

ENVIRONMENTAL ASSESSMENT
REVISED BOWERY CATTLE ALLOTMENT MANAGEMENT
DIXIE NATIONAL FOREST
IRON COUNTY

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ABSTRACT

The Cedar City District of the Dixie National Forest is proposing to change the management of the Bowery Cattle Allotment described in the Bowery Allotment Management Plan (AMP) dated 3/22/79. The AMP is not consistent with the Dixie National Forest Land and Resource Management Plan (LRMP), and existing conditions on the allotment are not in line with the desired future conditions identified in the LRMP. Because of this, it is necessary to identify management actions which will move the Allotment toward the desired future condition. The selected actions will be subsequently documented in a revised AMP to meet present Forest Service policy and direction.

The Proposed Action is to reduce livestock numbers from 193 to 160 cattle for a 6/21 to 9/20 grazing season. Grazing management would continue under the existing 3-pasture modified deferred-rotation grazing system. Structural improvements and vegetation treatments required as part of project implementation are included in the Proposed Action.

This Environmental Assessment documents the analysis of the Proposed Action. In addition, four alternatives to the Proposed Action have also been evaluated in this Environmental Assessment, including "No Action", which would result in continuation of the existing grazing system and existing permitted numbers.

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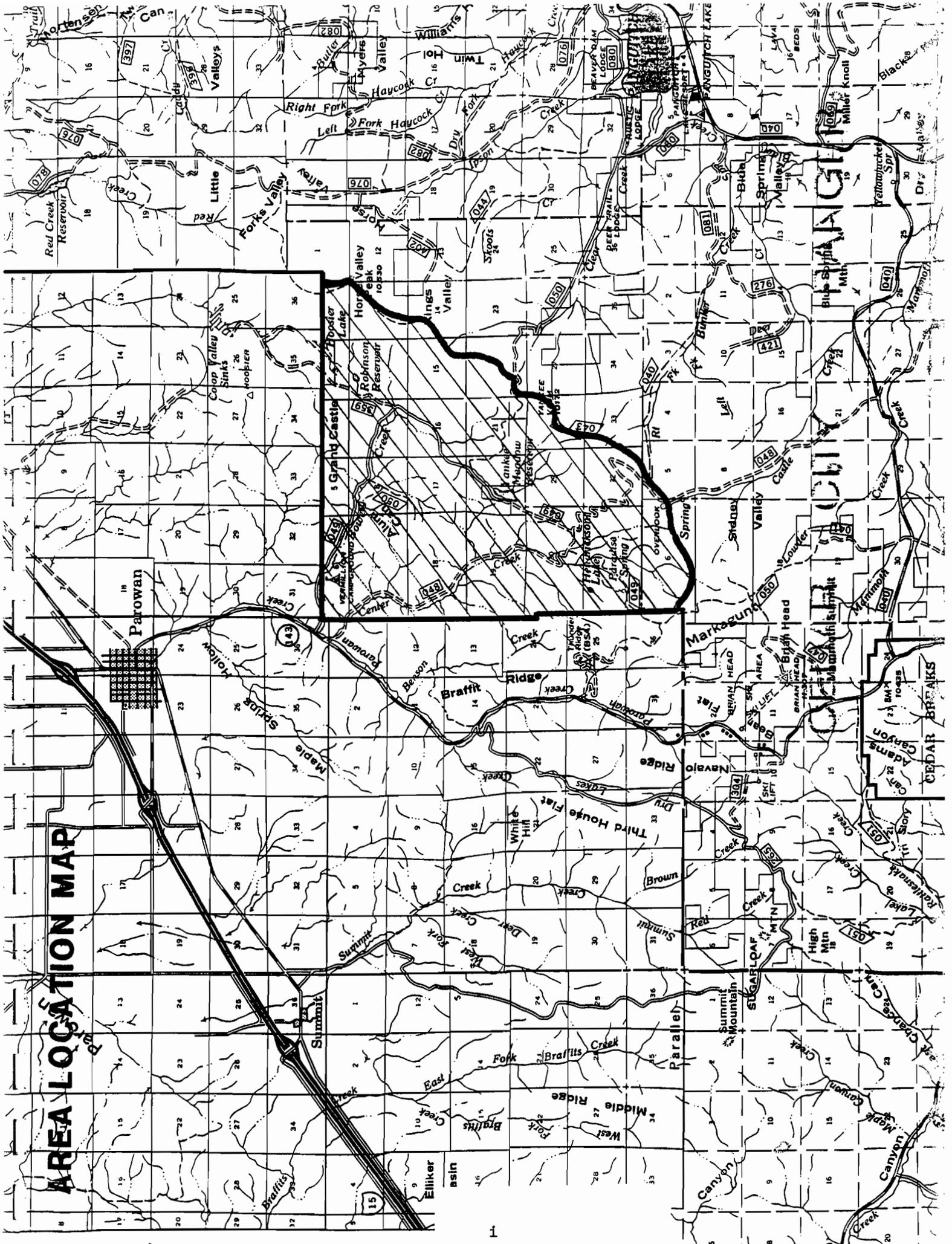
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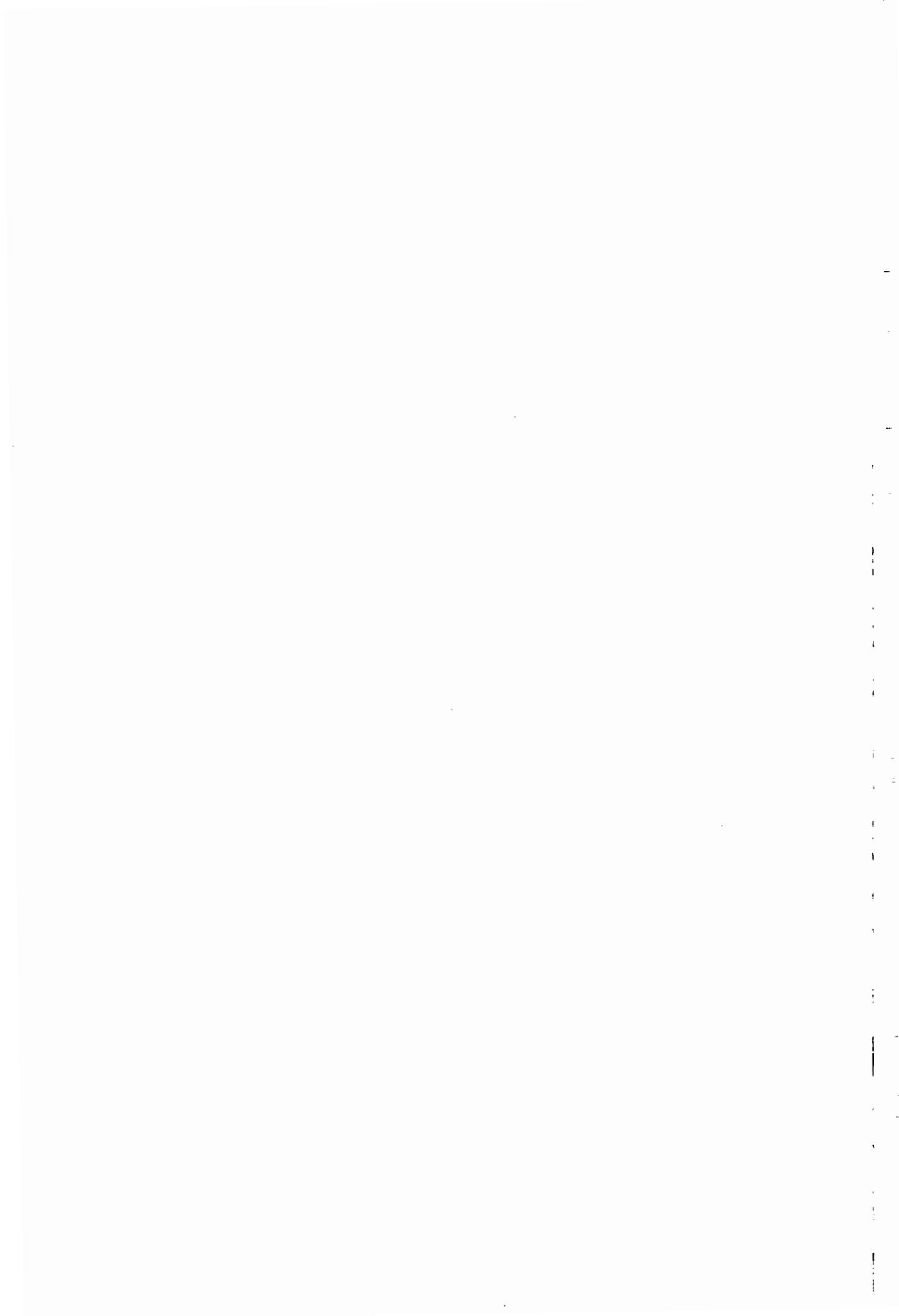


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SECTION 1: PURPOSE AND NEED FOR ACTION

INTRODUCTION

This environmental assessment (EA) was developed under the implementing regulations of the National Environmental Policy Act (NEPA), Council on Environmental Quality, Title 40, Code of Federal Regulation, Parts 1500-1508; and the National Forest Management Act (NFMA), Title 36, Code of Federal Regulations, Part 219. Further direction is provided in the 1986 Dixie National Forest Land and Resource Management Plan.

This EA documents analysis of site-specific, on-the-ground proposals. It discloses the environmental consequences of implementing the Proposed Action and alternatives to the Proposed Action.

It is *not* the Bowery Allotment Management Plan. Actions selected by the deciding officer as a result of the analysis documented in this EA will be documented in an AMP that will guide future management of the Bowery allotment.

PROJECT AREA

The Bowery Cattle Allotment includes approximately 14,618 acres of Dixie National Forest lands. These lands are located in SLBM, T35S., R8W. (refer to Area Location Map at the front of this document).

FOREST PLAN DIRECTION

The Environmental Assessment for Revised Bowery Cattle Allotment management is tiered to the Final Environmental Impact Statement for the Dixie National Forest Land and Resource Management Plan (FEIS-LRMP), and to the Dixie National Forest Land and Resource Management Plan (LRMP).

The National Forest System land within the Dixie National Forest has been divided into Management Areas, which differ from each other in resource emphasis. The following Management Areas are represented in the Bowery Allotment: Management Areas 1 (General Direction), 1A (Developed Recreation), 4A (Fish Habitat Emphasis), 6A (Livestock Grazing), 9A (Riparian Management) and 10B (Municipal Supply Watersheds). A map displaying the location of these Management Areas in the Bowery Allotment is in Appendix A.

Detailed descriptions of the Characteristics, Desired Future Condition and Management Area Direction are in LRMP-Chapter IV.

PURPOSE AND NEED STATEMENT

The acres designated in Management Area 6A and 9A account for most of the grazing capacity on the Bowery Allotment. Annual Operating Plans have allowed for one month of grazing use by permitted livestock numbers in each of the three pastures (Bowery, Yankee and Dark Hollow).

Based on past utilization observations, grazing use in excess of three weeks in the Bowery and Yankee Pastures can exceed the proper use standards and guidelines prescribed in the LRMP. This has been especially true in the riparian areas (Management Area 9A) and meadow areas, and partly stems from inadequate/uncontrolled livestock distribution. In addition, a small percentage of forage production is being lost as pinyon pine, juniper and mahogany increases on the Bowery Pasture and competes with more desirable forage plants.

In spite of the reduced time in these two pastures, permitted livestock have remained on the allotment for the full permitted grazing season most years, staying up to 45 days in the Dark Hollow Pasture.

While it is impossible to determine exact numbers, it is known that permitted livestock trail out of the Dark Hollow Pasture to graze on adjacent private lands, making it difficult to determine the actual grazing capacity in the Dark Hollow Pasture. However, if the Dark Hollow Pasture were fenced to the point where cattle were unable to graze adjacent private lands, the actual grazing capacity would be less than is currently permitted.

The purpose of the project is to implement and incorporate the goals and objectives of the LRMP by bringing permitted grazing capacity in line with actual grazing capacity and resolving grazing conflicts on adjacent private land. Revision of management practices on the Bowery Cattle Allotment Management will address grazing capacity, livestock distribution, grazing systems, structural improvements and vegetation manipulation.

PROPOSED ACTION

The Forest Service proposes to revise existing management on the Bowery Cattle Allotment by improving livestock distribution, enhancing forage through prescribed burning, improving existing fences, constructing additional fence, and adjusting livestock numbers to reflect actual grazing capacity on the Allotment. Specifically, the Proposed Action reduces livestock numbers from 193 to 160 cattle for a 6/21 to 9/20 grazing season. Grazing management would be a continuation of the existing 3-pasture modified deferred-rotation grazing system.

A complete description of the Proposed Action is included in this document under SECTION 2: ALTERNATIVES, INCLUDING THE PROPOSED ACTION.

ENVIRONMENTAL ISSUES

SCOPING

This section describes the efforts to determine the significant issues associated with the Proposed Action. Additional public involvement activities which occurred in conjunction with this project are included in this section.

The first step in the scoping process for management actions proposed for the Bowery Allotment was to identify members of the public who could be affected by the proposed action, or who might have an interest in the management of the Bowery Allotment. State and local government and other federal agencies were considered in this process.

These people and organizations were notified through personal contact by the District Range Staff Officer and/or by letter on January 18, 1991 that a revision in management practices on the Bowery Allotment was proposed to implement the LRMP in this area, and were informed about the kinds of decisions to be made. They were asked to comment on, or involve themselves in, the analysis of the Proposed Action and its alternatives.

A summary of public comments and the preliminary issues developed in response to the scoping letter were sent to all the respondents on May 21. On July 8, a public orientation meeting and field tour of the Bowery Allotment was held. As a follow-up, a written summary of the public meeting and tour, plus preliminary alternatives to the proposed action were sent out to interested publics on August 1. In all of these contacts, the opportunity for further comment was extended to all participants at each stage of the analysis process.

The record of these contacts, the mailing list and subsequent responses are in the Project File located at the Cedar City District Office.

ISSUE STATEMENTS

Approximately 19 individuals, groups, organizations and agencies responded to the invitation to comment on the proposed project, or involved themselves in the analysis of the project. Based on their input, and on information provided by Forest Service specialists to the Interdisciplinary Team, a list of the major issues to be considered in the analysis was developed. The following is the list of these major issues, and the indices of measurement for each.

1. Riparian areas may be adversely affected by livestock grazing. (*Number of AMs and season of use*)
2. Change in season or numbers may affect the permittees year-around livestock operation and economic stability. (*Permitted AMs*)
3. Dispersed recreation use may affect allotment management. (*Probability of contact between livestock and recreationists*)
4. Invasion of pinyon pine, juniper and mahogany, and natural forest succession from aspen to mixed conifer stands, may reduce grazing capacity for livestock. (*Percent reduction in suitable range over time*)
5. Uncontrolled livestock may be reducing the effectiveness of range management practices within the allotment, and impacting adjacent private land. (*Miles of secure allotment/pasture boundary*)
6. Vegetation density, distribution and vigor may be impacted by livestock grazing. (*Acres in satisfactory/unsatisfactory range condition*)
7. Wildlife may be affected by livestock grazing. (*Probable impact on use patterns and habitat for Management Indicator Species*)

CUMULATIVE EFFECTS ANALYSIS OF ISSUES: In addition to the direct effects which will be evaluated for each of the previously described issues, some issues warrant a Cumulative Effects Analysis (CEA) resulting from activities that would be generated by the implementation of the Proposed Action and alternatives. Those issues warranting a CEA are documented in the discussion of effects in Section 4 of this EA.

Issue #5 (uncontrolled livestock) was determined not to warrant a CEA as the problem affects a very localized area. The environmental effects related to this issue are appropriately addressed as direct effects.



SECTION 2: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

Section 2 describes the Proposed Action and the alternatives to the Proposed Action, including the "No Action" Alternative. In addition, this Section includes the alternatives considered but eliminated from detail analysis, features common to all "action" alternatives, and presents the environmental effects of the proposal and the alternatives in comparative form.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

CONVERSION OF UNSUITABLE LAND TO SUITABLE LAND THROUGH INTENSIVE VEGETATION TREATMENTS WITH NO REDUCTION IN LIVESTOCK NUMBERS/SEASON

This alternative would focus on converting areas with thick timber stands (unsuitable range) to suitable grazing areas through timber harvest/prescribe burning.

The ID Team determined that the number of acres which would need to be treated in order to realize the necessary forage production would be prohibitive for several reasons. As burning conditions would need to be extreme in order to maximize the clearing effect of the burn, there would be a very high risk to adjacent private lands and structures associated with prescribed burning large areas in the dense timber stands. Minimizing this risk would require substantial control lines and other measures which would drive up the cost of the burn and would still not prevent potential spot fires.

