grazing is to be covered by NEPA-based decisions. However in the meantime, the legislation instructs us to continue to permit livestock grazing under the same terms and conditions, if the inability to complete NEPA is the only reason why the use would not otherwise be permitted. In compliance with the Rescissions Act, the Forest Service set a 15 year schedule for completion of NEPA on all livestock grazing.

However, we all know that NEPA-based decisions do not last forever, especially as they are traditionally done. With changed conditions, they may become stale. Therefore, even an initial completion of a NEPA-based decision will not allow livestock grazing in perpetuity (this will be discussed in more detail later).

So, the Purpose of this project is based on: authorizing livestock grazing on all or some part of the project area, and then managing the authorized use in a manner that will provide for meeting or moving toward the desired condition objectives in the defined time frame and to the extent that livestock grazing is a key limiting factor.

The Need for the project is related to any significant resource, social, or economic disparities that were found when comparing the existing condition to the desired condition. The need statement is derived from an analysis of the existing and desired conditions (see example in table 1-5 above in the Desired Condition section). This makes it critical that a quality job be done in those two steps of the process.

An example of a need statement could include: In the fescue grasslands of the NW quarter of the Spring Creek pasture, cover values for fescue are well below the desired condition value of 45-65% (currently at 25%) and it is believed that early season use by livestock over many years is a part of the problem; or, willow cover in

the Skunk Creek riparian area below Weasel Creek is well below the desired condition of 40-70% (currently 20%) and the intensity and timing of livestock use is believed to be a factor. On a broader scale, a need statement could be: sage grouse habitat within the sagebrush communities of the project area is not consistently maintaining a moderate to tall structure during the breeding/fledging period of xx/xx to xx/xx. Livestock use (intensity) is a key factor. The desired condition within these vegetative communities is to maintain at least a moderate structure until the young have moved off of the nest (approximately xx/xx annually).

The Rescissions Act should not be cited as a Need. The Act provides temporary relief from requirements to complete NEPA, subject to a number of provisions. The Rescissions Act is not why we do NEPA. We do NEPA to comply with the NEPA Act itself; the Rescissions Act is simply a tool to help us get there.

The following is an example of displaying an allotment specific Need statement (note that this is the same table show as an example in the Desired Condition section):

**Table 1-5 Allotment Specific Need for Action based on specific areas not meeting or moving toward desired conditions in an acceptable timeframe.**

<p><u>Allotment:</u> Pasture ● Benchmark</p>	<p>Desired Conditions (DC) (see Table 1-4)</p>	<p>Existing Conditions</p>	<p>Need for Action</p>
<p><u>Badger East:</u></p> <p><b>Tappan Mtn</b></p> <ul style="list-style-type: none"> <li>▪ Home Spring</li> </ul> <p><b>Tappan Gulch</b></p> <ul style="list-style-type: none"> <li>▪ Bit Spring</li> </ul> <p><b>Platte Springs</b></p> <ul style="list-style-type: none"> <li>▪ Platte Spring</li> </ul>	<p><b>Manage for Grassland desired conditions</b></p> <p><b>Home Spring:</b> By 2015 achieve at least 60% effective ground cover, with species composition dominated by native grass and forb species; upland litter cover of between 30% and 60%.</p> <p><b>Bit Spring:</b> By 2015 achieve at least 50% effective ground cover, with species composition of at least 25% native grass and forb species; upland litter cover of between 40% and 75%.</p> <p><b>Platte Spring:</b> By 2015 achieve at least 60% effective ground cover, with species composition of at least 40% native grass and forb species; upland litter cover of between 40% and 75%.</p>	<p><b>Grassland - Portions of this allotment were burned in the Hayman fire of 2002. Many introduced species of perennial grass. Weeds prevalent - mostly Canada thistle, musk thistle and yellow toadflax. Upland grasses decadent. Percentage of bare ground increasing. No surface water, but some meadow conditions in shallow drainages at Platte Springs, Bit Spring and Home Spring. Rested since 2001. Fair condition. Recent downward trend.</b></p>	<ul style="list-style-type: none"> <li>• Effective ground cover and native forb and perennial native grass species compositions are all less than desired on key area sites.</li> <li>• Upland litter cover levels are higher than desired.</li> <li>• Percentage of bare ground is higher than desired.</li> </ul>

### **Step Six: Establish the Interdisciplinary Data Needs** (also refer back to Step two)

Once the existing condition, preliminary resource concerns, desired conditions, and so forth have been determined, the IDT (with close oversight by the authorized officer) will need to determine just what data needs exist, the funds and resources available for data collection, a priority for collection, and maybe most importantly, how they can be collected in the most efficient interdisciplinary manner. Realize that time/funding will fall short of what the team believes is needed, so carefully plan how the team will spend the limited funds and resources to gather the most essential information. In other words, prioritize the data needs within the IDT.

