# DECISION NOTICE
# AND
# FINDING OF NO SIGNIFICANT IMPACT

## *FOREST PLAN AMENDMENT*
## *of*
## *FORAGE UTILIZATION STANDARDS & GUIDELINES*

## FISHLAKE NATIONAL FOREST

Beaver, Garfield, Iron, Juab, Millard, Piute, Sevier, San Pete, and Wayne Counties, Utah

The Environmental Assessment (EA) for amending the Fishlake Land and Resource Management Plan (Forest Plan) to replace the current standards and guidelines for measurement of forage utilization discloses the environmental effects of using both utilization and residual stubble height methods for determining appropriate levels of utilization by livestock. This EA is available at the Fishlake National Forest Supervisor's Office in Richfield, Utah. I have reviewed the EA and related material and I base my decision to select Alternative 3 upon that review.

An interdisciplinary Team (IDT) of resource specialists conducted this analysis and documented the results. In accordance with the National Forest Management Act and the National Environmental Policy Act, the IDT considered the affected area, formulated alternatives, and estimated environmental consequences based on Forest Plan goals, objectives, and standards and guidelines, together with issues raised during scoping.

The revised forage utilization standards and guidelines will apply to all rangelands within the 1.5 million-acre area of the Fishlake National Forest on the Fillmore, Beaver, Richfield, and Loa Ranger Districts.

**Purpose and Need**

The Fishlake National Forest proposes to replace the current Forest Plan standards and guidelines regarding measurement of forage utilization. The purpose of this amendment is to modify current utilization measures, using state-of-the-art knowledge and technology, to provide the most effective and efficient method for analyzing the effects of livestock forage utilization on rangeland resources. Forage utilization is currently measured by percent utilization of total available forage. The amendment would change how utilization is measured in riparian areas to residual stubble height rather than percent utilization. Utilization in upland areas would continue to be measured by percent utilization, but those levels of use would be modified.

An underlying purpose is to achieve the overall direction of the Forest Plan to reach desired rangeland conditions, while allowing the appropriate use of rangeland resources.

The Forest Plan Goals that the Purpose and Need is intended to address are documented on pages 1-2, 1-3, and 1-4 of the EA.

**Decision**

This Environmental Assessment documents the analysis of the Proposed Action and two alternatives to the Proposed Action:

- The No Action Alternative (Alternative 1) would result in continuing with existing percent utilization S&G's currently prescribed in the Forest Plan.
- Under the Proposed Action (Alternative 2), allowable upland forage utilization would range from 40-60 percent on grass/forb types, and residual forage requirements in riparian areas (measured at the end of the growing season) would be four to six inches of stubble height, depending on seral condition.
- The Modified Proposed Action Alternative (Alternative 3) prescribes a uniform four-inch stubble height for all riparian areas, except riparian emphasis management areas that would have 6-inch stubble height criteria.

Based on the analysis and evaluation described in the EA, it is my decision to implement the Modified Proposed Action (Alternative 3):

This alternative is aimed at improving application of prescribed criteria. It addresses the Purpose and Need to reduce potential permittee confusion and management difficulties presented by the Proposed Action's requirement for a mix of both 4" and 6" stubble heights required in adjacent riparian areas within the same grazing unit. Since the intent of the utilization criteria is to provide simple tools by which the time to move livestock can be determined, this alternative prescribes a uniform 4" stubble height for all riparian zones except riparian emphasis management areas which require 6 inches of residual stubble height. Reaching the 4" stubble height triggers the time to move livestock, either between units or off the allotment.

Easier administration of prescribed use standards is also achieved with one stubble height criteria applied unilaterally and irrespective of seral condition; i.e.: a determination of seral condition is not a requisite for every riparian area.

A complete description of the Modified Proposed Action (Alternative 3) is found in Chapter 2 of the EA.

**Mitigation Measures**

My review has concluded that the "Features Common to all Alternatives" listed on pages 2-9 and 2-10 of the EA are adequate to reduce or prevent undesirable effects, to reduce adverse environmental effects below the "significance" level, and to resolve issues and concerns raised by the public.

**Monitoring**

The need for monitoring is pointed out in the Issues section beginning on page 2-6 and monitoring practices are discussed on pages 2-13 and 2-14 of the EA. Monitoring procedures are discussed in Appendix B of the EA. The purpose of all monitoring activities will be to ensure that management objectives are being achieved. If monitoring reveals lack of progress in maintaining or moving toward desired conditions, or raises questions on the validity of resource objectives, consideration will be given to making changes to address problems that have been revealed.

The following monitoring practices will be applied, as applicable, to determine both implementation and effectiveness:

1. Utilization monitoring to determine compliance with identified allotment allowable use or proper use standards and guidelines.

2. Monitoring of utilization levels on some upland range sites to determine herding, distribution, and improvement needs; monitoring of utilization levels in riparian areas to determine areas of concentration and requirements to maintain proper use.

3. Monitoring of riparian areas for timely removal of livestock and compliance to grazing system strategies.

4. Long-term monitoring to determine if management practices accomplished what was desired over time; i.e. did proper use improve vegetative conditions?

5. Determination if grazing at proper use is maintaining water quality standards in compliance with the existing Memorandum of Understanding with the Utah Department of Environmental Quality.

**Public Notice and Comment**

In response to the Notice and Comment period that began on April 25, 2001 and concluded on May 25, 2001, two letters commenting on the EA for the Forest Plan Amendment of Forage Utilization Standards & Guidelines were received. Appreciation is extended to those who have taken time to provide comments on this EA.

The responses to comments received during the Notice and Comment period are attached to this Decision Notice.

**Rationale for the Decision**

The Forest Service mission is to provide a sustained flow of renewable resources while promoting a healthy and productive environment for the Nation's forests and rangelands. Objectives of the range management program include providing for livestock forage, while maintaining or improving environmental quality. It is National Forest System policy to 1) Use appropriate methods, including livestock grazing, for managing range vegetation; and 2) Issue term permits, with appropriate terms and conditions, to allow use of range vegetation.

**1. Accomplishment of the Purpose and Need.** The Purpose and Need, as described in Chapter 1 of the EA, is met with the Selected Action – Modified Proposed Action Alternative (Alternative 3).

**2. Consistency with the Fishlake National Forest Land and Resource Management Plan.** I have compared the details of my decision with the Fishlake National Forest Land and Resource Management Plan (LRMP) goals and objectives, as well as standards and guidelines (S&Gs), for consistency with the LRMP. This decision is a non-significant amendment of the LRMP. Additionally, the Selected Action is consistent with the achievement of the Desired Condition of the Forest as described in LRMP, IV 18-23.

**3. Effects on the Environment and Responsiveness to Issues.** The detailed analysis in Chapter 4 of the EA discloses how the Selected Action responds to the issues and affects the resources. The Selected Action will:

- Implement state-of-the-art, scientifically reviewed residual forage standards.
- Meet Forest Plan Goals & Objectives for community stability.

- Meet Forest Plan Goals & Objectives for wildlife by leaving adequate forage for wildlife.
- Meet Forest Plan Goals & Objectives for rangeland health since all areas are expected to improve to fair or better condition with stable or upward trends.
- Result in a) positive net economic benefits to permittees and rural communities, b) no adverse social effects, and c) no adverse effects to rural lifestyles.
- Provide a simple and easy to measure methodology that will encourage improved permittee monitoring and compliance with prescribed standards and guidelines and management.
- Provide levels of stocking and proper forage utilization that ensure the achievement of identified future conditions of forest rangeland resources.

**Public Involvement**

The public involvement effort began in February 1998 with the scoping process associated with the environmental assessment for revision of 42 allotment management plans (AMPs). The Proposed Action for these AMP revisions included revising the forage utilization standards. Neither the February 1998 public scoping period or the February 1999 public notice and comment period resulted in any comments or issues specific to forage use standards and guides.

On February 21, 2001, a Scoping Notice was mailed to 377 interested publics whose names are maintained on the Forest NEPA mailing list; including permittees, special interest groups, other agencies, congressional offices, and interested citizens. The Scoping Notice described the Proposed Action and specifically identified the current forage use standards and guides and how they would be revised. The notice included a specific request for public comment.

During public scoping, eight individuals or organizations responded with comments. A majority of the comments concerned implementation of the stubble height criteria, training, and ease and consistency of monitoring. This scoping analysis did not reveal the identification of any issues significant enough to drive the creation of any alternatives other than the No Action Alternative (Alternative 1), the Proposed Action (Alternative 2), and the Modified Proposed Action Alternative (Alternative 3).

Besides the scoping effort discussed above, the EA was made available for public comment from April 25, 2001 to May 25, 2001 pursuant to 36 CFR 215.6. Two letters were received within the 30-day Notice and Comment period ending on May 25, 2001. All comments were addressed prior to issuing a Decision Notice.

**Other Alternatives Considered**

In addition to the No Action and Modified Proposed Action, the ID Team developed two additional potential alternatives to the Proposed Action Alternative: 1) an alternative to fence all riparian areas was considered unreasonable; 2) an alternative that would prescribe utilization levels at varying degrees below 50% was determined to provide no greater benefits than those of the alternatives considered in detail. These alternatives were considered, but eliminated from detailed study. They are described in Chapter 2 of the EA, along with the rationale for not considering them in detail.

| USDA - FOREST SERVICE<br><br>**GRAZING PERMIT - PART 3**<br>(Reference FSM 2230) | Page ___ of ___<br>Permittee Number<br><br>Permit Number |
|---|---|

**Special Terms and Conditions**
UTILIZATION STANDARDS

ALLOTMENT:_____

**Maximum Allowable Forage Utilization Criteria:**

| Maximum Allowable Forage Use Criteria | | |
|---|---|---|
| **Vegetation Type** | **Stubble Height/Use** | **Comments** |
| Riparian Hydric Species | 4" | Triggers the time to move livestock between units or off the allotment |
| Riparian Emphasis Management Areas | 6" | Triggers the time to move livestock between units or off the allotment |
| Non-hydric Sod-Forming Grass Species in Riparian Areas | 1 ½ " | Primarily Kentucky bluegrass--Triggers the time to move livestock between units or off the allotment |
| Wheatgrass Seedings | 60% | Management option to exceed 60% use to maintain healthy seedings |
| Riparian/Upland Browse Sprouts and Young-Aged Plants | ≤40% | # of current year's available twigs removed |
| Riparian/Upland Mature Browse | ≤50% | # of current year's available twigs removed |
| Upland Grass/Forb | 40-60% of key species; varies by grazing system and desired condition | % of current year's growth |
| Riparian Ground Cover | Maintain ground cover of at least 70% within riparian areas | |

**Compliance With The Forest Plan, Other Laws And Regulations**

Based on my review of the analysis presented in the EA and the supporting project file documentation, the Biological Assessment, and concurrence from the USF&WS; I have determined that the Selected Action is a non-significant amendment to the Fishlake National Forest Land and Resource Management Plan, the National Forest Management Act of 1976, the Clean Water Act of 1948 (as amended in 1972 and 1987), and the Endangered Species Act of 1973, as amended. In addition, no floodplains or wetlands will be affected as defined in Executive Orders 11988 and 11990.

I have determined that the analysis process was consistent with Section 8 of the Public Rangelands Improvement Act of 1978. Ample opportunity for consultation, cooperation, and coordination occurred throughout the analysis process.

Finally, I have determined that my decision is consistent with the Administrative Procedures Act. My decision is neither arbitrary nor capricious, but is based on careful review of the analysis process, findings for this project, public comment, and the purpose and need for action.

**Finding Of No Significant Impact**

I have reviewed the Council on Environmental Quality Regulations for significance (40 CFR 1509.27) and have determined that this action is not a major federal action, individually or cumulatively, and will not significantly affect the quality of the human environment. Therefore, an Environmental Impact Statement pursuant to Section 102(2)(c) of the National Environmental Policy Act is not required. This determination is based on the following factors:

**1. Context of the Proposed Project.** The project will occur on a local level. Decisions made relative to these allotments will directly affect livestock grazing permittees who reside in the South-Central Utah area of influence. No significant effects are expected to occur within or outside of this area, as defined in 40 CFR 1508.27 (EA, Chapter 4, Social/Economic section). The prescribed forage utilization standards and guidelines are specific to meeting the stated purpose and need of providing the most effective and efficient method for analyzing the effects of livestock forage utilization on rangeland resources. They are not part of any larger decisions at the Regional or National level.

**2. Intensity of the Proposed Project.** "Intensity" refers to the severity of impact. The following ten factors were evaluated in determining the intensity of the effects of the proposed project:

a) Beneficial and adverse effects from the Selected Alternative are not significant. The effects described in the EA, Chapter 4, support this conclusion.
b) Public health and safety are not adversely affected by the Selected Alternative.
c) There are no areas within Fishlake National Forest rangelands, or cumulative effects areas, with unique geographic characteristics such as historic or cultural resources, parklands, prime farmlands, wild and scenic rivers, or ecological critical areas that are significantly affected by the Selected Alternative. This is documented in the EA in Chapters 3 and 4.
d) The effects of the Selected Alternative on the quality of the human environment are not highly controversial. These effects are disclosed in detail in the EA, Chapter 4.
e) There are no known effects on the human environment that are highly uncertain or involve unique or unknown risks. All known effects are adequately discussed or referenced in the EA, Chapter 4, and were determined from professional experience, education, and/or scientific literature.
f) These actions do not set a precedent for other projects that may be implemented to meet the goals and objectives of the LRMP. The Selected Alternative was specifically designed for appropriate forage utilization measurement, and addresses the site-specific purpose and need for this project.

g) There are no known significant cumulative effects between this project and other projects implemented or planned in the area. This is substantiated in the cumulative effects discussion for each resource area in Chapter 4 of the EA.
h) There are no known historic resources affected.
i) There are no known federally listed (or proposed for listing) endangered or threatened plant or animal species within these allotments which will be adversely affected by the Selected Alternative (EA, Chapter 4; Biological Assessment located in the Project File--incorporated by reference).
j) The actions do not threaten a violation of Federal, State, or local laws or requirements imposed for the protection of the environment. My conclusion is based on a review of the EA, Chapter 4; concurrence with the Selected Action by the USF&WS; and based on the input from other federal, state, and county agencies which we have received to date on this project.

**Implementation And Administrative Review**

This decision is subject to appeal pursuant to Forest Service regulations at 36 CFR 215.7. Any written appeal must be postmarked or received by the Appeal Deciding Officer, Regional Forester Jack A. Blackwell, Intermountain Region Office, 324 25th Street, Ogden, UT 84401, within 45 days following the date that the legal notice of this decision is published in the Richfield Reaper newspaper, Richfield, Utah.

Appeals must meet content requirements of 36 CFR 215.14. For further information on this decision, contact David R. Grider, Range Specialist, Dixie and Fishlake National Forests, 82 North 100 East, Cedar City, UT 84720 (801) 865-3700.

Implementation of this decision may occur on, but not before, 5 business days from the close of the appeal filing period. If an appeal is received, implementation may not occur for 15 days following the date of appeal disposition.

**RESPONSIBLE OFFICIAL**

MAX REID
Acting Forest Supervisor

7/30/01 DATE

Attachment: Response to Notice & Comment Review

# APPENDIX
# RESPONSE TO COMMENTS
# 30-DAY NOTICE AND COMMENT PERIOD

The Code of Federal Regulations (CFR) requires that after preparing an environmental assessment (EA) and before preparing a Decision Notice (DN), the agency shall request comments from the public, soliciting comments from those persons or organizations who may be interested or affected. Regulations governing Notice and Comment of an EA are found at 36 CFR 215.3 to 215.6.

The notice of availability of a Predecisional EA for this proposed action was published in the Richfield Reaper on April 25, 2001. Concurrently, copies of the EA were mailed to those who responded to scoping and those who have requested to be kept informed about grazing activities on the Fishlake National Forest. A summary of the EA was mailed to all livestock grazing permittees. All names on the NEPA mailing list received a one-page notice of the EA availability. This April 25 Notice asked for comments by May 25, which allowed 30 days to provide comments.

Rules and regulations guiding commenting on environmental assessments state that "written comments may not be considered unless they are postmarked or facsimile imprinted by the close of business on the 30th day following publication of the notice" [36 CFR 215.6(c)(2)]. The Responsible Official is required to clearly note the date of receipt of comments. All comments, even those postmarked after the close of the comment period, should be kept as part of the project file. Timely comments must be considered prior to making a final decision on the project.

Two letters were received and/or postmarked within the 30-day Notice and Comment period ending on May 25, 2001. These letters are filed in the project file for the Environmental Assessment (EA) for the Forest Plan Amendment of Forage Utilization Standards and Guidelines for the Fishlake National Forest. The list of respondents included the following individuals and organizations:

| ORDER | RESPONDENT | RECEIPT DATE/POSTMARK |
|---|---|---|
| 1 | Jerold L. Jensen | May 16, 2001 |
| 2 | Wildlife Management Institute | May 29, 2001 |

The IDT Leader performed a content analysis of the comments received. The comments were categorized by subject into the following areas:

| CATEGORY | RESPONDENT(S) |
|---|---|
| Preferred Alternative | 1, 2 |
| Monitoring | 1, 2 |
| Improved Rangeland Condition | 1, 2 |
| Ease of Compliance | 2 |
| Interpretation of "remaining at end of growing season" | 2 |
| Drought Situations | 2 |

Categorized comments are included here and are numerically coded according to the numbered order of the respondent.

## PREFERRED ALTERNATIVE

**COMMENT:** I do not believe that this alternative (Alternative 3-Modified Proposed Action) "best meets the purpose and need and the Fishlake Forest goals and objectives".... (1)

**COMMENT:** In considering Alternative 2, I would argue that this proposal favors the watershed and its lifeblood, the riparian areas, while giving ample opportunity for intervention by an" interdisciplinary resource team (IDT)" should circumstances warrant. I believe that Alternative 2 with Residual Riparian Stubble Height of 4-6" best serves the land. I support the decision to adopt standards for forage utilization consistent with current scientific research identified as Alternative Two (2). (1)

**COMMENT:** I recommend that Alternative 2 be the final proposed action. I think it will best address needed changes in livestock management, especially for riparian areas. The Institute urges the Forest Service to implement these new standards and guidelines as opposed to the current measure of forage utilization. (2)

**RESPONSE: Your interest in the proper management of resources on the Fishlake National Forest is appreciated. Your preference of a selected alternative is noted and considered in the decision-making process.**

## MONITORING

**COMMENT:** Management without aggressive monitoring and standards enforcement by the Fishlake National Forest will render any decision meaningless. (1)

**COMMENT:** It will be important that necessary monitoring attention be given to all grazing allotments if these changes are made. The decision document must clarify how this will be done. (2)

**RESPONSE: NEPA requires that relevant mitigation measures, management requirements, and monitoring provisions be discussed in the EA. It does not require a detailed outline of how monitoring is done. Rangeland monitoring and evaluation procedures are outlined in FSH 2209.21 (USDA FS, 1993). Implementation of a monitoring plan is included in the development of an Allotment Management Plan. Appendix B of the EA provides suggested forage utilization monitoring procedures. A discussion of utilization monitoring and practices that may be applied to determine implementation and effectiveness of the prescribed standards is provided on page 2-13 of the EA. Provisions for monitoring are included in the EA, along with guidelines for determining monitoring objectives and methodologies for conducting monitoring studies. Adequate information regarding the requirements for monitoring is provided so that the Deciding Officer has sufficient information with which to base an informed decision.**

## IMPROVED RANGELAND CONDITION

**COMMENT:** I believe that Alternative 2: Proposed Action—Residual 4-6" Riparian SH Based on Seral Condition best meets the needs of the watershed. (1)

**COMMENT:** The key outcome from this effort must be that overall rangeland condition in the relevant allotments is maintained or improved. This is especially important for important riparian habitats. (2)

**RESPONSE: Table 2-6 of the EA provides the expectation that both Alternative 2 (Proposed Action) and Alternative 3 (Modified Proposed Action) meet Forest Plan goals and objectives for rangeland health, since forage use criteria are prescribed to maintain and improve rangeland conditions. The EA is consistent with the Fishlake Forest Plan and it satisfies the requirements of the Council on Environmental Quality (CEQ) and the National Environmental Policy Act (NEPA) with respect to improving resource conditions.**

## EASE OF COMPLIANCE

**COMMENT:** The (Wildlife Management) Institute understands the desire by the Forest Service to reduce complexity, or ease of compliance with criteria that do not require determination of seral condition. However, I'm not sure this justifies the proposed action represented in Alternative 3. (2)

**RESPONSE: Alternative 3 (Modified Proposed Action) is aimed at improving application of prescribed criteria. It addresses the Purpose and Need to reduce potential permittee confusion and management difficulties arising from a multiple of stubble height requirements in any one unit; i.e.: 4" stubble height in one riparian area and 6" in an adjacent riparian area within the same grazing unit. Easier administration of prescribed use standards is also achieved with one stubble height criteria applied unilaterally and irrespective of seral condition; i.e.: a determination of seral condition is not a requisite for every riparian area. The assessment is made in the EA (page 2-12) that: "Under the deferred rotation systems that the majority of the allotments are under, it is expected that each of the early units, considering regrowth, should achieve a minimum of 6 inches of residual stubble height; and every other year, one of the two alternating late units may have regrowth to 6 inches or more stubble height". This expectation would surpass the expectation from Alternative 2, which allows for a greater percentage of 4" stubble heights in the mix of 4" and 6" standards "required at the end of the growing season".**

## INTERPRETATION OF "REMAINING AT END OF GROWING SEASON"

**COMMENT:** I also do not completely understand the phrases in Table 2-5 describing stubble heights "remaining at end of growing season" (proposed action) versus the words "trigger the time to move livestock between units or off the allotment" (modified proposed action)? The final decision document should provide interpretation and meaning of these selected phrases. (2)

**RESPONSE: Interpretation of these two phrases is provided in the text discussion of the two alternatives on pages 2-11 and 2-12. Alternative 2 (Proposed Action) would allow for actual uses below the applicable 4" or 6" standard as long as regrowth by the end of the growing season would provide for reaching the standard residual height. Text at page 2-11 of the EA states: "To take into account regrowth (the entire year's growth of vegetation) and the stubble height that should remain following grazing for sediment filtering during spring flows, pastures grazed early may allow shorter stubble height values than areas grazed following seed ripe. In any case, the required stubble height (including any regrowth) must be at or above the standard by the end of the growing season". Under Alternative 3 (Modified Proposed Action), once use to the 4" stubble height has been reached the livestock must be removed from the unit or allotment, irrespective of any potential regrowth. Although for some riparian areas, this means an initial use below a 6" stubble height standard, it also means that that use cannot exceed a threshold of 4" regardless of any projected regrowth that may occur. Text at page 2-12 states: "This alternative proposes to use neither "end of growing season" nor "end of grazing season...Since the intent of the utilization criteria is to provide simple tools by which the time to move livestock can be determined, this alternative prescribes a uniform 4" stubble height. Reaching the 4" stubble height triggers the time to move livestock, either between units or off the allotment... Under this alternative, there would be no manipulation to plan use of expected regrowth—once the 4" stubble height is reached, livestock would be moved, without the opportunity for twice-over use".**