Timber harvest, either through small sales or commercial fuelwood harvest, would be the most practical opportunity to improve forage conditions. However, the potential increases in forage production would not be realized for 2-3 years following harvest, and the harvest activities themselves may not take place for up to 5 years following contract award. In addition, the complexity of issues involved with timber harvest activities would warrant a separate environmental analysis.

Future timber harvest opportunities will be explored, and if they are successfully implemented and yield substantial forage increases, additional livestock numbers would be considered at that time.

ELIMINATION OF LIVESTOCK GRAZING

This alternative was not considered in detail because it conflicts with the desired future conditions and management direction described in the Dixie Land and Resource Management Plan.

There have been no issues raised to date which would warrant the complete removal of livestock from the Bowery Allotment area.

REDUCTION IN GRAZING SEASON RATHER THAN NUMBER OF LIVESTOCK

Adjusting grazing capacity can be accomplished through adjustment in the number of animals or in the time they are permitted to graze.

Considering the numbers and season involved, the environmental effects would not be expected to vary significantly between the two methods. The permittees have expressed preference in adjustments to numbers rather than season. As the primary impact would be on them, reductions in season will not be evaluated in detail.

FEATURES COMMON TO ALL ACTION ALTERNATIVES

Applicable LRMP Standards and guidelines (S&G) for Management Areas 1, 1A, 4A, 6A, 9A and 10B are incorporated by reference in all action alternatives.

The following mitigation measures for this project are more specific applications of the S&G's to the Bowery Allotment area.

Proper use is 50% on all species except crested wheatgrass reseedings and wet meadows where 60% is allowable.

Livestock use will be prohibited in the Vermillion Castle Campground (Management Area 1A).

Livestock trailing will be prohibited along the length of Bowery Creek and Center Creek drainages.

Livestock grazing along Bowery Creek and Center Creek riparian area will be controlled at 50% of forage species including browse species.

Confine livestock trailing to establish driveways and historic trailing routes in Management Area 10B (municipal watershed area).

Reduce or remove livestock if municipal use water quality is endangered.

Burned areas will be protected from livestock grazing for two years by herding or by temporary fencing of the area, if necessary.

PROPOSED ACTION

GRAZING SYSTEM

The Cedar City District proposes to continue the existing 3-pasture modified deferred-rotation grazing system. Following is the grazing sequence for the first cycle:

TABLE 1: GRAZING SEQUENCE - PROPOSED ACTION

YEAR	BOWERY	YANKEE	DARK HOLLOW
1	A	C	B
2	C	A	B

A: Graze first - at range readiness - until proper use is reached.

B: Graze second - until proper use is reached.

C: Graze third - until proper use is reached or 9/20.

PERMITTED USE

Permitted use would be reduced from 193 permitted cattle for a 6/21 to 9/20 grazing season to 160 permitted cattle for the same season.

LIVESTOCK DISTRIBUTION

The permittees would do the riding necessary to keep the cattle from concentrating on riparian areas and on water sources where conflicts with other uses would occur.

IMPROVEMENTS

Improvements, except for private land/forest boundary fences, would be constructed on a cooperative basis between the Forest Service and permittees to maintain the integrity of the system (see Appendix B, Improvement Maps). Those improvements needed for total implementation of the system are:

1. Dark Hollow Pasture/private land boundary fence (approx. 1 1/2 miles)
2. Yankee Zone fence extension (approx. 1/4 mile)
3. Bowery division fence extension (approx. 1/4 mile)
4. Lower Bowery Creek cattleguard and drift fence (approx. 1/10 mile)
5. Second Left Hand Canyon cattleguard and drift fence (approx. 1/10 mile)
6. Dry Fork Spring development and trough
7. Racetrack Pond bentonite sealing
8. Prescribed burning (total approximately 750 acres):
 - Hendrickson Hill mahogany
 - Lower Bowery sagebrush and pinyon/juniper
 - Aspen/conifer areas

In the case of private land and livestock conflicts, permittees and landowners would need to resolve the conflicts.

ALTERNATIVES CONSIDERED AND ANALYZED IN DETAIL

Utilizing the issues identified in the analysis, the ID Team developed four alternatives in detail with others being eliminated from detailed study. The alternatives represent a range of management strategies and outputs to meet LRMP and allotment objectives.

All the "action" alternatives are consistent with LRMP direction, and with the Management Area Prescriptions found in the LRMP, pages IV-57 through IV-59; pages IV-109 through IV-113; pages IV-135 through IV-143; IV-156 through IV-159 and Appendix A, B and C. Any of the "action" alternatives could be implemented without amending the Forest Plan.

ALTERNATIVE 1 - NO ACTION

This alternative would continue the current management system and stocking rate. The existing modified-deferred rotation grazing system would be used. Following is the grazing sequence for the first cycle:

TABLE 2: GRAZING SEQUENCE - ALTERNATIVE 1 (NO ACTION)

YEAR	BOWERY	YANKEE	DARK HOLLOW
1	A	C	B
2	C	A	B

- A: Graze first - at range readiness - until proper use is reached.
- B: Graze second - until proper use is reached.
- C: Graze third - until proper use is reached or 9/20.

Permitted numbers and season would remain at 193 cattle for a 6/21 to 9/20 grazing season.

Improvements would include construction of one reservoir and 1/2 mile extension of the Bowery/Yankee pasture division fence, as identified on the existing Allotment Management plan approved 3/22/79 and on file in the Cedar City Ranger District Office (see Appendix B, Improvement Maps).

ALTERNATIVE 2

A modified rest-rotation grazing system would be implemented. Livestock numbers would be reduced to the estimated grazing capacity in two pastures. Following is the grazing sequence for the first grazing cycle:

TABLE 3: GRAZING SEQUENCE - ALTERNATIVE 2

YEAR	BOWERY	YANKEE	DARK HOLLOW
1	A	R	B
2	B	R	A
3	R	A	B
4	R	B	A

- A: Graze first - at range readiness - until proper use is reached.
- B: Graze second - until proper use is reached or 9/20.
- R: Rest

Permitted numbers and season would be 110 cattle for a 6/21 to 9/20 grazing season. When Dark Hollow is grazed first the season would be 7/1 to 9/30.

Improvements, except for private land/Forest boundary fences, would be constructed on a cooperative basis between the Forest Service and permittees to maintain the integrity of the system. Those improvements needed for total implementation of the system would be the same as described for the Proposed Action (see Appendix B, Improvement Maps).

ALTERNATIVE 3

The allotment would be separated into two divisions with the Bowery pasture as one division and Yankee and Dark Hollow pastures as another division.

The Bowery division would be used only by Adam's cattle under a season-long grazing system. The Yankee and Dark Hollow pastures would be used by the remainder of the permitted cattle under a season-long grazing system. Except for the Adam's cattle, all the cattle would be put in the Yankee pasture for six weeks and then moved to Dark Hollow for the remainder of the grazing season. The suitable range on Henderson Hill would be used in conjunction with the Yankee pasture.

Following is the grazing sequence for the first cycle:

TABLE 4: GRAZING SEQUENCE - ALTERNATIVE 3

YEAR	BOWERY	YANKEE	DARK HOLLOW
1	A	A	B

A: Graze first - at range readiness - until proper use is reached.

B: Graze second - until proper use is reached or 9/20.

Permitted numbers and season would be 45 cattle in the Bowery Division for a 6/21 to 9/20 grazing season.

Permitted numbers and season would be 115 cattle in the Yankee/Dark Hollow Division for a 6/21 to 9/20 grazing season.

Improvements would be developed as follows (see Appendix B, Improvement Maps):

1. Dark Hollow Pasture/Private Land Boundary Fence - permittees cooperating on construction of a section of the fence each year until it is completed.
2. Racetrack Pond and Dry Canyon Spring - the Forest and livestock association would cooperate to develop water storage at these locations.
3. The permittees would maintain the fences that divide the three major pastures. They would also construct fences above and below Willow Springs, with the Forest Service installing the cattle-guards.
4. The Forest would burn large stands of mahogany on Henderson Hill and in the Bowery area and study the possibility of burning selected areas covered with aspen and conifers.

ALTERNATIVE 4

The allotment would remain in three grazing pastures and under a deferred rotation grazing system. The difference between this alternative and the proposed action is the Dark Hollow pasture would be deferred until after seed ripe one year out of three. Grazing use would be delayed until July 1 when Dark Hollow was grazed first.

Following is the grazing sequence for the first cycle:

TABLE 5: GRAZING SEQUENCE - ALTERNATIVE 4

YEAR	BOWERY	YANKEE	DARK HOLLOW
1	A	B	C
2	C	A	B
3	B	C	A

A: Graze first - at range readiness - until proper use is reached.

B: Graze second - until proper use is reached.

C: Graze third - until proper use is reached or 9/20.

Permitted numbers and season would be reduced from 193 cattle for a 6/21 to 9/20 grazing season to 160 cattle for the same season.

Improvements would be the same as described for the Proposed Action except for a protection fence around Yankee Reservoir (see Appendix B, Improvement Maps). The fence would be on the property boundary line and would be constructed cooperatively between the Forest Service and the Utah Division of Wildlife Resources.

COMPARISON OF THE PROPOSED ACTION AND ALTERNATIVES

In this section, the Proposed Action and alternatives are compared in the way they address each Issue identified in Section 1. Tables graphically display the comparison, followed by a brief narrative. These comparisons are based on the detailed description of environmental effects, documented in Section 4: Environmental Effects.

ISSUE #1: Riparian areas may be adversely affected by livestock grazing. *(Number of AMs and season of use)*

TABLE 6: SUMMARIZED COMPARISONS FOR ISSUE #1

ALTERNATIVE	BOWERY CK AMs	SEASON OF USE	CENTER CK AMs	SEASON OF USE
Prop. Action	240	Early/Late	240	Mid
1 (No Action)	290	Early/Late	290	Mid
2	110	Early:Mid/Late/Rest	220	Early:Mid/Late
3	245	Season Long	235	Late
4	240	Early/Late/Mid	240	Early/Late/Mid

NARRATIVE FOR ISSUE #1: Bowery Creek is the riparian area most likely to be impacted by livestock use, as Center Creek is relatively inaccessible for livestock.

Alternative 2 would provide the optimum management for the Bowery Creek riparian area by implementing a rest-rotation system with substantially reduced numbers.

Alternative 4 would be the next favorable because it provides for reduced numbers and a mid-season of use in addition to early and late use.

The Proposed Action would follow Alternative 4 and Alternative 2, as it provides for reduced numbers and deferment.

Alternative 3, though it has reduces numbers, utilizes season-long use in Bowery Creek, which would make it difficult to prevent overuse in this area.

Alternative 1 is the least favorable because, even with deferment, it has no reduction in numbers.

ISSUE #2: Change in season or numbers may affect the permittees year-around livestock operation and economic stability. *(Permitted AMs)*

TABLE 7: SUMMARIZED COMPARISONS FOR ISSUE #2

ALTERNATIVE	PERMITTED AMs
Proposed Action	480
Alternative 1 (No Action)	579
Alternative 2	330
Alternative 3	480
Alternative 4	480

NARRATIVE FOR ISSUE #2: The No-Action Alternative would have the least economic impact on the permittees because there would be no reduction in numbers.

Although the permitted use is the same, Alternative 3 would have the next lowest impact compared to the Proposed Action and Alternative 4, because it divides the herd, reducing some uncontrolled livestock use problems.

The Proposed Action and Alternative 4 would be similar in economic impact, following Alternative 3 and 1.

Alternative 2 would have the greatest economic impact due to the substantial reduction in permitted use.

ISSUE #3: Dispersed recreation use may affect allotment management. (Probability of contact between livestock and recreationists)

TABLE 8: SUMMARIZED COMPARISONS FOR ISSUE #3

ALTERNATIVE	PERMITTED NUMBERS	GRAZING SYSTEM
Proposed Action	160	3-Pasture, Modified Deferred-Rotation
1 (No Action)	193	3-Pasture, Modified Deferred-Rotation
2	110	3-Pasture, Modified Rest-Rotation
3	45/115	Season Long/2-Pasture, Same Season
4	160	3-Pasture, Deferred-Rotation

NARRATIVE FOR ISSUE #3: Probability of contact was determined by using the number of livestock on the allotment and the number of pastures livestock could be encountered at any given time.

Using this criteria, Alternative 2 rated the least impacting to recreationists because it provides the lowest stocking level, and would have one pasture per year that would be entirely without livestock use.

Alternative 4 would be the second least impacting because of the lower stocking levels coupled with a full 3-pasture deferred rotation system that would provide for one pasture of use at a time, and that period of use would vary every year. In addition, Alternative 4 provides for fencing of Yankee Reservoir from livestock use.

The Proposed Action would follow Alternatives 4 and 2, due to the lower stocking levels and one pasture in use at a time. However, Dark Hollow would continue to be used at the same time each year.

Alternative 1 follows the Proposed Action: Though it has the highest stocking levels, livestock are only in one pasture at a time.

Alternative 3 would be least desirable because cattle are in two out of three pastures throughout the grazing season.

ISSUE #4: Invasion of pinyon pine, juniper and mahogany, and natural forest succession from aspen to mixed conifer stands, may reduce grazing capacity for livestock. *(Percent reduction in suitable range over time)*

TABLE 9: SUMMARIZED COMPARISONS FOR ISSUE #4

ALTERNATIVE	RATING BASED ON ESTIMATED PERCENT REDUCTION IN SUITABLE RANGE
Prop. Action	2
1 (No Action)	4
2	1
3	3
4	2

NARRATIVE FOR ISSUE #4: Alternative 1 would be most likely to have the highest percentage of reduction in suitable range over time. Stocking levels remain high, resulting in lowered plant vigor due to overuse. There would be no prescribed burning to retain/create more suitable range.

Alternative 3 would be next highest in reduction in suitable range. Though livestock numbers are reduced in this Alternative 3, it is believed that the season-long/same-season grazing use would result in lowered plant vigor and provide less competition to re-establishment of pinyon pine/juniper and conifers.

Alternative 4 and the Proposed Action would equally reduce the loss in suitable range as they both treat pinyon pine/juniper and conifer areas, and have deferred systems in addition to less livestock numbers.

Alternative 2 would be expected to have the least reduction in suitable range due to the prescribed burn treatments coupled with substantially reduced numbers and a rest-rotation system.

ISSUE #5: Uncontrolled livestock may be reducing the effectiveness of range management practices within the allotment, and impacting adjacent private land. *(Miles of secure allotment/pasture boundary)*

TABLE 10: SUMMARIZED COMPARISONS FOR ISSUE #5

ALTERNATIVE	BOWERY/PRIVATE	DARK HOLLOW/PRIVATE
Proposed Action	+	+
1 (No Action)	-	-
2	+	+
3	++	+
4	+	+

NARRATIVE FOR ISSUE #5: The Proposed Action and all "action" alternatives include construction of a fence on the National Forest/private land boundary along the Dark Hollow pasture, so these are equally superior to the Alternative 1 (No Action) in managing the uncontrolled livestock use in this area.

Uncontrolled use related to the Bowery pasture occurs as the Adams herd of cattle tries to return to preferable home ranges adjacent to the Bowery pasture. The Proposed Action and all "action" alternatives improve the interior fences to aid in turning cattle trying to return to private land through the Bowery pasture.

However, Alternative 3 specifically manages the Bowery pasture for the Adams cattle. Therefore, Alternative 3 would provide the greatest management of uncontrolled livestock use, followed equally by the Proposed Action and Alternatives 2 and 4. Alternative 1 would take no action to correct this situation.

ISSUE #6: Vegetation density, distribution and vigor may be impacted by livestock grazing. (*Acres in satisfactory/unsatisfactory range condition*)

TABLE 11: SUMMARIZED COMPARISONS FOR ISSUE #6

ALTERNATIVE	BOWERY AMs	YANKEE AMs	DARK HOLLOW AMs	GRAZING SYSTEM
Proposed Action	120	120	240	Mod. Def-Rotation
1 (No Action)	145	145	290	Mod. Def-Rotation
2	110/Rest	110/Rest	220	Rest-Rotation
3	135	110	235	Season Long
4	120	120	240	Deferred-Rotation

NARRATIVE FOR ISSUE #6: Alternative 2 would provide for the greatest number of acres in satisfactory condition, due to the substantially reduced livestock numbers, rest-rotation management, improved livestock distribution practices and vegetation treatments.

Alternative 4 would provide nearly as great an improvement towards satisfactory range, especially as it would include Dark Hollow in a fully deferred-rotation system and include reduced numbers, improved livestock distribution practices and vegetation treatments.