In many instances, individual functional areas will feel that their data needs are the most critical. This is a key decision point for the authorized officer. They must weigh budgets, time, risks, and benefits in making the decision as to which data to collect and which to forgo. If in their judgment a sufficient amount of data can be collected, it is the responsibility of the IDT to collect that data in the most efficient manner possible. If the authorized officer determines that resources are not adequate to collect sufficient data, the authorized officer may make the decision to postpone the initiation of the NEPA process in order to allow additional time for data collection.

In most instances, if the team can design a process whereby most of the data needs can be met through an interdisciplinary process, efficiencies will be found. This may mean that instead of each resource area going to a given stream/riparian area and conducting their own data collections, the team designs one streamlined process – e.g. the data is collected one time, using a unified set of protocols, for use by all. In many instances, this is not difficult to design and carry out – it simply involves letting go of turf and working together. However, in some instances, specific data needs or collection protocols will be unique to a specific resource. The authorized officer needs to understand why this data is needed, what priority it is, and why it cannot be collected in an interdisciplinary manner before approving the separate collection process.

Data analysis and evaluation must occur as a team effort to be meaningful and supportable by the team as a whole. Data collections and the analysis of that data cannot belong to one functional area. While it may be easier for an individual resource area specialist to evaluate relatively minor findings, even those should be presented to the team for full discussion and understanding. In any case, significant data should be evaluated as an interdisciplinary process by the Core team members, with key support team members involved in a synthesis of the findings as needed and appropriate. The IDT should also work together to come to a determination as to what the findings mean relative to the project.



## Step Seven: Design Criteria

Before we go into the proposed action, there is a term that we need to clearly understand. This term, design criteria, has been used before but the way that we use it in adaptive management makes it critical and somewhat unique.

Design criteria are the constraints that we impose, or that are imposed by other decisions, on our management. They define our playing field by setting sideboards to management – that is, they define what needs to happen on the ground and what needs to not happen on the ground. Basically, they define the “rules of play” for the project. They are developed by an interdisciplinary process and must be based on realistic responses to needs.

Design criteria, in the context of adaptive management, replace our reliance on the canned approaches of the past. That is, in the past in formulating alternatives, we jumped immediately to “decisions” such as 203 cattle, cow/calf, 6/7-9/13, and a three pasture deferred rotation system as being the “answer” to all problems (without ever really understanding the basic questions – e.g. the issues, the needs, the desired conditions, and so forth).

Instead of that approach, we are trying to work as a team to understand just what is important to have happen (or not happen) on the ground in order to ensure that management will meet or move toward our desired condition objectives. Numbers of animals per se are not normally important. Season of use per se is also not important, although there may be very important reasons why certain restrictions should be imposed on season of use (on dates, off dates, maybe even restrictions within season). The grazing system per se is also not important – although certain components of the grazing system may turn out to be very important once we understand what they mean and determine if they need to be applied as design criteria (for example: time and timing, intensity, duration and frequency).

As an example, let’s assume that one part of the project area has requirements from a Biological Opinion. That opinion states: “protect specified stream reaches from livestock impact during the time that fish are spawning and eggs are in the gravels (e.g. before 6/15)”.

In this instance the important criteria is simply to keep the livestock out of the specific stream reaches before 6/15 (e.g. it is required by the BO). In other words, don’t let the livestock step on the nests or disturb the eggs. Our design criteria statement may then simply be: “livestock do not enter stream reaches (xx, yy, zz) before 6/15.”

It is really important to understand what this statement does and does not say. What it does is to simply and cleanly focus on what is important to management – that is, livestock do not get into the water until after 6/15. It does **not** say that the pasture containing these reaches can not be grazed; nor does it say that livestock have to stay

out of these pastures until after 6/15; nor does it say what tools you have to use to make sure that the design criteria happen. In fact, it doesn't even say that livestock cannot graze the riparian area adjacent to these reaches before 6/15.

This is really important. Because the design criteria focus only on what should happen or not happen there is an array of options remaining available to the manager to meet the criteria. The simplest option of course would be to say that livestock cannot be in the pasture containing these reaches until after 6/15. However, the same design criteria could be accomplished by grazing with sheep controlled through close herding, or by the use of electric fencing until the 6/15 date is reached, or any number of other possible options. The key is that the design criteria do not jump to a quick hard answer – they retain appropriate flexibility while ensuring that what needs to happen, happens.

Design Criteria do not state which tools are to be used (unless that is really the only option), rather, they state what constraints (rules) must be applied. Then, the premise is that any tool that meets the constraint is still available in the toolbox. Tools in this context would include for example: fencing, rest, deferment, modification of allowable use standards, change of season, change of kind of livestock, and so forth.

In practice, the IDT would work through all essential design criteria. They would also work through all “nice to have” design criteria, making sure that they understand and document the distinction between essential design criteria, and “nice to have” design criteria. Basically the team would ask: “is there a need to constrain our management to resolve issues or to respond to our need statements?” They would consider resource areas such as: big game habitat; fisheries habitat; riparian/aquatic; TES species/habitats; recreation; visual management; public safety; heritage resources; and often many others.