## DROUGHT SITUATIONS

**COMMENT:** In years of low moisture, residual standards will be reached early in the grazing season or perhaps the desired stubble height will not be achieved. Under these conditions, if this system is to work, adequate logistical support and decision systems must be in place to provide for removal of livestock before the standard removal date. This always poses difficulties for both the agency and the permittee. We urge the Forest Service to be diligent in addressing this inevitable problem. (2)

**RESPONSE: The administration of proper forage utilization presented by drought situations poses difficulties with any prescribed utilization standard—stubble height as well as percent utilization. Although drought affects forage production on upland rangelands more seriously than production with riparian areas, use intensity within riparian areas is usually more severe during droughts. These considerations are part of routine allotment management planning and permit administration and apply regardless of the alternative selected. Since the purpose of this EA is simply to propose a prescribed stubble height utilization standard and not to prescribe Allotment Management Planning or Permit Administration procedures (which implement the selected standard), further addressing of this routine livestock grazing administration problem is outside the scope of this EA.**

United States
Department
Of Agriculture

Forest Service
Intermountain Region

**Fishlake National Forest**
**April 2001**

# ENVIRONMENTAL ASSESSMENT

## FOREST PLAN AMENDMENT
## OF
## FORAGE UTILIZATION STANDARDS & GUIDLEINES

# ENVIRONMENTAL ASSESSMENT

## FOREST PLAN AMENDMENT
## OF
## FORAGE UTILIZATION STANDARDS & GUIDLEINES

**FISHLAKE NATIONAL FOREST**
**SEVIER, BEAVER, WAYNE, IRON, GARFIELD, PIUTE, MILLARD, AND JUAB COUNTIES**

**Responsible Agency:** USDA, Forest Service

**Responsible Official:** Mary Erickson
Forest Supervisor
Fishlake National Forest

**For Further Information Contact:** David R. Grider
Range Specialist
Dixie/Fishlake National Forests
82 North 100 East
Cedar City, UT 84720
(435) 865-3731


### ABSTRACT

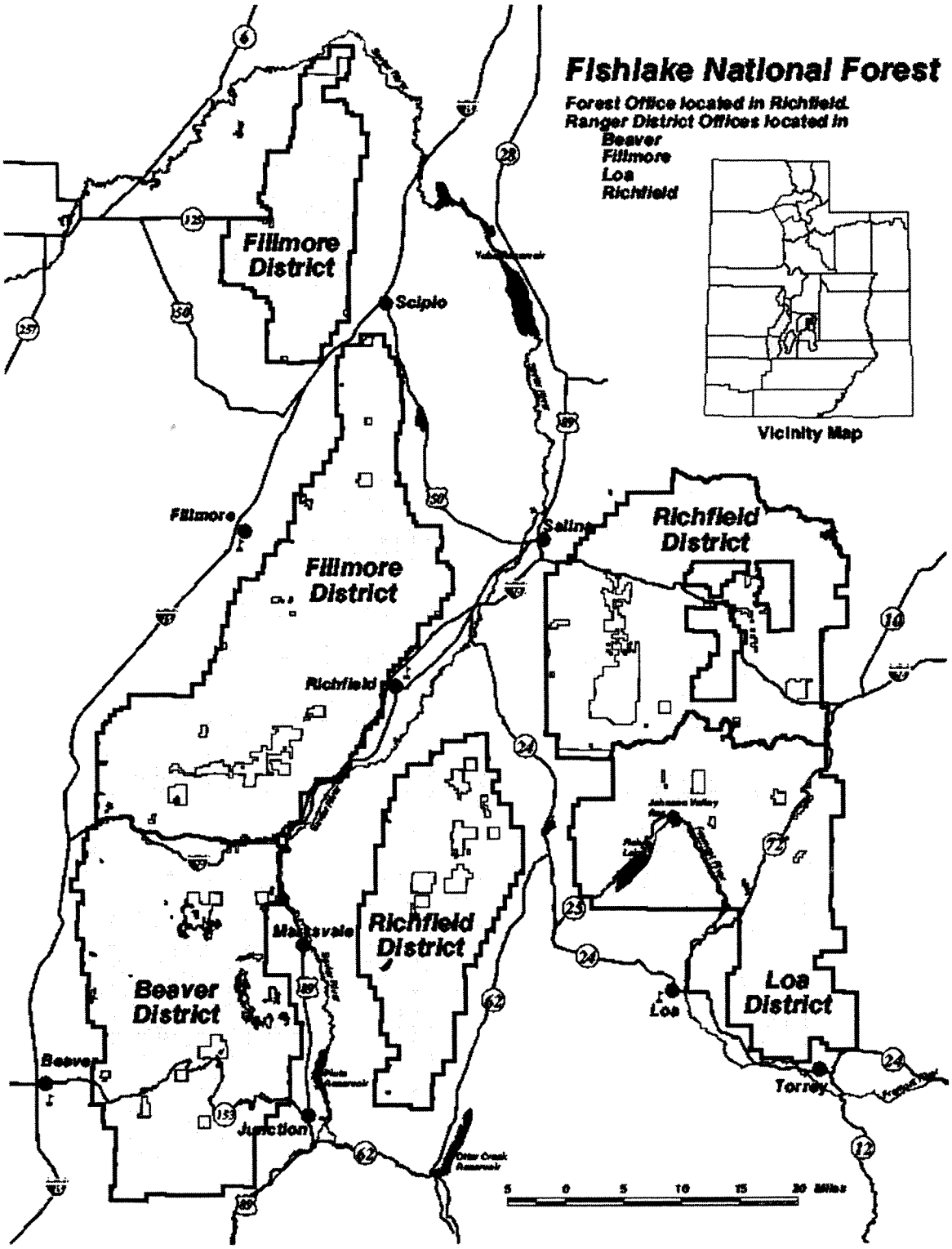
The Fishlake National Forest proposes to amend the Fishlake Land and Resource Management Plan. The amendment would replace the current Forest Plan standards and guidelines regarding measurement of forage utilization. Forage utilization is currently measured by percent utilization of total available forage. The amendment would change how utilization is measured in riparian areas to residual stubble height rather than percent utilization. Utilization in upland areas would continue to be measured by percent utilization, but those levels of use would be modified.

The forage utilization amendment would establish use standards that are consistent with current scientific research. Allowable upland forage utilization would range from 40-60 percent on grass/forb types, and residual forage requirements in riparian areas (measured at the end of the growing season) would be four to six inches of stubble height, depending on seral condition. Livestock would be moved to the next pasture or removed from the allotment once certain utilization thresholds (upland forage utilization, riparian forage utilization, riparian vegetation stubble height or riparian woody browse utilization) are met.

This Environmental Assessment documents the analysis of the Proposed Action and two alternatives to the Proposed Action: the No Action alternative, which would result in continuing with existing percent utilization S&G's currently prescribed in the Forest Plan; and a Modified Proposed Action Alternative.

This alternative prescribes a uniform four-inch stubble height for all riparian areas, except riparian emphasis management areas which would have 6-inch stubble height criteria.

## TABLE OF CONTENTS




**VICINITY MAP**

# CHAPTER 1
# PURPOSE AND NEED FOR ACTION

## A. PROPOSED ACTION

The Fishlake National Forest proposes to amend the Fishlake Land and Resource Management Plan (LRMP/Forest Plan) *(USDA FS 1986a)*. This Forest Plan was completed in 1986. Copies may be obtained from the Fishlake National Forest at 115 East 900 North, Richfield, UT 84701.

This amendment would replace the current Forest Plan standards and guidelines regarding measurement of forage utilization. Forage utilization is currently measured by percent utilization of total available forage. The amendment would change how utilization is measured in riparian areas to residual stubble height rather than percent utilization. Utilization in upland areas would continue to be measured by percent utilization, but those levels of use would be modified.

The forage utilization amendment would establish use standards that are consistent with current scientific research. Allowable upland forage utilization would range from 40-60 percent on grass/forb types, and residual forage requirements in riparian areas (left at the end of the growing season) would vary from four to six inches of stubble height, depending on seral condition. Livestock would be moved to the next pasture or removed from the allotment once certain utilization thresholds (upland forage utilization, riparian forage utilization, riparian vegetation stubble height or riparian woody browse utilization) are met. Livestock would be moved when a shift in preference from herbaceous to woody species is noted. Meeting or exceeding one of these threshold levels would initiate a move of livestock (either to the next pasture or off the allotment). The following chart compares the current "General Direction" to the proposed amendment.

Note: These are NOT proper use criteria. An IDT may determine that resource conditions require a modification of the allowable use standards. When this occurs, the modified allowable use is termed "proper use". See Appendix A for glossary definitions and discussions.

The amendment would provide a modification of the General Direction #2 for Range Resource Management Direction (D02) on page IV-21 of the LRMP as follows:

| Current General Direction #2 | Proposed Amendment |
|---|---|
| Manage Livestock and wild herbivores forage use by implementing proper use guides. | Manage ungulate forage use by implementing maximum allowable forage use criteria and modifying these criteria where necessary to obtain "proper use". |

In addition, the amendment would provide modifications of Standard & Guideline 2a on pages IV-21, 22, and 23 and Standard & Guideline 3a (Riparian Area Management) on page IV-34 of the Forest Plan.

| Current Standard & Guideline 2a | Proposed Amendment |
|---|---|
| Livestock and wild herbivores proper use guides are prescribed by grazing system. | Maximum Allowable Forage Use Criteria for riparian areas are prescribed by stubble height, based on seral condition. Maximum Allowable Forage Use Criteria for upland areas are prescribed by percent utilization removed. |

| Current Standard & Guideline 3a | Proposed Amendment |
|---|---|
| Allow a maximum of 50% use (season-long system) 60% use (deferred rotation system), 65% use (rest rotation system) of total forage production in riparian zones.<br>Allow a maximum of 50% use of current year's growth on browse species in riparian areas.<br>Maintain ground cover of at least 70% within riparian areas. | In riparian areas, allow 4-6" of Stubble Height (SH) on hydric species, and/or 1 ½" of SH on non-hydric sod-forming grass species (Kentucky bluegrass), remaining at the end of the growing season. Allow a maximum of 50% use of current year's growth on mature browse species in riparian and upland areas. Allow a maximum of 40% use of current year's growth on sprouts and young-age browse species in riparian and upland areas. Maintain ground cover of at least 70% within riparian areas. |

## B. PURPOSE AND NEED

The National Forest System operates under two of several important congressional laws: the Resources Planning Act (RPA) as amended by the National Forest Management Act (NFMA), both of which require analysis of livestock impacts on the grazing resource. The Forest Service has traditionally used utilization measures as one way to assess livestock impacts *(USDA FS 1993)*.

These same laws provide for changing Forest Plans when new information becomes available. The purpose of this amendment is to modify current utilization measures, using state-of-the-art knowledge and technology, to provide the most effective and efficient method for analyzing the effects of livestock forage utilization on rangeland resources.

An underlying purpose is to achieve the overall direction of the Forest Plan to reach desired rangeland conditions, while allowing the appropriate use of rangeland resources. The Forest Plan identifies livestock grazing as an appropriate use under certain conditions as described in the standards and guidelines.

Forest Plan goals for administering livestock grazing and range management programs on the Fishlake National Forest are listed on page IV-4 and pages IV-21 through IV-24 of the Forest Plan (USDA FS 1986a). See Table 2-6, page 15 for Comparison of Alternatives—Ability to Meet Forest Plan Goals and Objectives. These goals are summarized below.

1. Provide livestock grazing consistent with range capacity and other uses to sustain wildlife populations and the local dependent livestock industry.

2. Maintain rangelands being used by livestock in at least fair condition with stable or upward trend through the use of proper management and restoration measures.

3. Encourage permittees to assume greater responsibility and latitude in managing permitted grazing use.

4. Manage livestock and wild herbivores forage use by implementing proper use guides.

The Purpose and Need is intended to address these Forest Plan Goals as described below:

**1. Provide livestock grazing consistent with range capacity and other uses to sustain the local dependent livestock industry (Forest Plan IV-4, IV-21).**

The social and economic structure of southern Utah has its roots in agriculture. Livestock grazing is among the oldest land uses in the region and pre-dates establishment of the Fishlake National Forest in 1905—then the Sevier Forest Reserve. Current livestock use on the Fishlake National Forest is aimed principally at meat and wool production. In

1999 there were 335,000 beef cattle in Utah. Sixteen percent (53,500) of these were in the five-county project area (Beaver, Millard, Piute, Sevier, and Wayne Counties). The value of agricultural production totaled $244.5 million in 1998 and beef production was the most important agricultural segment, averaging 89% of the total market value of agricultural products sold in the five-county area *(Utah 1997-2000).*

There is a need to sustain livestock production on federal lands and to maintain summer-forage livestock grazing as a balance in year-long ranching operations to (1) support State and local economies that are dependent on agriculture production; (2) maintain the economic viability of small, family ranches; and (3) contribute to rural social values and lifestyles.

**2. Maintain rangelands being used by livestock in at least fair condition with stable or upward trend through the use of proper management and restoration measures (Forest Plan IV-4).**

Most key upland range sites within the allotments in this analysis are reported to be in satisfactory condition with stable to upward trends. However, in some selected areas on some allotments, utilization is occurring which sometimes exceeds current Forest Plan Standards and Guidelines. There is a need to reduce concentrated use by frequent herding and by improving distribution of cattle with water developments and fencing. For some allotments, there is a need to establish a proper use level lower than the maximum allowable utilization levels for key species permitted by current Forest Plan Standards and Guidelines (Forest Plan, pgs. IV-21, 22).

Some riparian areas have been degraded by concentrated grazing use. There is a need to revise riparian area utilization standards and guidelines to reflect residual stubble heights as the method of determining appropriate use levels and duration of use within a specific grazing unit, rather than percent utilization. During pasture rotations and exiting from the allotment, there is a need to assure permittee compliance to requirements for complete and timely removal of livestock from riparian areas and compliance to grazing system strategies.

**3. Encourage permittees to assume greater responsibility and latitude in managing permitted grazing use (Forest Plan IV-4).**

The trend of reduced workforce facing an increasing workload forces federal range managers to find new and innovative ways to improve rangelands. Funding for range management has declined during the last two decades while a changing social and political environment has added new work for Forest Service conservationists. More time is now spent with forest planning and complying with the National Environmental Policy Act (NEPA), making less time available for on-the-ground work with ranchers. Therefore, there is a greater need for grazing permittees to assume broader rangeland stewardship roles. There is a need to improve the effectiveness of fewer professionals to manage large rangeland areas and to minimize the amount of time involved in utilization monitoring, while at the same time achieving resource management objectives. Concurrently, there is a need to maximize permittee stewardship responsibilities connected with determining appropriate use levels and the times at which livestock must be moved within grazing units. For this effort to be successful, there is a need to minimize scientific jargon and complicated procedures of monitoring and for ranchers and Forest Service range specialists to have a mutual understanding of monitoring methods and common ownership in goals and objectives.

**4. Establish proper grazing capacity and to manage livestock and wild herbivores forage use by implementing allowable use guides (Forest Plan IV-4, IV-21)**

Forage utilization standards, as prescribed in the 1986 Fishlake Forest Plan have been

critically reviewed, compared to current scientific research, and determined to need revision in order to facilitate ecological objectives and management objectives. While the overall consensus is that, on the whole, range uplands are generally in satisfactory condition, it is recognized that many riparian areas are often heavily impacted by livestock. A compelling amount of research (Clary and Webster 1989, Hall and Bryant 1995) suggests that protection and improvement of riparian communities can best be monitored by the use of standards for stubble height—3 to 4 inches (40-50 % use) of residual stubble height for maintenance and 6 inches or more (24-32 % use) for protection and recovery. Current research efforts indicate that focusing on herbage remaining or un-grazed is a more effective monitoring tool than looking at how much has been utilized. Current forage use levels allowed by the Forest Plan are 50%-60% of key forage species grazed under deferred-rotation systems and 70%-80% of key species grazed under rest-rotation systems. Forest-wide application of uniform monitoring criteria is necessary to provide uniform administration, grazing management practices, levels of acceptable use, and strategy for achieving desired conditions.

## C. SCOPE OF THE PROPOSAL

The analysis area for amendment of the Forest Plan forage utilization standards and guidelines is all National Forest System lands contained within established grazing allotments, and on which livestock grazing is permitted, on the Fishlake National Forest.

In this analysis, effects of the Proposed Action and its alternatives are not evaluated for every element of the ecosystem. The issues that drive the process focus the analysis on those key elements that present situations that are clearly unresolvable conflicts and/or disputes about the outcome of the Proposed Action. The focus on identifying the appropriate purpose and need will result in dropping issues that are outside the scope of the Purpose and Need, thus keeping alternatives analyzed to those that meet Purpose and Need. Issues will drive alternative development, but a minimum of two alternatives must be considered: 1) The Proposed Action, 2) No Action or No Change.

Implementation of the activities specifically identified in the Decision Notice (DN) will begin as soon as possible and without further NEPA documentation.

Development of the environmental assessment will follow the implementing regulations of the National Forest Management Act of 1976 (NFMA), Title 36: Code of Federal Regulations Part 219 (36 CFR 219); National Environmental Policy Act of 1969 (NEPA), Title 40 CFR 1500-1508.

## D. DECISION TO BE MADE

This EA is not a decision document. Rather, it discloses the analysis and environmental consequences associated with implementing the proposal and alternatives to it. Based on this analysis, the responsible official, the Fishlake National Forest Supervisor, will decide what standards and guidelines will be used to determine allowable livestock forage use levels.

This decision will be documented in a Decision Notice.

# CHAPTER 2
# ISSUES AND ALTERNATIVES

## A. INTRODUCTION

This chapter describes public involvement, issues raised, and the alternatives developed and analyzed for the revision of forage utilization criteria on the Fishlake National Forest. These alternatives were developed in response to the Purpose and Need and issues raised during interdisciplinary review and public involvement.

## B. PUBLIC INVOLVEMENT

The public involvement effort began in February 1998 with the scoping process associated with the environmental assessment for revision of 42 allotment management plans (AMPs). The Proposed Action for these AMP revisions included revising the forage utilization standards. Neither the February 1998 public scoping period or the February 1999 public notice and comment period resulted in any comments or issues specific to forage use standards and guides.

On February 21, 2001, a Scoping Notice was mailed to 377 interested publics whose names are maintained on the Forest NEPA mailing list; including permittees, special interest groups, other agencies, congressional offices, and interested citizens. The Scoping Notice described the Proposed Action and specifically identified the current forage use standards and guides and how they would be revised. The notice included a specific request for public comment.

During public scoping, eight individuals or organizations responded with comments.

Specific forage use standard and guideline (S&G) comments were received from one grazing permittee and three permittee grazing associations. Three organizations and one concerned citizen provided comments and recommendations. General consensus of permittee comments is that the current utilization monitoring method is working and they see no need for a change. On the other hand, organizations and the one concerned citizen support the change to stubble height measurements in riparian areas. One comment was received concerning impacts on utilization by elk.

A majority of the comments concerned implementation of the stubble height criteria, training, and ease and consistency of monitoring. The full text of public comments received in response to scoping is contained in the project analysis file.

This scoping analysis did not reveal the identification of any issues significant enough to drive the creation of any alternatives other than the No Action Alternative (Alternative 1), the Proposed Action (Alternative 2), and the Modified Proposed Action Alternative (Alternative 3).

Comments were categorized by subject and summarized in the following areas:

**Table 2-1**
**Public Scoping Comments**

| Comment Topic | Public Comments |
|---|---|
| **Implementation of Riparian SH S&G's** | We feel that the current utilization method is working, and see no need for change. We would like to ask that we follow the (existing) standards. History has demonstrated that trying to estimate utilization of forage species is very difficult and often not very accurate. Recent range research is demonstrating that measures of residual vegetation are much more meaningful. There have been some controversies involving some of the standards and guidelines but the methodology has generally not produced the biggest controversy. The biggest controversy has been how monitoring data has been interpreted. Movement to a "residual stubble height" methodology provides not only a more useful tool, but also a more objective basis for these important measurements. |
| **Measuring SH in Droughty Years** | In a drought plants do not reach normal stubble height. Some species won't grow to six inches and drought and other factors may inhibit plant growth without ever being grazed. In years of low moisture, the residual standards will be reached early in the grazing season. If this system is to work, adequate logistical support systems must be In place to provide for the removal of livestock before the standard removal date. |
| **Livestock Distribution** | It will be important that efforts are made to obtain better livestock distribution throughout the allotments if these standards are to be met. |
| **Range Readiness** | It would appear that using "range readiness" as a standard would fit in with what you are trying to do under this proposal. Using stubble height to determine utilization lends itself more to range readiness than does percent utilization. |
| **Consistency, Uniformity, Objectivity, Easiness** | Easier to measure standards and monitoring of riparian vegetation should help determine when the maximum allowable use has occurred and livestock should be moved. Small changes in the degree of utilization are very difficult to measure, even for an experienced person. The use of stubble height in measuring utilization is a more consistent method and would create a more uniform standard. It also woiuld tend to be more accurate and would definitely be easier. |
| **SH of Kentucky bluegrass** | In ideal conditions, it is difficult to maintain a four-inch stubble height in Kentucky bluegrass. We would like to ask that the proposed measuring method not be used in Kentucky bluegrass. |
| **Which Species Will Require 6" SH** | Which plant species will require the six-inch stubble height. These hydric species should be identified and a specific list used. Then there wouldn't be any question as to which key species would need a six inch stubble height or a 1 ½" stubble height. |
| **Monitoring & Enforcement** | This approach will require that adequate and consistent monitoring efforts are put in place for each allotment. This will require the dedication of sufficient resources to make this happen. Unless these tools are applied through monitorship, constant vigilance, and when necessary, enforcement, then the effort will be for naught. |
| **Loss of Forage** | We are concerned about the possible loss of forage for grazing that may occur by using a 6-inch stubble height. Loss of forage could possible result in a loss of AM's. This would mean higher financial burden on local ranchers. |
| **Training Required** | We recommend that a plan to inform and educate grazing permittees about the changes be developed. We are concerned that anyone may take a ruler, measure any plant, and decide that an area is being overused without the proper training and knowledge. |
| **Range Trend** | Rather than devote time and effort to detailed, supposedly accurate measurement of utilization I would suggest that more effort be spent in determining the range trend. Significant benefit can accrue to riparian areas, and an overall healthier range and watershed could result. |
| **Elk Conflicts** | We (permittee association) agree that the riparian areas in the Tidwell Allotment are affected more by the elk wallowing and tromping than the cattle. There is nothing that talks about wildlife use prior to livestock entering an area. |

## C. ISSUES

Of primary concern for this analysis are the key concerns identified by the ID team that were also a focus of comments received from the public. Although there were no public issues that were identified as "significant" or unresolvable, several comments do indicate a common concern about some resources.