The Proposed Action would follow Alternative 4 and Alternative 2 as it reduces numbers, maintains the existing modified deferred-rotation, improves livestock distribution practices and implements vegetation treatments.

Even though it reduces numbers, improves livestock distribution practices and implements vegetation treatments, Alternative 3 would follow the Proposed Action, Alternative 4 and Alternative 2 in number of acres in satisfactory range condition due to the season-long/same season grazing system.

Alternative 1 would be least favorable as it maintains the current high stocking level, without any improved distribution practices or vegetation treatments.

ISSUE #7: Wildlife may be affected by livestock grazing. (Probable impact on use patterns and habitat for Management Indicator Species)

TABLE 12: SUMMARIZED COMPARISONS FOR ISSUE #7

ALTERNATIVE	IMPACT ON BIG GAME	IMPACT ON BIRDS	IMPACT ON SMALL MAMMALS
Proposed Action	+	+	+
1 (No Action)	0	0	0
2	++	++	++
3	+	0	0
4	+	+	+

NARRATIVE FOR ISSUE #7: The Proposed Action and alternatives would not adversely impact any of the management indicator species. However, some treatments would have some positive benefits.

Alternative 2 would provide benefits to all classes due to the rest-rotation system. This system would benefit the riparian areas, which would provide the greatest boost to birds and small mammals. In addition, big game animals may be attracted to the rested pasture.

The Proposed Action and Alternatives 4 would have positive impacts on all classes due to the reduced numbers and deferred rotation treatments.

Alternative 3 would be positive for big game, due to reduced numbers, but may lose this benefit for birds and small mammals in the riparian areas because of the season long/same season grazing system.

Alternative 1, although not negatively impacting any class, would not provide any additional benefits to wildlife habitat.

TOTAL BENEFIT/COST COMPARISON

An economic analysis was completed for the Proposed Action and each alternative. This analysis included benefits derived from the value of an animal unit month compared against the costs of fence and reservoir construction, costs associated with prescribed burning, costs to monitor management actions and costs to administer the grazing program on the Bowery Allotment.

Monetary values for non-market goods (e.g. wildlife/fisherman user day) are not comparable to dollars used in the economic analysis because they are 'derived' dollar values and not based on actual market prices or cost data. Therefore, they were not included as benefits for the purposes of this economic analysis.

The benefit:cost ratios for the Proposed Action and alternatives are included in the table below:

TABLE 13: ECONOMIC ANALYSIS

ALTERNATIVE	BENEFIT:COST RATIO	ESTIMATED BENEFITS	ESTIMATED COSTS
Proposed Action	0.81:1	\$45,591	\$56,245
Alternative 1	8.06:1	\$54,995	\$6,827
Alternative 2	0.56:1	\$31,344	\$56,245
Alternative 3	0.79:1	\$45,591	\$57,980
Alternative 4	0.69:1	\$45,591	66,006

Appendix C contains the economic analysis spreadsheets from which these numbers were derived.

SECTION 3: AFFECTED ENVIRONMENT

INTRODUCTION

The allotment includes Management Areas (1, 1A, 6A, 9A, and 10B). Each of these Management Areas have specific management prescriptions relating to livestock, timber, recreation values, and maintenance of wildlife and watershed values. Detailed management prescriptions are displayed in the 1986, Dixie National Forest Land and Resource Management Plan on pages IV-57, IV-109, IV-135, and IV-156.

ISSUE #1 - RIPARIAN AREAS

Bowery Creek and Center Creek are designated riparian areas in the Dixie National Forest Land and Resource Management Plan (see Management Areas Map, Appendix A). There are other streams, springs and seeps that are not designated as riparian areas due to their small, scattered and intermittent nature.

Yankee Meadow Reservoir, owned by the State and administered by Utah Division of Wildlife Resources, is located in the center of the Allotment and provides irrigation water for Parowan Water Users as well as an important fishery resource (see Recreation/Wildlife Map, Appendix D). Bowery Creek and Center Creek are not considered significant fishery resources. Bowery Creek is dewatered late in the summer each year and Center Creek has a very steep gradient with high stream velocities.

Bowery Creek flows in a northerly direction for approximately five miles from Yankee reservoir to the Forest Boundary near Parowan Canyon. The upper two miles of riparian area are most affected by livestock grazing, and are currently classified in unsatisfactory condition (see Range Condition Map, Appendix E). The lower three miles of Bowery Creek flows through a narrow, inaccessible canyon.

A typical section of Bowery Creek below Yankee reservoir is approximately 20' to 25' wide with Kentucky bluegrass and wiregrass as the primary plant species. There are sedges in places along the water edge but willows are absent except for isolated areas.

Around mid-September each year, the water is shut off at Yankee reservoir by the Parowan Irrigation Company, resulting in the dewatering of Bowery Creek below the reservoir. The water isn't turned back into the channel until May or June the following year. When the water is turned out of Yankee each year, there are relatively high flows that contribute to erosion of the channel.

The Bowery Creek riparian area includes areas in unsatisfactory condition. Raw, vertical banks, that can be partly attributed to the high flow release from Yankee Reservoir, exist on a portion of the channel. There are sections of the creek where cattle are trailing into water and causing trampling and sloughing of the banks. Willows are evident only in those rocky, inaccessible areas. Desirable riparian vegetation appears to be limited by the dewatering of Bowery Creek.

Center Creek flows for approximately six miles from the head of Dark Hollow to Parowan Canyon. The channel gradient is steep as it flows through Second Left Hand Canyon of Bowery Creek. Much of the channel is located in a steep, rough drainage with considerable brush cover. For these reasons, there is little effect on the riparian vegetation from livestock grazing in this area. Near the headwaters of Center Creek there is a diversion in which water is piped approximately three miles to Yankee reservoir.

Bowery and Center Creeks are often a source of floodwaters affecting the Parowan area. These floods originate from high intensity summer storms on the barren Pink Cliffs in the middle to lower sections of both drainages.

ISSUE #2 - SOCIAL-ECONOMIC

Historically, Parowan Valley and the range adjacent to the Allotment has been used for ranching and farming purposes for over 140 years. Parowan Valley is agricultural based and Parowan City relies heavily upon taxes which come directly from agriculture.

Livestock grazing on the Bowery allotment occurred prior to the creation of the Forest in 1905 until now. Originally there were both sheep and cattle grazing on the area. Cattle increased until the peak was reached in 1898. Sheep reached their peak in 1931. From this point the numbers were reduced to the present permitted numbers.

Current permitted numbers are 193 cattle for a June 21 to September 20 grazing season, for a total of 579 animal months.

Permitted numbers for individual permittees on the Bowery allotment range from 5 head to 63 head. There are nine permittees, of which about half have outside jobs other than farming or ranching. Two permittees are involved in both sheep and cattle operations.

Permittees that use the allotment are engaged primarily in a cow-calf operation. They use the allotment for a majority of their summer grazing. The cattle graze on private land in the spring, fall and winter months.

ISSUE #3 - RECREATION USE

Recreation within the allotment consists of dispersed recreation activities such as camping, picnicking, fuelwood gathering, biking, horseback riding, pleasure driving and hunting. The heaviest use occurs during the fishing season associated with Yankee Reservoir. There is an influx of hunters during the deer hunt in October. Fuelwood gathers frequent the area through out the summer and fall. There is a Boy Scout Camp located at Thunder Ridge adjacent to the allotment and is used heavily during June, July and August.

The Yankee reservoir area is closed to overnight camping. As a result, the National Forest land adjacent to Yankee Reservoir, including upper Bowery Creek, are popular camping areas and receive heavy use.

Recreation use associated with Brian Head, which includes primarily mountain biking and hiking, have become important uses in the Dark Hollow pasture of the Bowery allotment. The Dark Hollow Trail, Hendrickson Lake Trail, Boy Scout Trail, and the Second Left Hand Road are tied into the Brian Head trail system and consequently are receiving heavy use.

Willow Flat in the lower part of Second Left Hand Canyon is used for various group activities during the summer months. In addition, individual campers use the area.

The Recreation/Wildlife Map in Appendix D displays the location of trails and other important recreation features on the Allotment.

ISSUE #4 - INVASION OF PINYON-JUNIPER AND CONIFER

There are 1328 acres of sagebrush/grass type on the allotment (see Vegetation Type Map, Appendix F). An estimated 35% is being invaded by pinyon-juniper. Trend studies on the allotment indicated there has been a substantial increase in pinyon-juniper on the sagebrush/grass types on the allotment (Project File). Grass, forb and browse production is presently being affected by the increase in pinyon-juniper.

Average forage production on the sagebrush/grass type is 440 lbs/acre. Ground cover, including vegetation and litter, is approximately 47% (Project File).

In the aspen type there is a gradual increase in conifers. The largest block of suitable acres of aspen are in the Dark Hollow pasture of the allotment. Total acres of suitable aspen on the allotment are 2006 of which 70% is located in Dark Hollow (see Vegetation Type Map, Appendix F). Conifers are invading the openings in the aspen types and competing with aspen reproduction in the pure aspen types.

Average forage production in the aspen type is 450 lbs/acre. Ground cover in the aspen type averages approximately 87% (Project File).

ISSUE #5 - UNCONTROLLED LIVESTOCK USE ON ADJACENT PRIVATE LAND

There has been a continuing problem with uncontrolled livestock use on private land adjacent to the Allotment.

On the north boundary of the Allotment there is private land belonging to an absentee owner. Beyond that small tract of land, one of the Allotment permittees owns a large block of grazing land. The boundary fence between private land and National Forest land is in poor condition and, historically, cattle have drifted back and forth from the Forest to the private land. There are letters in the Allotment folder documenting a history of unauthorized use (Project File).

On the southwest boundary of the Allotment, the adjacent private land is currently owned by Brian Head Enterprises. The boundary fence is practically non-existent; consequently the Bowery cattle drift off the Forest onto private land. Private land around Brian Head continues to be developed for recreational and year-round residences, resulting in conflicts with the unauthorized grazing. There have been complaints from subdivision owners, as well as the Town of Brian Head, about cattle trespassing and causing damage to their property and facilities (Project File).

About 1974, the Boy Scouts of America (BSA) acquired land west of Hendrickson Lake for the Thunder Ridge Boy Scout Camp. The Scout Camp is now a popular facility used by hundreds of Scouts during June, July and August. The area is not fenced, consequently Allotment cattle drift off the allotment and graze the Boy Scout complex and surrounding area. Though earlier written correspondence (Project File) from BSA officials indicated that there were little conflicts with livestock use of the area, recent correspondence and conversations with BSA officials indicate that uncontrolled livestock use has become a problem.

ISSUE #6 - VEGETATION DENSITY, DISTRIBUTION AND VIGOR

The Bowery Allotment encompasses five distinct vegetation types: Aspen, sagebrush/grass, reseeded areas, forbs and conifer (see Vegetation Type Map, Appendix F). The suitable grazing area includes all types except the conifer type (see Suitability Map, Appendix G).

Riparian vegetation is interspersed throughout the allotment. These areas are discussed under Issue #1 - Riparian Areas.

There are no known federally listed threatened, endangered or sensitive vegetation species on the Allotment (Appendix H).

Refer to Appendix E, Range Condition Map for a graphic display of satisfactory and unsatisfactory range conditions.

ASPEN TYPE

This vegetation type accounts for 2006 acres of the total 14618 acres within the Allotment.

The principle species in the aspen type are: Aspen (*Populus tremuloides*), sedge (*Carex spp.*), bluegrass (*Poa pratensis*), Letterman needlegrass (*Stipa lettermanii*), snowberry (*Symphoricarpos oreophyllis*), clover (*Trifolium spp.*) and dandelion (*Taraxicum officinale*).

Vegetation vigor is good in these areas due to the low level of grazing pressure they receive (see Utilization Map, Appendix I).

SAGEBRUSH/GRASS TYPE

This vegetation type accounts for 1328 acres of the total 14618 acres within the Allotment.

The principle species in the sagebrush/grass type are: Big sagebrush (*Artemesia tridentata*), bitterbrush (*Purshia tridentata*), snowberry (*Symphoricarpos oreophyllis*), aster (*Aster spp.*), sedge (*Carex spp.*), slender wheatgrass (*Agropyron trachycaulum*), oakbrush (*Quercus gambelii*), pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*).

Vegetation vigor is fair to good in these areas, and is related to the level of grazing pressure received. Areas receiving repeated use in excess of 50% are generally in low vigor (see Utilization Map, Appendix I). These areas are moderately used by livestock.

RESEEDED AREAS

This vegetation type accounts for 390 acres of the 14618 acres within the Allotment.

The principle species in the reseeded areas are: Silver sagebrush (*Artemesia cana*), smooth brome grass (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), western wheatgrass (*Agropyron smithii*), Kentucky bluegrass (*Poa pratensis*), and fleabane (*Erigeron flageraris*).

Vegetation vigor is fair to good in these areas, and is related to the level of grazing pressure received. Areas receiving repeated use in excess of 60% are generally in low vigor (see Utilization Map, Appendix I). These areas are moderately to heavily used by livestock, especially in those areas adjacent to Bowery Creek.

The smooth brome grass seeding is over 20 years old, and is low in vigor. Sage brush is beginning to become an increasing component in these areas.

FORB TYPE

This vegetation type accounts for 104 acres of the total 14618 acres within the Allotment.

The principle species in the forb type are: Arrowleaf balsamroot (*Balsamorhiza sagittata*), bitterbursh (*Purshia tridentata*), Kentucky bluegrass (*Poa pratensis*), sedge (*Carex spp.*), fleabane (*Erigeron flageraris*), and needlegrass (*Stipa columbiana*).

Vegetation vigor is fair to good in these areas, and is related to the level of grazing pressure received (see Utilization Map, Appendix I). These areas are lightly to moderately used by livestock, depending on the quality of livestock distribution across the Allotment.

CONIFER TYPE

This vegetation type account for 10790 acres of the total 14618 acres within the Allotment.

The principle species in the conifer type are: Douglas fir (*Pseudotsuga menziesii*), Engleman spruce (*Picea englemanni*), white fir (*Abies concolor*), and subalpine fir (*Abies lasiocarpa*). There is virtually no understory in these dense stands, and, consequently, little grazing use (see Utilization Map, Appendix I).

ISSUE #7 - WILDLIFE USE

The Bowery allotment provides habitat for approximately five Management Indicator Species identified in the LRMP. These include: Deer, elk, turkey, common flicker, and goshawk. Primarily, big game use on the allotment is deer, although elk, bear and cougar are found occasionally. No critical wildlife habitat areas have been identified within the Allotment (see Recreation/Wildlife Map, Appendix D).

A pellet group transect located on the sidehill north of the Bowery enclosure was used for recording deer winter use but discontinued in 1988. Most of the use on the site was during spring, summer and fall. Prior to discontinuation of the transect deer use ranged from 62 deer days/hectare in 1980 to 131 deer days/hectare in 1987.

Bitterbrush and willows have been hedged by livestock next to water. Light use is occurring on bitterbrush on other areas of the allotment. There have been no deer/livestock conflicts identified.

Brook trout and rainbow trout are found in Yankee reservoir, Hendrickson Lake and Bowery Creek. Center Creek has been identified as having Utah cutthroat trout.

There are no known federally listed threatened, endangered or sensitive species on the Allotment (Appendix H).



SECTION 4: ENVIRONMENTAL EFFECTS

INTRODUCTION

The environmental effects provide the scientific and analytical basis for the comparison of alternatives described in Section II. It includes direct, indirect, and cumulative effects for the Grazing Management Alternatives.

ISSUE #1 - EFFECTS ON RIPARIAN AREAS

PROPOSED ACTION

The proposed action would result in beneficial effects to vegetation and soil because animal months would be reduced by 17% and the Bowery and Yankee pastures would be deferred until after seed ripe in alternate years.

The Dark Hollow pasture would be deferred until after flowering each year. Center Creek, which is part of the Dark Hollow pasture, for the most part is inaccessible to livestock and would have light grazing.

Deferred grazing works best where considerable differences exist between the palatability of plants and the conveniences of areas for grazing (Holchek 1983). In the Bowery allotment, deferred use would provide the opportunity to balance grazing use on the preferred streamside zone with use on the less palatable upland sites. Increased vigor and seed production every other year would also be a benefit.

Plant vigor and range condition would be improved over the allotment, however, those areas in unsatisfactory condition would be slower to respond. (Launchbaugh and Owensby, 1978).

Even under some types of rotational grazing systems, riparian areas often receive excessive use even under light stocking rates because they are readily accessible to water, occur with relatively flat topography, and usually contain high palatability forage (Roath and Krueger 1982, Holechek 1983). Utilization standards for the Bowery allotment would not exceed 50% use by weight on all areas of the allotment, including riparian areas.