So, the bottom line is that design criteria are critical to making adaptive management work. They focus on the important question of what needs to happen and what shouldn't happen in management. They do not constrain management with regard to things that don't really matter (like 203 cattle or a three pasture deferred rotation system). They define the sideboards to the “constrained flexibility” available to management.

The following are examples of some frequently used design criteria:

***Design Criteria – Management Requirements Common to all Allotments:***

- *Keep livestock distributed as evenly as possible throughout suitable rangelands.*
- *Keep livestock in the proper pasture at the proper times.*

***Uplands –***

- *Use the Grazing Response Index (GRI) to assess the effects of annual livestock management and to allow for periodic adjustments in management in*

*response to the findings. The management goal would be to have a positive or neutral GRI score as an average over every three-year period.*

- *Grazing intensity or amount of forage utilization in uplands would be light to moderate in areas with less than 40% bare ground and between 30% and 60% litter cover. (See Appendix XXX for definitions of slight, light, moderate, heavy and severe intensity levels and utilization levels.)*
- *In upland areas with 41- 60% bare ground and more than 61% litter cover, forage utilization would be moderate to heavy, but of short duration (14 days or less).*
- *Grazing intensity or amount of forage utilization in uplands would be moderate to heavy in areas with less than 40% bare ground more than 61% litter cover.*
- *Grazing duration would be limited to a 21 day maximum stay in most pastures or grazing management areas so that frequency of livestock grazing individual plants would be four times or less each year. Frequency would be limited to favor maximum plant rest and regrowth.*
- *As an average over time, plants would be given the opportunity to reach near full growth prior to grazing (deferment) or to regrow following grazing.*
- *The earliest turn on date and latest removal date will be based on access to allotments due to wet soils or snow, and on avoiding conflicts with elk calving and big game hunting.*

#### **Riparian –**

- *Utilization of riparian graminoids (sedges, etc.) would be measured by the average stubble height (residue) in key areas. Allowable use standards are an easy way to quantify this use.*
  - *Once the allowable use trigger standard for stubble height is reached, livestock must be moved to the next pasture, or in the case of the last pasture, removed from the allotment.*
  - *Four to six inches of residual plant material must be present in the hydrophilic plant community at the end of the grazing event or the end of the growing season (whichever occurs later), to trap and retain sediments associated with winter-spring water flows (Clary, 2000).*
  - *If livestock graze the riparian area before September, the trigger stubble height standard would be four inches on riparian graminoids in key areas. This assumes in an average year, the plants would regrow to meet residual stubble height standard during the growing season.*
  - *If livestock graze after September, the riparian stubble height standard would be five to six inches on riparian graminoids in key areas depending on where these key areas are located. This assumes that plants would not have much of an opportunity to regrow following grazing. At this point, once the stubble height standard is reached, livestock would be removed from the pasture or in the case of the last pasture; livestock would be removed from the allotment.*
  - *Key area specific trigger stubble height and residual stubble height design criteria may be developed based on these general design criteria.*

- *Monitoring of the pastures and allotments for compliance with allowable use standards and to judge livestock moves based on stubble height would require active management by the permittee and Forest Service.*
- *If the desired condition of a specific riparian area includes **increasing willow cover**, livestock would graze the riparian area earlier in the season when grasses and forbs are preferred over willows.*
  - *Livestock would be removed from the pasture when they reach allowable use standards on grasses or begin to make significant use of riparian shrubs (whichever comes first).*
  - *The maximum utilization on riparian woody species (especially willow) in key areas would be light use of the current year's growth, as defined by the GRI.*
- *If the desired condition of a specific riparian area includes **increasing sedge or riparian graminoid cover**, livestock would graze the riparian area later in the season when the sedges are not the only green and palatable forage in the pasture or livestock would graze early in the season (first pasture grazing) to allow these plants the greatest opportunity for growth following grazing. If this is not feasible due to pasture location, arrangement or availability, then the amount of time allowed for grazing that particular area would be lessened.*
- *Streambeds, banks, aquatic habitat, riparian vegetation composition, and structure would be monitored for progress toward desired condition objectives.*
  - *Long-term trend monitoring would be conducted in representative benchmark sites within key riparian community types on a 5-10 year cycle.*
  - *Where current temperature sensors exist, stream temperatures would be monitored by Forest hydrologists or fish biologists to determine effectiveness of improved management.*
  - *Monitoring of stream segments would continue for approximately 5-10 years, with a review of the results at the end of this period.*

**Special Design Criteria –**

- *Ground disturbing activities such as installation of water developments, pipelines, fences or exclosures will require **heritage resource survey** by a Forest Service archaeologist or para-archaeologist to determine clearance.*
- ***Aspen regeneration** will be monitored to determine the effects of livestock grazing. Use of aspen regeneration as browse would be limited to light use (up to 40%) as defined by the xxxxx. If livestock impacts are determined to be resulting in survival of aspen regeneration at less than desired, or if livestock use is greater than light use, livestock will be excluded from using the pasture or the regeneration will be fenced using either electric or permanent fencing until such time as the aspen growth is sufficiently tall (normally greater than 4.5 feet on average) that the area may be opened to livestock grazing with little expected impact on aspen growth.*
- *Riparian areas identified as potential **Preble's Meadow Jumping Mouse** habitat (Buffalo Creek, Craig Meadows, Wigwam, and Badger) would be rested if allowable use standards are exceeded the previous grazing season, if*