Key issues expressed by the public and identified by the ID team are:

1. **Riparian area conditions.** Interest is high concerning livestock grazing, particularly cattle grazing, on riparian habitats. Documentation shows that cattle, given the opportunity, will spend a disproportionate amount of time in a riparian area as compared to adjacent xeric uplands (Clary and Webster 1989). Heavy use of streambanks may cause direct physical damage through the breakdown of the bank and overuse of the herbaceous vegetation. Overuse may change the vegetation from protective sedges to open, non-protective forbs. This fosters streambank erosion and reduces the filtering action of dense sedges required to reduce sediment loading (Hall and Bryant 1995). The effectiveness of the alternatives response to this issue is measured by the amount of residual stubble height, including regrowth, which is left at the end of the growing season and is available to protect riparian areas from the effects of flood events.

**2. Threatened, Endangered, Proposed (TEPS), and Sensitive species viability.** Although no issues were raised with regard to TEPS or sensitive species, the Forest Service is required to assess potential impacts of livestock grazing to assure compliance with the Endangered Species Act, Forest Service Handbook directives, the Code of Federal Regulations (CFR), and Conservation strategies. As part of the NEPA process, a Biological Assessment (BA) is prepared to determine the potential effects on species that are federally listed as either threatened, endangered, or proposed for listing. This assessment is used to determine whether consultation or conference with the Fish and Wildlife Service (USF&WS) is required. If a "may effect" determination is made in a BA, then formal consultation is initiated with the USF&WS. Mitigation measures are based on the "findings" determinations in the BA. A Biological Evaluation (BE) is prepared to determine the potential effects on sensitive species. Informal consultation is a routine part of TEPS species evaluation and is used to produce a sound biological evaluation that incorporates the best information available from the USF&WS. The effectiveness of the alternatives response to this issue is measured in terms of being compliant to the ESA and any Conservation Strategies.

**3. Ease of administration and monitoring.** There is a great deal of concern relative to limited funding and workforce resources available to perform monitoring. While this concern exists, it is also understood that satisfactory implementation of forage utilization standards and guidelines requires prescribed levels of permit administration, rangeland inventory, monitoring, analysis, and compliance inspection. The effectiveness of the alternatives response to this issue is measured in terms of streamlining administration requirements and monitoring techniques to provide for consistency, repeatability, and minimal but adequate sampling. Equally important is the relative ease for permittees to use the monitoring techniques.

**4. Economic viability (as affected by allowable use levels).** The intent of utilization monitoring is to restrict use of key or identified forage species by grazing animals at or below established levels to allow achievement of desired ecological conditions. In order to achieve resource management objectives and desired conditions, stocking rates – as

determined from animal months allowed to graze to reached allowable use levels – will be used to make necessary adjustments in permitted use. It is also recognized that deterioration of riparian areas, where use is not in compliance with standards, may potentially result in reductions in permitted livestock use. There is also a concern that more intensive management efforts by permittees, and thus increased operating expense, will be required to ensure good livestock distribution, proper maintenance of improvements, and complete livestock removal from units. The effectiveness of the alternatives response to this issue is measured in terms of sustaining current permitted livestock animal unit months of grazing (permitted numbers and seasons of use).

Each of these issues were used to 1) measure the effect of alternatives, 2) determine allowable forage use, 3) determine monitoring needs, and 4) determine mitigation measures.

**D. ALTERNATIVE DEVELOPMENT**

The Purpose and Need for this project (see Chapter 1) helped the ID team define alternatives that could reasonably be expected to meet Purpose and Need and Forest Plan standards and guidelines. Since the analysis area is located within similar landscapes and the allotments frequently have similar physical and biological attributes, the ID team established the following criteria, or sideboards, to develop alternatives for the analysis area.

- At a minimum, analyze (1) the continuation of existing utilization standards and guidelines (No Action), and (2) the Proposed Action.
- Livestock grazing is a historic use of National Forest System lands, is recognized by the Congress, and is first addressed specifically in the Multiple Use-Sustained Yield Act of 1960. Livestock grazing is an integral part of National Forest System Management on the Fishlake National Forest. Therefore, a no grazing alternative is beyond the scope of this analysis.

- Upland areas within the allotments are generally in satisfactory condition (USDA FS 2000). Ellison et al. (1951) reported, "...Vegetation has improved generally, both in kind and amount, on practically every area of high mountain range in the Intermountain Region, where management has replaced the exploitive grazing practices of early days. Although permanent plot and photographic records attest the improvement that has occurred in many places, there are no records on most of the range. These changes are recognizable today only in the indicator aspects of vegetation and soil--healed gullies, former wind-scoured depressions now clothed with vegetation, etc."

  Although range conditions on every acre have not improved to the level that many would like, much progress has been made. Busby (1978) reported that management by the Forest Service between 1905 and 1935 resulted in 77 percent of the National Forest lands being classified in an improving trend. Platts (1979, 1982) agreed with this interpretation, but pointed out that the improvement was based mainly on data collected from drier portions of the rangeland and did not take into account the still deteriorated condition of riparian areas.

  Therefore, continuation of percent utilization monitoring for upland areas was considered to remain an appropriate monitoring technique. It was also concluded that monitoring intensity for upland areas is of secondary priority to the intensity required for riparian areas.

- Within the Forest Service/Permittee partnership, it is expected that permittees accept the responsibility for compliance

with the terms and conditions of the grazing permit. This means sharing with the Forest Service the responsibility for maintaining those rangelands that are in a satisfactory ecological status and for improving unsatisfactory rangelands. This partnership continues to be built on trust, commitment to cooperation, coordination, and consultation, and fosters permittee and Forest Service commitment to good livestock husbandry practices and rangeland monitoring.

The range specialist has technical skills, knowledge, agency perspective, and ultimately, the responsibility for monitoring. The permittee brings to the partnership historical perspective, commitment, consistency, and momentum afforded by long-term stewardship of the allotment, and experience in practical application of management strategies.

Grazing permittees are often in a position to collect rangeland monitoring data which would not have otherwise been collected. Should a permittee choose to collect range monitoring information in a voluntary and unsupervised manner, the application of standards and guidelines that are simple and uncomplicated will generate reliable data.

## E. FEATURES COMMON TO ALL ALTERNATIVES

The following measures are intended to reduce or prevent undesirable effects, to reduce adverse environmental effects below the "significance" level, and to resolve issues and concerns raised by the public and the ID Team. These measures are common to all alternatives.

1. Grazing permits will continue to be administered in a professional, business-like manner. Complete compliance with the terms and conditions of the permit is expected. Strict accountability of the numbers of livestock grazed and how they are grazed will continue to be expected. Immediate, appropriate action, following administrative procedures, will be taken for all known permit non-compliance and/or unauthorized use. Removal of livestock from the National Forest will be enforced through permit action, if necessary, at the end of the grazing season.

2. A Biological Assessment for effects on Threatened, Endangered, and Proposed species has been prepared and is included in the project record. All management requirements listed in this document will be followed. The U.S. Fish and Wildlife Service concurs with the "may affect but not likely to adversely affect" determination for southwestern willow flycatcher, bald eagle, and Utah prairie dog and "no effect" determination for other threatened and endangered species and critical habitat.

Allotment Management Plans and Annual Operating Plans should provide grazing systems, utilization standards, and soil disturbance levels that will maintain or improve sensitive plant species and their habitats.

3. Forest Plan forage utilization standards and guidelines prescribe maximum allowable use levels. An interdisciplinary resource team (IDT) may prescribe proper use levels, that are lower than those presented as maximum allowable use levels (see discussion of "allowable use" and "proper use" in the Glossary at Appendix A). Allowable use guidelines will be included in grazing permits and will be followed by all grazing uses on rangeland ecosystems. Allowable use guidelines will be followed in (1) establishing stocking rates, (2) seasonally adjusting numbers of livestock and duration grazed, and (3) verifying numbers of AUMs permitted to graze.

4. The grazing impact of elk on key allotments will be monitored to determine habitat needs, population objectives, distribution needs,

impacts on range improvements, and forage utilization.

5. Current permitted livestock numbers and seasons of use will not be changed. Utilization standards are a tool by which managers can observe change, or movement toward or away from objectives, as a reflection of management. When this observation is made, changes in management may be prescribed. The grazing capacity on each allotment should be reviewed through formal utilization monitoring and confirmed and/or adjusted based on one or more of the following: management objectives, allowable or proper use criteria, trend study data.

6. Current livestock management systems will not be changed. Allotments within the analysis area have historically been managed using prescribed grazing systems (generally rest rotation or deferred) for the past few decades. Over this span of time, these grazing systems have been continually refined through changes in permitted AUMs, fence locations, and type of grazing system (for example, 3-pasture versus 4-pasture rest-rotation). On many allotments, monitoring indicates existing grazing systems are allowing vegetative conditions to reach, or move towards, desired conditions.

7. Permittee responsibilities to maintain assigned range improvements and to ensure proper livestock distribution do not change. Permittees must accept the responsibility to determine the appropriate time to move livestock in compliance with prescribed utilization standards. All alternatives require that all livestock be removed from units once the standards are reached and "trigger" the time to move. The movement process, once triggered, must happen relatively quickly – typically within 5 days or less.

## G. DESCRIPTION OF ALTERNATIVES CONSIDERED IN DETAIL

### ALTERNATIVE 1 – No Action – Existing Percent Use Standards

The standard method of determining utilization is to measure or estimate the amount of annual herbage removed by weight. This process requires a comparison of the amount of herbage left compared with the amount of herbage produced during the year; thus estimates of both production and utilization are required.

Measurement of utilization is stratified by management type, rangeland ecosystem conditions, and by broad groups including riparian, upland, browse, crested wheatgrass seedings, and alpine ecosystems. The standard time for completing utilization measurement and mapping use zones is at the end of the growing season. Seasonal utilization can be collected at the end of a use period. This timing indicates the amount of use at a particular time due to a certain stocking rate and mix of animals. It also shows the cumulative effect of grazing on plants through a sequence of growth stages. See Table 2-3 for a display of the proper use guides currently in the Forest Plan.

| Table 2-3<br>ALTERNATIVE 1 – No Action | |
|---|---|
| **Current Livestock and Wild Herbivores Proper Use Guides** | |
| **Grazing System** | **Utilization** |
| **1. Rest Rotation** | -Up to 55% utilization of total forage (80% use of key species) on late use pastures.<br>-Up to 45 % use of total forage (70% use of key species) on early use pastures.<br>-Wild herbivores use during spring in rest pastures will not exceed 25% use of key species. |
| **2. Deferred Rotation** | -Up to 27% use of total forage on all pastures grazed before seed ripe (50% of key species).<br>-Up to 37% of total forage grazed after seed ripe (60% of key species). |
| **3. High Intensity/Low Frequency** | -Up to 55% use of total forage (80% of key species). |
| **4. Continuous System** | Use of key species by condition class:<br>• Good/Excellent: 50%<br>• Fair: 40%<br>• Very Poor/Poor: 30%<br>-Use of total forage by condition class:<br>• Good/Excellent: 27%<br>• Fair: 22%<br>• Very Poor/Poor: 15% |
| **5. Alternate Years System** | -Use of key species by condition class:<br>• Good/Excellent: 75%<br>• Fair: 65%<br>• Very Poor/Poor: 52%<br>-Use of total forage by condition class:<br>• Good/Excellent: 50%<br>• Fair: 40%<br>• Very Poor/Poor: 30% |

**ALTERNATIVE 2: Proposed Action – Residual 4-6" Riparian SH Based on Seral Condition**

Forage utilization criteria for upland and riparian areas will be incorporated in Part 3 of the grazing permit to prescribe allowable use by seral condition and to specify requirements for allowable use in riparian areas to be determined by residual stubble height remaining after the growing season. To take into account regrowth (the entire year's growth of vegetation) and the stubble height that should remain following grazing for sediment filtering during spring flows, pastures grazed early may allow shorter stubble height values than areas grazed following seed ripe. In any case, the required stubble height (including any regrowth) must be at or above the standard by the end of the growing season. Allowable upland forage utilization would range from 40-60 percent on grass/forb types, and residual forage requirements in riparian areas (left at the end of the growing season) would vary from 4-6 inches, depending on seral condition. Livestock would be moved to the next pasture or removed from the allotment when any utilization threshold (upland forage utilization, streambank alteration, riparian forage utilization, riparian vegetation stubble height, or riparian woody browse utilization) is reached. Livestock would be moved when a shift in preference from herbaceous to woody species is noted. Meeting or exceeding one of these threshold levels would initiate a move of

livestock (either to the next pasture or off the allotment). See Table 2-4.

**Table 2-4**
**ALTERNATIVE 2: PROPOSED ACTION**

| Utilization By Seral Stage | | | | | |
|---|---|---|---|---|---|
| **Vegetation Type** | **Very Early** | **Early** | **Mid** | **Late** | **Comments** |
| | SH = Stubble Height of Key Species | | | | |
| Riparian Hydric Species | 6" SH | 6" SH | 4" SH | 4" SH | Remaining at end of growing season |
| Riparian Emphasis Management Areas | 6" SH | 6" SH | 6" SH | 6" SH | Remaining at end of growing season |
| Hydric Species in wet meadows not influenced by streams | 6" SH | 6" SH | 4" SH | 4" SH | Remaining at end of growing season |
| Non-hydric Sod-Forming Grass Species in Riparian Areas | 1½" SH | 1½" SH | 1½" SH | 1½" SH | Remaining at end of growing season (primarily Kentucky bluegrass) |
| Wheatgrass Seedings | 60% | 60% | 60% | 60% | Management option to exceed 60% use to maintain healthy seedings |
| Riparian/Upland Browse Sprouts and Young-Aged Plants | ≤40% | | | | # of current year's available twigs removed |
| Riparian/Upland Mature Browse | ≤50% | | | | # of current year's available twigs removed |
| Upland Grass/Forb | 40-60% of key species; varies by grazing system and desired condition | | | | % of current year's growth |
| Riparian Ground Cover | Maintain ground cover of at least 70% within riparian areas | | | | |

**ALTERNATIVE 3 – Modified Proposed Action – Residual 4" Riparian SH**

This alternative is aimed at improving application of prescribed criteria. It addresses the Purpose and Need to reduce potential permittee confusion and management difficulties arising from a multiple of stubble height requirements in any one unit; i.e.: 4" stubble height in one riparian area and 6" in an adjacent riparian area within the same grazing unit. Easier administration of prescribed use standards is also achieved with one stubble height criteria applied unilaterally and irrespective of seral condition; i.e.: a determination of seral condition is not a requisite for every riparian area.
This alternative also eliminates confusion between "grazing season" and "growing season". The purpose of stubble height criteria is to retain the appropriate amount of residual plant material at the end of the growing season so that protection is provided against pending high flow events.

Under the deferred rotation systems that the majority of the allotments are under, it is expected that each of the early units, considering regrowth, should achieve a minimum of 6 inches of residual stubble height; and every other year, one of the two alternating late units may have regrowth to 6 inches or more stubble height.

This alternative proposes to use neither "end of growing season" nor "end of grazing season". Since the intent of the utilization criteria is to provide simple tools by which the time to move livestock can be determined, this alternative prescribes a uniform 4" stubble height. Reaching the 4" stubble height triggers the time to move livestock, either between units or off the allotment.

Under this alternative, there would be no manipulation to plan use of expected regrowth—once the 4" stubble height is reached, livestock would be moved, without the opportunity for twice-over use. See Table 2-5.

**Table 2-5**
**ALTERNATIVE 3 – Modified Proposed Action**

| Maximum Allowable Forage Use Criteria | | |
|---|---|---|
| **Vegetation Type** | **Stubble Height/Use** | **Comments** |
| Riparian Hydric Species | 4" | Triggers the time to move livestock between units or off the allotment |
| Riparian Emphasis Management Areas | 6" | Triggers the time to move livestock between units or off the allotment |
| Non-hydric Sod-Forming Grass Species in Riparian Areas | 1 ½" | Primarily Kentucky bluegrass--Triggers the time to move livestock between units or off the allotment |
| Wheatgrass Seedings | 60% | Management option to exceed 60% use to maintain healthy seedings |
| Riparian/Upland Browse Sprouts and Young-Aged Plants | ≤40% | # of current year's available twigs removed |
| Riparian/Upland Mature Browse | ≤50% | # of current year's available twigs removed |
| Upland Grass/Forb | 40-60% of key species; varies by grazing system and desired condition | % of current year's growth |
| Riparian Ground Cover | Maintain ground cover of at least 70% within riparian areas | |

## H. MONITORING

The ID team identified two broad levels of monitoring: implementation and effectiveness. Implementation monitoring determines if the selected alternative was implemented as described in the decision. Monitoring would include annual, short-term monitoring to determine if livestock are managed as directed in the AMP and annual operating instructions (AOI). This monitoring would be completed through field observations documented in allotment notes. For example, allotment administrators would determine if livestock were moved to a different pasture or removed from the allotment when utilization parameters were met (forage utilization, stubble height, browse utilization). Livestock operators would be encouraged to assist in monitoring. At the end of each year, these observations would be summarized and a determination made if overall, on-the-ground management practices met the prescribed parameters. If these parameters were exceeded, administrative action described in FSH 2209 16.21 would be followed..

Effectiveness monitoring determines if results achieved match expected outcomes. For example, if Alternative 3 is selected, the environmental effects described for Alternative 3 in Chapter 4 are expected to occur. Effectiveness monitoring would be accomplished through the establishment and maintenance of long-term monitoring sites.

If monitoring reveals lack of progress in maintaining or moving toward desired conditions, or raises questions on the validity of resource objectives, consideration will be given to making changes to address problems that have been revealed.

The following monitoring practices will be applied, as applicable, to determine both implementation and effectiveness:

1. Utilization monitoring to determine compliance with identified allotment allowable use or proper use standards and guidelines.

2. Monitoring of utilization levels on some upland range sites to determine herding, distribution, and improvement needs; monitoring of utilization levels in riparian areas to determine areas of concentration and requirements to maintain proper use.

3. Monitoring of riparian areas for timely removal of livestock and compliance to grazing system strategies.
4. Long-term monitoring to determine if management practices accomplished what was desired over time; i.e. did proper use improve vegetative conditions?

5. Determination if grazing at proper use is maintaining water quality standards in compliance with the existing Memorandum of Understanding with the Utah Department of Environmental Quality.

## I. ALTERNATIVES CONSIDERED BUT NOT GIVEN DETAILED STUDY

**1. The ID Team dropped from consideration an alternative to fence all riparian areas.** This alternative was derived from the suggestion that there be a reduction in grazing levels to provide improvements to riparian ecosystems and wildlife and fish habitat. The ID Team determined that it is unreasonable to expect to construct and maintain fence around hundreds of miles of perennial streams.

**2. The IDT dropped from consideration alternatives that would prescribe utilization levels at varying levels below 50%.** Research concludes that root growth stoppage, and thus storage of plant food reserves, does not occur until 50% of the forage leaf volume is removed (Frazier 1979). The IDT determined that prescribing maximum allowable use levels below 50% would not provide benefits significantly greater than those of the alternatives considered in detail.

## J. COMPARISON OF ALTERNATIVES

This section provides a summary of key differences between the alternatives. For a detailed description of the alternatives, refer to sections E and F. This section also presents a comparison of alternatives using the key issues and purpose and need identified in Chapter 1. The intent of these tables is to present the environmental effects of the alternatives so that they can be easily and efficiently compared. Readers are cautioned that this section displays only a summary of the environmental consequences. Detailed descriptions of existing conditions are disclosed in Chapter 3, and detailed descriptions of expected environmental consequences are disclosed in Chapter 4.