In addition, the dewatering of Bowery Creek by the Parowan Irrigation Company for over half of the year would limit densities of desirable grasses and sedges. High water releases would continue to adversely effect channel stability.

Proposed improvements, including burning, additional water developments, and improved fences would reduce actual time the livestock would spend in the riparian areas. As a result, there would be less trampling and trailing damage.

Over time, this Proposed Action would maintain or gradually improve the condition of riparian areas.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Riparian condition would be slightly improved under this Alternative, which would result in reduced potential for sediment transport outside of the Allotment and into the cumulative effects area.

ALTERNATIVE 1 - NO ACTION

There would be no adjustments in livestock numbers or season. The Bowery Creek riparian area would continue to be managed under a modified deferred-rotation grazing system.

The Dark Hollow pasture would be deferred until after flowering each year. Center Creek would receive light use by livestock.

Under the existing modified deferred-rotation grazing system, and existing livestock numbers, riparian improvement would not be expected.

In addition, the dewatering of Bowery Creek by the Parowan Irrigation Company for over half of the year would limit densities of desirable grasses and sedges. High water releases would continue to adversely effect channel stability.

Utilization standards as outlined in the Land and Resource Management Plan would be applied as directed.

There would be limited benefits from the proposed improvements under this alternative.

Over time, riparian areas would be expected to continue moving towards unsatisfactory condition.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Riparian condition would be static or degrade slightly under this Alternative. This would result in increased potential for sediment transport outside of the Allotment and into the cumulative effects area over time. However, the amount of sediment which might be contributed would be unsubstantial.

ALTERNATIVE 2

There would be a major reduction in permitted use of 43% and implementation of a double rest-rotation grazing system.

The Dark Hollow pasture would have alternate early and mid-season use, which would differ from the Proposed Action and other alternatives.

Hayes (1978), in Idaho, stated that species composition appeared to be improved under a rest-rotation grazing system and bank slough-off occurrences were not increased if utilization was under 60%.

Claire and Storch (unpublished) found a rest-rotation system to be favorable for achieving desired streamside management objectives if one year of total rest in every three years was included in the rotation schedule.

A double rest-rotation grazing strategy was used with good success on pastures surrounding the Johnson Creek, Idaho, study site (Platts 1981).

There would be an increase in plant vigor and seedling establishment. Ground cover, including willow rejuvenation, and overall watershed stability would improve. (BLM Technical Reference 1987).

Criticism of rest-rotation systems includes reports that objectives for herbaceous vegetation were not being achieved within desired time limits (Storch 1979), and that rest-rotation systems increase trailing and trampling damage, causing streambank erosion and instability (Meehan and Platts 1978).

On the Bowery allotment, maximum utilization standards of 50% would be applied on all areas of the allotment.

Livestock trailing restrictions along the length of Bowery Creek and Center Creek would aid in riparian area protection and recovery.

However, while the rest-rotation system would be the most beneficial grazing strategy for the Bowery Creek riparian area (compared to the Proposed Action and other alternatives), positive change on the riparian area

would still be limited by the dewatering of Bowery Creek by the Parowan Irrigation Company for over half of the year. This action would ultimately limit the full potential of the rest-rotation system to increase densities of desirable grasses and sedges. High water releases would continue to adversely effect channel stability.

Proposed improvements under this Alternative (burning, water developments and fencing) would encourage livestock use on upland areas, consequently reducing time livestock would spend in riparian areas.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Riparian condition would be improved to it's highest potential under this Alternative, which would result in reduced potential for sediment transport outside of the Allotment and into the cumulative effects area.

ALTERNATIVE 3

This alternative would reduce animal months by 17%. The Bowery pasture would be grazed season-long. Yankee and Dark Hollow pastures would receive repeated same-season grazing.

Dark Hollow would be deferred until flowering time each year. Center Creek would remain in it's present condition since livestock use in this drainage is light.

In the Bowery Creek riparian area, the vegetation would show the least amount of improvement under this Alternative compared with the Proposed Action and other alternatives. In a recent study, season-long grazing treatment has provided the least amount of vegetative improvement over the eight-year period (Volland 1990). Streambank cover would be reduced resulting in channel instability (Platts 1986).

In addition, the dewatering of Bowery Creek by the Parowan Irrigation Company for over half of the year would limit densities of desirable grasses and sedges. High water releases would continue to adversely effect channel stability.

Utilization standards of 50% or less would leave stubble for some streamside protection.

Proposed improvements and better livestock distribution would reduce actual time the livestock would be using the riparian areas. As a result trampling and trailing damage would be reduced. However, adequate livestock distribution under a season-long system is more difficult to achieve as cattle naturally prefer riparian areas and will congregate in these areas.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Riparian condition would be static or gradually degraded over time under this Alternative, which would result in the potential for sediment transport outside of the Allotment and into the cumulative effects area. However, the amount of sediment actually leaving the Allotment area would be unsubstantial.

ALTERNATIVE 4

Under this alternative, impact to the riparian areas would be reduced by decreasing animal months by 17% and implementing a 3-pasture deferred-rotation grazing system.

All of the pastures, including the Dark Hollow pasture would be deferred until after seed ripe, one year out of three.

There would be beneficial effects to vegetation and soil by improving plant vigor and providing the opportunity for seed production in each pasture. (Platts, 1981).

As in the Proposed Action, the deferred system would provide the opportunity to balance grazing use on the preferred streamside zone with use on the less palatable upland sites (Holchek, 1983).

Improvement of range conditions would be gradual, especially on those areas that are in unsatisfactory condition (Launchbaugh and Owensby, 1978).

Utilization standards would be met in the riparian zone which would leave plant stubble to protect the streambank. Under this system, bank trampling damage is minimized by deferring grazing until late August when soil moisture content has decreased by 8-10% or less (BLM Technical Reference 1987).

The dewatering of Bowery Creek by the Parowan Irrigation Company for over half of the year would limit densities of desirable grasses and sedges. High water releases would continue to adversely effect channel stability.

Center Creek would continue to have light grazing use and would not be affected.

Proposed improvements (burning, water developments, and fencing) would reduce actual time the animals would spend in the riparian zone. This would result in less trailing and trampling.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Riparian condition would have slight improvement under this Alternative, which would result in reduced potential for sediment transport outside of the Allotment and into the cumulative effects area.

ISSUE #2 - EFFECTS ON SOCIO-ECONOMICS

PROPOSED ACTION

Under the Proposed Alternative, permitted numbers would be reduced by 17%, from 579 animal months to 480 animal months.

Allotment reductions create detrimental effects on the ranching sector by forcing ranchers to substitute higher cost forages in order to maintain herd sizes (Torell, et.al, 1981). If they choose to reduce the herd size for their entire operation, then pasture costs increase as a result of facilities, equipment, etc, costs spread over the smaller herd size.

CUMULATIVE EFFECTS:

This action, while adversely impacting the permittees on the Bowery Allotment, would have a mild cumulative effect on the Parowan economic base. This effect would result from a somewhat reduced cash flow from the nine individual ranch pastures.

ALTERNATIVE 1 - NO ACTION

There would be no reduction in animal months under this alternative. Therefore, there would be no economic impact to the permittees, nor any negative cumulative effect on the Parowan economic base.

ALTERNATIVE 2

Under Alternative 2, permitted numbers would be reduced by 43%, from 579 animal months to 330 animal months.

This Alternative, compared with the Proposed Action and other alternatives, would cause the greatest negative impact to the ranchers due to the size of the reduction.

Allotment reductions create detrimental effects on the ranching sector by forcing ranchers to substitute higher cost forages in order to maintain herd sizes (Torell, et.al, 1981). If they choose to reduce the herd size for their entire operation, then pasture costs increase as a result of facilities, equipment, etc, costs spread over the smaller herd size.

CUMULATIVE EFFECTS: This action would have a moderate cumulative effect on the Parowan economic base. This effect would result from a substantially reduced cash flow from the nine individual ranch units.

ALTERNATIVE 3

Under Alternative 3, permitted numbers would be reduced by 17%, from 579 animal months to 480 animal months.

Allotment reductions create detrimental effects on the ranching sector by forcing ranchers to substitute higher cost forages in order to maintain herd sizes (Torell, et.al, 1981). If they choose to reduce the herd size for their entire operation, then pasture costs increase as a result of facilities, equipment, etc, costs spread over the smaller herd size.

CUMULATIVE EFFECTS: This action, while adversely impacting the permittees on the Bowery Allotment, would have a mild cumulative effect to the Parowan economic base. This effect would result from a somewhat reduced cash flow from the nine individual ranch units.

ALTERNATIVE 4

Under Alternative 4, permitted numbers would be reduced by 17%, from 579 animal months to 480 animal months.

Allotment reductions create detrimental effects on the ranching sector by forcing ranchers to substitute higher cost forages in order to maintain herd sizes (Torell, et.al, 1981). If they choose to reduce the herd size for their entire operation, then pasture costs increase as a result of facilities, equipment, etc, costs spread over the smaller herd size.

CUMULATIVE EFFECTS: This action, while adversely impacting the permittees on the Bowery Allotment, would have a mild cumulative effect to the Parowan economic base. This effect would result from a somewhat reduced cash flow from the nine individual ranch units.

ISSUE #3 - EFFECTS ON DISPERSED RECREATION

PROPOSED ACTION

Under the proposed action, livestock numbers would be reduced 17%. As a result, there would be less contact between livestock and dispersed recreation users but it would not be substantially less.

In the Dark Hollow pasture, there is a network of trails that originate at Brian Head and pass through the pasture. As dispersed recreation use on these trails increases, human-livestock contacts would increase. This Alternative would schedule livestock use on the Dark Hollow pasture for approximately one month each year between July 20 and September 20.

Cattle would continue to use Yankee Reservoir and Bowery Creek as a water source. There would continue to be livestock-dispersed recreation user contacts. As recreation use increases and the frequency of contacts with livestock increases, direct conflicts would be more likely.

Fishermen tend to be more sensitive to management practices such as grazing. However, many of the users are local residents who frequent the area each year. There is a direct relationship between the familiarity with National Forest as measured by the number of prior visits, and a willingness to accept intensive management

practices. There is also data that indicates that users with more than 16 visits to the area are more likely to accept intensive grazing management than those with fewer visits (Saunderson, Meganck and Gibbs 1987).

Utilization standards would be adhered to in all areas which would minimize overuse areas by livestock.

Proposed improvements and better livestock distribution would reduce concentration of livestock and reduce opportunities for dispersed recreation users to criticize grazing management.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Recreation Cumulative Effects Map, Appendix K.

As recreation pressure increases within the cumulative effects area, the probability of contact between recreationists and livestock will increase. However, since this Alternative reduces livestock numbers, it should not result in displacement of recreationists to another area.

ALTERNATIVE 1 - NO ACTION

This alternative would continue the current level of livestock use on the allotment. Livestock grazing would be managed by deferring use in the three pastures. Contact between livestock and dispersed recreationists under this alternative would be the highest probability compared to the Proposed Action and any of the alternatives.

In the Dark Hollow pasture, there is a network of trails that originate at Brian Head and pass through the pasture. As use on these trails increases, human-livestock contacts would increase. Under this alternative, the livestock would use the Dark Hollow pasture for approximately one month between July 20 and August 20.

There would be livestock concentrations at Yankee Reservoir and camping areas near Bowery Creek as is now the case. There would continue to be high probability of livestock - recreation user contacts.

Cattle would tend to concentrate along Bowery Creek resulting in occasional contacts with dispersed recreation users. Many of the recreationists who use the area each year are local residents. They are familiar with National Forest and grazing management practices and are willing to accept these practices.

Fishermen tend to be more sensitive to management practices such as grazing. However, many of the users are local residents who frequent the area each year. There is a direct relationship between the familiarity with National Forest as measured by the number of prior visits, and a willingness to accept intensive management practices. There is also data that indicates that users with more than 16 visits to the area are more likely to accept intensive grazing management than those with fewer visits (Saunderson, Meganck and Gibbs 1987).

Utilization standards would be used and would minimize overuse which would avoid conflicts with dispersed recreation users.

Proposed improvements outlined under this alternative would have minimal affect on livestock-recreation contacts.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Recreation Cumulative Effects Map, Appendix K.

As recreation pressure increases within the cumulative effects area, the probability of contact between recreationists and livestock will increase. This Alternative keeps livestock at existing numbers, so this potential conflict would be greater than in the Proposed Action or other alternatives. However, it should not result in displacement of recreationists to another area.

ALTERNATIVE 2

With this alternative, livestock would be reduced 43%. This alternative would result in the least amount of contact between livestock and dispersed recreationists.

In the Dark Hollow pasture, there is a network of trails that originate at Brian Head and pass through the pasture. As use on these trails increases, human-livestock contacts would increase. Under this alternative, there would be 110 head of permitted cattle for a one month season four years out of six. Less cattle numbers would reduce the potential frequency of contacts with recreationists.

For the Yankee Reservoir area, including Bowery Creek, there would be a major reduction in cattle numbers decreasing the frequency of contacts between livestock and recreationists. The grazing system would dictate scheduled rest two years out of six.

Fishermen tend to be more sensitive to management practices such as grazing. However, many of the users are local residents who frequent the area each year. There is a direct relationship between the familiarity with National Forest as measured by the number of prior visits, and a willingness to accept intensive management practices. There is also data that indicates that users with more than 16 visits to the area are more likely to accept intensive grazing management than those with fewer visits (Saunderson, Meganck and Gibbs 1987).

Utilization standards would be used and would minimize overuse which would avoid conflicts with dispersed recreation users.

Proposed improvements and improved livestock distribution outlined under this alternative would reduce the time livestock would spend around heavily used recreation areas near Yankee Reservoir and Bowery Creek. Livestock and recreation contacts would be minimized.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Recreation Cumulative Effects Map, Appendix K.

As recreation pressure increases within the cumulative effects area, the probability of contact between recreationists and livestock will increase. This Alternative substantially reduces livestock numbers, and provides one pasture out of three which will receive no livestock use each year. This Alternative would have the least chance of displacing recreationists, and may even attract recreationists into the rested pastures.

ALTERNATIVE 3

Under this alternative, there would be a 17% reduction in permitted cattle. The Dark Hollow pasture would be used the same time each year for approximately a month and a half. Livestock would be using the Dark Hollow pasture from about the first of August until the middle of September.

In the Dark Hollow pasture, there is a network of trails that originate at Brian Head and pass through the pasture. As use on these trails increases, livestock-recreation users contacts would increase. Under this alternative, the livestock would use the Dark Hollow pasture for approximately six weeks between August 1 and September 20.

There would be livestock concentrations at Yankee Reservoir and camping areas near Bowery Creek as is now the case. There would continue to be high probability of livestock - recreation user contacts.

Cattle would tend to concentrate along Bowery Creek resulting in occasional contacts with dispersed recreation users. Many of the recreationists who use the area each year are local residents. They are familiar with National Forest and grazing management practices and are willing to accept these practices.

Fishermen tend to be more sensitive to management practices such as grazing. However, many of the users are local residents who frequent the area each year. There is a direct relationship between the familiarity with

National Forest as measured by the number of prior visits, and a willingness to accept intensive management practices. There is also data that indicates that users with more than 16 visits to the area are more likely to accept intensive grazing management than those with fewer visits (Saunderson, Meganck and Gibbs 1987).

Utilization standards would be used and would minimize overuse which would avoid conflicts with dispersed recreation users.

Proposed improvements outlined under this alternative would have minimal affect on livestock-recreation contacts.

As recreation use increased around Brian Head and Yankee Reservoir, frequency of contact with livestock would increase and potential conflicts would occur.

CUMULATIVE EFFECTS:

The area included in the cumulative effects analysis is displayed on the Recreation Cumulative Effects Map, Appendix K.

As recreation pressure increases within the cumulative effects area, the probability of contact between recreationists and livestock will increase. Though this Alternative reduces livestock numbers, grazing use will occur in two of the three pastures at any given time. In spite of this, it should not result in displacement of recreationists to another area.

ALTERNATIVE 4

Under the proposed action, livestock numbers would be reduced 17% of the present obligation which would decrease the opportunity for contact between livestock and recreation users.

In the Dark Hollow pasture, there is a network of trails that originate at Brian Head and pass through the pasture. As use on these trails increases, human-livestock contacts will increase. This action has livestock using the Dark Hollow pasture for approximately one month each year between July 1 and September 20th.

Cattle would continue to use Yankee Reservoir as a water source. There would be continue to be livestock-recreation contacts. Fisherman tend to be more sensitive to management practices such as grazing, consequently they would be more aware of the presence of livestock.