*the riparian conditions decline, or if monitoring indicates the desired future conditions won't be achieved within ten years and livestock grazing is shown to be a significant factor. Rest may be achieved by rest of the full pasture, development of temporary electric fencing to exclude livestock from the specific riparian habitat, or permanent fencing to create a special riparian pasture to be managed to meet design criteria specific to the Preble's Meadow Jumping Mouse (see the Wildlife write-up...page XXX).*

The following table shows an example of portraying allotment specific design criteria (note that this example also includes potential adaptive options):

**Table 2-2 Allotment Specific Design Criteria and Adaptive Management Options**

<b>Specific Design Criteria</b>	<b>Adaptive Options</b>
<ul style="list-style-type: none"> <li>▪ Pull Tappan Mtn., Tappan Gulch and Platte Springs pastures from the old "Badger" allotment and form a new allotment called "Badger East".</li> <li>▪ Change allotment boundary on southeast side to exclude the South Platte River from the allotment.</li> <li>▪ Treat noxious weeds using an integrated approach including chemical and biological treatments.</li> <li>▪ Allow only light use (see Appendix XXX) over known Pawnee Montane Skipper habitats.</li> <li>▪ Earliest on date would be May 1<sup>st</sup>.</li> <li>▪ Latest off date would be Oct 31<sup>st</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>• If allowable use standards cannot be achieved in the Tappan Mountain key area (riparian) then:               <ul style="list-style-type: none"> <li>○ Apply a herder to move livestock out of riparian area and into Tappan Mtn valley or adjacent upland areas at least 3 times per week utilizing gentle herding techniques (see Appendix XXX for reference.)</li> <li>○ Improve use of salt/supplement to draw livestock to Tappan Mtn valley or any upland areas with litter cover greater than 60%.</li> <li>○ Fence the Tappan Mountain riparian area using either electric or hard fence;                   <ul style="list-style-type: none"> <li>▪ Graze the area for only 21 days and only after Arizona fescue has reached an average of 8 inches.</li> </ul> </li> </ul> </li> <li>• If livestock distribution is less than desired, then:               <ul style="list-style-type: none"> <li>○ Develop upland water sources in Tappan Mountain and Tappan Gulch pastures in T11S R72W S24 SE ¼, T11S R71W S31 SE ¼ and T11S R71W S19 SW ¼ to improve distribution and lessen impacts at existing water sources. (see proposed allotment map on page XXX) Fence the source as needed to protect the site.</li> </ul> </li> <li>• If desired effective cover goals are not met through weed or grazing treatments, then:               <ul style="list-style-type: none"> <li>○ Inter-seed with a native grass mix.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ Remove Matukat pasture from Badger West allotment and add to Wigwam allotment.</li> <li>▪ Remove South Tappan Gulch pasture from Badger West allotment and call South Tappan Forage Reserve.</li> </ul>	<ul style="list-style-type: none"> <li>• If allowable use standards cannot be achieved in the Marksbury Gulch key area (riparian) then:               <ul style="list-style-type: none"> <li>○ Apply a herder to move livestock out of riparian area and into Thorpe Gulch or adjacent upland areas at least 3 times per</li> </ul> </li> </ul>

<b>Specific Design Criteria</b>	<b>Adaptive Options</b>
<ul style="list-style-type: none"> <li>▪ <i>Treat noxious weeds in Matukat using an integrated approach including chemical and biological treatments.</i></li>   <li>▪ <i>Remove stock tanks that are currently in drainages and riparian areas and replace/redevelop in stable upland sites to maximize riparian vegetation recovery and eliminate additional concentrated riparian use.</i></li>   <li>▪ <i>Earliest on date would be May 1<sup>st</sup>.</i></li>   <li>▪ <i>Latest off date would be Oct 31<sup>st</sup>.</i></li> </ul>	<p><i>week utilizing gentle herding techniques (see Appendix XXX.)</i></p> <ul style="list-style-type: none"> <li>○ <i>Improve use of salt/supplement to draw livestock to Thorpe Gulch or any upland areas with litter cover greater than 50%.</i></li> <li>○ <i>Move to next pasture (limit days in Marksbury pasture).</i></li> <li>○ <i>Fence the Marksbury Gulch riparian area using either electric or hard fence;</i> <ul style="list-style-type: none"> <li>▪ <i>Graze the area for only 21 days and only after Arizona fescue has reached an average of 8 inches.</i></li> <li>▪ <i>Make hardened water gaps.</i></li> <li>▪ <i>Rest the riparian pasture until the willow population increases to at least 5% of the greenline cover</i></li> <li>▪ <i>Rest the riparian pasture until at least 50% of the gulch has defined stream channels</i></li> <li>▪ <i>Rest the riparian pasture until riparian vegetation has expanded its extent by 10% as measured on a greenline cross section.</i></li> </ul> </li> <li>● <i>If livestock distribution is not adequate to achieve litter cover goals, then:</i> <ul style="list-style-type: none"> <li>○ <i>Develop upland water sources in Marksbury and Tappan Gulch pastures in T11S R72W S24 SE ¼, T11S R71W S31 SE ¼ and T11S R71W S19 SW ¼ to improve distribution and lessen impacts at existing water sources. (see proposed allotment map on page XXX) Fence the source as needed to protect the site.</i></li> <li>○ <i>Improve use of salt/supplement to draw livestock to any upland areas with litter cover greater than 50%.</i></li> <li>○ <i>Use prescribed burning to reduce litter accumulations and increase vigor of upland grasses.</i></li> <li>○ <i>Thin Ponderosa pine saplings in encroachment areas in Badger Springs and Mud Springs.</i></li> </ul> </li> <li>● <i>If livestock use around riparian stock tanks results in damage to riparian vegetation (trampling/loss of plants), then:</i></li> <li>● <i>Move stock tanks out of riparian areas and redevelop on adjacent uplands.</i></li> </ul>