**Table 2-6**
**Comparison of Alternatives—Ability to meet Purpose and Need and Forest Plan Goals**

| Forest Plan G&O's Category | Alternative 1 No Action | Alternative 2 Proposed Action | Alternative 3 Modified Proposed Action |
|---|---|---|---|
| **Stock allotments at established capacities** | Does not change permitted 136,000 AUMs. Meets Forest Plan G&O's for livestock | May change permitted AUMs by 10% due to early removal to 124,000 AUMs. Meets Forest Plan G&O's for livestock | Does not change permitted 136,000 AUMs. Meets Forest Plan G&O's for livestock |
| **Contribute to local economy** | Contributes $4,454,660 to local economy. Meets Forest Plan G&O's for community stability. | Contributes $4,077,500 to local economy. Meets Forest Plan G&O's for community stability. | Contributes $4,454,660 to local economy. Meets Forest Plan G&O's for community stability. |
| **Sustain wildlife populations** | Meets Forest Plan G&O's for wildlife by leaving adequate forage for wildlife. In MA 6B (Livestock emphasis) 10% of available forage is allocated to wildlife | Meets Forest Plan G&O's for wildlife by leaving adequate forage for wildlife. In MA 6B (Livestock emphasis) 10% of available forage is allocated to wildlife | Meets Forest Plan G&O's for wildlife by leaving adequate forage for wildlife. In MA 6B (Livestock emphasis) 10% of available forage is allocated to wildlife |
| **Maintain ranges in fair condition with stable or upward trends** | Would not consistently meet Forest Plan G&O's for rangeland health since some riparian and upland sites would not be maintained in fair condition or have upward trends. | Meets Forest Plan G&O's for rangeland health since forage use criteria are prescribed to maintain and improve rangeland conditions. Proposed S&G's require administrative determination of seral condition for each riparian area. | Meets Forest Plan G&O's for rangeland health since all areas would improve to fair or better condition with stable to upward trends. Proposed S&G's do not require administrative determination of seral condition for each riparian area. |
| **Improve permittee stewardship** | Would not meet Forest Plan G&O's for improving permittee stewardship since current noncompliance is contributing to deteriorating resource conditions. | The use of multiple S&G's for forage utilization monitoring complicates permittee understanding of what/where expectations. Compliance may be difficult to obtain. | The use of S&G's for forage utilization that are simple and easy to measure will encourage improved permittee monitoring and compliance with prescribed S&G's and management. |
| **Implement proper use guides** | Current allowable use guides are inconsistent with state-of-the-art science. Does not meet Forest Plan G&O's for implementing appropriate forage use standards. | Implements state-of-the-art, scientifically reviewed residual forage standards. Meets Forest Plan G&O's for implementing appropriate forage use standards. | Implements state-of-the-art, scientifically reviewed residual forage standards. Meets Forest Plan G&O's for implementing appropriate forage use standards. |

**Table 2-7**
**Comparison of Alternatives--Riparian Function**

| Component | Alternative 1 No Action | Alternative 2 Proposed Action | Alternative 3 Modified Proposed Action |
|---|---|---|---|
| **Providing food and habitat for aquatic and terrestrial plants and animals**<br><br>**and**<br><br>**Maintaining stream width, depth, elevation, and meander patterns**<br><br>**and**<br><br>**Controlling water temperatures**<br><br>**and**<br><br>**Maintaining riparian resistance and resilience to disturbance** | Maintenance or degradation of sites that are properly functioning or functioning-at-risk. Continued damage to sites that are not properly functioning unless completely rested or proper use criteria are applied. | Maintenance or improvement in 10 years for sites that are properly functioning or functioning-at-risk. Sites that are not properly functioning may need complete rest or proper use criteria to initiate recovery. | Maintenance or improvement in 10 years for sites that are properly functioning or functioning-at-risk. Sites that are not properly functioning may need complete rest or proper use criteria to initiate recovery. |
| **Dissipating stream energy**<br><br>**and**<br><br>**Storing water and sediments in the floodplain**<br><br>**and**<br><br>**Filtering upland sediments** | No measurable improvement for properly functioning or functioning-at-risk sites. Additional loss of functionality possible on degraded sites. | Maintenance or improvement for properly functioning and functioning-at-risk sites. Measurable improvement at not properly functioning sites for spring snowmelt periods, but possibly not during summer thunderstorm events. | Maintenance or improvement for properly functioning and functioning-at-risk sites. Measurable improvement at not properly functioning sites for most to all channel forming flows and erosion-causing events. |

**Table 2-8**
**Comparison of Alternatives--T&E Species Viability**

| Component | Alternative 1 No Action | Alternative 2 Proposed Action | Alternative 3 Modified Proposed Action |
|---|---|---|---|
| **Livestock impacts** | Slight to none. Compliance with ESA and Conservation Agreements and Recovery Plans required | Slight to none. Compliance with ESA and Conservation Agreements and Recovery Plans required | Slight to none. Compliance with ESA and Conservation Agreements and Recovery Plans required |
| **Season of use** | As per Conservation Agreements and Recovery Plans | As per Conservation Agreements and Recovery Plans | As per Conservation Agreements and Recovery Plans |
| **Livestock exclusion** | As per Conservation Agreements and Recovery Plans | As per Conservation Agreements and Recovery Plans | As per Conservation Agreements and Recovery Plans |
| **Duration of use** | Generally seasonal 6/1-10/15 | Generally seasonal 6/1-10/15 | Generally seasonal 6/1-10/15 |
| **Trend to PNC** | Static to downward | Static to moderately upward | Static to moderately upward |
| **Compliance with Conservation Strategies** | Compliance required; actions taken for non-compliance | Compliance required; actions taken for non-compliance | Compliance required; actions taken for non-compliance |

**Table 2-9**
**Comparison of Alternatives – Ease of Administration and Monitoring**

| Component | Alternative 1<br>No Action | Alternative 2<br>Proposed Action | Alternative 3<br>Modified Proposed Action |
|---|---|---|---|
| **Permittee Compliance** | Permit terms and conditions, AMP provisions, utilization criteria compliance are required. | Stubble height measurements are easier to observe and determine appropriate times to move livestock. Having several different SH criteria within a unit complicates compliance. | Stubble height measurements are easier to observe and determine appropriate times to move livestock. Having only one SH criteria to monitor makes compliance easier. |
| **Administration** | No change in administration requirements. | Requires determination of seral conditions of key rangelands to determine SH prescriptions; is confused by grazing season vs. growing season definitions and is complicated by trends to estimate amount of regrowth available for use. | Permittees are able to assume a greater role in determining appropriate times to move livestock. Use prescriptions can be made without determining seral condition. Livestock moves are based on SH measurements, irrespective of grazing season or growing season. |
| **Monitoring Ease** | Relies on estimates; there is some variability between different observers. | Residual stubble height can be measured rather than estimated. SH measurement is a quick, easy, reliable sampling method. Requires more intensive monitoring where multiple SH S&Gs are prescribed in the same unit. | Residual stubble height can be measured rather than estimated. SH measurement is a quick, easy, reliable sampling method. Less intensive monitoring is required since one SH standard is prescribed unilaterally. |

**Table 2-10**
**Comparison of Alternatives--Socio-Economic Conditions**

| Component | Alternative 1<br>No Action | Alternative 2<br>Proposed Action | Alternative 3<br>Modified Proposed Action |
|---|---|---|---|
| **Permitted AUMs** | 125,000 cattle AUMs<br>11,000 sheep AUMs | 113,000 – 125,000 cattle AUMs (estimated, due to early removals at 6" SH);<br>11,000 sheep AUMs | 125,000 cattle AUMs<br>11,000 sheep AUMs |
| **Operational Costs** | Static | Generally up (5-10%) due to increased compliance, herding, and maintenance | Generally up (5-10%) due to increased compliance, herding, and maintenance |
| **Forage produced and available** | Static to downward as livestock concentrate in riparian areas, stream channels degrade, water tables drop, forage vigor declines, and preferred species are lost | As seral stages move from very early and early to mid and late, sites are more productive and greater use is allowed | As seral stages move from very early and early to mid and late, sites are more productive and greater use is available |
| **Trend in range condition** | Static to slow improvement on upland ranges, degraded riparian sites will remain static with slow trends to recovery or deterioration depending on management and stocking levels | Static to slow improvement on upland ranges; in degraded riparian sites, measurable improvement in 10 years | Static to slow improvement on upland ranges; in degraded riparian sites, measurable improvement in 10 years |
| **Proper use levels** | Remedial measures to improve deteriorated ranges will result in application of more severe proper use criteria. | Increase as seral stages in riparian areas move from very early and early to mid and late; upland use levels will remain static | Increase as seral stages in riparian areas move from very early and early to mid and late; upland use levels will remain static |
| **Net Value** | $1,272,760 | $1,165,500 (due to early cattle removal 10% of time) | $1,272,760 |
| **Contribution to local economy** | $4,454,660 | $4,077,500 (due to early cattle removal 10% of time) | $4,454,660 |
| **Cost Increase per AUM** | $0 | $1.00-$1.50/AUM ($136,000 - $204,000) depending on permittee monitoring for compliance and increased intensity of livestock management | $1.00-$1.50/AUM ($136,000 - $204,000) depending on permittee monitoring for compliance and increased intensity of livestock management |
| **Calf crop losses** | $0; Calf crops should remain static | AUMs may be decreased due to early removals, but calf crops should remain static | $0; Calf crops should remain static |
| **Lamb crop losses** | No early removals expected | No early removals expected | No early removals expected |

# CHAPTER 3
# AFFECTED ENVIRONMENT

## A. INTRODUCTION

In this chapter, we describe the existing condition of the environment that may be affected by the alternatives. This description of current resource conditions provides the basis for assessing the projected environmental effects of the alternatives discussed in Chapter 4 (Environmental Consequences). It also provides the context for assessing how the alternatives respond to the issues identified in Chapter 2; riparian area conditions, T&E species viability, ease of administration and monitoring, and economic viability.

## B. PROJECT AREA

The proposed revised forage utilization standards and guidelines will apply to all rangelands within the 1.5 million-acre area of the Fishlake National Forest on the Fillmore, Beaver, Richfield, and Loa Ranger Districts. The Richfield and Loa Districts lie within the High Plateaus section of the Colorado Plateaus Physiographic Province. The Fillmore and Beaver Districts are located in the Basin and Range Province. Portions of Sevier, Millard, Juab, Piute, Wayne, Garfield, Beaver, and Iron Counties are found within the Project Area. Richfield, Beaver, Fillmore, Loa, Bicknell, Salina, Scipio, Delta, Junction, Circleville, Marysvale, Kanosh, Elsinore, Joseph, Monroe, Koosharem, and Holden are cities/towns adjacent to the Project Area.

Elevations range from 5200' in Sevier Valley (5500' in Pahvant Valley) to over 10,000' on Monroe Mountain, the Tushars, the Pahvant Range, Musina Peak, Old Woman Plateau, and Hilgard Mountain. Vegetation types range from desert salt shrub in the Sevier Valley and pinyon-juniper and sagebrush in other valley floors to mountain brush, aspen, ponderosa pine, mixed conifer, alpine-forb communities on the Tushars, Mt. Terrill, and Gunison Valley. Riparian ecosystems may occur within any or all of these types. Alpine riparian areas occur on Lake Peak and in the heads of North Creek on the Beaver Ranger District.

Watersheds draining to the north and west are tributary to the Sevier River and Beaver River drainages in the closed Great Basin. Watersheds draining to the east are tributary to the Dirty Devil River within the Colorado River Basin.

Threatened, endangered, and proposed species (TEPS) and habitats occur within the Fishlake National Forest. Occupied habitat for TEPS wildlife includes northern goshawk, peregrine falcon, southwestern willow flycatcher, Mexican spotted owl, Utah prairie dog, three-toed woodpecker, flammulated owl, bald eagle, spotted bat, western big-eared bat, Bonneville cutthroat trout, and Colorado cutthroat trout. Occupied habitat for TEPS plants include Arizona willow, Barneby woody aster, Bicknell milkvetch, Tushar paintbrush, creeping draba, Nevada willowherb, Elsinore buckwheat, little penstemon, Ward beardtongue, Beaver Mountain groundsel, Maguire campion, Sevier townsendia, Bicknell thelesperma, San Rafael cactus, Winkler cactus, Maguire daisy, Last Chance townsendia, pinnate spring parsley, Fish Lake niad, and Wonderland alice-flower.

## C. DESCRIPTION OF AFFECTED ENVIRONMENT – RIPARIAN AREA CONDITIONS

The Fishlake National Forest Land and Resource Management Plan *(USDA FS 1986a)* defines a riparian area as: An area of land directly influenced by water. Examples are streamsides, lake borders, and marshes. The

Forest Plan further defines a riparian ecosystem as: A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. The Plan defines the component ecosystems of riparian areas as including the aquatic ecosystem, the riparian ecosystem (characterized by distinctive vegetation), and adjacent ecosystems that are within 100 feet, measured horizontally from the edges of perennial streams or from shores of lakes and other still water bodies.

Riparian areas typically are a reflection of the overall health of the watershed and are among the first landscape features to show damage from improper management. A significant portion of the riparian areas within the Fishlake National Forest are below their potential, and therefore their capability to provide benefits is currently limited. Riparian areas in poor condition are unable to buffer the effects of accelerated runoff from uplands.

During April and May of 1998, the Fishlake National Forest Ranger Districts conducted a coarse-filter assessment of the existing resource conditions occurring within 35 cattle allotments located throughout the Forest *(USDA FS 1998)*; of these allotments, 17 were identified as having unsatisfactory conditions with respect to watershed integrity or pertaining to water quality issues. Six sheep allotments were also analyzed but none were deemed to be in unsatisfactory condition. According to these evaluations, some of the environmental impacts that were directly related to grazing activities included active headcutting, decreased streambank stability and increased sediment delivery into nearby streams. The allotments that were thought of as having detrimental conditions existing within their fragile riparian areas also were areas where, in some cases, utilization actually exceeded the proper use guidelines established by the Forest Plan.

Riparian evaluations conducted during the mid-1990's on many of the stream systems within the Project Area indicate that ecological status of riparian areas associated with narrow, steep, and entrenched stream systems is generally in Late seral stages or at Potential Natural Community (PNC). In contrast, the ecological status of riparian areas along moderate gradient to flat bottom streams varies from Very Early to Mid seral status. Indicators for this lower seral condition include:

- Loss of natural shrub structure, primarily willow
- Lowering of water tables and encroachment of more xeric and less soil-binding vegetation species
- Exotic plant invasion
- Low vigor, density, and species diversity of key hydric and riparian species

The Properly Functioning Condition Assessment completed in 1996 for the High Utah Plateaus and Mountains Section *(USDA FS 1996)* concludes that riparian areas throughout the Region, including the Project Area, have been significantly affected over the past several decades, indicating a pattern of riparian systems being lost to encroachment of spruce-fir, ponderosa pine, Douglas-fir, and sagebrush.

Nearly all of the streams within the Project Area are set in down-cut channels. Some systems are severely impacted as a result of a weak or disturbed riparian community. In many complexes the willow appears to be in a general state of decline, being heavily browsed and having little or no regeneration. Winward (2000) indicates that a measurement of age-class distribution of woody species can indicate whether current management is allowing an adequate amount of recruitment to sustain or recover the woody component in a particular complex. He concludes that generally, there should be several times more plants present in the sprout and young categories as in the mature and dead categories.

Some key riparian areas are considered to be generally at a moderate to high range of departure from properly functioning condition.

Many have improved greatly from historic deteriorated conditions resulting from excessive grazing use at the turn of the century. However, many have not recovered sufficiently to be considered healthy enough to be "not at risk" or threat of possible damage resulting from recurring watershed events. Some are at a threshold from which if deterioration occurs, recovery to functionality may be foregone. Most are currently at a state of equilibrium, neither improving nor deteriorating, but not yet fully functioning or fully contributing to meeting riparian area objectives for ecosystem health.

Overgrazing of riparian areas on the Fishlake National Forest has caused a decrease in vegetative cover and an increase in soil compaction. This has caused a decrease in infiltration and an increase in runoff from these areas, which has caused increased erosion and impacts to the streams, especially where bank damage or degradation to the riparian vegetation has occurred. Since some riparian areas have continued to receive heavy use of over 55% utilization, the infiltration rate is probably still adversely impacted in these areas. Less water is held on site; this has altered the streamflow and channel stability. Sedimentation and increases in water temperatures have also resulted. The channels are less able to withstand flood events, and many of the stream channels within the allotments were damaged and severely downcut by the flood events of 1983 and 1984. Most of these channels are showing recovery, but grazing activities have slowed the process.

Many of the riparian areas within the Fishlake National Forest are not currently in ``proper functioning condition" *(USDI BLM 1993).* They do not have the diversity of vegetation or the amount of sedges, willows or other woody vegetation that would be expected in functioning riparian areas. Areas with bare stream banks are found in some allotments. Many have Kentucky bluegrass as the primary riparian vegetation type. Areas that have exclosures, fences or limited access have better diversity.

Although riparian areas make up a small percentage of the rangelands within the Fishlake National Forest, they are of prime importance to stream function, water quality and quantity, aquifer re-charge, and fisheries habitat. They are also valuable for livestock grazing, cropland agriculture, timber production, wildlife habitat, and recreational opportunities.

## D. DESCRIPTION OF AFFECTED ENVIRONMENT – VIABILITY OF T&E SPECIES

### 1. Theatened, Endangered, and Proposed Wildlife Species

Threatened, Endangered, and Proposed Wildlife species occurring or suspected of occurring on the Fishlake National Forest include: southwestern willow flycatcher (E), bald eagle (T), Utah prairie dog (T), and Mexican Spotted owl (E). During the informal consultation process the Fishlake National Forest and the U.S. Fish and Wildlife Service concurred that the Mexican spotted owl and the bald eagle are not affected by grazing and that further analysis would not be needed.

- **Southwestern Willow Flycatcher**. Several willow flycatcher observations have been documented on the Loa and Richfield Ranger Districts. It is unknown if these birds are members of southwestern or western race. Recent information from the Utah Division of Wildlife Resources suggests that these birds are not the subspecies that is endangered. However; an official opinion by the USF&WS has not been given. No formal forest-wide surveys have been initiated for the southwestern willow flycatcher; however, informal

project level surveys are conducted for all projects with suitable habitat.

- **Utah Prairie Dog**. The Fishlake National Forest has four transplant populations located on the Forest. Two of these are located in the Fishlake Basin on the Loa Ranger District. In both of these transplants the prairie dogs have not survived and the sites have been abandoned. A third prairie dog "town" is located near Hogan Pass on the Solomon Allotment on the Loa RD. There were dogs reported there in 1997. The fourth transplant population is located in the Rocky Pond area on the Beaver Ranger District, South Beaver Allotment. To date these transplants have been considered unsuccessful with low reproductive rates. These sites are being evaluated by the Utah Division of Wildlife Resources (UDWR). In addition, several "towns" are located adjacent to the Forest boundary in the Koosharem area near Monroe Mountain, and on private lands in the Gooseberry Valley. No critical habitat has been designated for the Utah prairie dog on the Fishlake NF.

**2. Sensitive Wildlife Species**

There are six sensitive wildlife species known to occur on allotments, which may be influenced by grazing. These sensitive species occurring on the Fishlake National Forest include: peregrine falcon, northern goshawk, spotted bat, western big-eared bat, flammulated owl, and three-toed woodpecker.

**3. Sensitive Fish Species**

Sensitive fish species include Bonneville cutthroat trout and Colorado cutthroat trout. Colorado cutthroat trout were re-introduced into UM Creek in 1996 and at the same time introduced into Sand Creek. Bonneville cutthroat trout occurs as native populations in the following streams, all on the Beaver Ranger District:

- Birch Creek, Beaver Ranger District
- Pine Creek, Beaver Ranger District
- Briggs Creek, Beaver Ranger District
- North Fork North Creek, Beaver RD
- Manning Creek, Richfield Ranger District
- Sam Stowe Creek, Fillmore Ranger District

**4. Threatened, Endangered, Proposed, and Sensitive (TEPS) Plant Species**

Consideration for TEPS plant species on the Fishlake National Forest has two parts: 1) those species officially listed by the Fish and Wildlife Service (FWS) as threatened, endangered, or proposed for listing, and 2) those species officially listed on the Regional Forester's R4 Sensitive Species List. Forest Service Manual (FSM 2670) on endangered, threatened, and sensitive species directs the agency to "develop and implement management practices to ensure that [sensitive] species do not become threatened or endangered because of Forest Service actions."

San Rafael cactus (endangered), Last Chance townsendia (threatened), and Maguire daisy (threatened) are the only three federally listed species known to occur on the Fishlake National Forest. It is assumed that Winkler cactus (listed as threatened in 1998) occurs on the Forest based on unconfirmed reports from two locations on the Richfield Ranger District. Currently, no plant species proposed for listing are known to occur on the Forest.

A "final draft" (1998) Interagency Conservation Agreement and Strategy covers both San Rafael cactus and Winkler cactus. The FWS prepared a recovery plan for Last Chance townsendia in 1993. Also, two Interagency Conservation Agreements and Strategies give direction for the sensitive species Arizona willow (1995) and Wonderland alice-flower (1996) and their habitats.

## E. DESCRIPTION OF AFFECTED ENVIRONMENT -- ADMINISTRATION AND MONITORING

In the past 20 years; inflation, static range budgets, and escalation in support and overhead costs, coupled with ever-increasing legal and environmental documentation requirements have continued to erode away the agency's ability to provide efficient and effective administration of livestock grazing and rangeland resources on the National Forests.

Downsizing and reorganization strategies have resulted in 1) the elimination of seasonal range crews which supported structural range improvement efforts; 2) the loss of temporary and seasonal range technicians who assisted in range inventory and data collection and performed compliance inspections; and 3) the loss, in many cases, of professional range conservationists in the infrastructure of each Ranger District--who assumed primary roles in accomplishing allotment inspections, and inventory and analysis of range conditions and trends *(USDA FS 1997)*.

The direct result of insufficient staffing is a lack of accomplishment in all facets of the range program. For the last several years, program emphasis has been placed on permit administration as the number one priority. However, even permit administration is not being performed at the minimum level, where every allotment is inspected at least once per grazing season.

Satisfactory implementation of forage utilization S&G's requires prescribed levels of permit administration, rangeland inventory, monitoring, analysis, and compliance inspection. This "prescribed level" is defined as a National Standard *(USDA FS 2001)* and consists of complete implementation of all the monitoring and mitigation outlined in livestock grazing permitting decisions; including:

- For a minimal field administration program, at least 2/3 of all grazing allotments should be managed to the agency standard. This would require 2 to 3 visits per year and the immediate initiation of any needed corrective measures. The remaining 1/3 should be administered to a low standard with at least one visit to the allotment per year with follow-up visits and corrective action initiated only when resource conditions are observed to be deteriorating or permittee infractions are discovered.

- Complete implementation of all the monitoring and mitigation outlined in the existing decisions; including 1) allotment inspections to determine degree of compliance with terms and conditions of the grazing permit, 2) monitoring to determine degree and distribution of livestock use, 3) monitoring to determine the effects on resources of implementation of proper use grazing prescriptions (long-term trend studies, riparian inventories and analyses, soils and watershed trend studies, impacts on wildlife and fisheries habitats, conflicts with recreational use, etc.).

Although information and data requirements to respond to the challenges of ecosystem management are greater than ever, support for applied management is the weakest it has been in decades. The Fishlake National Forest's current and average range management budget for the last several years is less than 50% of that required to meet the national standard of range management and administration. Consequently, the level of work is limited to only a portion of the permit administration program.

Considering manpower and funding restrictions, it is critical that administration requirements be streamlined and monitoring techniques provide for consistency, repeatability, and minimal but adequate sampling. There is a need to structure

utilization monitoring programs so that this responsibility is assumed, voluntarily, by the permittee, particularly for determining times for moving livestock before exceeding established standards. This allows permittees to document their own findings of the conditions of pastures at various times.

Permittees are required to continue to meet the terms and conditions of their permits and to continue to report on actual use. It is expected that many permittees will voluntarily collect and report data such as stubble height measurements and dates pastures are visited to monitor criteria for pasture moves. It is expected that permittees will fund whatever is necessary to comply with the grazing permit terms and conditions. They will continue to incur costs for reporting what they are currently required to do. If permit compliance requires more frequent visits to the allotment, there would be additional costs. If the permittee fails to comply with the grazing permit terms and conditions, enforcement actions will be applied.