Grazing along Bowery Creek and Willow Flat would result in direct contact with dispersed recreation users. Many of the users are local residents who frequent the area each year. They would be familiar with Forest management and would be more willing to accept intensive management practices.

Fishermen tend to be more sensitive to management practices such as grazing. However, many of the users are local residents who frequent the area each year. There is a direct relationship between the familiarity with National Forest as measured by the number of prior visits, and a willingness to accept intensive management practices. There is also data that indicates that users with more than 16 visits to the area are more likely to accept intensive grazing management than those with fewer visits (Saunderson, Meganck and Gibbs 1987).

Utilization standards would be adhered to in all areas which would minimize overuse areas by livestock.

Proposed improvements and better livestock distribution would reduce concentration of livestock and reduce opportunities for dispersed recreation users to criticize grazing management.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Recreation Cumulative Effects Map, Appendix K.

As recreation pressure increases within the cumulative effects area, the probability of contact between recreationists and livestock will increase. However, since this Alternative reduces livestock numbers, it should not result in displacement of recreationists to another area.

ISSUE #4 - EFFECTS ON PINYON-JUNIPER & CONIFER INVASION

PROPOSED ACTION

Implementation of the proposed action would have limited effect on pinyon-juniper and conifer invasion. The deferred-rotation grazing system would improve forage plant physiological conditions and their ability to compete with undesirable vegetation. Considering the current stage of the pinyon-juniper and aspen/mixed conifer stands, competition from other vegetation would be insignificant. The mountain brush and aspen types would continue to decline as they moved toward dominant stands of pinyon-juniper and conifer.

Improvements planned under the proposed action would slow natural succession. This would be accomplished through controlled burning of 750 acres of the target species. The vegetation types would be set back to early seral stage which would be more desirable to livestock and wildlife (Wright, Neueschwader and Britton 1979).

Once the areas are burned the treated areas would need to be protected from grazing until grass and forbs species are firmly established. Without protection from grazing, desirable vegetation would not be able to compete with invading species. Reduced competition from grasses has permitted pinyon-juniper to invade adjacent commpastureies rapidly (Nabi 1978).

There would be temporary siltation to Parowan Creek until establishment of ground cover. Temporary protection from livestock on the treated areas would be necessary until plants were established.

While the treated areas are protected from grazing there would be temporary loss of production and grazing capacity. After a two year period of protection, there would be an increase in grazing capacity.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Over the short term, there would be minor cumulative effects with the Proposed Action. Temporary sedimentation to Parowan Creek until ground cover is established would be expected. Burning would be scheduled in four locations in the Bowery Creek drainage. No additional burning would be done until adequate ground cover was established on the treated site.

ALTERNATIVE I - NO ACTION

Implementation of the no action alternative would have limited effect on pinyon-juniper and conifer invasion. Considering the current stage of the pinyon-juniper, over mature mahogany and aspen/mixed conifer stands, competition from other vegetation would be insignificant. The mountain brush and aspen types would continue to decline in productivity as they moved toward dominant stands of pinyon-juniper and conifer.

Improvements planned under the proposed action would not effect natural succession. There would be no controlled burning under this alternative, consequently movement toward climax vegetation would not be interrupted.

The pinyon-juniper and conifer would continue to encroach at a rapid pace. This would result in a decrease in grazing capacity for livestock on the allotment.

Current levels of livestock grazing would not have a significant effect on this condition, except there would be increased level of use by livestock on all suitable grazing areas.

The reseeded area in the Bowery and Yankee pastures would continue to diminish in production as silver sage and rabbitbrush increases. Vigor of smooth brome would remain low as a result of physiological conditions of the plant and heavy livestock use. As forage production decreases, impacts from livestock use on all suitable grazing areas would increase.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

With this alternative, livestock grazing would be the heaviest of all the alternatives. Less desirable plant species would outcompete other plant species. There would continue to be encroachment pinyon-juniper and conifer. Over time the sediment load into Parowan Creek would increase from reduced ground cover.

ALTERNATIVE 2

Implementation of this alternative would have limited effect on pinyon-juniper and conifer invasion. The rest-rotation grazing system would improve forage plants physiological conditions and their ability to compete with undesirable vegetation. Considering the current stage of the mountain brush, overmature mahogany and aspen/mixed conifer stands, competition from other vegetation would be insignificant. The mountain brush and aspen types would continue to decline as they moved toward dominant stands of pinyon-juniper, overmature mahogany and conifer.

Many stands are in a declining condition because the absence of fire has allowed them to reach advanced stages of succession. In some areas, closure of mahogany crowns excessive litter accumulation, and competition from other vegetation are inhibiting regeneration (Gruell, Bunting and Neuenschwader 1986).

Burning planned under the proposed action would slow natural succession. Droughts and competition from grass probably only served to slow the invasion and growth of junipers in adjacent grasslands, because trees are easily established during wet years (Johnson 1962; Smith and others 1975)

Treatment would be accomplished through controlled burning of 750 acres of the target species. The vegetation types would be set back to early seral stage which would be more desirable to livestock and wildlife (Wright, Neueschwader and Britton 1979).

Once the areas are burned, the treated areas would need to be protected from grazing until grass and forbs species are firmly established. Without protection from grazing, desirable vegetation would not be able to compete with invading species.

There would be temporary siltation to Parowan Creek until establishment of ground cover. Protection of the treated areas from livestock would be necessary until plants were established.

Burning would be done during the scheduled rest period which would provide the needed protection from grazing. After the two year rest period, there would be an increase in grazing capacity.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Over the short term, there would be minor cumulative effects with this alternative. Temporary sedimentation to Parowan Creek until ground cover is established would be expected. Burning would be scheduled in four locations in the Bowery Creek drainage. No additional burning would be done until adequate ground cover was established on the treated site.

ALTERNATIVE 3

Implementation of this alternative would have limited effect on pinyon-juniper and conifer invasion. The season-long grazing system would not provide for the physiological conditions of the forage plants. The

forage plants would not compete with undesirable vegetation. The mountain brush, overmature mahogany and aspen types would continue to decline and move toward dominant stands of pinyon-juniper and conifer.

Improvements planned under the proposed action would slow natural succession. This would be accomplished through controlled burning of 750 acres of the target species. The vegetation types would be set back to early seral stage which would be more desirable to livestock and wildlife.

Once the areas are burned the treated areas would need to be protected from grazing until grass and forbs species are firmly established. Without protection from grazing, desirable vegetation would not be able to compete with invading species.

While the treated areas are protected from grazing there would be temporary loss of production and grazing capacity. After a two year period of protection, there would be an increase in grazing capacity.

There would be temporary siltation to Parowan Creek until establishment of ground cover. Temporary protection from livestock on the treated areas would be necessary until plants were established.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Over the short term, there would be minor cumulative effects with this alternative. Temporary sedimentation to Parowan Creek until ground cover is established would be expected. Burning would be scheduled in four locations in the Bowery Creek drainage. No additional burning would be done until adequate ground cover was established on the treated site. The rest-rotation management would accelerate site recovery.

ALTERNATIVE 4

Implementation of Alternative 4 would have limited effect on pinyon-juniper and conifer invasion. The deferred-rotation grazing system would improve forage plant physiological conditions and their ability to compete with undesirable vegetation. The mountain brush and aspen types would continue to decline as they moved toward dominant stands of pinyon-juniper and conifer. Considering the current stage of the pinyon-juniper and aspen/mixed conifer stands, competition from other vegetation would be insignificant.

Improvements planned under the proposed action would slow natural succession. This would be accomplished through controlled burning of 750 acres of the target species. The vegetation types would be set back to early seral stage which would be more desirable to livestock and wildlife.

Once the areas are burned the treated areas would need to be protected from grazing until grass and forbs species are firmly established. Without protection from grazing, desirable vegetation would not be able to compete with invading species.

There would be temporary siltation to Parowan Creek until establishment of ground cover. Temporary protection from livestock on the treated areas would be necessary until plants were established.

While the treated areas are protected from grazing there would be temporary loss of production and grazing capacity. After a two year period of protection, there would be an increase in grazing capacity.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Over the short term, there would be minor cumulative effects with this alternative. Temporary sedimentation to Parowan Creek until ground cover is established would be expected. Burning would be scheduled in four locations in the Bowery Creek drainage. No additional burning would be done until adequate ground cover was established on the treated site.

ISSUE #5 - EFFECTS ON UNCONTROLLED LIVESTOCK USE

PROPOSED ACTION

By implementing this action, approximately 1.5 miles of boundary fence would be constructed in Dark Hollow by the permittees and private land owners to control the permitted livestock. The conflicts between grazing on the Bowery allotment and private land owners at Brian Head and Boy Scouts at Thunder Ridge Scout camp would be greatly reduced.

Once the fence is constructed, the fence would be maintained annually to maintain a secure boundary. Permittees would do the riding necessary to properly distribute the cattle and reduce the pressure on the allotment boundary fence.

Permitted livestock would be reduced 17%. In the Dark Hollow pasture, cattle use would be deferred until approximately July 20 each year and then grazed for approximately one month.

On the north boundary, approximately 1.0 mile of allotment boundary fence would be reconstructed by permittees to control the permitted livestock. Permittees would do the annual maintenance necessary to maintain a secure allotment boundary fence.

In the Bowery pasture, cattle use would be alternately used first and last each year for approximately one month.

ALTERNATIVE 1 - NO ACTION

An allotment boundary fence in the Dark Hollow pasture is not proposed under this alternative. Approximately 1.5 miles of allotment boundary fence would remain unsecured.

Permittees would continue the present system for controlling the livestock which is to ride the area and move the cattle when a problem is identified. Typically, the cattle are allowed to drift to the suitable grazing areas near Brian Head and when a complaint is made about cattle encroaching on private property, the permittees gather the cattle and push them to suitable areas inside the Forest boundary. This action would continue to occur until the cattle are moved out of the Dark Hollow grazing pasture.

Permitted livestock under this alternative would be the same as the current obligation. Cattle would use the Dark Hollow pasture from approximately July 20 to August 30 each year.

On the north boundary of the allotment, there would continue to be a problem with Adam's cattle drifting on and off the forest. Approximately 1.0 miles of boundary fence would remain unsecured.

Permittees would ride and move cattle when a problem is identified. When permitted cattle drift off the allotment, it hasn't been considered a management problem because it isn't effecting the allotment condition. However, when cattle drift onto the Forest when not scheduled, a problem is created and trespass action is initiated.

ALTERNATIVE 2

Under this alternative, the Dark Hollow boundary fence would be constructed to control the permitted livestock. This would involve construction of approximately 1.5 miles of boundary fence by the permittees and private land owners. With the construction of the Dark Hollow fence, a secure boundary would be established between the Bowery grazing allotment and private land.

Annual maintenance on the fence would be required to maintain a secure boundary. Permittees would ride as needed to properly distribute the livestock to minimize livestock pressure on the allotment boundary fence.

Permitted livestock would be reduced 43%. Cattle would grazing the Dark Hollow pasture for about 6 weeks, four years out of six between July July 1 and September 20. This alternative would result in the least livestock effects of any of the alternatives because of the reduced numbers and season.

On the north allotment boundary, herding would be required to control the livestock. Permittees would be required to reconstruct the allotment boundary fence in this area if the cattle couldn't be controlled by riding.

Reduced numbers and rest-rotation grazing would reduce the conflicts without doing anything else.

ALTERNATIVE 3

Under this alternative, the Dark Hollow boundary fence would be constructed to control the permitted livestock. This would involve construction of approximately 1.5 miles of boundary fence by the permittees and private land owners. With the construction of the Dark Hollow fence, a secure boundary would be established between the Bowery grazing allotment and private land.

Annual maintenance on the fence would be required to maintain a secure boundary. Permittees would ride as needed to properly distribute the livestock to minimize livestock pressure on the allotment boundary fence.

There would be a 17% reduction in animal months. Although livestock numbers would be reduced, cattle would be in the Dark Hollow pasture longer than under the proposed action or Alternative I.

This alternative is designed to reduce the conflict with the Adam's cattle drifting on and off the Forest by allowing only the Adam's cattle in the Bowery pasture. Cattle numbers would be reduced to 50 head for a ~~three~~ month season.

Permittees would do the riding necessary to maintain proper distribution and control their livestock. No fencing is proposed under this alternative, however, if permittees are not able to control he livestock through riding, they will be required to secure the boundary by fencing.

ALTERNATIVE 4

By implementing this action, approximately 1.5 miles of boundary fence would be constructed in Dark Hollow by the permittees and private land owners to control the permitted livestock. The conflicts between grazing on the Bowery allotment and private land owners at Brian Head and Boy Scouts at Thunder Ridge Scout camp would be greatly reduced.

Once the fence is constructed, the fence would be maintained annually to maintain a secure boundary. Permittees would do the riding necessary to properly distribute the cattle and reduce the pressure on the allotment boundary fence.

Permitted livestock would be reduced 17%. In the Dark Hollow pasture, cattle use occur between July 1 and September 20, depending on schedule for deferment that year. Cattle would be in the pasture for approximately one month each year.

On the north boundary, permittees would do the riding necessary to maintain proper distribution and control their livestock. No fencing is proposed under this alternative, however, if permittees are not able to control he livestock through riding, they would be required to secure the boundary by fencing.

In the Bowery pasture, cattle would graze the area between June 20 and September 20 each year depending on the grazing schedule. Cattle would be in the pasture for approximately three months each year.

ISSUE #6 - EFFECTS ON VEGETATION DENSITY, DISTRIBUTION AND VIGOR

The probable effects on riparian vegetation are discussed under Issue #1 - Riparian Areas, and will not be included in this section.

PROPOSED ACTION

The Proposed Action would continue the existing modified deferred-rotation grazing system under reduced numbers. This provides for alternate year deferment through the seed ripe stage for the Bowery and Yankee Pastures, and for annual use following the flowering stage for the Dark Hollow Pasture.

Improved production and quality of forage results from rotation grazing practices (Walton, et.al, 1981). Grazing after seed maturity injures plants less and is beneficial for both seed and rhizome reproducing plants (Stoddart, et.al, 1975). These benefits would be realized most on the Bowery and Yankee pastures. Plant vigor and range condition would be improved; however, areas currently in unsatisfactory condition would be slower to respond (Launchbaugh and Owensby, 1978). This would be especially true in the Dark Hollow Pasture, which would not benefit from a periodic seed-ripe treatment.

Plant communities have the potential to change when grazed by animals. Those plants most preferred by the grazing animals are the first to show signs of stress from grazing. As a result of this stress, the preferred plants lose vigor, little annual growth is produced and reproduction may be absent. This may result in the death of the plant and eventual removal of this component of the vegetation communities (Stoddart, et.al, 1975).

In the sagebrush/grass and reseeded areas, reducing livestock numbers and improving distribution practices would result in grazing at proper utilization levels. This would improve herbaceous plant vigor and density by not taxing root reserves needed to maintain the plant (Waller, et.al, 1985). Plants which typically decrease with overgrazing would be expected to maintain and gradually increase in vigor and density. Perennial plants would be expected to make up the majority of the plant composition over time.

In the forb and aspen areas, improved distribution practices would result in a moderate level of utilization in these previously lightly used areas. As overuse would be unlikely under improved distribution, current plant composition and vigor would be maintained.

Prescribed burning practices in the sagebrush/grass (pinyon/juniper) and aspen/conifer areas would result in stimulation of "fire-intolerant increaser" herbaceous plants and woody shrub production. These species are initially consumed by fire, but are usually the first species to colonize a site following fire (Kramp, et.al, 1983). Sagebrush, pinyon pine and juniper are "fire-intolerant decreaseers", as well as Engleman spruce and sub-alpine fir. These species would be destroyed by fire and would not be expected to re-establish following fire (Habeck and Mutch, 1973, Wellner 1970).

Proper grazing use and distribution would help to maintain the established fire-adapted community an expected 15-20 years until natural succession increased the sagebrush/pinyon pine/juniper in the sagebrush/grass vegetation type.

Harper (unpublished) reported that undergrowth production in aspen stands decreased progressively as the proportion of conifers in the stands increased. In addition to being less productive in the strongly seral stands, plant communities consisted of a smaller proportion of herbs and a greater proportion of shrubs. If fire set back succession every 20-30 years in seral aspen communities, forage production would continue (Kleinman, 1973).

Improvements on existing fences, and new fence construction, would have the effect of providing more secure pastures to manage rotation grazing and improve livestock distribution (effects on vegetation previously described). This would be particularly evident in the Dark Hollow Pasture, which currently suffers from inadequate control of livestock within the pasture.

The water developments would help move livestock into lightly used areas, as it has been demonstrated to be a strong attractant for livestock movement. This would assist in reducing the pressure on the moderate/heavily grazed areas.