## **Step Eight: Define the Proposed Action**

The Proposed Action spells out to the public what it is that we propose to do. It needs to be clear and complete enough that members of the public are able to provide focused meaningful responses if they desire rather than just broad general responses.

The proposed action is based on addressing the IDT resource concerns (and ultimately within the NEPA process, the key issues).

For livestock grazing-related NEPA processes, the proposed action should be spelled out at two scales: the project-wide scale, and the allotment (or group of allotments) scale.

An example of a project-wide proposed action may be as follows:

Authorize livestock grazing on all (or some specified parts) of the suitable rangeland within the project area. Follow an adaptive management process that will meet Forest Plan objectives, Standards and Guidelines, and other legal requirements such as Biological Opinions, and will meet or move toward our Desired Conditions in an acceptable timeframe.

However, such a broad general statement does not really do a quality job of explaining to the public just what it is that we propose to do (nor does it really allow the IDT to fully understand how the package all fits together). Therefore, we should continue farther and develop allotment or area-specific proposed actions. These may be for single allotments or if a group of allotments is proposed to be managed together, these statements may be by a logical grouping. The following is an example of a portion of a site-specific proposed action statement:

*For the Hilow Allotment, the proposed action will implement the following design criteria and specific actions:*

- *Operate between the earliest on-date of May 20 (to ensure that soils are dry enough to withstand livestock effects without permanent damage and at the same time that upland forages are at a high palatability) and the latest off date of October 15 (to ensure that livestock are removed before the start of the peak recreational hunter season)*
- *Utilize a mix of cattle, cow/calf and light yearlings not to exceed a 50:50 mix (to encourage improved distribution while allowing the settling influence of cow/calf on the yearlings)*
- *When opportunity presents, authorize a band of up to 1000 sheep, ewe/lamb to utilize the upland aspen communities for two weeks before entry by the cattle to help control poisonous plants*
- *Utilize the Deer Creek pasture no earlier than June 30 annually to allow maximum riparian plant growth until desired conditions on the Deer Creek benchmark are attained*

- *Allow no use of the Spruce pasture after September 15 to avoid conflict with hunters*
- *When soils are wet and livestock are in the Bear pasture, place an electric fence around the heritage site bv-0325 to exclude livestock*
- *Utilize the Pine Pasture as early in the grazing season as possible, but not more often than two years out of three (to improve distribution into the uplands while still ensuring periodic deferment)*
- *Encourage additional livestock utilization on the perennial grasses in the uplands of Pine Pasture (up to 50%) to reduce litter buildup and encourage young plant growth and vigor.*
- 

*Adaptive Options which may be employed as the need is determined through monitoring:*

- *If allowable use standards cannot be achieved in the Tappan Mountain key area (riparian) then:*
  - *Apply a herder to move livestock out of riparian area and into Tappan Mtn valley or adjacent upland areas at least 3 times per week utilizing gentle herding techniques (see Appendix XXX for reference.)*
  - *Improve use of salt/supplement to draw livestock to Tappan Mtn valley or any upland areas with litter cover greater than 60%.*
  - *Fence the Tappan Mountain riparian area using either electric or hard fence;*
    - *Graze the area for only 21 days and only after Arizona fescue has reached an average of 8 inches.*
- *If livestock distribution is less than desired, then:*
  - *Develop upland water sources in Tappan Mountain and Tappan Gulch pastures in T11S R72W S24 SE ¼, T11S R71W S31 SE ¼ and T11S R71W S19 SW ¼ to improve distribution and lessen impacts at existing water sources. (see proposed allotment map on page XXX) Fence the source as needed to protect the site.*
- *If desired effective cover goals are not met through weed or grazing treatments, then:*
  - *Inter-seed with a native grass mix.*

As a key part of the proposed action, we also need to define the monitoring that will be used to guide our adaptive management decisions. This is a critical component of adaptive management. Too often we tend to throw monitoring at a project, knowing full well that we will never be able to complete it all. And too often we engage in massive overkill – attempting to make up for uncertainty by burying the project in monitoring requirements. This is neither necessary nor smart.