## F. DESCRIPTION OF AFFECTED ENVIRONMENT – SOCIO-ECONOMICS

As one of many multiple uses permitted by the Forest Plan, forage for livestock grazing is permitted and contributes to the economic well being of local communities. The subject to be considered in this section is the economic effect that would be expected if revised forage utilization standards and guidelines would significantly limit livestock grazing on National Forest System lands. The Affected Environment of this analysis is the five county area of south-central Utah consisting of Beaver, Millard, Sevier, Piute, and Wayne Counties.

**1. Demographics.** There are 2,121,053 people in the State of Utah. Only 2.8% (40,906) live within the south central five-county area. Most (66 percent) of Utah farmers and ranchers are 55 years of age or older with 37% over age 65. Within the five-county area the median age of 30.9 is among the oldest in the state, being 3.3 years older than the state's median age of 27.6 *(Utah 1997-2000).*

**2. Importance of agriculture**. The social and economic structure of southern Utah has its roots in agriculture. Livestock grazing is among the oldest land uses in the region and pre-dates establishment of the Fishlake National Forest in 1905--then the Sevier Forest Reserve *(Hinton, 1987).* Early pioneer uses on the Forest included dairy farming associated with cheese production. Current livestock use on the Fishlake is aimed principally at meat and wool production. In 1999 there were 335,000 beef cattle in Utah. Sixteen percent (53,500) of these were in the five-county project area. There were also 360,000 sheep and lambs, including about 300,000 ewes. The five-county project area supports only 6% of Utah's total sheep numbers (22,000), with Beaver County having less than 500 breeding sheep and lambs. The value of agricultural production totaled $244.5 million in 1998 and beef production was the most important agricultural segment, averaging 89% of the total market value of agricultural products sold in the five-county area.

The following table describes the proportion of each County's income and employment base as contributed by the Agriculture industrial sector

**Table 3-17**

| County | Agriculture as a Percentage of Total County Income (Utah 1997-2000) | | Percent |
|---|---|---|---|
| **Beaver** | Total County Employment | 3,307 | |
| | Agriculture Employment | 706 | 21% |
| | Total County Personal Income | $83,000,000 | |
| | Total County Agricultural Wages | $46,100,000 | 56% |
| | 1998 Per Capita Income | $15,00 | |
| | 1998 Per Capita Income County Ranking | 7th lowest | |
| | Market Value of Agriculture Products Sold | $58,525,000 | |

| | | | |
|---|---|---|---|
| | Market Value of Livestock Sales | $52,087,000 | 89% |
| | | | |
| **Millard** | Total County Employment | 6,111 | |
| | Agriculture Employment | 963 | 16% |
| | Total County Income | $186,000,000 | |
| | Total County Agricultural Wages | 100,300,000 | 54% |
| | 1998 Per Capita Income | $15,600 | |
| | 1997 Per Capita Income County Ranking | 10th lowest | |
| | Market Value of Agriculture Products Sold | $71,047,000 | |
| | Market Value of Livestock Sales | 42,628,000 | 60% |
| | | | |

| County | Agriculture as a Percentage of Total County Income (Utah 1997-2000) | | Percent |
|---|---|---|---|
| **Piute** | Total County Employment | 492 | |
| | Agriculture Employment | 154 | 31% |
| | Total County Income | $18,000,000 | |
| | Total County Agricultural Wages | 13,900,000 | 77% |
| | 1998 Per Capita Income | $13,200 | |
| | 1998 Per Capita Income County Ranking | 3rd lowest | |
| | Market Value of Agriculture Products Sold | $7,216,000 | |
| | Market Value of Livestock Sales | $6,567,000 | 91% |
| | | | |
| **Sevier** | Total County Employment | 9,918 | |
| | Agriculture Employment | 565 | 06% |
| | Total County Income | $281,000,000 | |
| | Total County Agricultural Wages | 141,700,000 | 50% |
| | 1998 Per Capita Income | $15,900 | |
| | 1998 Per Capita Income County Ranking | 12th lowest | |
| | Market Value of Agriculture Products Sold | $39,668,000 | |
| | Market Value of Livestock Sales | $33,321,000 | 84% |
| | | | |
| **Wayne** | Total County Employment | 1,665 | |
| | Agriculture Employment | 246 | 15% |
| | Total County Income | $36,000,000 | |
| | Total County Agricultural Wages | 19,600,000 | 54% |
| | 1998 Per Capita Income | $16,400 | |
| | 1998 Per Capita Income County Ranking | 14th lowest | |
| | Market Value of Agriculture Products Sold | $11,200,000 | |
| | Market Value of Livestock Sales | $10,192,000 | 91% |

3. **Dependence of federal land grazing.** For several generations, many of the local ranches have been dependent upon the National Forest for summer forage to round out year-long operations. The high percentage of Federal land ownership in south-central Utah, averaging approximately 78% for the five-county area, emphasizes the importance to local ranchers of Federal rangelands in maintaining viable local livestock ranching operations. In south-central Utah, beef calves and lambs are usually born in the spring (March and April) and their mothers graze lower elevation private or federal native rangelands or seeded pastures until about June 1. At that time, the cattle breeding season begins on mid-elevation native or seeded rangeland and continues through August, often on National Forest System lands. Cows and calves usually graze private crop aftermath during September and October. Calves are weaned and sold (except for heifer calves retained as cow herd replacements) in November. The cowherd is usually pregnancy tested at this time, cull cows are sold, and the remainder of the herd (bulls, cows, replacement heifers, and calves retained to be sold as yearlings) is wintered on hay or lower elevation private or federal native rangelands until March when the spring calving and lambing cycle begins anew.

**4. Economic viability of south-central Utah ranches.** Due to high operating costs and low livestock prices, the typical Utah family-owned ranch frequently earns a negative return on owned ranch capital *(Workman 1997)*. Two questions arise when viewing this dismal situation: (1) how do ranchers stay in business? And (2) why would they want to? The first question may be answered by including ranch perquisites (home-grown food, housing supplied by ranch buildings), postponement of improvement and equipment depreciation, off-ranch employment, and loan re-financing when real estate values are increasing. When these important items are brought into the analysis, we can conclude that ranch operations can survive during most years. The second question is answered by recognizing that ranch loan principal payments are amounts paid by the borrower to her/himself and by including annual increases in land value as additions to owned capital. After making these two adjustments to the analysis, it is concluded that

family-sized Utah ranches are economically rational investments during some years.

**5. Cultural and social values.** Livestock grazing on National Forest System Lands also contributes important cultural and social values to the area. Intertwined with the economic aspects of livestock operations are the lifestyles and culture that have co-evolved with Western ranching. Rural social values and lifestyles, in conjunction with the long heritage of ranching and farming continued to this day from the earliest pioneers in Utah, have shaped the communities and enterprises that make up much of southern Utah. The rural Western lifestyle also contributes to tourism in the area, presenting to travelers a flavor of the West through tourist oriented goods and services, scheduled events, even with tourists photographing sheep bands or cattle in the pastoral setting of the forest.

**6. Value contributions to the economy.** In Utah, cattle produce an average of 28.5 pounds of meat and sheep produce an average of 24.8 pounds per AUM. Wool production is 4.3 pounds per AUM *(Council for Agricultural Science and Technology 1974)*. The number of AUMs grazed on National Forest System lands within the Fishlake National Forest and the estimated amounts of meat and wool produced by the forage consumed during the permitted grazing seasons are summarized as follows:

| Table 3-18 | | |
|---|---|---|
| **Class of Livestock** | **AUM's** | **Lbs. Production** |
| Cattle and calves | 125,000 | 3,562,500 |
| Sheep and lambs | 11,000 | 272,800 |
| Wool | | 77,300 |

Gross receipts from the sale of livestock represent new money brought into the local economy. This money is re-spent several times within the community, which expands economic values far beyond the original amount. Regional economic impacts from permitted livestock grazing were modeled using a multiplier derived by Nielson (1991) to determine the induced income dollar benefit per AUM. This value was then multiplied by the permitted AUMs prescribed under each alternative. The value represents the amount of induced economic activity in dollars in the state of Utah, and principally benefits those centers of commerce within the five-county area. If one uses a gross production value of $ 8.98 per AUM for cattle and $13.66 for sheep, the contribution to the local economy per AUM grazed on Federal rangelands would be $31.43 for cattle and $47.81 for sheep. It should be emphasized that the costs/benefits are estimates, and are used for comparison purposes only. The values do not represent economic benefits in absolute terms. The 3.5 multiplier developed by Nielson (1991) is applied to the net value (permitted AUMs x $8.98/cattle AUM or $13.66/sheep AUM) from livestock grazing, which is dependent on the permitted livestock numbers under the action alternative(s). The annual values of livestock production derived from grazing on federal rangelands in the five-county area may thus be estimated as follows:

**Table 3-19**
**Annual Values of Livestock Production Derived From Grazing NFS Lands**

**ALT 1 - NO ACTION AND ALT 3 - MODIFIED PROPOSED ACTION ALTERNATIVES**

| Livestock | A $ Value/AUM | B Contribution to Economy (A x 3.5) | C AUMs | D Total Production Values ($) (A x C) | E Total Contribution to Economy (B x C) |
|---|---|---|---|---|---|
| Cattle | $8.98 | $31.43 | 125,000 | $1,122,500 | $3,928,750 |
| Sheep | $13.66 | $47.81 | 11,000 | $150,260 | $525,910 |
| Total | | | 136,000 | $1,272,760 | $4,454,660 |

**ALTERNATIVE 2 – PROPOSED ACTION - 6" SH BY SERAL CONDITION**

| Livestock | A $ Value/AUM | B Contribution to Economy (A x 3.5) | C AUMs | D Total Production Values ($) (A x C) | E Total Contribution to Economy (B x C) |
|---|---|---|---|---|---|
| Cattle | $8.98 | $31.43 | 113,000 | $1,014,740 | $3,551,590 |

| | | | | | |
|---|---|---|---|---|---|
| Sheep | $13.66 | $47.81 | 11,000 | $150,260 | $525,910 |
| Total | | | 124,000 | $1,165,500 | $4,077,500 |

# CHAPTER 4
# ENVIRONMENTAL CONSEQUENCES

## A. INTRODUCTION

In this chapter, we describe the effects, or potential impacts, from implementing each of the alternatives on the four resources described in Chapters 2 and 3. A comparison of the alternatives is presented in Chapter 2. Chapter 4 ends with discussions on whether or not the alternatives are consistent with the Fishlake Forest Plan and with policy and direction. Full descriptions of the proposed actions are contained in Chapter 2 of this Environmental Assessment.

## B. EFFECTS ON RIPARIAN AREA CONDITIONS

This report summarizes the hydrologic analysis for the Grazing Amendment Environmental Assessment. From a watershed perspective, the Proposed and Modified Proposed Amendments both offer improvements over the existing Forest Plan standards for grazing riparian areas. In particular, Alternative 3 greatly simplifies monitoring and enforcement of maximum allowable use and reduces to some degree, the potential risks and damages that can result from summer floods.

### RIPARIAN CONDITIONS

An important part of the purpose for amending the existing riparian grazing standards is based on the need to improve our ability to protect or restore riparian conditions on allotments located on the Fishlake National Forest. Vegetation appears to be more affected by grazing intensity than by grazing systems *(Clary and Webster 1989).* Current research demonstrates that specifying residual stubble height to be left at the end of the growing or grazing season is better than percent utilization standards for ensuring riparian values are protected *(Skinner 1998, Mosley et. al. 1997, Clary and Webster 1989 and 1990).* The stubble height standards are intended to improve riparian conditions by managing the level of use and by maintaining vegetation structure and composition needed for riparian areas to function properly. The primary improvement would come from an easier ability, relative to the existing standards, to measure and enforce the proposed standards. However, stubble height standards often are not a good indicator for when excessive bank trampling and shearing is occurring *(Bengeyfield and Svoboda 1998).* Therefore, bank stability standards will eventually be needed to more directly protect and restore riparian conditions.

### Riparian Vegetation Structure, Composition, and Function

The consumption of vegetation, changes in soil properties, and direct disturbances related to moderate to heavy grazing can alter vegetation structure and composition. The type, seral stage, distribution, density, and diversity of vegetation play major roles in determining the existing condition, functionality, and resilience of riparian areas and stream channels *(Winward 2000, Mosley et. al. 1997, Rosgen 1996, Platts 1991, Clary and Webster 1989, Kauffman and Krueger 1984).* Important riparian functionality includes providing food and habitat for aquatic and terrestrial plants and animals, maintaining appropriate stream channel dimensions, pattern, and profile, dissipating stream energy, storing water and sediments in the floodplain, controlling water temperatures, filtering upland sediments, and maintaining the ability of the riparian system to resist and recover from disturbance. Due in part to measurement and enforcement

difficulties; the existing riparian use standards have been found to be inadequate for providing this functionality in some cases. Also, the existing standards are not fully in line with recommendations based on current research. The existing and proposed standards will be evaluated by how they address or affect the important components of riparian condition briefly outlined below.

**Providing Food, Nutrients, and Habitat.** Riparian vegetation houses and feeds a wide variety of aquatic and terrestrial plants and animals (including insects). Therefore, it is important that the potential natural riparian community be aptly represented and maintained. Vegetation at the stream margins is particularly essential for this purpose. Clary and Webster (1989) recommend minimum 4 to 6 inches of stubble heights to prevent adverse changes in riparian vegetation composition and structure.

| Providing Food, Nutrients, and Habitat | |
|---|---|
| **Alternative 1 Existing Standards** | It has been demonstrated that this alternative does not maintain desirable vegetative composition and structure in some cases. It is not clear whether the standards are ineffective due to difficulty or lack of proper administration, or because the standards are inherently not sufficient. To the degree that existing standards are ineffective, it is likely a combination of both factors. The standards associated with Alternative 1 do not match recommendations based on current research and allow more use of key riparian vegetation than the other two alternatives. |
| **Alternative 2 Proposed Standards** | These standards if correctly applied should maintain vegetative composition and structure on sites in mid to late seral stages. Taller stubble heights or complete rest may be needed on degraded sites to restore desired riparian characteristics (Platts 1991, Clary and Webster 1989). However, that determination is made at the project level during the development of proper use criteria for individual Allotment Management Plans. |
| **Alternative 3 Modified Proposed Standards** | These standards are the easiest to apply and enforce, and meet the intent of research recommendations, such as Clary and Webster 1989, aimed at maintaining desired vegetative composition and structure in riparian areas. As with Alternative 2, taller stubble heights or complete rest may be needed on degraded sites to restore desired riparian characteristics (Platts 1991, Clary and Webster 1989), and would be determined by project level assessments. |

**Maintaining Appropriate Stream Channel Width, Depth, Elevation, and Meander Patterns**: The importance of riparian vegetation to channel stability, and sensitivity to disturbance vary significantly by stream type *(Rosgen 1996)*. The most sensitive streams are typically low to moderate gradient channels such as Rosgen C, E, and G types where the bed and banks are composed primarily of cobble sized or smaller materials. Higher gradient A and B channels dominated by gravel or smaller particle sizes can also be dependent on vegetation for stability. C channels tend to depend on deep-rooted woody plants for stability, more so than other stream types *(Rosgen 1996)*. Overgrazing and direct trampling or shearing of streambanks can lead to changes in stream dimensions, elevation, and location. These alterations can lead to lowered water tables, increased sediment loading, and degradation of water quality and aquatic habitats. Therefore, it is essential that healthy riparian vegetation be maintained. Researchers recommend minimum stubble heights of 4 to 6 inches for the purpose of maintaining channel form. Taller stubble heights or complete rest may be needed on degraded sites to restore riparian vegetation with deep, dense rooting characteristics, which maintain channel form *(Clary and Webster 1989)*. Adjustments in

channel morphology are most active during periods of high stream flows. USGS records indicate that peak flows on the Fishlake are usually associated with spring floods generated by snowmelt and spring rains. However, summer convective thunderstorms are common and are in some cases the largest floods on record.

| Maintaining Appropriate Stream Channel Width, Depth, Elevation, and Meander Patterns | |
|---|---|
| **Alternative 1 Existing Standards** | This alternative allows greater utilization of key riparian species than the proposed new standards. Especially on inherently sensitive stream types, the existing grazing standards have not always effectively maintained stream width, depth, elevation, and meander patterns. |
| **Alternative 2 Proposed Standards** | This alternative is an improvement over the existing standards because end of growing season stubble heights are prescribed to be 4 to 6 inches, matching recommendations based on current research. However, this alternative runs the risk of having stubble heights being less than 4 inches during summer floods if grazed lower with the anticipation of regrowth. |
| **Alternative 3 Modified Proposed Standards** | This alternative best meets the needs for this element by prescribing that at least 4 inches of stubble height be present throughout the entire year. Regrowth on early grazed units would provide additional benefit for channel maintenance, but does not need to be relied upon to reach minimum stubble height standards. |

**Dissipating Stream Energy, and Storing Water and Sediments**: This element is most relevant during periods when streamflow approaches or exceeds bankfull. In-channel and floodplain roughness elements that create turbulence, eddies, and resistance to flow help dissipate stream energy. Vegetation plays an important role in creating and maintaining channel roughness. Vegetation also helps sustain the ability of a stream to access its floodplain by maintaining channel width, depth, and elevation. This is important because a stream can dissipate energy, and store water and in-channel sediments by spilling onto the floodplain. Colonization of point bars by vegetation on low gradient meandering channels is also needed to store sediment and maintain channel form. In regard to trapping and storing sediment, Clary and Webster (1990) recommend that stubble heights be at least 4 to 6 inches.

| Dissipating Stream Energy and Storing Water and Sediment | |
|---|---|
| **Alternative 1 Existing Standards** | This alternative allows greater utilization of key riparian species than the proposed new standards. Past monitoring indicates that height of vegetation remaining when applying the existing use standards has not always been sufficient, based on the guidelines from current research, to provide for maintaining stream form and floodplain functionality. |
| **Alternative 2 Proposed Standards** | This alternative provides for residual stubble heights of 4 to 6 inches at the end of the growing season, matching recommendations, based on current research, for effectiveness in dissipating stream energy and storing water and sediment. However, this alternative runs the risk of having stubble heights being less than 4 inches during summer floods if grazed lower with the anticipation of regrowth. |
| **Alternative 3 Modified Proposed Standards** | This alternative best meets the needs for this element by prescribing that at least 4 inches of stubble height be present throughout the entire year. Regrowth on early grazed units would provide additional benefit for channel maintenance, but does not need to be relied upon to reach minimum stubble height standards. |

**Controlling Water Temperatures**: Riparian vegetation, especially woody plants, help maintain cool water temperatures in the summer by maintaining narrow channels that are less exposed to solar radiation and warm air. Conversely, herbaceous and woody plants help prevent the building of potentially damaging ice formations in the winter by maintaining narrow channels that are less exposed to or more insulated from the cold environment. Bank trampling, loss of woody plants, and conversion to early seral species caused by overgrazing can lead to conditions that create water temperatures that are too warm to support cold water fisheries in the summer and cause ice formation in the winter. How the alternatives relate to channel characteristics such as width and depth, which can affect water temperatures, has already been addressed above. Therefore, the following table focuses on how the standards relate to maintenance of willows and woody plants.

| Controlling Water Temperatures | |
|---|---|
| **Alternative 1 Existing Standards** | Relative to the proposed new standards, this alternative allows the most utilization of key non-woody riparian species and sprouts and young-aged browse species, which increases the likelihood that cattle will switch to and over-utilize woody plants. |
| **Alternative 2 Proposed Standards** | Cattle tend to switch their use to willows when forage use reaches about 45 percent (4 to 6 inch stubble height, Clary and Webster 1989). Use below 4 inches in anticipation of re-growth could increase the likelihood that cattle would switch to woody species. Clary and Webster 1989 recommend no more than 40 to 50 percent use of current years twig growth on woody species, which is fairly consistent with the existing and proposed Forest Plan standards. However, Hall 1999 indicates that browse utilization is extremely difficult and time consuming to accurately measure. Winward (2001) suggests that browse utilization should be measured on sprouts and young-aged plants and that the allowable use should be less than that allowed for mature browse species. |
| **Alternative 3 Modified Proposed Standards** | The retention of at least 4 inches of standing crop will normally deter significant feeding on willows and most other riparian woody plants (Hall and Bryant 1995, Clary and Webster 1989). Like Alternative 2, the woody plant utilization standard would prevent use greater than 40 percent of current year twig growth on sprouts and young-aged browse species to the degree that the requirement can be measured. |

**Filtering Upland Sediments**: Another important function of riparian areas is to filter upland runoff and trap sediment before it can enter stream channels. The density, type, height of biomass, the width and slope of the buffer strip, and the timing and amount of flood flows determine how effectively vegetation can trap and store upland sediments. Clary and Webster 1990 recommend that stubble heights be at least 4 to 6 inches for this purpose.

| Filtering Upland Sediments | |
|---|---|
| **Alternative 1 Existing Standards** | This alternative allows greater utilization of key riparian species than either of the proposed new standards. Past monitoring indicates that height of vegetation remaining using the existing use standards has not always been sufficient, based on the guidelines from current research, to provide for proper filtering of upland sediments. |
| **Alternative 2 Proposed Standards** | Using these standards, 4 inch or taller stubble heights would be attained by the end of the growing season. However, this filtering functionality may be less than desired during summer thunderstorms if vegetation has been grazed below 4 inches in anticipation of regrowth. |
| **Alternative 3 Modified Proposed Standards** | Using these standards, 4 inch or taller stubble heights would be maintained year round. This would promote trapping upland soil erosion during summer thunderstorms, which are usually more erosive than spring snowmelt conditions. |

**Riparian and Stream Channel Resistance and Resilience**: The importance of slope and channel processes, sensitivity to disturbance, and recovery potential all vary depending on morphological characteristics and conditions of the stream and watershed *(Rosgen 1996).*

Restoring and maintaining the functionality discussed above promotes riparian resistance and resilience to disturbance *(Platts 1991, Clary and Webster 1990, Kauffman and Krueger 1984).*

| Maintaining the Ability of the Riparian System to Resist and Recover from Disturbance | |
|---|---|
| **Alternative 1 Existing Standards** | Of the options considered, this alternative is the most difficult to interpret and apply and has proven in some cases to be ineffective. Existing standards primarily rely on indirect measures to provide for riparian condition and functionality. The direct cause and effect linkages between the criteria and desired riparian conditions are not adequately specified. |
| **Alternative 2 Proposed Standards** | This alternative, while an improvement over existing standards, has ambiguities and some potential risks related to summer thunderstorms that do not meet the purpose and need as well as Alternative 3. A more direct indicator for bank stability, in addition to stubble height, would further benefit maintenance and protection of riparian conditions and functionality. More definable browse utilization standards would be desirable, given the difficulty of directly monitoring and predicting the use of willows and other woody plants. This alternative could result in greater utilization of browse species, relative to Alternative 3, on allotment units that are grazed below 4 inches in anticipation of regrowth. However, the proposed stubble height standard has been set at levels that should help maintain browse species. Future bank stability standards could also act as a surrogate criteria designed to protect woody plants. |
| **Alternative 3 Modified Proposed Standards** | This alternative is the easiest to interpret and apply and best meets the riparian condition portion of the purpose and need for the alternatives considered. Like Alternative 2, a bank stability standard and more measurable browse utilization criteria would further benefit riparian conditions. |

## CUMULATIVE EFFECTS

Cumulative effects for the multi-resource management authorized by the Fishlake Forest Plan were assessed in the Forest Plan Final Environmental Impact Statement *(USDA 1986b).* The grazing amendment is proposed because there is enough historic evidence to show that existing Forest Plan riparian standards are in several cases not adequate, are too difficult to administer, or both. Continuation of the existing standards would result in cumulative effects greater than those anticipated from the original Forest Plan analyses. Compared to existing standards, the proposed alternatives would be easier to implement and would increase the ability of the Forest Service and permittees to monitor and protect riparian resources. Implementing either of the new standards is expected to lessen direct and indirect impacts, and thus the watershed level cumulative effects associated with grazing. Comparison to the findings of current research and past monitoring indicates that Alternatives 2 and 3 would meet the original Forest Plan assumptions and intent for favorable riparian conditions better than Alternative 1. Alternative 3 would be expected to make the most improvements in riparian conditions relative to the other alternatives considered. The proposed new riparian standards indicate maximum allowable use and are by definition programmatic. Site-specific cumulative effects related to grazing are addressed by project level assessments. It is in these analyses that specific management criteria and proper use standards can be

developed and are evaluated for individual allotments.