In summary, the continuation of a modified deferred-rotation system under reduced livestock numbers, in addition to the prescribed burning and structural improvements, would result in a moderate improvement in the acres currently categorized as unsatisfactory range condition.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

The Proposed Action would enhance overall vegetation vigor, density and diversity within the Bowery Allotment area, and would therefore contribute positively towards these attributes within the cumulative effects area.

The moderate improvement from unsatisfactory to satisfactory condition would result in a higher percentage of vegetative cover with stable root systems (as compared to shallow, annual plant root systems). This would improve soil stabilization and reduce sedimentation within the watershed from overland flow.

ALTERNATIVE 1-NO ACTION

This Alternative would continue the existing modified deferred-rotation grazing system under current livestock numbers. This provides for alternate year deferment through the seed ripe stage for the Bowery and Yankee Pastures, and for annual use following the flowering stage for the Dark Hollow Pasture.

Improved production and quality of forage results from rotation grazing practices (Walton, et.al, 1981). Grazing after seed maturity injures plants less and is beneficial for both seed and rhizome reproducing plants (Stoddart, et.al, 1975). These benefits would be realized most on the Bowery and Yankee pastures. Plant vigor and range condition would be improved; however, areas currently in unsatisfactory condition would be slower to respond (Launchbaugh and Owensby, 1978). This would be especially true in the Dark Hollow Pasture, which would not benefit from a periodic seed-ripe treatment.

Plant communities have the potential to change when grazed by animals. Those plants most preferred by the grazing animals are the first to show signs of stress from grazing. As a result of this stress, the preferred plants lose vigor, little annual growth is produced and reproduction may be absent. This may result in the death of the plant and eventual removal of this component of the vegetation community (Stoddart, et.al, 1975).

Heavy stocking rates may result in a species complex that is generally less palatable, less productive and more grazing tolerant (Heitschmidt, et.al, 1989).

In the sagebrush/grass and reseeded areas, maintaining existing livestock numbers and distribution practices would result in uneven grazing patterns. Popular grazing areas would receive overuse and less accessible, poorly watered areas would be underutilized. This would reduce herbaceous plant vigor and density in these areas by taxing root reserves needed to maintain the plant (Waller, et.al. 1985). Plants which typically decrease with overgrazing would be expected to gradually reduce in vigor and density. A higher level of annual or less desirable perennial plants would be expected to make up the majority of the plant composition in the popular grazing areas over time.

In the forb and aspen areas, grazing pressure would continue to be light. Current plant composition and vigor would be maintained.

Without treatment of some type to prevent invasion of the sagebrush/grass type by pinyon pine and juniper, forage production in this type would be reduced overtime, adding grazing pressure to other areas.

Forage production in aspen areas would decrease as the conifer component increases with natural succession. Harper (unpublished) and Kleinman (1973) reported that undergrowth production in aspen stands decreased progressively as the proportion of conifers in the stands increased. In addition to being less productive in the strongly seral stands, plant communities consisted of a smaller proportion of herbs and a greater proportion of shrubs.

The addition of one reservoir would improve distribution slightly in the immediate area. The fence extension would help control livestock within the Bowery Pasture.

In summary, the continuation of a modified deferred-rotation system under existing livestock numbers, in addition to minimal additions to water developments, would result in a gradual decline in the acres currently categorized as satisfactory range condition, and maintain those acres in unsatisfactory range condition.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Alternative 1 would gradually reduce vegetation vigor, density and diversity within the Bowery Allotment area, and would therefore contribute negatively towards these attributes within the cumulative effects areas.

The projected gradual decline from satisfactory to unsatisfactory condition would result in a higher percentage of vegetative cover with stable root systems (as compared to shallow, annual plant root systems). This would reduce soil stabilization and increase sedimentation within the watershed from overland flow.

ALTERNATIVE 2

Alternative 2 would implement a modified rest-rotation system under substantially reduced numbers. This provides for total rest for two successive years out of a four year grazing cycle for the Bowery and Yankee Pastures, and for alternate early and mid-season use for the Dark Hollow Pasture.

Improved production and quality of forage results from rotation grazing practices (Walton, et.al, 1981). Grazing after seed maturity injures plants less and is beneficial for both seed and rhizome reproducing plants (Stoddart, et.al, 1975). Studies have indicated that a spring-summer rest period two years in succession results in a significant increase in perennial grasses (Martin, 1973). Rest-rotation has also been found to minimize the negative effects of drought on rangeland (Ratliff and Rader, 1962; Woolfolk, 1960). These benefits would be realized most on the Bowery and Yankee pastures.

Some improvement would be expected in the Dark Hollow Pasture from the implementation of the early/mid-season rotation. This is because plants vary in their palatability, resulting in different plants being grazed different seasons (Stoddart, et.al, 1975). Therefore, grazing pressure on a given plant would be expected to vary depending on the season of use, which would provide some relief to some plant species.

Plant communities have the potential to change when grazed by animals. Those plants most preferred by the grazing animals are the first to show signs of stress from grazing. As a result of this stress, the preferred plants lose vigor, little annual growth is produced and reproduction may be absent. This may result in the death of the plant and eventual removal of this component of the vegetation communities (Stoddart, et.al, 1975).

In the sagebrush/grass and reseeded areas, significantly reducing livestock numbers and improving distribution practices would result in grazing at proper utilization levels. This would improve herbaceous plant vigor and density by not taxing root reserves needed to maintain the plant (Waller, et.al, 1985). Plants which typically decrease with overgrazing would be expected to maintain and gradually increase in vigor and density. Perennial plants would be expected to make up the majority of the plant composition over time.

In the forb and aspen areas, improved distribution practices would result in a moderate level of utilization in these previously lightly used areas. As overuse would be unlikely under improved distribution, current plant composition and vigor would be maintained.

Prescribed burning practices in the sagebrush/grass (pinyon/juniper) and aspen/conifer areas would result in stimulation of "fire-intolerant increaser" herbaceous plants and woody shrub production. These species are initially consumed by fire, but are usually the first species to colonize a site following fire (Kramp, et.al, 1983). The rest periods would enhance the ability of these plants to establish themselves and reduce the overuse that can occur when livestock are attracted to freshly burned areas.

Sagebrush, pinyon pine and juniper are "fire-intolerant decreaseers", as well as Engleman spruce and sub-alpine fir. These species would be destroyed by fire and would not be expected to re-establish following fire (Habeck and Mutch, 1973; Wellner, 1970).

Proper grazing use and distribution would help to maintain the established fire-adapted community an expected 15-20 years until natural succession increased the sagebrush/pinyon pine/juniper in the sagebrush/grass vegetation type.

Harper (unpublished) reported that undergrowth production in aspen stands decreased progressively as the proportion of conifers in the stands increased. In addition to being less productive in the strongly seral stands, plant communities consisted of a smaller proportion of herbs and a greater proportion of shrubs. If fire set back succession every 20-30 years in seral aspen communities, forage production would continue (Kleinman, 1973).

Improvements on existing fences, and new fence construction, would have the effect of providing more secure pastures to manage rotation grazing and improve livestock distribution (effects on vegetation previously described). This would be particularly evident in the Dark Hollow Pasture, which currently suffers from inadequate control of livestock within the pasture.

The water developments would help move livestock into lightly used areas, as water has been demonstrated to be a strong attractant for livestock movement. This would assist in reducing the pressure on the moderate/heavily grazed areas.

In summary, the implementation of a modified rest-rotation system under substantially reduced livestock numbers, in addition to the prescribed burning and structural improvements, would result in a greater rate of improvement (compared to the Proposed Action and other alternatives) in the acres currently categorized as unsatisfactory range condition.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Alternative 2 would enhance overall vegetation vigor, density and diversity within the Bowery Allotment area, and would therefore contribute positively towards these attributes within the cumulative effects area.

The greater rate of improvement from unsatisfactory to satisfactory condition would result in a higher percentage of vegetative cover with stable root systems (as compared to shallow, annual plant root systems) realized in a shorter period of time than the Proposed Action and other alternatives. This would improve soil stabilization and reduce sedimentation within the watershed from overland flow.

ALTERNATIVE 3

Alternative 3 would separate the existing Allotment into two divisions. The Bowery Division would receive grazing use all season from one herd of cattle. The Yankee/Dark Hollow Division would be grazed by a separate herd of cattle, with the Yankee Pasture grazed first and Dark Hollow Pasture second every year.

Livestock numbers would be reduced to reflect actual pasture capacity.

None of the pastures would benefit from rotation grazing. The improved production and quality of forage resulting from rotation grazing practices (Walton, et.al, 1981) would not be realized in either Division.

Plant vigor and range condition would be maintained in the Dark Hollow Pasture, but would be expected to decline in the Bowery and Yankee Pastures due to repeated, same season use.

Plant communities have the potential to change when grazed by animals. Those plants most preferred by the grazing animals are the first to show signs of stress from grazing. As a result of this stress, the preferred plants lose vigor, little annual growth is produced and reproduction may be absent. This may result in the death of the plant and eventual removal of this component of the vegetation community (Stoddart, et.al, 1975).

Plants vary in their palatability, resulting in different plants being grazed different seasons (Stoddart, et.al, 1975). Therefore, grazing pressure on a given plant would be expected to vary depending on the season of use, which would provide some relief to some plant species. However, under this Alternative, Pastures would be exposed to grazing pressure at the same time every year, which would deny the opportunity for seasonal rest.

In the sagebrush/grass and reseeded areas, reducing livestock numbers and improving distribution practices would result in grazing at proper utilization levels. While this would ordinarily improve herbaceous plant vigor and density by not taxing root reserves needed to maintain the plant, a large portion of this benefit would be offset by repeated, same season and/or continuous use (Waller, 1985).

In the forb and aspen areas, improved distribution practices would result in improved utilization in these previously lightly used areas. As overuse would be unlikely under improved distribution, current plant composition and vigor would be maintained.

Prescribed burning practices in the sagebrush/grass (pinyon/juniper) and aspen/conifer areas would result in stimulation of "fire-intolerant increaser" herbaceous plants and woody shrub production. These species are initially consumed by fire, but are usually the first species to colonize a site following fire (Kramp, et.al, 1983). Sagebrush, pinyon pine and juniper are "fire-intolerant decreasers", as well as Engleman spruce and sub-alpine fir. These species would be destroyed by fire and would not be expected to re-establish following fire (Habeck and Mutch, 1973, Wellner 1970).

Proper grazing use and distribution would help to maintain the established fire-adapted community an expected 15-20 years until natural succession increased the sagebrush/pinyon pine/juniper in the sagebrush/grass vegetation type.

Harper (unpublished) reported that undergrowth production in aspen stands decreased progressively as the proportion of conifers in the stands increased. In addition to being less productive in the strongly seral stands, plant communities consisted of a smaller proportion of herbs and a greater proportion of shrubs. If fire set back succession every 20-30 years in seral aspen communities, forage production would continue (Kleinman, 1973).

Improvements on existing fences, and new fence construction, would have the effect of providing more secure pastures to manage rotation grazing and improve livestock distribution (effects on vegetation previously described). This would be particularly evident in the Dark Hollow Pasture, which currently suffers from inadequate control of livestock within the pasture.

The water developments would help move livestock into lightly used areas, as water has been demonstrated to be a strong attractant for livestock movement. This would assist in reducing the pressure on the moderate/heavily grazed areas.

In summary, implementation of this Alternative would have very limited benefits to vegetation density, distribution and vigor. There would be no change in the acres currently categorized as unsatisfactory range condition, and some of the satisfactory condition range might decline over time.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Alternative 3 would maintain or reduce vegetation vigor, density and diversity within the Bowery Allotment area, and would therefore contribute negatively towards these attributes within the cumulative effects area.

The potential for moving from satisfactory to unsatisfactory condition would result in a higher percentage of vegetative cover with shallow, annual plant root systems. This would reduce soil stabilization and increase sedimentation within the watershed from overland flow.

ALTERNATIVE 4

Alternative 4 implement a 3-pasture deferred-rotation grazing system under reduced numbers. This would provide for early, mid and late season use for each pasture.

Improved production and quality of forage results from rotation grazing practices (Walton, et.al, 1981). Grazing after seed maturity injures plants less and is beneficial for both seed and rhizome reproducing plants (Stoddart, et.al, 1975). These benefits would be realized on all three pastures under this Alternative, rather than just on Bowery and Yankee as in the Proposed Action. Plant vigor and range condition would be improved; however, areas currently in unsatisfactory condition would be slower to respond (Launchbaugh and Owensby, 1978).

Plant communities have the potential to change when grazed by animals. Those plants most preferred by the grazing animals are the first to show signs of stress from grazing. As a result of this stress, the preferred plants lose vigor, little annual growth is produced and reproduction may be absent. This may result in the death of the plant and eventual removal of this component of the vegetation community (Stoddart, et.al, 1975).

In the sagebrush/grass and reseeded areas, reducing livestock numbers and improving distribution practices would result in grazing at proper utilization levels. This would improve herbaceous plant vigor and density by not taxing root reserves needed to maintain the plant (Waller, et.al, 1985). Plants which typically decrease with overgrazing would be expected to maintain and gradually increase in vigor and density. Perennial plants would be expected to make up the majority of the plant composition over time.

In the forb and aspen areas, improved distribution practices would result in a moderate level of utilization in these previously lightly used areas. As overuse would be unlikely under improved distribution, current plant composition and vigor would be maintained.

Prescribed burning practices in the sagebrush/grass (pinyon/juniper) and aspen/conifer areas would result in stimulation of "fire-intolerant increaser" herbaceous plants and woody shrub production. These species are initially consumed by fire, but are usually the first species to colonize a site following fire (Kramp, et.al, 1983). Sagebrush, pinyon pine and juniper are "fire-intolerant decreaseers", as well as Engleman spruce and sub-alpine fir. These species would be destroyed by fire and would not be expected to re-establish following fire (Habeck and Mutch, 1973, Wellner 1970).

Proper grazing use and distribution would help to maintain the established fire-adapted community an expected 15-20 years until natural succession increased the sagebrush/pinyon pine/juniper in the sagebrush/grass vegetation type.

Harper (unpublished) reported that undergrowth production in aspen stands decreased progressively as the proportion of conifers in the stands increased. In addition to being less productive in the strongly seral stands,

plant communities consisted of a smaller proportion of herbs and a greater proportion of shrubs. If fire set back succession every 20-30 years in seral aspen communities, forage production would continue (Kleinman, 1973).

Improvements on existing fences, and new fence construction, would have the effect of providing more secure pastures to manage rotation grazing and improve livestock distribution (effects on vegetation previously described). This would be particularly evident in the Dark Hollow Pasture, which currently suffers from inadequate control of livestock within the pasture.

The water developments would help move livestock into lightly used areas, as water has been demonstrated to be a strong attractant for livestock movement. This would assist in reducing the pressure on the moderately/heavily grazed areas.

In summary, the implementation of a 3-pasture deferred-rotation system under reduced livestock numbers, in addition to the prescribed burning and structural improvements, would result in more widespread improvement in the acres currently categorized as unsatisfactory range condition than in the Proposed Action.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Watershed Cumulative Effects Map, Appendix J.

Alternative 4 would enhance overall vegetation vigor, density and diversity on all pastures within the Bowery Allotment area, and would therefore contribute positively towards these attributes within the cumulative effects area.

The moderate improvement from unsatisfactory to satisfactory condition would result in a higher percentage of vegetative cover with stable root systems (as compared to shallow, annual plant root systems). This would improve soil stabilization and reduce sedimentation within the watershed from overland flow.

ISSUE #7 - EFFECTS ON WILDLIFE

PROPOSED ACTION

The Proposed Action would result in improvement of existing wildlife habitat conditions on the Bowery Allotment.

Of the five Management Indicator Species located on the Bowery Allotment, none would be adversely affected by the Proposed Action.

The reduced livestock numbers and improved livestock distribution and use patterns which would result from implementation of the Proposed Action would reduce grazing overuse, particularly in areas associated with water. This would yield positive benefits to wildlife in the form of increased cover and nesting areas for birds and small mammals.

The overall improved range conditions would help stabilize the watershed and lessen sediment impacts on brook, rainbow and Utah cutthroat trout.

The prescribed burns would benefit a variety of species. Burned areas often support more diverse animal populations than comparable unburned sites due to increased habitat diversity (Kramp, et.al, 1983). Deer would benefit from the improved forage conditions. Birds, which are highly mobile, can benefit from the increase populations and improved visibility of prey species in burn areas, though ground nests could be destroyed during a fire. Most small mammals easily survive fires by hiding in burrows and rock crevices.

Water developments under the Proposed Action would be beneficial to all wildlife species within the Allotment.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Wildlife Cumulative Effects Map, Appendix L.