Monitoring can and should be designed to answer multiple questions from relatively simple interdisciplinary data collections. The team needs to identify, clearly and succinctly, just what they need to know in order to decide if the management is working properly or not. That is, the monitoring will tell them if the design criteria and tools are being implemented as planned (implementation monitoring) and in the



longer term, if management is meeting or moving toward the established desired condition objectives (effectiveness monitoring). And, they need to design monitoring in an interdisciplinary approach to be cost and time efficient, to focus on the basic information needs, to be collected at appropriate times (season, prior to grazing, post grazing, end of season) and timing (annually or at some multiple year interval), and to the maximum extent feasible to be able to be completed as “one point, one time, and interdisciplinary.” Many of the corporate rangeland management inventory and monitoring protocols have been designed specifically to help meet interdisciplinary data needs.

### **Step Nine: Define the Acceptable Adaptive Options for Management**

The basic premise behind adaptive management is that there is almost always uncertainty and, there is almost always more than one potentially feasible path to the desired condition. In most instances, several management options will potentially work. The idea is to pick, as a starting point, the management system (e.g. design criteria plus management tools) that the IDT believes best meets the goals of meeting or moving toward the desired condition in an acceptable timeframe while incorporating cost efficiency and practicality.

Then, the team assumes that parts of the starting management may not work as planned, that parts may prove to be incapable of being implemented as planned, or that the on-the-ground situation may change. The team then defines acceptable options to the starting management as explained in the following.

One way of looking at adaptive management is that the team needs to define these “options” or alternate pathways to the best of their ability up front in the planning process. Then in application, management starts down one pathway, conducting monitoring as we go. If the monitoring indicates that management is doing fine, we continue. If monitoring indicates that something isn’t working as planned or that we are not making satisfactory progress toward our desired condition objectives, the team selects a different path from the pre-determined options (we certainly don’t keep going down the same path if it isn’t getting us where we want to go).

By defining potential options up front in our planning process and by analyzing the effects of implementing those options in the NEPA analysis, if the time comes where there is a need to take one of those alternate paths, the IDT and authorized officer simply selects it and keeps moving. There is no need to go back and re-do NEPA, as the option is already covered and is available for implementation if needed. Of course, there will at times be circumstances that could not be foreseen by the IDT in the NEPA analysis. In these cases, some additional level of NEPA may be needed.

So, what would these options look like? Remember, adaptive management is the process of making use of monitoring information to determine if management course changes are needed, and if so, what changes and to what degree (always keeping the focus on the desired conditions). From a NEPA standpoint, the key is to pre-

determine as many of the feasible options (potential course changes) as possible and to analyze them in the NEPA document so that if they are needed they may be implemented without further analysis. Just a note, one concern often expressed by those who have not worked through the process is that it seems like there could be a huge number of potential options. In reality, options tend to be quite limited. Once the team has a solid foundation of design criteria, desired condition objectives, and so forth, there are actually a pretty limited set of options available that will meet the design criteria and are feasible.

As an example of how options would work (see also Table 2-2 above): if implementation monitoring indicates that we are not meeting allowable use standards in a given key area, then what are our options? In formulating our adaptive management alternative, the team would look at feasible options. In this example, options may include things like: fencing off the key area (using either electric or hard as long as either will meet the objectives); use the affected pasture during a time of season when the livestock will be least likely to concentrate on the area of concern (e.g. maybe like using the pasture early in the season two years out of three); increase the level of riding and herding; and so forth. In other words, there are options that the team believes could potentially work to meet the design criteria, resolve the problem, and move toward the desired conditions.

Another example: effectiveness monitoring indicates that a certain benchmark riparian area is not making satisfactory progress toward the desired condition objectives in an acceptable timeframe. Specifically, the age class and species composition mix as defined in the desired condition statement is not being achieved. Options may include: increase the allowable stubble height standard to xx inches; or, increase the residual stubble height standard to xx inches; or rest the riparian area until satisfactory progress toward the desired condition objectives is attained (note that this is another adaptive decision point in that if rest is selected, it could be attained by resting the entire pasture, or by permanently fencing off the riparian area, or by temporarily fencing off the riparian area). The key again is that any of these options are believed by the IDT to be capable of moving management toward attainment of the desired condition objectives.

So, how are adaptive management options derived? Basically, they come from the design criteria and the desired condition objectives. For example, we have a desired condition objective for a given riparian area based on attaining some defined level of species composition, hardwood age classes, and so forth. In this same riparian area, we have design criteria defined either by the IDT in response to concerns and desired conditions, or given to the team by higher level decisions (such as Biological Opinions).