## C. EFFECTS ON VIABILITY OF TEPS SPECIES

**Threatened, Endangered, Proposed and Sensitive (TEPS) Plants.** Grazing has minimal impacts on many TEPS plant species because growth sites are on steep exposed soil such as Wasatch Limestone or open calcareous limestone or igneous gravels where livestock rarely graze. While many of the listed TEPS plants are not known to occur on the Fishlake National Forest, suitable habitat for these species may exist on the Forest. The Proposed Action would have no direct effects on these species; however, increases in the health and vigor of upland and riparian areas is expected. Through time, as rangeland vegetation improves, potential habitat for these species will also improve.

San Rafael cactus (endangered), Last Chance townsendia (threatened), and Maguire daisy (threatened) are the only three federally listed plant species known to occur on the Fishlake National Forest. It is assumed that Winkler cactus (listed as threatened in 1998) occurs on the Forest based on unconfirmed reports from two locations on the Richfield Ranger District. Currently, no plant species proposed for listing are known to occur on the Forest.

A "final draft" (1998) Interagency Conservation Agreement and Strategy covers both San Rafael cactus and Winkler cactus. The FWS prepared a recovery plan for Last Chance townsendia in 1993. Also, two Interagency Conservation Agreements and Strategies give direction for the sensitive species Arizona willow (1995) and Wonderland alice-flower (1996) and their habitats.

The Biological Assessment (BA) and Evaluation (BE) are based on the Utah Natural Heritage data base, reports on file at the Fishlake National Forest, Life History of Endangered, Proposed, Threatened, and Sensitive Species of Fishlake National Forest, A Utah Flora, the Utah Endangered, Threatened, and Sensitive Plant Field Guide, and personal observations of the Fishlake National Forest ecologist. In concurrence with the BA and BE, implementation and enforcement of proper forage utilization standards as outlined in any of the alternatives, along with compliance with conservation agreements and recovery plans will have the following results on TEPS species:

1. For the listed species San Rafael cactus, Winkler cactus, and Last Chance townsendia, the determination is "no effect". The change in forage utilization standards would not have any effect on these species or their critical habitats. Such grazing activities will not result in an irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of reasonable and prudent alternatives in the future.

2. For the 16 sensitive species known to occur on the Fishlake National Forest, the determination of "no impact" was made for 11 of the 16 species. For the remaining five species (Elsinore buckwheat, Tushar paintbrush, Arizona willow, wonderland alice-flower, and little penstemon) a determination of "may impact" was made. Livestock grazing activities (consumption and/or trampling) may impact individual sensitive plants or their habitats, but will not likely contribute to a trend towards federal listing or loss of viability to any population or species. In addition, if microsites of known occurrences for these rare plant species are avoided while trailing and herding of livestock in-mass, potential threats from trampling these plants and their habitats would be reduced substantially.

For a full disclosure of effects on Threatened and Endangered plant species and sensitive plant species, resulting from the selected alternative, please refer to the Biological Assessment and Biological Evaluation prepared for this analysis.

**Threatened, and Endangered Wildlife Species.** During the informal consultation process, the Fishlake National Forest and the U.S. Fish and Wildlife Service concurred that the Mexican spotted owl and the bald eagle are not affected by the degree of forage utilization and that further analysis would not be needed. A determination of "may affect – not likely to adversely affect" was made for the southwestern willow flycatcher and Utah prairie dog.

There are six sensitive wildlife species known to occur on allotments, which may be influenced by grazing. These sensitive species occurring on the Fishlake National Forest include: peregrine falcon, northern goshawk, spotted bat, western big-eared bat, flammulated owl, and three-toed woodpecker. A determination of "may affect – but not likely to adversely affect" was made for all of these species.

Implementation of proper use standards in spring and summer pastures which are in satisfactory and unsatisfactory condition would be expected to be maintained or improve. Rationale for this conclusion is based on the assumption of regrowth to at least a 4-inch stubble after the cattle are removed. Spring and summer pastures presently in satisfactory condition that have been grazed at 50-60% utilization following standards in the Fishlake Forest Plan (USDA Forest Service 1986), are apparently able to withstand this amount of use. It should be noted that pastures described here as "satisfactory condition" are generally those with stable banks and greenline" vegetation and not necessarily the desired condition for woody species (i.e., willows, cottonwoods or other riparian trees or shrubs). Proper use standards in fall pastures that are in satisfactory condition would be expected to maintain desired riparian tree/shrub habitat conditions. Since riparian habitats would be maintained or improved with proper use, the LRMP goal to maintain or enhance the terrestrial habitat for all wildlife species that presently occur on the Forest would be met.

Existing populations of the southwestern willow flycatcher or riparian shrub/tree habitat characteristics in satisfactory condition would expect to be maintained with spring, summer or fall grazing with proper use standards being implemented. Potential physical disturbance to nests would not occur with fall grazing. The greatest threat to Utah prairie dogs is loss of habitat from urbanization, plague, and killing of the prairie dogs by poisoning or shooting. Maintaining suitable habitat for the prairie dogs by proper use grazing would provide minimal benefit to help moderate these adverse effects. Proper use grazing would benefit Utah prairie dogs, but would not likely affect their viability. Achieving proper forage utilization would meet Forest Service NFMA requirements for these T&E species.

For a full disclosure of effects on threatened and endangered wildlife species, resulting from the selected alternative, please refer to the Biological Assessment prepared for this analysis.

**Sensitive Wildlife Species.** Because peregrine falcons have increased in population numbers and productivity under current management, it is determined that each alternative reviewed in this analysis would maintain habitat to sustain viable populations of peregrines.

Grazing would have no effects to the large tree, snag or down wood habitat components for northern goshawk. Utilization standards of all of the alternatives considered in this EA are consistent with the direction in the Utah Northern Goshawk Amendment. Grazing at

proper use would maintain suitable grasses, shrubs and forbs necessary for prey species and thereby maintain foraging habitat. None of the Alternatives considered in this EA would affect goshawks or goshawk viability, meeting the intent of the Management Recommendations for the Northern Goshawk in the Southwestern United States, Forest Service NFMA requirements and the LRMP.

For a full disclosure of effects on sensitive wildlife species, resulting from the selected alternative, please refer to the Biological Evaluation prepared for this analysis.

**Sensitive Fish Species.** Sensitive fish species include Bonneville cutthroat trout and Colorado cutthroat trout. A determination of "may affect – but not likely to adversely affect" was made for both fish species.

For a full disclosure of effects on sensitive fish species, resulting from the selected alternative, please refer to the Biological Evaluation prepared for this analysis.

## D. EFFECTS ON ADMINISTRATION AND MONITORING

**Administration.** Range management administration involves managing and manipulating the grazing animal-forage plant-soil complex to obtain desired conditions or objectives. Common to the management of all grazing lands must be forage plant considerations such as plant growth requirements, providing for plant vigor and reproduction, defoliation and other animal impacts, and seasonality and other fluctuations in forage production. It includes controlling overall livestock numbers and seasons of use, controlling livestock distribution, determining range readiness, measuring forage utilization, providing for wildlife needs, and restoration of deteriorated rangelands.

Desirable range administration attributes regarding implementation of management practices include a number of important considerations, briefly described hereafter. The existing and proposed standards will be evaluated by how they address or affect each component.

The application of stubble height measurements as an "end of growing season" criteria, tends to lead to an interpretation that grazing in early units may be allowed to reach stubble heights less than that prescribed, if regrowth is considered. This leads to continual management quagmires, constant time-in-unit alterations, and unreliability of predicted regrowth. Likewise, the use of "end of grazing season" as part of the criteria elicits confusion as to whether what is meant is the permit off-date by which livestock must be off the allotment or the time at which livestock are scheduled to move between units; i.e.: does "end of grazing season" mean August 1, if that is the time the livestock leave a particular unit or is it October 20, when the livestock are to be off the allotment?

| **Is it a workable system; how easy is it for grazing permittees to use and will they use it; does it make sense?** | |
|---|---|
| Alternative 1<br>Existing Standards | Present indications are that the Forest Service range program does not have adequate funding to fully implement utilization monitoring where needed on all allotments with areas in deteriorating condition. Likewise, range funding to accomplish additional inventory requirements, such as the determination of seral conditions for each riparian area has not been allocated. Utilization monitoring is not an easy technique for permittees to master. |
| Alternative 2<br>Proposed Action | Same as Alternative 3, except this Alternative requires more intensive monitoring where multiple SH S&Gs are prescribed in the same unit |
| Alternative 3 | Residual stubble height can be measured rather than estimated. SH measurement is a |

| | |
|---|---|
| Modified Proposed Action | quick, easy, reliable sampling method. Having only one SH standard to monitor makes compliance easier |

| **How easy is it to maintain compliance; do grazing permittees have general acceptance of the practice or requirement; is it compatible with routine livestock management; does it result in a "watch dog" requirement?** | |
|---|---|
| Alternative 1<br>Existing Standards | Most key upland range sites on the Fishlake National Forest are reported to be in satisfactory condition with stable to upward trends. This is an indication of the general effectiveness of existing utilization standards on these uplands. However, in some selected upland areas, utilization is occurring which sometimes exceeds Forest Plan S&G's. Likewise, some riparian areas have been degraded by concentrated grazing use. Although permittees have general acceptance of percent utilization criteria, compliance with the standards have not been consistently met. Under this Alternative, additional emphasis would be placed on gazing permit terms and conditions, AMP provisions, and utilization criteria compliance. |
| Alternative 2<br>Proposed Action | Stubble height measurements are easier to observe and determine appropriate times at which to move livestock. Having several different SH standards within a unit complicates compliance. Requires more intensive monitoring where multiple SH S&Gs are prescribed in the same unit |
| Alternative 3<br>Modified Proposed Action | Stubble height measurements are easier to observe and determine appropriate times at which to move livestock. Having only one SH standard to monitor makes compliance easier |

| Does the alternative minimize administrative costs and make the overall range administrative job easier; including reduction of time spent on an allotment (time-consuming analyses, compliance inspections, determination of livestock move dates, etc.), reliance on permittee monitoring/stewardship, moves resources toward desired conditions and avoids the need for complex reviews and studies associated with non-compliance and deterioration of rangelands? | |
|---|---|
| Alternative 1<br>Existing Standards | Percent utilization monitoring is the most complex and complicated of the methods analyzed. It requires maximum allocation of funding and resources. It has not been effective in determining livestock moves between units. It has not, at least in some cases, moved resources toward desired conditions. Continued use of existing standards may result in the need for more intensive, time-consuming studies and evaluations. |
| Alternative 2<br>Proposed Action | Residual stubble height can be measured rather than estimated. SH measurement is a quick, easy, reliable sampling method. Requires determination of seral conditions of key rangelands to determine SH prescriptions; is confused by grazing season vs. growing season definitions and is complicated by trends to estimate amount of regrowth available for use. |
| Alternative 3<br>Modified Proposed Action | Residual stubble height can be measured rather than estimated. SH measurement is a quick, easy, reliable sampling method. Permittees are able to assume a greater role in determining appropriate times to move livestock. Use prescriptions can be made without determining seral condition. Livestock moves are based on SH measurements triggering movement and determining the end of the use period, irrespective of grazing season or growing season. With the exception of riparian emphasis management areas, less intensive monitoring is required since one SH standard is prescribed unilaterally |

**Monitoring.** Desirable inventory and monitoring characteristics for utilization monitoring include a number of important considerations, briefly described hereafter. The existing and proposed standards will be evaluated by how they address or affect each component.

| **Do different observers get similar results; is the procedure objective and simple and does it minimize personal bias; does it require extensive training; is the method accurate and repeatable?** | |
|---|---|
| Alternative 1<br>Existing Standards | Removed material, such as percent use, must be estimated based on comparisons to estimated annual production and are highly subject to personal bias. Comparisons may require the use of ungrazed plots or cages. This method tends to rely heavily on species composition, which is very difficult, time consuming, and requires training in the identification of plant species. |
| Alternative 2<br>Proposed Action | Same as Alternative 3, except that a level of complexity is added with the requirement to determine seral condition of each riparian area in order to determine SH standards of 4 inches or six inches. |
| Alternative 3<br>Modified Proposed Action | The SH method is relatively simple and allows a direct way to measure remaining forage. Measurements, as opposed to estimates, usually have lower variability between observers and have fewer presumptions about how much is removed. Statistical reliability improves because numerous measurements can be taken in a relatively short time. Minimal training of examiners is needed to use this method. |

| **Is the method adaptable to a variety of sampling situations without the need for extensive calibration?** | |
|---|---|
| Alternative 1<br>Existing Standards | Most methods for measuring forage utilization involve clipping and weighing samples and converting to oven-dry material. While clipping is considered to be the most accurate, it is very labor intensive and often impractical for a range situation. The Utilization Gage (Height-Weight Method) is perhaps the easiest technique to learn and use to collect percent utilization data. It requires measurement of grazed and ungrazed plants. It must be used with key species, and thus you must be able to identify the key species being managed. It requires conversion of data to determine calculations of percent forage used. |
| Alternative 2<br>Proposed Action | Same as Alternative 3, except that specialized training and riparian green line sampling is required to determine seral condition. |
| Alternative 3<br>Modified Proposed Action | No specialized equipment is needed besides a note pad and a ruler. Measurement of plants can be sampled by life form (grass, forb, sedges, rushes). Limitations may stem from infrequent applications in a variety of rangeland ecosystems, although it has been used with great success in riparian areas. |

| **Does the data provide useful information that can be interpreted and used as a basis for decision-making?** | |
|---|---|
| Alternative 1<br>Existing Standards | Utilization measurements are often used to estimate short-term objectives, such as current year management decisions and understanding livestock distribution. However; it is difficult to determine, from percent use data, where resources will be in the future. It is also difficult to use in making decisions concerning soil erosion or plant species diversity. |
| Alternative 2<br>Proposed Action | Same as Alternative 3, except that multiple SH standards of four inches or six inches adds management complexity and confusion to appropriate timing of decisions to move livestock. |
| Alternative 3<br>Modified Proposed Action | What remains can be sampled with little training, and can be an indication of the plant community's ability to maintain the stream banks and riparian areas. Criteria can be established that are easy to understand--such as a stubble height of four inches, and what remains can be shown to people: "this is what we want to accomplish", "this is why we want this standard", "this is when the animals must be moved". |

| Does the method require a minimum amount of time at a specific location so that large pastures can be sampled? | |
|---|---|
| Alternative 1<br>Existing Standards | Utilization measurements that require clipping are very labor intensive and time consuming. The necessity for comparison with ungrazed plots also increases complexity and time requirements. Visual estimates continue to require the occasional clipped plot to check accuracy. |
| Alternative 2<br>Proposed Action | Same as Alternative 3, except that multiple SH standards of four inches or six inches adds additional complexity and time constraints. |
| Alternative 3<br>Modified Proposed Action | Stubble height measurements are relatively rapid and do not require ungrazed areas for training purposes. This technique can be used to monitor large areas in less time than is needed with traditional utilization methods. |

| **How Do Administration and Monitoring Provisions of The Alternatives Meet Purpose & Need** -- to modify current utilization measures, using state-of-the-art knowledge and technology, to provide the most effective and efficient method for analyzing the effects of livestock forage utilization on rangeland resources? | |
|---|---|
| Alternative 1<br>Existing Standards | Percent utilization standards continue to meet the Forest Plan Goal to sustain the local dependent livestock industry; however, the Forest Plan Goal to maintain rangelands in at least a fair condition with stable or upward trends has not been consistently and fully met. This technique does not meet the Forest Plan Goal to encourage permittees to assume greater responsibility and latitude in managing permitted grazing use. The Purpose & Need to implement state-of-the-art, scientifically researched proper use standards is not met by this Alternative. |
| Alternative 2<br>Proposed Action | The Proposed Action may require early removals of livestock in late units where 6" SH standards are imposed; thus, the Forest Plan Goal to sustain the local dependent livestock industry is not fully met. All other Forest Plan Goal and Purpose & Need statements described in this analysis are met by this Alternative. |
| Alternative 3<br>Modified Proposed Action | The Modified Proposed Action meets all of the Forest Plan Goal and Purpose & Need statements identified in this analysis. |

### CUMULATIVE EFFECTS

This forage utilization S&G amendment is proposed because there is enough historic evidence to show that existing percent utilization standards require a level of administration that is beyond current funding allocations, resulting in a minimal level of utilization monitoring. Continuation of the existing standards will result in cumulative effects of a greater backlog of monitoring needs and an increasing time lag before accomplishment can be done. Cumulative effects would also be expected to result in the need for greater administrative requirements as resources continue to receive inadequate observation, resulting in deteriorated conditions and the need for more exhaustive, comprehensive, and expensive analyses. Compared to existing standards, the proposed alternatives would be easier and less expensive to implement and would increase the ability of the Forest Service and permittees to monitor and protect riparian resources. Cumulative effects associated with the proposed actions would be for increasing permittee stewardship resulting in less administrative requirements and decreased monitoring needs.

## E. EFFECTS ON ECONOMIC VIABILITY

### ALTERNATIVE 1: NO ACTION: EXISTING PERCENT USE STANDARDS - - DIRECT/INDIRECT EFFECTS

This alternative maintains the status quo of permitted livestock numbers and seasons of use, without any required increase in intensity of management. Continuing livestock grazing at current permitted numbers and seasons of use would sustain the existing National Forest

System-dependent ranching industry in south-central Utah. In the short term, and although grazing fees would continue to be charged and permittees would remain responsible for improvement maintenance and cooperative construction of new improvements, the net economic benefit is positive.

In the mid-term, negative economic impacts could result from the effects of deteriorating resource conditions caused by a disregard for implementing effective utilization standards and guidelines, particularly in riparian areas. This could result in adverse social or economic effects to either permittees or rural community economies. The resulting loss of permitted livestock AUMs could affect the sustainability of ranching enterprises and in turn adversely affect rural lifestyles.

The No Action Alternative meets the intent of the Fishlake National Forest Land and Resource Management Plan and is in compliance with laws permitting the grazing of livestock on National Forest System lands.

**ALTERNATIVE 1: NO ACTION --** CUMULATIVE EFFECTS

Past, present, and foreseeable future economic activities considered relevant to this analysis of cumulative effects are the timber, recreation, and tourism industries. Under the No Action Alternative and in the mid to long term, the cumulative effects of adverse impacts to ranching enterprise sustainability could result in a decline in total ranch value.

| **Alternative 1: No Action Alternative: Existing Percent Use Standards** | |
|---|---|
| **Component** | **Effect (Numbers derived from Table 3-19)** |
| Permitted AUMs | 125,000 cattle AUMs; 11,000 sheep AUMs |
| Operational Costs | Static |
| Forage Produced and Available | Static to downward as livestock concentrate in riparian areas, stream channels deteriorate, water tables drop, forage vigor declines, and preferred species are lost |
| Trend in Range Condition | Static to slow improvement on upland ranges; degraded riparian sites will remain static with slow trends to recovery or deterioration depending on management and stocking levels |
| Proper Use Levels | Remedial measures to improve deteriorated ranges will result in application of more severe proper use criteria |
| Net Value | $1,272,760 |
| Contribution to Local Economy | $4,454,660 |
| Cost Increase per AUM | $0 |
| Calf Crop Losses | $0 – Calf crops should remain static |
| Lamb Crop Losses | No early removals expected |

**ALTERNATIVE 2: PROPOSED ACTION: 4-6 INCH RESIDUAL STUBBLE HEIGHT BASED ON SERAL CONDITIONS --** DIRECT/INDIRECT EFFECTS

This alternative prescribes a residual stubble height measurement of 4" to 6", depending on seral condition, measured at the end of the growing season. Since forage regrowth consideration is allowed in this alternative, the ability to comply with stubble height standards in the early units is not expected to present a problem. However, compliance becomes critical in the fall unit, where when the standard is met, livestock have to leave the allotment. For some allotments, this could mean that grazing seasons are cut short, resulting in a loss of permitted AUMs.

A reduction of grazing on National Forest allotments would directly affect local residents and permittees, and would disrupt total ranch operations that rely on coincidental dates of leaving Forest allotments and entering BLM

allotments. In order to maintain a viable ranching enterprise, permittees would have to replace the forage lost on National Forest land with other purchased or leased forage at a comparable cost/benefit ratio.

The loss of forage for summer grazing would cause imbalances in the yearlong feed supply and a greater ultimate reduction in over-all ranch grazing capacity than just the loss of summer feed. Adjustments ranchers could make to compensate for reduced grazing on federal lands include reduction of herd numbers, purchase of more feed, improvement of private rangelands to increase forage productivity, and conversion of cropland to irrigated pasture or hay land. These alternatives to grazing on federal lands would provide a lower economic return to the ranchers unless meat and wool prices were to increase greatly. A reduction in herd numbers would decrease total production. Purchased feed is expensive. Private rangelands, like most rangelands, have limited physical capabilities for increased forage production. They cannot support cultivated crops.