The Proposed Action would not result in the displacement of any wildlife species within the cumulative effects area.

ALTERNATIVE 1 - NO ACTION

Alternative 1 would result in little change from existing wildlife habitat conditions on the Bowery Allotment.

Of the five Management Indicator Species located on the Bowery Allotment, none would be substantially adversely affected by Alternative 1.

Continued overuse of popular grazing areas, especially near areas of water, would be detrimental to cover and nesting areas for birds and small mammals.

The slow decline in range conditions may eventually increase sediment impacts on brook, rainbow and Utah cutthroat trout.

Water developments under this Alternative would be beneficial to all wildlife species within the Allotment.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Wildlife Cumulative Effects Map, Appendix L.

Though this Alternative would provide little improvement to vegetation condition and productivity, Alternative 1 would not result in the displacement of any wildlife species within the cumulative effects area.

ALTERNATIVE 2

Alternative 2 would result in improvement of existing wildlife habitat conditions on the Bowery Allotment.

Of the five Management Indicator Species located on the Bowery Allotment, none would be adversely affected by Alternative 2.

The substantially reduced livestock numbers and improved livestock distribution and use patterns which would result from implementation of this Alternative would reduce grazing overuse, particularly in areas associated with water. This would yield positive benefits to wildlife in the form of increased cover and nesting areas for birds and small mammals.

The overall improved range conditions would help stabilize the watershed and lessen sediment impacts on brook, rainbow and Utah cutthroat trout.

The prescribed burns would benefit a variety of species. Burned areas often support more diverse animal populations than comparable unburned sites due to increased habitat diversity (Kramp, et.al, 1983). Deer would benefit from the improved forage conditions. Birds, which are highly mobile, can benefit from the increase populations and improved visibility of prey species in burn areas, though ground nests could be destroyed during a fire. Most small mammals easily survive fires by hiding in burrows and rock crevices.

Water developments under this Alternative would be beneficial to all wildlife species within the Allotment.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Wildlife Cumulative Effects Map, Appendix L.

Alternative 2 would not result in the displacement of any wildlife species within the cumulative effects area and may, in fact, attract big game into the rested pastures and burned areas.

ALTERNATIVE 3

Alternative 3 would result in little positive change to existing wildlife habitat conditions on the Bowery Allotment.

Of the five Management Indicator Species located on the Bowery Allotment, none would be substantially adversely affected by the Alternative 3.

The reduced livestock numbers and improved livestock distribution and use patterns which would result from implementation of this Alternative would have some benefits to vegetation density and production. However, the season-long grazing system may not result in substantially reducing grazing overuse, particularly in areas associated with water. Compared to the Proposed Action and other action alternatives, this would not yield the positive benefits to wildlife in the form of increased cover and nesting areas for birds and small mammals in these areas.

Alternative 3 would not be expected to increase sediment impacts on brook, rainbow and Utah cutthroat trout.

The prescribed burns would benefit a variety of species. Burned areas often support more diverse animal populations than comparable unburned sites due to increased habitat diversity (Kramp, et.al, 1983). Deer would benefit from the improved forage conditions. Birds, which are highly mobile, can benefit from the increase populations and improved visibility of prey species in burn areas, though ground nests could be destroyed during a fire. Most small mammals easily survive fires by hiding in burrows and rock crevices.

Water developments under this Alternative would be beneficial to all wildlife species within the Allotment.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Wildlife Cumulative Effects Map, Appendix L.

Though little improvement is expected in vegetation condition and productivity, Alternative 3 would not result in the displacement of any wildlife species within the cumulative effects area.

ALTERNATIVE 4

Alternative 4 would result in similar improvement of existing wildlife habitat conditions on the Bowery Allotment as would be expected under the Proposed Action. The difference would be that improvement would be expected to be greater in the Dark Hollow Pasture in this Alternative due to its incorporation in the deferred rotation system.

Of the five Management Indicator Species located on the Bowery Allotment, none would be adversely affected by Alternative 4.

The reduced livestock numbers and improved livestock distribution and use patterns which would result from implementation of Alternative 4 would reduce grazing overuse, particularly in areas associated with water. This would yield positive benefits to wildlife in the form of increased cover and nesting areas for birds and small mammals.

The overall improved range conditions would help stabilize the watershed and lessen sediment impacts on brook, rainbow and Utah cutthroat trout.

The prescribed burns would benefit a variety of species. Burned areas often support more diverse animal populations than comparable unburned sites due to increased habitat diversity (Kramp, et.al, 1983). Deer would benefit from the improved forage conditions. Birds, which are highly mobile, can benefit from the

increase populations and improved visibility of prey species in burn areas, though ground nests could be destroyed during a fire. Most small mammals easily survive fires by hiding in burrows and rock crevices.

Water developments under this Alternative would be beneficial to all wildlife species within the Allotment.

CUMULATIVE EFFECTS: The area included in the cumulative effects analysis is displayed on the Wildlife Cumulative Effects Map, Appendix L.

Alternative 4 would not result in the displacement of any wildlife species within the cumulative effects area.

MONITORING

Three different types of monitoring will be conducted to measure the effects of the selected management practices on resources within the Bowery Allotment: Implementation, Effectiveness and Validation Monitoring.

Implementation monitoring determines if the project was implemented as described in the EA and in the subsequent revised Allotment Management Plan, e.g. actual livestock use does not exceed 50% utilization in riparian areas.

Effectiveness monitoring determines if the management actions accomplished what was intended, e.g. 50% utilization maintains or improves vegetation condition.

Validation monitoring determines if the management actions are resolving the issues identified for the project.

Monitoring practices have been developed for each of the resources identified as Issues in this EA. Appendix N contains the monitoring forms which fully described the objective of monitoring, the item to monitor, the type of monitoring, the methods and parameters that will be used, the frequency and duration of monitoring, the projected costs associated with the monitoring, the procedures used to report results, and who will be responsible for implementing the monitoring practices.

SECTION 5: LIST OF PREPARERS

The following individuals were members of the Interdisciplinary Team or provided technical support.

INTERDISCIPLINARY TEAM MEMBERS

NAME	TITLE	SUBJECT AREA
Dale Harris	Interdisciplinary Team Leader District Range Conservationist	Range/Wildlife
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Ron Rodriguez	Wildlife Biologist	Wildlife
Marian Jacklin	Archaeologist	Cultural Resources



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SECTION 7: GLOSSARY

A

Actual use - The use made of forage on any area by livestock and/or game animals without reference to permitted or recommended use. It is usually expressed in terms of animal-unit months or animal-units.

Affected environment - The natural and physical environment that exists at the present time within the area being analyzed.

Allotment - An area designated for the use of a prescribed number and kind of livestock under one plan of management.

Alternative - One of several policies, plans, or projects proposed for decision making.

Animal months - A month's tenure upon range by one animal. Not synonymous with animal-unit month.

B

Benefit - The total value of an output or other effect.

Benefit cost/ratio - Measure of economic efficiency computed by dividing total discounted primary benefits by total discounted economic costs.

Biodiversity - The variety of life and its myriad of processes in an area. Because biodiversity is so complex, it is usually discussed in terms of species diversity, genetic diversity, ecosystem diversity and regional diversity.

Browse - Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game animals for food.

C

Canopy - The more-or-less continuous cover of branches and growth.

Climax - The highest ecological development of a plant community.

Community - A group of one or more populations of plants and animals in common spatial arrangement.

Competition - The active demand by two or more organisms or kinds of organisms for some environmental resource in short supply.

Conifer - Those cone-bearing trees, mostly evergreen, including the pine, spruce, fir, etc.

Continuous grazing - The grazing of a specific unit by livestock throughout a year or for that part of the year during which grazing is feasible. The term is not necessarily synonymous with yearlong grazing.

Cultural resource - The remains of sites, structures, or objects used by humans in the past---historical or archaeological.

D

Decreaser - Plant species of the original or climax vegetation that will decrease in relative amount with continued overuse.

Deferment - Delay or discontinuance of livestock grazing on an area for an adequate period of time to provide for plant reproduction, establishment of new plants, or restoration of vigor of existing plants.

Deferred grazing - The use of deferment in grazing management of a management unit, but not in a systematic rotation including other units.

Deferred rotation - Any grazing system having a stocking density index >1 and <2 , which provides for a systematic rotation of the deferment among pastures.

Density - (1) The number of individuals per unit area. (2) Refers to the relative closeness of individuals to one another.

Desirable plant species - Species which contribute to the management objectives.

Discount rate - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits.

Dispersed recreation - A general term referring to recreation use outside the developed recreation site; this includes activities such as scenic driving, hunting, backpacking, and recreation in primitive environments.

District Ranger- The official responsible for the administration of Forest System lands contained within a District boundary of a National Forest. He/she reports to the Forest Supervisor.

Diversity - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. See also "Edge," "Horizontal Diversity," and "Vertical Diversity."

E

Ecosystems - An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems.

Effects - Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in this statement are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic cultural, economic, Social, or Health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even in on balance the agency believes that the effects will be beneficial (40 CFR 1508.8).

Environmental analysis - An analysis of alternative actions and their predictable short-and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions.

Environmental assessment - The concise public document required by the regulations for implementing the procedural requirements of NEPA (40 CFR 1508.9).

F

Forage - All browse and non-woody plants that are available to livestock or wildlife for grazing or harvested for feeding.

Forb - Any herbaceous plant other than true grasses, sedges, or rushes.

Forest Supervisor - The official responsible for administering the National Forest System lands in a Forest Service administrative unit, which may consist of two or more National Forests or all the Forests within a state. He/she reports to the Regional Forester.

G

Grass/forb - An early Forest successional stage where grasses and forbs are the dominant vegetation.

Grazing capacity - The maximum stocking rate possible without inducing damage to vegetation or related resources. It may vary from year to year on the same area due to fluctuating forage production.

Grazing system - A specialization of grazing management which defines systematically recurring periods of grazing and deferment for two or more pastures or management units. Descriptive common names such as "Merrill," "Hormay," "South African switchback," etc., may be used. However, the first usage of a grazing system name in a publication should be followed by a description using standard format. This format shall consist of a numerical description in the following prescribed order: [the number of pastures (or units)-number of herds; length of grazing periods: length of deferment periods for any given unit in the system followed by an abbreviation of the unit of time used].

H

Habitat - The place where a plant or animal naturally or normally lives or grows.

I

Increaser - Plant species of the original vegetation that increase in relative amount, at least for a time, under overuse.

Interdisciplinary approach - The utilization of individuals representing two or more areas of knowledge and skills focusing on the same task, problem, or subject. Team member interaction provides necessary insight to all stages of the process.

Intermountain Region - That part of the National Forest System which encompasses National Forests within the Intermountain Region (Utah, southern and central Idaho, western Wyoming, and Nevada).

Issue - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

M

Management area - An area of land with similar management goals and a common management prescription.

Management direction - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

Management Indicator Species (MIS) - A species selected because its population changes indicate effects of management activities on the plant and animal community. A species whose condition can be used to assess the impacts of management actions on a particular area.

Mitigation - Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice.

Monitoring and evaluation - The periodic evaluation on a sample basis of Forest Plan management practices to determine how well objectives have been met and how closely management standards have been applied.

N

National Environmental Policy Act (NEPA) - An act to declare a National policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

NEPA - An abbreviation for the National Environmental Policy Act.

No Action Alternative - The most likely condition expected to exist in the future (short term) if current management direction were to continue unchanged. In the long term conditions would be expected to change in relation to natural succession or influenced by fire, insect or disease.

O

Objective - A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

Optimum - A level of production that is consistent with other resource requirements as constrained by environmental, social, and economically sound conditions.

P

Palatability - The relish with which a particular species or plant part is consumed by an animal.

Pasture - (1) A grazing area enclosed and separated from other areas by fence. (2) Forage plants used as food by grazing animals.

Perennial plant - A plant that has a life cycle of 3 or more years.

Permittee - One who holds a permit to graze livestock on state, federal or certain privately-owned lands.

Policy - A guiding principle which is based on a specific decision or set of decisions.

Prescribed burning - The use of fire as a management tool under specified conditions for burning a predetermined area.

Proper use - A degree and time of use of current year's growth which, if continued, will either maintain or improve the range condition consistent with conservation of other natural resources.

Proposed action - In terms of the National Environmental Policy Act, the project, activity, or decision that a federal agency intends to implement or undertake.

Public participation - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

R

Range - Lands producing native forage for animal consumption and lands that are revegetated naturally or artificially to provide forage cover that is managed like native vegetation, which are amenable to certain range management principles or practices.

Range condition - The current productivity of a range relative to what that range is naturally capable of producing.

Ranger District - Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

Regional Forester - The official responsible for administering a single Region.

Responsible official - The Forest Service employee who has been delegated the authority to carry out a specific planning action.

S

Scoping process - A continuing process throughout the environmental analysis for planning and management activities. It may involve a series of meetings, telephone conversations, or written comments from different interested groups.

Seral species - A tree species representative of the early or intermediate stages in natural succession; typically they are relatively intolerant species.

Shade-intolerant plants - Plants species that do not germinate or grow well in the shade.

Shade-tolerant plants - Plants that grow well in shade.

Shrub/seedling - A Forest successional stage in which shrubs and seedling trees are the dominant vegetation.

Soil compaction - Reduction of soil volume which results in alternation of soil, chemical, and physical properties.

Soil productivity - The capacity of a soil to produce a specific crop such as fiber, forage, etc., under defined levels of management. Productivity is generally dependent on available soil moisture and nutrients and length of growing season.

Standard and guideline - A principle requiring a specific level of attainment, a rule to measure against; a mandatory requirement.

Suitable range - (1) Range accessible to livestock and which can be grazed on a sustained yield basis without damage to the resource. (2) The limits of adaptability of plant or animal species.

U

Understory - The trees and other woody species growing under a more-or-less continuous cover of branches and foliage.

V

Vegetation type - A plant community with distinguishable characteristics.

W

Watershed - The entire area that contributes water to a drainage system or stream.

Wildlife habitat diversity - The distribution and abundance of different plant and animal communities and species within a specific area.

APPENDIX C

ECONOMIC ANALYSIS-RANGE ALLOTMENT PROJECT REGION 04
 DIXIE NATIONAL FOREST
 CEDAR CITY DISTRICT

ALLOTMENT PROJECT
 BOWERY ALLOTMENT
 ALTERNATIVE ACTION DATE 09/04/91
 PART I BENEFITS OUTPUTS "WITH PROJECT"

BENEFITS
 Constant 1 - 3 4 - 8 9 - 15 16 - 25
 Items B. Analysis Time Periods (year)

	1 - 3	4 - 8	9 - 15	16 - 25
GRAZING AUM'S				
1. Permitted graz. AUM's (a) Increase *	0	0	0	0
annual/year for period. (b) Sustain *	480	480	480	480
(c) Total *	480	480	480	480
2. AUM Value Coefficient \$/AUM *	\$2,918	\$2,918	\$2,918	\$2,918
3. Total Value, AUM				
4. Discount Factor *	0.04000	6.73274	11.11839	15.62208
		3.95765	4.38564	4.50369
5. AUM Present Value	\$8,099	\$11,550	\$12,799	\$13,144
TOTAL GRAZING BENEFITS				\$45,591

RESOURCE RELATED BENEFITS

6. Watershed *	\$0	\$0	\$0	\$0
7. Wildlife				
(a) Wildlife/Fisherman Use Day *	0	0	0	0
(b) Value WFUD *	\$0	\$0	\$0	\$0
(c) Benefit *	\$0	\$0	\$0	\$0
8. Fuelwood, other products *				
9. FS Operational Cost Savings *	\$0	\$0	\$0	\$0
10. TOTAL RESOURCE BENEFITS	\$0	\$0	\$0	\$0
11. Discount Factor	0.04000			
12. Present Value	\$0	\$0	\$0	\$0
13. Total Benefits	\$8,099	\$11,550	\$12,799	\$13,144
14. Total Benefits P.V.				\$0

COSTS

	1	2	3	4	5	6 - 10	11 - 15	16 - 25
Investment Costs								
15. Forage Improvement Acres *	0	0	0	0	0	0	0	0
(a) Installation *	\$2,000	\$0	\$1,500	\$0	\$2,500	\$2,500	\$0	\$0
(b) Support *	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
(c) Subtotal	\$2,000	\$0	\$1,500	\$0	\$2,500	\$2,500	\$0	\$0
16. Structural Improve. (No. Structures) *	0	0	0	0	0	0	0	0
(a) Installation *	\$1,000	\$3,375	\$1,750	\$0	\$0	\$0	\$0	\$0
(b) Support *	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
(c) Subtotal	\$1,000	\$3,375	\$1,750	\$0	\$0	\$0	\$0	\$0
17. Total Investment Costs	\$3,000	\$3,375	\$3,250	\$0	\$2,500	\$2,500	\$0	\$0
18. Discount Factor Percent	0.04000	0.9615	0.9246	0.8890	0.8548	7.4353	10.5631	15.2470
19. Present Value, Investment Costs	\$3,000	\$3,245	\$3,005	\$0	\$2,137	\$9,514	\$0	\$0
Total P.V. Investment Costs						\$9,514	\$0	\$20,903