As an example, referring to our previous example, assume that there is a biological opinion that requires that livestock not enter certain reaches of a stream before 6/15 in order to avoid impacts to spawning fish or the eggs in the gravel. So, what adaptive options are available to meet this design criteria (keeping in mind that in practice,

there will often be other inter-related design criteria that will affect the viability of some of these options)? A variety of options may potentially be viable. For example: the entire pasture containing the stream reaches of concern could be deferred until after 6/15; or maybe the reaches of concern could be permanently excluded through the use of hard fencing; or maybe an electric fence could be used up until 6/15 so that livestock could make use of the remainder of the pasture during the early season; or maybe a combination of periodically deferring the use until after 6/15 combined with periodically using electric fence to allow use of the surrounding rangelands; or maybe even conversion from cattle to sheep with herding to keep the sheep away from the reaches of concern. The point is that there are a number of options. The team will need to determine which may be feasible and should be carried forward to analysis, and which are not and should be documented and dropped from further analysis.

The key to the entire process is that rather than relying on old standby decision points such as numbers, hard and fast grazing seasons, textbook grazing systems, and so forth, we use our desired condition objectives, build design criteria to define what must happen or must not happen, and then develop feasible management options that can be analyzed through NEPA to allow us the opportunity to deal with uncertainty over time. And we rely on our simple, focused monitoring to tell us when to change and what pre-determined option to select.

### **Step Ten: Building Alternatives for use in the NEPA Process**

When we get to the NEPA process, we will normally have two to three alternatives (possibly more but if the adaptive management alternative is well done, additional alternatives are not often necessary).

The “no grazing” alternative must be developed and analyzed in detail because the permitting of livestock grazing is a discretionary action and the Courts, in interpreting the NEPA Act, have found that a NEPA decision is required to permit livestock grazing on NFS lands (except as otherwise provided for by laws such as the Rescissions Act and others).

The “current situation” or “no change” alternative needs to be fully developed but may or may not need to be analyzed in detail. The determining factor is whether or not this alternative responds to the purpose and need for the project (to include meeting applicable laws, regulations, policy, forest plan, biological opinions, and so forth). Keep in mind that the current situation alternative may adequately respond to the purpose and need relative to one allotment in the project area but not for another. What this means is that this alternative needs to be developed based on an allotment-specific basis. Where this alternative is viable for a given allotment, it should be fully developed and analyzed. For those allotments where it is not responsive to the purpose and need, this alternative may be developed but not considered in detail (with appropriate documentation as to why it was not considered in detail). The determination is made allotment by allotment.

The “adaptive management” alternative should be developed in detail by allotment or specific area. For some allotments where the current situation is meeting or moving toward the desired condition objectives, there may be no need to develop this third (e.g. adaptive management) alternative. However, in most instances, there will be some value gained in terms of management flexibility by fully developing and analyzing an adaptive management alternative for all allotments in the project area. Basically this means that the desired condition objectives, design criteria, monitoring, starting point management, and management options need to be spelled out for each allotment or area (or at times a group of allotments).

One very clean way of portraying the alternatives (especially the adaptive management alternative) is to develop the alternative up front in the plan-to-project process as the proposed action. Then, in chapter 2 where the alternatives are discussed, there would be a brief summary of each alternative by allotment. For at least the adaptive management alternative (and/or the current situation alternative as appropriate), there would also be a reference to an appendix where a more detailed description of the alternative by allotment can be found.

This more detailed appendix write up then can be documented in a format that serves both as the detailed description of the alternative for the NEPA process, and can later serve as the Allotment Management Plan (AMP) (e.g. the write-up for a specific allotment is electronically copied from the NEPA appendix after the NEPA-based Decision is reached, and is pasted into a Part 3 of the Term Grazing Permit where, with an appropriate heading and a letter of permit modification to the permit holder, it becomes the AMP – see the attachment to this document for a format for this e.amp concept).

## **Conducting the NEPA Process**

In practice, an adaptive management NEPA process is almost the same as any other NEPA process. We follow the training from 1900-1 and we comply with the NEPA handbook guidance. The key NEPA-related difference is that instead of having the traditional multiple alternatives with often only minor differences between them, we have an adaptive management alternative with options. From the adaptive management alternative perspective, the key difference between traditional approaches and adaptive management is that while traditionally we focused on numbers, seasons, and textbook grazing systems, adaptive management focuses on what we want the ground to look like and what must happen or not happen to allow us to get there. Adaptive management sets sideboards to management and allows the IDT and authorized officer the constrained flexibility to adapt to changing conditions based on monitoring findings. In this regard, adaptive management is very different from what we have traditionally done.

## **NEPA Analysis Relative to Adaptive Management**

In practical application, questions often arise with regard to how to conduct an appropriate NEPA analysis (including ESA biological evaluations or assessments)

when the team is dealing with a number of potential adaptive management options rather than dealing with one clear cut decision (such as 203 cattle, cow/calf, 6/3-9/13, three pasture deferred rotation system, for ten years, with little opportunity for change over time...).