The number of allotments where forage stubble height standards would be met before the end of permitted grazing seasons is not expected to be significant. Minimal reductions in livestock grazing on the National Forest would not have significant adverse effects on rural communities, nor would there be significant adverse effects on maintaining way-of-life and quality-of-life for permittees and local residents dependent on an agriculture-based economy. Alternative 2 would be consistent with the Fishlake National Forest LRMP which allocates suitable rangelands for forage utilization and establishes a desired condition of managing these lands for livestock grazing.

**ALTERNATIVE 2: PROPOSED ACTION--** CUMULATIVE EFFECTS

There would be an adverse cumulative effect to the area economy from a loss of permitted grazing. The degree of adversity would depend on the availability of substitute forage, substitute timber supplies should timber sales decline, and ability of local communities to diversify and benefit from increased tourism and recreation income opportunities. Economic decline for a sustained period is not expected to result from Alternative 2.

| **Alternative 2: Proposed Action: 4-6 Inch Residual Stubble Height Based On Seral Conditions** | |
|---|---|
| **Component** | **Effect (Numbers derived from Table 3-19)** |
| Permitted AUMs | 113,000 to 125,000 cattle AUMs (estimated due to early removals at 6" SH on 10% of allotments); 11,000 sheep AUMs |
| Operational Costs | Generally up (5-10%) due to increased compliance, herding, and maintenance |
| Forage Produced and Available | As seral stages move from very early to mid and late, sites are more productive and greater use is allowed |
| Trend in Range Condition | Static to slow improvement on upland ranges; in degraded riparian sites, measurable improvement occurs within 10 years |
| Proper Use Levels | Increases as seral stages in riparian areas move from very early and early to mid and late; upland use levels will remain static |
| Net Value | $1,165,000 (due to early cattle removal 10% of time) |
| Contribution to Local Economy | $4,077,500 (due to early cattle removal 10% of time) |
| Cost Increase per AUM | $1.00 - $1.50 per AUM ($136,000 – 204,000) depending on permittee monitoring for compliance and increased intensity of livestock management |
| Calf Crop Losses | $0 – AUMs may be decreased due to early removals, but calf crops should remain static |
| Lamb Crop Losses | No early removals expected |

**ALTERNATIVE 3: MODIFIED PROPOSED ACTION – 4-INCH END OF USE PERIOD STUBBLE HEIGHT --** DIRECT/INDIRECT EFFECTS

This alternative provides criteria for a stubble height standard of 4 inches, measured at the end of the use period, which is compatible with maintaining current permitted numbers and seasons of use. It is anticipated that more intensive livestock management will be required to ensure appropriate monitoring and timely livestock movements and to ensure complete livestock removal from units and that no twice-over use occurs. Timely gathers are defined as being within 5 days after reaching the 4-inch stubble height. Being untimely, which results in stubble heights reaching below 3 inches, would require administrative non-compliance actions, and could have adverse economic impacts on permittees. The effects of effectively implementing the Proposed Action are relative to permittee's cost/benefits from grazing livestock on the allotments, the benefits to rural and county economies from livestock grazing, and revenues/costs to the government. Continuing livestock grazing at currently permitted numbers and seasons of use would sustain the existing National Forest System-dependent ranching industry in south-central Utah. Although grazing fees would continue to be charged, and permittees would remain responsible for improvement maintenance and cooperative construction of new improvements, and there would be increased investments relative to management intensity, the net economic benefit is positive. Under the Proposed Action there would not be adverse social or economic effects to either permittees or rural community economies. Under the Proposed Action there would not be adverse effects to rural lifestyles. The Proposed Action meets the intent of the Fishlake National Forest Land and Resource Management Plan and is in compliance with laws permitting the grazing of livestock on National Forest System lands.

**ALTERNATIVE 3: MODIFIED PROPOSED ACTION** --CUMULATIVE EFFECTS

The area considered in the cumulative effects analysis for social and economic impacts is the five-county area of south-central Utah consisting of Sevier, Millard, Piute, Wayne, Beaver Counties. This area was selected on the basis of adjacency with rural communities dependent upon National Forest resources for an economic base. The five-county area, rather than isolation by county, was selected because of the regional inter-dependency upon the livestock industry as an economic base. Past, present, and foreseeable future economic activities considered relevant to this analysis of cumulative effects are the timber, recreation, and tourism industries. Under the Proposed Action, along with a sustainable timber supply and emerging recreation and tourism, cumulative effects of sustained, permitted grazing would be positive.

| **Alternative 3: Modified Proposed Action: 4" SH Measured at The End of The Use Period** | |
|---|---|
| **Component** | **Effect (Numbers derived from Table 3-19)** |
| Permitted AUMs | 125,000 cattle AUMs; 11,000 sheep AUMs |
| Operational Costs | Generally up (5-10%) due to increased compliance, herding, and maintenance |
| Forage Produced and Available | As seral stages move from very early to mid and late, sites are more productive and greater use is allowed |
| Trend in Range Condition | Static to slow improvement on upland ranges; in degraded riparian sites, measurable improvement occurs within 10 years |
| Proper Use Levels | Increases as seral stages in riparian areas move from very early and early to mid and late; upland use levels will remain static |
| Net Value | $1,272,760 |
| Contribution to Local Economy | $4,454,660 |
| Cost Increase per AUM | $1.00 - $1.50 per AUM ($136,000 - $204,000) depending on permittee monitoring |

| | |
|---|---|
| | for compliance and increased intensity of livestock management |
| Calf Crop Losses | $0 – Calf crops should remain static |
| Lamb Crop Losses | No early removals expected |

# CHAPTER 5
# LIST OF PREPARERS

This Environmental Assessment (EA) was prepared by resource specialists on the Fishlake National Forest. Contributing scientists were:

Dave Grider, Fishlake NF Range Specialist
Stan Andersen, Fillmore and Beaver RD Wildlife Biologist
Dale Deiter, Fishlake NF Hydrologist
Frank Fay, Fishlake NF NEPA Coordinator

**DAVE GRIDER** is the Forest Range Specialist for the Fishlake and Dixie National Forests. He is located at the Dixie NF in Cedar City, Utah. He has a B.S. degree in range management from New Mexico State University. He joined the Forest Service in 1976. He worked as a range conservationist on the Gila, Cibola, Fishlake, and Wasatch-Cache National Forests, and as a District Ranger on the Toiyabe National Forest. He has been in his current position for the past six years. He provides range management expertise and is the IDT leader and writer-editor for this project.

**STAN ANDERSEN** is the wildlife biologist for both the Fillmore and Beaver Ranger Districts on the Fishlake NF. He is located at the Fillmore RD in Fillmore, Utah. He has B.S. and M.S. degrees in Wildlife and Range Management from Brigham Young University. He joined the Forest Service in 1989. He has worked as a wildlife technician on the Kaibab National Forest, a rangeland management specialist and wildlife biologist on the Manti-LaSal National Forest, and has been in his current position on the Fishlake National Forest for about a year. He provides wildlife and T&E species expertise and prepares the required Biological Evaluation and Biological Assessment.

**DALE DEITER** is the Forest Hydrologist for the Fishlake NF. He is located at the Fishlake NF in Richfield, Utah. He has B.S. and M.S. degrees in Forestry from Northern Arizona University and is a graduate of the Continuing Education in Ecosystem Management program (CEEM). He started working for the Forest Service as a seasonal on the Gila, Bridger-Teton, and Apache-Sitgreaves National Forests from 1983-1989. He became a permanent full-time employee in 1989. He provides riparian and watershed expertise.

**FRANK FAY** is the Fishlake NF NEPA coordinator. He is located at the Fishlake NF in Richfield, Utah. He has a B.S. degree in Forest Management from Humboldt State University. He has been working for the Forest Service since 1983. He provides NEPA process oversight, facilitates public review, and ensures publishing of news releases.

# APPENDIX A
# GLOSSARY

***Allowable Use***: The degree of utilization considered desirable and attainable on various specific parts of an allotment considering the present nature and condition of the resource, management objectives, and level of management. Allowable use is based on the morphological and physical characteristics of forage species and is the amount of use that can occur for a specified period of time while meeting basic resource needs and associated resource management goals.

***Animal Month:*** A month of use by one animal. Must specify the kind and class of animal. Not synonymous with "animal unit month".

***Animal Unit Month (AUM):*** The quantity of dry forage required by one mature cow (1,000 pounds or the equivalent) for one month based on a forage allowance of 26 pounds per day.

***Biological Assessment (BA):*** The legal record of findings for USDI Fish and Wildlife Service proposed, threatened, or endangered species.

***Biological Evaluation (BE):*** The legal record of finding for USFS Region 4 sensitive species.

***Cumulative Effect:*** The effect on the environment which results from an incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time.

***Ecosystem:*** A complete, interacting system of organisms considered together with their environment (for example: a marsh, a watershed, or a lake).

***Floodplain:*** The area adjacent to the active stream channel that is inundated during flows that exceed bankfull level. The floodplain acts as an energy dispersion zone during flood flows, and functions as an area of deposition.

***Forage:*** All browse and herbaceous foods that are available to grazing animals for food.

***Functioning:*** Proper functioning condition (functioning): Riparian-wetland areas are functioning properly when adequate vegetation, landform or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian wetland areas is a result of interaction among geology, soil, water, and vegetation.

***Functioning-At-Risk:*** Riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

***Grasslike Plant:*** A plant of the Cyperaceae or Juncacea families that vegetatively resembles a true grass of the graminae family.

***Green Line:*** The green line is defined as that specific area where a more or less continuous cover of perennial vegetation is encountered when moving away from the perennial water source. At times the green line may be at the water's edge, or it may be part-way back on a gravel or sand bar. The green line may be only a foot or two wide, or it may be many feet wide, depending on soil water features. Natural plant species forming the green line (e.g. beaked sedge, water sedge, elk sedge, or Nebraska sedge) are generally good buffers of water forces. Disturbance activities such as overgrazing or trampling by animals or people may result in conversion to species such as Kentucky bluegrass or redtop, both of which have reduced ability to buffer water forces. The green line is where the forces of water, as influenced by total watershed condition, play their most prominent role. Additionally, there is a strong relationship between amount and kind of vegetation along the water's edge and bank stability. Natural plant species in this permanently watered area have developed rooting systems that enhance bank stability. An evaluation of the vegetation on this area can thus provide a good indication of the general health of the entire watershed.

**Hydrophytic (Hydric) Species:** Vegetation adapted to wet soil conditions. Hydrophytic vegetation is defined as the plant life that grows in areas inundated either permanently or periodically, or in areas where the soil is saturated to the surface at some time during the growing season of the prevalent vegetation. Vegetation indicators include: sedges (water sedge, elk sedge, beaked sedge, Nebraska sedge, etc.), rushes (Juncus species), and willows. Two upland species that flourish in well-watered parks, wet meadows, and along streambanks that may also serve as indicators are: tufted hairgrass (Deschampsia), and reedgrass (Calamagrostis).

***Indirect Effects:*** Effects separated in time or space from the causative actions.

***Interdisciplinary Team:*** A group of individuals from different resource disciplines assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. The members of the team proceed to solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions. This is different from a multidisciplinary team where each specialist is assigned a portion of the problem and their partial solutions are linked together at the end to provide the final solution.

***Issue:*** A problem or subject of concern raised by the public or by agency employees during scoping. Issues important to the decision at hand are analyzed in the EA.

***Key Areas:*** Utilization and residue surveys can be completed anywhere, depending on the objectives. Common locations for surveying include critical areas and key areas. Key areas are tied to specific resource management objectives as outlined in the AMP, to the Forest Plan if an AMP has not been approved or formulated, or to those areas most sensitive to changes in use patterns. Key areas are selected subjectively such that it is hoped will reflect what is happening on a larger scale. Depending on resource management objectives, a key area may be a representative sample of a large stratum, such as a pasture, allotment, etc., or it may be a representative of a small stratum having important values, such as a heavy use area near water, a riparian zone, etc. A key area could also be a representative or

critical area, such as a fragile watershed; sage grouse nesting ground; threatened, endangered or sensitive species habitat; etc. Although it would be desirable to make inferences about a larger scale from sampling key areas, there is no way this can be done in the statistical sense because the key areas have been chosen subjectively. For this reason, it is important to develop objectives that are specific to key areas. It is equally important to make clear that actions will be taken based on what happens in the key area, even when it can not be demonstrated statistically that what is happening in the key area is happening in the larger area it was chosen to represent.

Key areas should be selected only after a careful evaluation of the current pattern of grazing use. Small areas of natural concentration, such as those immediately adjacent to water, salt, roads, trails, or shade usually are not suitable key management areas for reflecting what is happening on a larger scale. However, they may be selected to provide representative samples of areas having important or critical values such as riparian zones, fragile watersheds, or heavily grazed areas. Key areas may need to be changed or new ones selected when the pattern of use is significantly modified because of a difference in season of use, kind or classes of grazing animals, pasture size, water supplies, or other factors affecting use distribution.

***Key Species:*** Key species are those forage species whose use serves as an indicator to the degree of use of associated species. A basic assumption of the key species concept is that when the key species is (are) properly used, other less important, less palatable, species will not be over-used. Key species should serve as indicators of change that may occur in the desired plant community complex. Some criteria in the selection of a key species include 1) high relative plant palatability, 2) reasonably resistant to grazing pressure, 3) resistant to competition from other species, 4) sufficiently abundant to be an important component of the plant community, 5) nutritious, 6) has a soil holding capability, and 7) produces a reasonable volume of forage.

***Mitigate:*** Avoid or minimize impacts by limiting the degree or magnitude of the action and its implementation; to rectify the impact by repairing, rehabilitating, or restoring the affected environment; to reduce or eliminate the impact of preservation and maintenance operations during the life of the action.

***Monitoring:*** The orderly collection analysis, and interpretation of resource data to evaluate progress toward meeting management objectives.

***National Environmental Policy Act of 1969 (NEPA)***: Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.

***National Environmental Policy Act (NEPA) Process:*** An interdisciplinary process, mandated by the National Environmental Policy Act, which concentrates decision-making around issues, concerns, and alternatives, and the effects of those alternatives on the environment.

***National Forest Management Act (NFMA):*** A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act (RPA), which requires the development of regional and forest plans and the preparation of regulations to guide that development.

***National Forest system:*** All National Forest lands reserved or withdrawn from the public domain of the United States; all National Forest lands acquired through purchase, exchange, donation, or other means; the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012); and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system.

**Non-hydric (non-hydrophytic) Species:** Herbaceous vegetation occurring within the meadow environment or the influence of the riparian zone where there is generally a shallow water table and a high water table during some portion of the year, but no standing water. Vegetation is typically comprised of dryland sedges, Kentucky bluegrass, dandelion, redtop, and timothy.

***Not Properly Functioning:*** Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or other large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed under proper functioning condition. The absence of certain physical attributes, such as a floodplain where one should be, is an indicator of not properly functioning condition.

***Objective:*** A clear and quantifiable statement of planned results to be achieved within a stated time period; something aimed at or striven for within a predetermined time period. An objective must: be achievable, be measurable, have a stated time period for completion, be quantifiable, be clear, and its results must be described.

***Percent Use:*** The percentage of the current year's forage production that is consumed or destroyed by grazing animals. May refer to a single species or to the vegetation as a whole.

***Project File:*** More detailed documentation of an environmental analysis, usually located in files in the Forest Service District Office or the Forest Supervisor's Office.

***Proper Use***: Proper use is determined from allowable use and is the level of grazing utilization that can be permitted on an area considering the need to maintain or reach desired conditions while at the same time considering all limiting factors. The Intermountain Region Range Analysis Handbook (FSH R4-2209.29, 1993, ch. 0, par. 05, pg. 6) describes proper use as being determined by..."The limiting factor or factors which will be measured on a particular site. It could be percent utilization of forage, impact on other resources or uses, or any other measurable factor on a particular site". Proper-use criteria is developed from interdisciplinary input; for example: fish surveys, ecological type transects, research findings, coordination requirements, observations, and good judgment. It is necessary that proper-use criteria be based on the factor that becomes critical first—the limiting factor. The limiting factor, as to the degree of utilization allowed, may be seral condition; the degree of use of key hydric species; trampling of streambanks and resultant damage to fisheries; degree of use allowed in critical wildlife habitats; the presence of Threatened & Endangered plants, wildlife, or fish; season of use; class of livestock; type of grazing system; esthetics; etc.

Therefore, the site-specific development and application of Proper Use criteria may prescribe lower utilization levels than those presented as maximum allowable use standards. Levels of grazing use that reach either adjusted "proper use" criteria or established maximum allowable use standards will indicate the proper time to remove livestock from that pasture or allotment.

***Range Allotment:*** A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands and associated lands administered by the Forest Service.

***Rangeland:*** All land producing, or capable of producing, native forage for grazing and browsing animals, and lands that have been revegetated naturally or artificially to provide a forage cover that is managed like native vegetation. It includes all grasslands, shrublands, and those forest lands which will continually or periodically, naturally or through management, support an understory of herbaceous or shrubby vegetation that provides forage for grazing or browsing animals.

***Riparian Area:*** The Fishlake National Forest Land and Resource Management Plan *(USDA 1986a)* defines a riparian area as: An area of land directly influenced by water. Examples are stream sides, lake borders, and marshes. The Forest Plan further defines a riparian ecosystem as: A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. The Plan defines the component ecosystems of riparian areas as including the aquatic ecosystem, the riparian ecosystem (characterized by distinctive vegetation), and adjacent ecosystems that are within 100 feet, measured horizontally from the edges of perennial streams or from shores of lakes and other still water bodies.
These riparian areas usually have visible or physical characteristics reflecting this water influence. Streamsides, lake borders, or marshes are typical riparian areas. At a minimum, riparian areas include all land within 100 feet of the high water marks of lakes, streams, and marshes.

Although most streamside zones are riparian, some are not. Examples of non-riparian sites are those areas where the sagebrush ecosystem reaches the water's edge, where the streamside zone is composed of bedrock, where streams are bordered by steep-sided canyon lands, or where streamside environments are composed of boulders or rubble *(Platts 1979)*. Swanson (1986) notes that different riparian areas have different potentials. Some will produce trees that provide shade and nesting habitat for birds, and others will produce lush meadow vegetation as their best crop. Most riparian areas support a diversity of vegetation types which may encompass only a small area. Some streams can support productive fisheries and others never could.

A riparian zone is characterized by grasses, woody shrubs, trees, and other vegetation. It maintains a relatively high water table and acts as a sponge by holding water in streambanks, therby raising the water table in the surrounding area and providing a more stable stream flow *(GAO, 1988, pg.8)*. Diversity of vegetation is an important characteristic of riparian areas in good condition *(Chaney et al. 1990)*. Unlike adjacent terrestial communities, water is more readily available for plant uptake in riparian zones, and duration of this free, unbound water may influence community composition (Youngblood et al. 1985).

Late seral communities, especially along the greenline, are stable by nature; they are dominated by deep rooted, often rhizomatous, species which take several years (5-7 years) to show the effects of changes in management. It is especially important, when monitoring late seral to PNC riparian sites to also monitor physical conditions of the stream channels. Streambanks and channel characteristics will respond more quickly to increased impacts than will the stable vegetation. Conversely, these late seral communities may show improvement more quickly because the desireable plant communities are already in place. In contrast, early to mid seral greenline communities will show downward trends

more quickly because they are typically dominated by weakly rooted species that are more easily displaced through continued surface disturbance and through water action against stream banks lacking adequate protection because of the weak rooting systems. Early seral greenlines will take more time to improve because the species necessary to colonize and develop into communities stable enough to hold streambanks are not well represented (Padgett, 1995).

Communities associated with streams and rivers may have to contend with frequent scouring or deposition resulting from flooding. Riparian communities found along seeps or springs that have constant high water tables may be limited by continual accumulation of organic material *(Youngblood et al. 1985).*

Kindschy (1987) emphasizes that "only one factor can be dominant in limiting the successional advancement of riparian vegetation. Typical primary factors are hydrologic scouring due to high volume spring runoff, steep shoreline relief, livestock grazing, or a lack of suitable soil. Reduction or removal of this limiting factor will enable progressive vegetative succession until the next limiting factor is reached. Reduction or removal of any secondary factor will have little effect if the primary factor is not similarily reduced." Swanson (1988) observed that many streams have straightened and become steeply incised and lost access to their floodplains. He defines this situation as passing a threshold beyond which there is no return to previous conditions. He says, "Land managers must avoid simply attacking that which is most ugly....The lowest priority streams, even if they are the ugliest, are unlikely to respond to management. Stream energy is concentrated and management inputs are likely to be wasted where a stream has downcut and is totally confined in the bottom of a gully."

Winward (1994) notes that Utah streams with gradients less than .5 percent are usually dominated by herbaceous species; shrubs and trees are most often absent. Streams with gradients between .5 and 1.5 percent usually have patchy willows or trees present. Where gradients range between 1.5 and 3.0 percent, large willows and trees become very prominent. Winward notes that in general, almost all of the dominant natural species that occur in riparian settings are extremely strong, deep-rooted species. As such, their major role is in buffering the forces of moving water (Winward 1994).

***Rosgen Stream Channel Types:*** Rosgen (1996) classified streams by types A-G, with A being described as steep to very steep (4 to 10% slope) cascading, step/pool streams. Type B streams are moderately entrenched riffle dominated channels with gradients between 2 and 4 percent. Type C streams are low-gradient, meandering streams with broad, well-defined floodplains; slope is less than 2 percent. Clary and Webster (1989) noted that grazing conflicts with riparian-dependent resources were usually not severe in Type A stream channels or in most type B stream channels. Generally, these stream channels are in narrow valleys occupied by woody species and are armored by rocks providing resistance to erosion and trampling damage. The greatest conflicts occurred in type B channels with medium- to fine-textured, easily erodable soil materials and most type C channels. The latter channel types are typically associated with meadow complexes that are attractive to livestock and are often important fishery habitats. In these channel types a vigorous plant community is important for protecting streambanks against erosive forces and for trapping sediments.

***Ruminant:*** Any even-toed, hoofed mammal that chews the cud and has a four-chambered stomach, i.e. cattle, sheep, goat, buffalo, bison, antelope, deer, elk, moose, and llama.

***Sensitive Species:*** Those plant or animal species identified by the Regional Forester for which population viability is a concern, as evidenced by 1) a significant current or predicted downward trend in population numbers or density, or 2) a significant current or predicted downward trend in habitat capability that would reduce a species' existing distribution..

***Seral:*** A biotic community that is developmental; a transitory stage in an ecologic succession.

***Seral Stages:*** The developmental stages of an ecological succession.

***Stubble Height:*** This is the standing herbaceous vegetation on the green line at the time of measurement. These values take into consideration any anticipated regrowth. Measurement can be done in two ways. It can be an average of all the forage within the bank full zone, or it can focus on several key species. It is realized that some species may not naturally grow to a desired length, or natural conditions such as a drought may stagnate growth. If this occurs, percent utilization may on these occasions be a better parameter than stubble height.

The green line for stubble height determinations is defined as subirrigated areas adjacent to streams that are on the water's edge or extend from the water's edge several feet perpendicular to the stream. The purpose of moving out from the water's edge is to be able to measure or observe enough area to get accurate stubble height measurements or estimations. To take into account regrowth (the entire year's growth of vegetation) and the stubble height that should remain following grazing for sediment filtering during spring flows, pastures grazed early may allow shorter stubble height values than areas grazed following seed ripe. In any case, the required stubble height (including any regrowth) must be at or above the standard by the end of the growing season.

Stubble height standards are expected to improve riparian area plant vigor; protect steambanks from excessive trampling damage; entrap sediment; deter excessive feeding on willows; encourage late seral, bank stabilizing plants; and generally improve riparian area health. Unacceptable impacts from livestock grazing can be avoided in riparian areas by recognizing that a shift in cattle preference can occur as stubble heights less than four inches are approached. It can be assumed that undesirable impacts will occur at any time as stubble heights fall below three inches as a result of major shifts in livestock preference. Drying of herbaceous forage (indicating a change in forage quality and a consequent change in palatability), particularly Kentucky bluegrass, also will cause a shift in preference that may adversely impact riparian ecosystems.

***Threatened and Endangered Species (TES):*** Any species of the plant or animal kingdom at risk of extinction or whose viability is in doubt. Federal codes are defined as follows:

- ***Endangered(E):*** Any species that is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the Endangered Species Act would present an overwhelming and overriding risk to man.
- ***Threatened (T):*** Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

***Ungulate:*** Any hoofed animal, including ruminants but also horses.

# APPENDIX B
# MONITORING PROCEDURES

## SUGGESTED FOREST SERVICE PROCESS FOR MONITORING

The following checklist is a Forest Service protocol for determining monitoring objectives and is intended to cover all possible steps in the implementation of a monitoring program. In many cases, only a portion of the following steps will be necessary. Rangeland allotment permittees may be involved in as little or as much of the following process as they choose.

1. Summarize Background Information. Permittees and their range specialists should visit about their perceptions of resource conditions on their allotments, including the conditions and locations of existing sampling areas. Review all previous information collected on the allotment, especially range inspections, utilization surveys, and range analyses. Identify existing monitoring sites and designated critical areas. Review soil surveys, wildlife information, material on plant requirements, or any other information regarding limiting factors, resource values or management objectives. Review the Forest Plan and applicable standards and guidelines, and "Desired Future Condition" statements. Review appropriate utilization criteria for the plant communities on the allotment

2. Identify existing site-specific management objectives including plant species composition and the condition of physical characteristics such as soil conditions and stream bank integrity. Evaluate existing objectives to ensure that they are realistic and attainable.

3. Determine Monitoring Objectives. Document the reasons for monitoring. What questions need to be answered and what is the simplest way to get the information necessary?

4. Select the Area to be Monitored. A "key area" may be a representative sample of a large stratum (such as a pasture or allotment with the capability to reflect what is happening on a larger area); or it may be representative of a small stratum having important values such as a heavy use area near water or a riparian zone. Area selection is closely tied to management objectives. The folowing criteria may be used to select these areas:

a. Monitoring areas will be identified by both permittees and District range management specialists.
b. They should be representative of the range area in which they are located, be likely to show responses to management actions, and be indicative of management responses occurring on a larger scale.
c. Areas will be tied to specific resource management objectives or to those areas most sensitive to changes in management.
d. Sampling areas should be selected after careful evaluation of patterns of grazing use. Small areas of natural animal concentration such as those immediately adjacent to watering areas, salting areas, roads, trails, movement corridors, bedding grounds or shade usually are not suitable management areas because they seldom reflect what occurs on a larger scale. Sites may be selected to represent similar sites having critical values such as riparian zones, fragile watersheds, or heavily grazed areas.
e. The number of areas selected will be based on the amount of information needed and the diversity of the monitoring area.

5. Determine Species to be Monitored. Identify key species for each monitoring site and utilization standards for those species. Allowable use standards and guides are documented in the Forest Plan.

6. Determine Appropriate Monitoring Type and Method. Based on the management and monitoring objectives and therefore the amount of information needed. Select a monitoring strategy that will provide the data required. The level of complexity, expertise and the time commitment that either the permittee or the Forest Service must make needs to be considered. Once a monitoring method is selected, it is advantageous to maintain the consistent use of that method through successive years of the monitoring period. Supplemental monitoring information may be collected by either a permittee or Fishlake National Forest resource specialists.

7. Summarize and Review Monitoring Data. In the case of short-term monitoring strategies, data should be reviewed immediately to determine if management action (livestock movements, etc.) is necessary. An annual review of both short and long-term monitoring results between permittees and the District range specialist may provide an opportunity to evaluate consistency in observations and to discuss the relevance of the results to management decisions.

## VOLUNTARY RANGELAND MONITORING BY GRAZING PERMITTEES

The intent of this section is to provide technical guidance to permittees who choose to implement a voluntary rangeland monitoring system on grazing allotments for which they are responsible. Grazing permittees often are in a position to collect rangeland monitoring data which would not otherwise be collected. Should a permittee choose to collect range monitoring information in a voluntary and unsupervised manner, the proper use of the methods described here will generate reliable data. It should be noted that voluntary participation or lack thereof will in no way encumber the status of grazing permits currently held by range allotment permittees; however, permittees may find that such monitoring will greatly facilitate movement of livestock at proper times and may alleviate possible adjustment actions because of over use.

The rangeland monitoring methods presented here provide information for "short-term" or annual monitoring techniques that can be used to identify and quantify different uses of the resource and natural events occurring to the resource. The voluntary monitoring system is designed to be a tool that permittees can use to better manage livestock allotments, determine appropriate times to move livestock within units, note livestock distribution needs and opportunities, and determine needed range improvements. It is intended to supplement rather than relieve the Forest Service from its rangeland monitoring responsibilities. The Forest Service retains the responsibility for ensuring that permittee data is consistent and repeatable.

Monitoring data gains importance by associating it with data from prior years. Therefore, it is recommended that the permittee establish a permanent notebook of monitoring data in which photographs and data forms are stored. The permittee or range management specialist should summarize monitoring data annually. It is recommended that evaluation of monitoring data be developed cooperatively between the permittee and the District range specialist.

## MONITORING METHODS.

The following is a summary of the stubble height measurement technique which will produce reliable data and which should be a viable option for permittee implementation.

## STUBBLE HEIGHT MEASURING METHOD

References:

- FSH 2209.21 – Rangeland Ecosystem Analysis and Management Handbook, R-4 Amendment 2209.21-93-1
- Utilization and Residual Measurements, Interagency Technical Reference, 1996.

The concept of this method is to measure stubble height, or height (in inches) of herbage left ungrazed at any given time. This method, because of its simple application, is becoming a well-accepted method for expressing rangeland use. Stubble height measurements are simple, quick, accurate, and do not require ungrazed areas for training purposes. Stubble height monitoring has been used with great success in riparian areas. Statistical reliability improves because numerous measurements can be taken in a relatively short time. No specialized equipment is needed besides a note pad and ruler.

- **Training.** Minimal training of examiners is needed to use this method. Although it is helpful to identify plant species, it is acceptable to indicate that the plant is simply a sedge, a rush, or a grass. This method requires measuring stubble heights of selected key species, which can easily be accomplished by agency personnel, permittees, or other interested individuals.
- **Establishing Studies.** Measurements need to be made on key riparian areas that have been cooperatively identified between permittees and the range specialist. These areas should be indicative of effects of management on the total grazing unit. Riparian plant species whose stubble height will be monitored and measured should also be cooperatively and mutually selected. Monitored plants should be selected from those included in the late ecological status grouping and represent management goals and objectives. Normally, only 1-3 plant species need to be monitored.
- **Photographs.** Once the stream segment or transect site has been selected, take a photograph looking down the stream segment or transect and include a re-locatable bearing point (prominent feature in the background of the photo such as a rocky point, tree, etc.).
- **Sampling Process.** Sampling should be done along a 363-foot greenline monitoring segment of a stream, doing both sides of the stream and measuring the strip of vegetation from the water's edge back about 12-16 inches. At every 10th step along this sampling unit, record the stubble height of the key species being monitored that is nearest to the toe of the right foot. Measurements should be in inches of leaf stubble left. This will result in a total of approximately 36 samples (eighteen on each side of the stream) being taken along the green line monitoring area. For wet meadow riparian sites, measurements should be taken along a pre-determined course or transect. An average of 36 samples will be indicative of the stubble height remaining for that species.
- **Calculations.** Use data from the Stubble Height form for calculating the average stubble height by species.

| STUBBLE HEIGHT | | | | | | Page ___ of ___ |
|---|---|---|---|---|---|---|
| Study Location: | | | Date: | Examiner: | | |
| Allotment Name: | | | | Pasture: | | |
| End of unit use measurement ____ | | | | End of growing season measurement ____ | | |
| Sample Point | Species | | | | | |
| | | | | | | |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | | | |
| 33 | | | | | | |
| 34 | | | | | | |
| 35 | | | | | | |
| 36 | | | | | | |
| Total | | | | | | |
| Average | | | | | | |

| Stubble Height Summary | | | |
|---|---|---|---|
| Species | Total Stubble Height | Number of Plants | Average Stubble Height |
| | | | |
| | | | |
| | | | |
| | | | |
| Totals | | | |

| USE MONITORING OBSERVATIONS AND COMMENTS | Page ___ of ___ |
|---|---|
| # of livestock and dates of use (actual use) | |
| Wildlife numbers and activities | |
| Nearest salt location | |
| Availability of water away from riparian areas | |
| Topography: slope, rockiness, size of area, type of stream channel | |
| Stream flow | |
| Weather events (floods, storms, etc.) | |
| Beaver activity | |
| Recreational impacts | |
| Relative forage production and vigor | |
| Heading or flowering dates | |
| Presence of unusual plants | |
| Use intensity and distribution patterns: livestock concentration | |
| Head cuts or stream bank damage/trampling | |
| Physical disturbances (erosion, man/animal damage, open gates, cut fences, etc.) | |
| Browsing of willows and other woody species by livestock or wildlife | |
| Effectiveness of grazing system/time in unit | |
| Photos taken | |
| Comparison with previous surveys | |

| | |
|---|---|
| Recommendations and conclusions | |

| Stubble Height | | | | | | Page 1 of 2 |
|---|---|---|---|---|---|---|
| **Study Location:** | | | **Date:** *8/3/01* | **Examiner:** *MJB* | | |
| **Allotment Name:** *East Fork* | | | | **Pasture:** *Willow Spring* | | |
| **End of unit use measurement** *X* | | | | **End of growing season measurement** | | |
| **Sample Point** | **Species** | | | | | |
| | *Sedges* | *Rush's* | *Grass* | | | |
| 1 | *4* | *3* | *2* | | | |
| 2 | *7* | *5* | | | | |
| 3 | *6* | *6* | *4* | | | |
| 4 | *8* | *4* | | | | |
| 5 | *2* | *2* | *4* | | | |
| 6 | *5* | *1* | *4* | | | |
| 7 | *3* | *7* | | | | |
| 8 | *6* | *4* | | | | |
| 9 | *9* | | *3* | | | |
| 10 | *4* | *3* | *5* | | | |
| 11 | *4* | *5* | *3* | | | |
| 12 | *3* | *6* | *6* | | | |
| 13 | *2* | | | | | |
| 14 | *5* | *2* | *4* | | | |
| 15 | *4* | *4* | *5* | | | |
| 16 | *2* | *4* | | | | |
| 17 | *3* | | | | | |
| 18 | *6* | *6* | *2* | | | |
| 19 | *2* | *6* | | | | |
| 20 | *7* | | | | | |
| 21 | *4* | *3* | *4* | | | |
| 22 | *5* | | | | | |
| 23 | *3* | *4* | | | | |
| 24 | *6* | *3* | *4* | | | |
| 25 | *5* | *3* | *4* | | | |
| 26 | *3* | | | | | |
| 27 | *6* | *5* | *3* | | | |
| 28 | *6* | *7* | | | | |
| 29 | *2* | *6* | | | | |
| 30 | *5* | *4* | *2* | | | |
| 31 | *3* | | | | | |
| 32 | *5* | *2* | | | | |
| 33 | *6* | *4* | *2* | | | |
| 34 | *4* | | *2* | | | |
| 35 | *4* | *3* | | | | |
| 36 | *5* | | | | | |
| Total | *165* | *112* | *63* | | | |
| Average | *4.6* | *4.1* | *3.5* | | | |

| Stubble Height Summary | | | |
|---|---|---|---|
| Species | Total Stubble Height | Number of Plants | Average Stubble Height |
| *HIMU 2* | *165* | *36* | *4.6* |
| *BOER* | *112* | *27* | *4.1* |
| *BOCU* | *63* | *18* | *3.5* |
| | | | |
| Totals | *340* | *81* | *4.2* |

| USE MONITORING OBSERVATIONS AND COMMENTS | Page ___ of ___ |
|---|---|
| # of livestock and dates of use (actual use) | *300 mother cows with calves*<br>*June 1 to September 30* |
| Wildlife numbers and activities | *Elk calve in this area and a resident herd of about 50 elk stay here all summer and don't leave until fall migration. Elk begin use in this unit prior to cattle entry. Big game hunting seasons affect cattle distribution and ability to gather.* |
| Nearest salt location | *On the ridge to the east, about ½ mile away* |
| Availability of water away from riparian areas | *Flow out of Side Hill Spring has decreased* |
| Topography: slope, rockiness, size of area, type of stream channel | *Broad valley bottom about ¼ mile wide and ½ mile long. Steam channel is intermittently choked with willows so cattle can't penetrate. Openings are flattened crossings armored with some rock.* |
| Stream flow | *High spring flows kept streamside riparian forage under water until late June.* |
| Weather events (floods, storms, etc.) | *Winter moisture was above average with high spring runoffs. Rainfall during June and July was below normal and average in August. No major summer flooding.* |
| Beaver activity | *None* |
| Recreational impacts | *None* |
| Relative forage production and vigor | *Although overall precipitation was probably above normal, production and vigor in the meadow area was not significantly different than previous years. This is probably due to the relatively static water table.* |
| Heading or flowering dates | *Late July/early August; a lot of seed heads produced* |
| Presence of unusual plants | *Scattered native thistles are increasing.* |
| Use intensity and distribution patterns: livestock concentration | *It was a good summer, with good forage production everywhere. Cattle were well distributed on the uplands and were moved off the riparian areas with a limited amount of herding effort.* |
| Head cuts or stream bank damage/trampling | *Stream crossings are hardened. No excessive soil movement or displacement noted.* |
| Physical disturbances (erosion, man/animal damage, open gates, cut fences, etc.) | *High flood events were well-buffered by willow thickets. Fishermen left the gate open at Dry Gulch in May and 15 head of cattle entered this unit early.* |
| Browsing of willows and other woody species by livestock or wildlife | *Some browsing on young willows noted along edges of stands. Ratio of young willows to mature willows is good.* |
| Effectiveness of grazing system/time in unit | *System is working well. It was a good year, which helped distribution. Concentration in riparian area was less of a problem this year. Was able to get a good, clean gather. Time in unit might be a problem in dryer years.* |
| Photos taken | *Took general view of meadow, linear view of stream, representative crossings, representative streambanks, and willow use.* |
| Comparison with previous surveys | *Previous surveys indicate average stubble height to be between 3" and 4".* |
| Recommendations and conclusions | *Maintain the current cattle numbers and season of use. Need to repair Side Hill Spring at the head of the basin.* |

# APPENDIX C
# LITERATURE CITED

Bengeyfield, P. and D. Svoboda. 1998. Determining allowable use levels for livestock movements in riparian areas. Rangeland Management and Water Resources, American Water Resources Association, May 1998, pp 243-257.

Busby, Frank E. 1978. In proceedings of the forum--grazing and riparian/stream ecosystems (1979), Denver, CO. pp. 6-12.

Chaney, Ed, Wayne Elmore and William S. Platts. 1990. Livestock grazing on western riparian areas. A report for the U.S. Environmental Protection Agency, Northwest Resource Information Center, Inc., Eagle, ID. 45 pp.

Clary, Warren P. and Bert F. Webster. 1989. Managing Grazing of Riparian Areas in the Intermountain Region, GTR INT-263. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 13 p.

Clary, W. and B. Webster. 1989. Managing grazing of riparian areas in the Intermountain Region. USDA Forest Service General Technical Report INT-263, 11 p.

Council for Agricultural Science and Technology. 1974. Livestock grazing of federal lands in the 11 western states. Journal of Range Management 27(3). May 1974.

Elmore, Wayne. 1988. Stream processes and grazing strategies. Presentation at: Riparian management workshop challenges and opportunities; 1988 May 3, Elko, Nevada: Nevada Cooperative Extension.

Frazier, Joseph. 1979. Grazing systems for western rangelands. USDA, Forest Service, Intermountain Region, Humboldt National Forest.

GAO (General Accounting Office). 1988. Public rangelands, some riparian areas restored but widespread improvement will be slow. Report to congressional requesters. RCED-88-105. Washington, D.C.: General Accounting Office.

Hall, Frederick C., and Larry Bryant. 1995. Herbaceous stubble height as a warning of impending cattle grazing damage to riparian areas. U.S. Department of Agriculture, Pacific Northwest Forest and Range Experiment Station, Forest Service. GTR-362.

Hall, F. 1999. Test of observer variability in measuring riparian shrub twig length. Journal of Range Management. 52(6): 633-636.

Hinton, Wayne K. 1987. The Dixie National Forest - Managing an Alpine Forest in an Arid Setting. Dixie National Forest. 161 pp.

Kauffman, J. and W. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications. A review. Journal of Range Management. 37(3): 430-437.

Kindschy, Robert R. 1987. Riparian reminiscences. In Rangelands, Society for Range Management, Vol. 9, No. 2. pp. 71-74.

Mosley, J., P. Cook, A. Griffis, and J. O'Laughlin. 1997. Guideline for managing cattle grazing in riparian areas to protect water quality: Review of research and best management practices policy. Idaho Forest, Wildlife, and Range Policy Analysis Group Report No. 15. University of Idaho

Nielsen, Darwin B. 1991. Rural Utah Economic Survival - Federal Land Grazing. Utah State University Extension Publication ERI-91-05. 13 pp.

Padgett, Wayne G. 1995. Wasatch-Cache proposed action, alternative 2: amend the forest plan. 22 p.

Platts, William S. 1979. Livestock grazing and riparian/stream ecosystems--an overview. proceedings, forum--grazing and riparian/stream ecosystems. Trout Unlimited, Inc. pp. 39-45.

Platts, William S. 1982. Livestock and riparian-fishery interactions: what are the facts? transactions of the 47th North American Wildlife and Natural Resources Conference. pp. 507-515.

Platts, W. 1991. "Livestock Grazing" In: Meehan, W., ed. "Influence of Forest and Rangeland on Salmonid Fisheries and their Habitats. AFS Special Publication 19. pp. 389-423.

Rosgen, D. 1996. Applied River Morphology. Printed Media Companies, Minneapolis, MN. pg. 6-40, 8-8 to 8-14

Skinner, Q. 1998. Stubble height and function of riparian communities. p 29-46. In: Stubble height and utilization measures: Uses and misuses. Oregon State University. Corvallis, OR. Agricultural Experiment Station Bulletin 682.

Swanson, Sherman. 1986. Options for riparian grazing management. Fact sheet 86-77, University of Nevada Cooperative Extension.

Swanson, Sherman. 1988. Prioritizing streams for rehabilitation and riparian management. Fact sheet 88-76, University of Nevada Cooperative Extension.

USDA. 2000. National Agricultural Statistics Service. Washington, DC.

USDA Forest Service. 1986a. Fishlake National Forest Land and Resource Management Plan. U.S. Forest Service, Intermountain Region, Ogden, UT.

USDA Forest Service. 1986b. Final Environmental Impact Statement, Fishlake National Forest Land and Resource Management Plan. Fishlake National Forest, Richfield, UT.

USDA Forest Service. 1993a. Forest Service Handbook (FSH) R4-2209.21. Rangeland Ecosystem Analysis and Management Handbook. Intermountain Region, Ogden, UT.

USDA FS. 1996. Properly functioning condition assessment. Utah high plateaus and mountains section. July 17, 1996. Forest Service Intermountain Region. Ogden, UT.

USDA FS 1997. State of the range. A request of the southern Utah ecogroup range effectiveness quality improvement team. Dixie, Fishlake, and Manti-LaSal National Forests. Cedar City, UT.

USDA FS. 1998. Fishlake National Forest. Environmental Effectrs of Livestock Grazing. Soils report/multi-allotment analysis. Michael D. Smith, forest soil scientist. March 6, 1988.

USDA FS. 2000. Project analysis file. Appropriate livestock grazing practices environmental assessment. DRAFT. Fishlake National Forest. Richfield, UT.

USDA FS. 2001. Rangeland Management Program Costs. A staff assessment of workforce and funding needs. March 2001. Washington, DC.

USDI BLM. 1993. Riparian area management. Process for assessing proper functioning condition. Technical reference 1737-9.

Utah. 1997-2000. Demographic and economic analysis (DEA). Governor's Office of Planning and Budget. Salt Lake City, UT.

Winward, Alma H. 1994. Riparian SRM 422. In: rangeland cover types of the United States. Society for Range Management 1994. Denver CO. Pp. 59-60.

Winward, A. 2000. Monitoring the vegetation resources in riparian areas. USDA Forest Service General Technical Report RMRS-GTR-47

Winward, Alma H. 2001. Personal Communication in discussion of GTR-47 "Monitoring the vegetation resources in riparian areas" and appropriate utilization criteria for riparian browse species.

Workman, John P. 1997. Utah livestock ranching. Number of livestock in Utah. The Society for Environmental Education.

Youngblood, Andrew P., Wayne G. Padgett and Alma H. Winward. 1985. Riparian community type classification of eastern Idaho-western Wyoming. U.S. Department of Agriculture, Forest Service, Intermountain Region, Report # R4-Ecol-85-01.