The answer is to look at two views of the situation. First, the IDT is going to define the desired conditions. These will be interdisciplinary and designed to meet the needs of the affected resources. Second the team will define the design criteria that constrain management (e.g. provides the sideboards to management). Third, the team will define the carefully focused and achievable monitoring that will be used to determine if course changes are needed. Finally, incorporating all of these items, the team will define a starting point for management. This starting point will set out how management will be applied as the project begins in year one. This starting point will be pretty clear cut. The analysis can then evaluate what this means (e.g. effects of implementation) basically as it would any alternative.

Then, the analysis can take a look at the big picture – e.g. the maximum implementation focus. In other words, if management over time does not fully function as initially planned and all adaptive management options are ultimately employed, what would be the effects of implementation of this scenario? In practice, it is kind of like looking at two alternatives. One, the starting point has certain practices, design criteria, etc. that can be analyzed. The second, the max implementation “alternative” has more practices and it too can be analyzed. Comparing the two situations provides a range of potential effects. In writing up the analysis, the team should consider that all options are focused on attainment of the desired condition and that the team really believes that the starting point is capable of moving toward the desired condition, as are any of the options. The options are simply building in constrained flexibility to respond to uncertainty. The analysis should also indicate that it is highly unlikely that we will ever need to resort to the max implementation scenario – but the effects of implementing those practices (options) are analyzed in the NEPA document just in case they are needed at some point.

In terms of analyzing the effects of specific improvements, the options should spell out to the best of our ability what improvements are likely to be needed and approximately where they will be located. It is seldom if ever critical to know exactly where an improvement will be located in order to assess the effects of that improvement. When the structure is actually scheduled to be constructed, direction requires that there be a cultural resource and TES clearance. At that point, the team will know with some precision where the improvement will be located and can do a site-specific inventory and assessment as needed.

## **NEPA Decisions**

When dealing with multiple allotments in one NEPA analysis, there are options available to the authorized officer with regard to how to document the actual Decision(s).

One option is to include all allotments in one single decision (Decision Notice or ROD). This option simplifies the process in terms of writing only one decision document rather than multiple documents.

However, this approach has the potential to not work well if there are likely to be 36 CFR 215 appeals in that the 215 appeals process provides for automatically delaying implementation until 15 days after all appeals are resolved. This provision applies to the decision, and not just to any specific allotment covered by that decision regardless of whether the appeal takes issue with only management of a single allotment, or management of all allotments covered by the decision. On the other hand, under 36 CFR 251, implementation may proceed unless a stay is requested and granted.

So, if 36 CFR 215 appeals are anticipated, it may be better to issue multiple decisions (e.g. one per allotment, or possibly grouping of allotments based on controversy, potential appeal issues, etc.) rather than one single decision to cover all allotments.

If 36 CFR 251 appeals are anticipated, from the implementation standpoint it would make no difference if individual decisions were issued or if all allotments were included in one decision. The deciding factor here is whether or not a stay is likely to be requested and approved. If approved, a stay would affect all allotments included in the decision being appealed, regardless of whether the appeal takes issue with only management of a single allotment, or management of all allotments covered by the decision.

As an added consideration, if there are a few controversial allotments in a project area containing a number of non-controversial allotments, the controversy surrounding the few can potentially draw attention to, and therefore impact the decisions for the many. In such instances, it might be best to separate out the controversial allotment decisions and issue those both separate from each other and from the non-controversial allotment decision(s).

## **NEPA Lifeline**

Frequently we hear it said that a NEPA analysis and NEPA-based Decision have a life of ten years, or five, or three, or whatever. In point of law and regulation, a NEPA-based decision life span is determined by changed conditions. In other words, a NEPA-based Decision may continue indefinitely if there are no changed conditions that were not anticipated and analyzed in the NEPA document, and that influence the effects of implementation of that decision. This is one of the tenants of adaptive management – that is, if we conduct a thorough analysis of potential issues, develop

well-founded desired condition objectives, build quality design criteria, and develop sound management options with appropriate monitoring that allows us to respond to the most likely potential “changed condition” situations, our analysis and decision could potentially continue indefinitely. In reality, at some point, it is highly likely that there will be some changed conditions that the team could not foresee or plan for that will drive the process back into the NEPA arena at some level. But even here, if the adaptive management process is well done in the first place, the chances are that much or most of the analysis needed to deal with the unforeseen changed conditions will have already been completed in the original NEPA analysis.

The key to keeping a NEPA-based decision alive and well for an extended time-frame (besides relying on a well developed adaptive management alternative) is that the authorized officer must periodically review the analysis and decision and determine if it remains viable or if there have been changed conditions that require a second look. If the officer determines that it remains viable, this review and finding must be documented in writing. One very good time to conduct this review (for livestock grazing related decisions) is when a term permit on a given allotment(s) is waived or expires and comes up for a new issuance. The authorized officer should review the analysis and decision pertinent to the affected allotment(s) and determine if the analysis and decision is still viable. If it is, document the finding and proceed to issue the permit and continue management as planned.

**Appendices:**

1. e.amp template