S/YEAR/PERIOD C. Analysis Time Periods (Year)

	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25
20. Analysis and Plans *	\$0	\$0	\$0	\$0	\$0
21. Resource Management *	\$650	\$650	\$650	\$0	\$0
22. Maintenance Forage Impr. *	\$0	\$0	\$0	\$0	\$0
23. Maintenance Structural Impr. *	\$0	\$0	\$0	\$0	\$0
24. Support *	\$0	\$0	\$0	\$0	\$0
25. FS Other Operational Costs *	\$0	\$0	\$0	\$0	\$0
26. Total Operational Costs	\$650	\$650	\$650	\$0	\$0
27. (a) Discount Factor	0.04000	6.0021	10.5631	15.2470	
28. (b) Present Value	2.8861	4.1160	4.5611	4.6838	16.2470
28. (c) Total P.V. Operational Costs	\$1,876	\$2,675	\$2,965	\$0	\$0
29. Total P.V. Budget Costs Inv. & Oper.					\$7,516
					\$28,417

PART III ECONOMIC COSTS (Permittee, Cooperator)

	1	2	3	4	5	6 - 10	11 - 15	16 - 25
30. Investment Costs								
31. Forage Improvement *	\$1,000	\$0	\$750	\$0	\$1,500	\$1,500	\$0	\$0
32. Structural Improvements *	\$8,500	\$3,375	\$1,750	\$0	\$0	\$0	\$0	\$0
33. Total Investment Costs *	\$9,500	\$3,375	\$2,500	\$0	\$1,500	\$1,500	\$0	NA
34. (a) Discount Factor	ERR	0.9615	0.9246	0.8890	0.8548	3.8054	3.1278	4.6838
35. (a) Present Value Econ. Inv. Costs	\$9,500	\$3,245	\$2,311	\$0	\$1,282	\$5,708	\$0	NA
36. (b) Total Present Value								\$22,047

Operational Costs (Ave./Yr)

	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25
37. Maintenance	\$0	\$0	\$0	\$0	\$0
(a) Forage Improvement *	\$500	\$500	\$500	\$0	\$0
(b) Structural Improvement *	\$500	\$500	\$500	\$0	\$0
(c) Total	\$0	\$0	\$0	\$0	\$0
38. Other Permittee Costs *	\$500	\$500	\$500	\$0	\$0
39. Total Economic Costs	0.04000	4.1160	4.5611	4.6838	16.2470
40. Discount Factor	\$1,443	\$2,058	\$2,281	\$0	\$0
41. (a) Present Value					
(b) Total P.V. Econ. Oper. Costs					\$5,782
42. TOTAL P.V. ECONOMIC COSTS					\$27,829

PART IV B/C SUMMARY

43. Benefits Present Value	\$45,591
44. Costs Present Value	\$28,417
(a) Budget Costs	\$27,829
(b) Economic Costs	\$56,245
(c) Total Costs	0.81 : 1
45. BENEFIT/COST RATIO	-\$10,654
46. PRESENT NET VALUE (B - C)	
47. ALLOTMENT PROJECT RATING:	
Highly Favorable	0
Favorable	0
Marginal	1

\$/YEAR/PERIOD C. Analysis Time Periods (Year)

	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25
20. Analysis and Plans *	\$0	\$0	\$0	\$0	\$0
21. Resource Management *	\$200	\$200	\$200	\$0	\$0
22. Maintenance Forage Impr. *	\$0	\$0	\$0	\$0	\$0
23. Maintenance Structural Impr. *	\$0	\$0	\$0	\$0	\$0
24. Support *	\$0	\$0	\$0	\$0	\$0
25. FS Other Operational Costs *	\$0	\$0	\$0	\$0	\$0
26. Total Operational Costs	\$200	\$200	\$200	\$0	\$0
27. (a) Discount Factor	0.04000	6.0021	10.5631	15.2470	
28. (b) Present Value	2.8861	4.1160	4.5611	4.6838	16.2470
(c) Total P.V. Operational Costs	\$577	\$823	\$912	\$0	\$0
29. Total P.V. Budget Costs Inv. & Oper.					\$2,313
					\$3,414

PART III ECONOMIC COSTS (Permittee, Cooperator)

	1	2	3	4	5	6 - 10	11 - 15	16 - 25
A. Investment								
30. Investment Costs	\$500	\$625	\$0	\$0	\$0	\$0	\$0	\$0
31. Forage Improvement *	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
32. Structural Improvements *	\$500	\$625	\$0	\$0	\$0	\$0	\$0	\$0
33. Total Investment Costs *								NA
34. (a) Discount Factor	1.0000	0.9615	0.9246	0.8890	0.8548	3.8054	3.1278	4.6838
35. (a) Present Value Econ. Inv. Costs	\$500	\$601	\$0	\$0	\$0	\$0	\$0	\$0
36. (b) Total Present Value								\$1,101

C. Analysis Time Period

	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25
Operational Costs (Ave./Yr)					
37. Maintenance	\$0	\$0	\$0	\$0	\$0
(a) Forage Improvement *	\$200	\$200	\$200	\$0	\$0
(b) Structural Improvement *	\$200	\$200	\$200	\$0	\$0
(c) Total	\$0	\$0	\$0	\$0	\$0
38. Other Permittee Costs *	\$0	\$0	\$0	\$0	\$0
39. Total Economic Costs	\$200	\$200	\$200	\$0	\$0
40. Discount Factor	2.8861	4.1160	4.5611	4.6838	16.2470
41. (a) Present Value	\$577	\$823	\$912	\$0	\$0
(b) Total P.V. Econ. Oper. Costs					
42. TOTAL P.V. ECONOMIC COSTS					\$2,313
					\$3,414

PART IV B/C SUMMARY

43. Benefits Present Value					\$54,995
44. Costs Present Value					
(a) Budget Costs	\$3,414				
(b) Economic Costs	\$3,414				
(c) Total Costs					\$6,827
45. BENEFIT/COST RATIO					8.06 : 1
46. PRESENT NET VALUE (B - C)					\$48,168
47. ALLOTMENT PROJECT RATING:					
Highly Favorable	1.50				1
Favorable	1.00				0
Marginal	0.60				0

ECONOMIC ANALYSIS-RANGE ALLOTMENT PROJECT REGION XX
 DIXIE NATIONAL FOREST
 CEDAR CITY RANGER DISTRICT

ALLOTMENT PROJECT BOWERY ALTERNATIVE II DATE 09/04/91
 PART I BENEFITS OUTPUTS WITH PROJECT

BENEFITS B. Analysis Time Periods (year)

Constant 1 - 3 4 - 8 9 - 15 16 - 25
 Items

330 330 330 330
 0 0 0 0
 330 330 330 330

\$6.08

\$2,006 \$2,006 \$2,006 \$2,006

2.77509 6.73274 11.11839 15.62208
 3.95765 4.38564 4.50369

\$5,568 \$7,941 \$8,799 \$9,036
 TOTAL GRAZING BENEFITS \$31,344

RESOURCE RELATED BENEFITS

- 6. Watershed *
- 7. Wildlife
- 8. (a) Wildlife/Fisherman Use Day *
- 9. (b) Value WFUD *
- 10. (c) Benefit *
- 11. Fuelwood, other products *
- 12. FS Operational Cost Savings *

\$0 \$0 \$0 \$0
 0 0 0 0
 \$0 \$0 \$0 \$0
 \$0 \$0 \$0 \$0
 \$0 \$0 \$0 \$0
 \$5,568 \$7,941 \$8,799 \$9,036

COSTS

PART II VARIABLE COSTS

B Year Period

1 2 3 4 5 6 - 10 11 - 15 16 - 25

Investment Costs
 15. Forage Improvement Acres *
 (a) Installation *
 (b) Support *
 (c) Subtotal
 16. Structural Improve. (No. Structures) *
 (a) Installation *
 (b) Support *
 (c) Subtotal

0 0 0 0 0 0 0 0
 \$2,000 \$0 \$0 \$0 \$0 \$0 \$0 \$0
 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0
 \$2,000 \$0 \$0 \$0 \$0 \$0 \$0 \$0
 0 0 0 0 0 0 0 0
 \$1,000 \$3,375 \$1,750 \$0 \$0 \$0 \$0 \$0
 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0
 \$1,000 \$3,375 \$1,750 \$0 \$0 \$0 \$0 \$0
 \$3,000 \$3,375 \$3,250 \$0 \$2,500 \$2,500 \$0 \$0
 18. Discount Factor Percent 0.04000 0.9615 0.9246 0.8890 0.8548 7.4353 10.5631 15.2470
 19. Present Value, Investment Costs \$3,000 \$3,245 \$3,005 \$0 \$2,137 \$9,514 3.1278 4.6838
 Total P.V. Investment Costs \$20,701

C. Analysis Time Periods (Year)

\$/YEAR/PERIOD	C. Analysis Time Periods (Year)						
	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25		
20. Analysis and Plans *	\$0	\$0	\$0	\$0	\$0		
21. Resource Management *	\$650	\$650	\$650	\$0	\$0		
22. Maintenance Forage Impr. *	\$0	\$0	\$0	\$0	\$0		
23. Maintenance Structural Impr. *	\$0	\$0	\$0	\$0	\$0		
24. Support *	\$0	\$0	\$0	\$0	\$0		
25. FS Other Operational Costs *	\$0	\$0	\$0	\$0	\$0		
26. Total Operational Costs	\$650	\$650	\$650	\$0	\$0		
27. (a) Discount Factor	0.04000	6.0021	10.5631	15.2470			
	2.8861	4.1160	4.5611	4.6838	16.2470		
28. (b) Present Value	\$1,876	\$2,675	\$2,965	\$0	\$0		\$7,516
(c) Total P.V. Operational Costs							\$28,417
29. Total P.V. Budget Costs Inv.& Oper.							

PART III ECONOMIC COSTS (Permittee, Cooperator)

	B. Year Period						
	1	2	3	4	5	6 - 10	11 - 15
30. Investment							
31. Forage Improvement *	\$1,000	\$0	\$750	\$0	\$1,500	\$1,500	\$0
32. Structural Improvements *	\$8,500	\$3,375	\$1,750	\$0	\$0	\$0	\$0
33. Total Investment Costs *	\$9,500	\$3,375	\$2,500	\$0	\$1,500	\$1,500	\$0
34. (a) Discount Factor	0.04000	0.9615	0.9246	0.8890	0.8548	3.8054	3.1278
35. (a) Present Value Econ. Inv. Costs	\$9,500	\$3,245	\$2,311	\$0	\$1,282	\$5,708	\$0
36. (b) Total Present Value							\$22,047

C. Analysis Time Period

	C. Analysis Time Period						
	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25		
37. Maintenance							
(a) Forage Improvement *	\$0	\$0	\$0	\$0	\$0		
(b) Structural Improvement *	\$500	\$500	\$500	\$0	\$0		
(c) Total	\$500	\$500	\$500	\$0	\$0		
38. Other Permittee Costs *	\$0	\$0	\$0	\$0	\$0		
39. Total Economic Costs	\$500	\$500	\$500	\$0	\$0		
40. Discount Factor	0.04000	4.1160	4.5611	4.6838	16.2470		
41. (a) Present Value	\$1,443	\$2,058	\$2,281	\$0	\$0		\$5,782
(b) Total P.V. Econ. Oper. Costs							\$27,829
42. TOTAL P.V. ECONOMIC COSTS							

PART IV B/C SUMMARY

43. Benefits Present Value							
44. Costs Present Value							\$31,344
(a) Budget Costs							\$28,417
(b) Economic Costs							\$27,829
(c) Total Costs							\$56,245
45. BENEFIT/COST RATIO							0.56 : 1
46. PRESENT NET VALUE (B - C)							-\$24,901
47. ALLOTMENT PROJECT RATING:							
Highly Favorable	1.50						0
Favorable	1.00						0
Marginal	0.60						0

ECONOMIC ANALYSIS-RANGE ALLOTMENT PROJECT REGION 04
 DIXIE NATIONAL FOREST
 CEDAR CITY DISTRICT

ALLOTMENT PROJECT BOWERY ALLOTMENT ALTERNATIVE III DATE 09/04/91

BENEFITS B. Analysis Time Periods (year)

GRAZING AUM'S	Time Periods (year)					TOTAL GRAZING BENEFITS
	1 - 3	4 - 8	9 - 15	16 - 25	Y	
1. Permitted graz. AUM's (a) Increase * annual/year for period. (b) Sustain * (c) Total *	0 480 480	0 480 480	0 480 480	0 480 480	0 480 480	\$45,591
2. AUM Value Coefficient \$/AUM *	\$2,918	\$2,918	\$2,918	\$2,918	\$2,918	
3. Total Value, AUM	2.77509	6.73274	11.11839	15.62208	4.50369	
4. Discount Factor *	\$8,099	\$11,550	\$12,799	\$13,144	\$45,591	
5. AUM Present Value						

RESOURCE RELATED BENEFITS

6. Watershed *	\$0	\$0	\$0	\$0	\$0	
7. Wildlife	0	0	0	0	0	
(a) Wildlife/Fisherman Use Day *	\$0	\$0	\$0	\$0	\$0	
(b) Value WFUD *	\$0	\$0	\$0	\$0	\$0	
(c) Benefit *	\$0	\$0	\$0	\$0	\$0	
8. Fuelwood, other products *	\$0	\$0	\$0	\$0	\$0	
9. FS Operational Cost Savings *	\$0	\$0	\$0	\$0	\$0	
10. TOTAL RESOURCE BENEFITS	\$0	\$0	\$0	\$0	\$0	
11. Discount Factor	\$0	\$0	\$0	\$0	\$0	
12. Present Value	\$0	\$0	\$0	\$0	\$0	
13. Total Benefits	\$8,099	\$11,550	\$12,799	\$13,144	\$45,591	
14. Total Benefits P.V.						

PART II VARIABLE COSTS

COSTS	B Year Period					TOTAL
	1	2	3	4	5	
Investment Costs	0	0	0	0	0	0
15. Forage Improvement Acres *	\$2,000	\$0	\$1,500	\$0	\$2,500	\$6,500
(a) Installation *	\$0	\$0	\$0	\$0	\$0	\$0
(b) Support *	\$2,000	\$0	\$1,500	\$0	\$2,500	\$6,500
(c) Subtotal	0	0	0	0	0	0
16. Structural Improve. (No. Structures) *	\$1,000	\$3,375	\$1,750	\$0	\$0	\$6,125
(a) Installation *	\$0	\$0	\$0	\$0	\$0	\$0
(b) Support *	\$1,000	\$3,375	\$1,750	\$0	\$0	\$6,125
(c) Subtotal	\$3,000	\$3,375	\$3,250	\$0	\$2,500	\$12,125
17. Total Investment Costs	1.00000	0.9615	0.9246	0.8890	0.8548	7.4353
18. Discount Factor Percent	\$3,000	\$3,245	\$3,005	\$0	\$2,137	\$9,514
19. Present Value, Investment Costs						
Total P.V. Investment Costs						\$26,501

\$/YEAR/PERIOD	C. Analysis Time Periods (Year)						
	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25		
20. Analysis and Plans *	\$0	\$0	\$0	\$0	\$0		
21. Resource Management *	\$800	\$800	\$800	\$0	\$0		
22. Maintenance Forage Impr. *	\$0	\$0	\$0	\$0	\$0		
23. Maintenance Structural Impr. *	\$0	\$0	\$0	\$0	\$0		
24. Support *	\$0	\$0	\$0	\$0	\$0		
25. FS Other Operational Costs *	\$0	\$0	\$0	\$0	\$0		
26. Total Operational Costs	\$800	\$800	\$800	\$0	\$0		
27. (a) Discount Factor	0.04000	6.0021	10.5631	15.2470			
	2.8861	4.1160	4.5611	4.6838	16.2470		
28. (b) Present Value	\$2,309	\$3,293	\$3,649	\$0	\$0		\$9,250
29. Total P.V. Budget Costs Inv. & Oper.							\$30,151

PART III ECONOMIC COSTS (Permittee, Cooperator)

	B. Year Period						
	1	2	3	4	5	6 - 10	11 - 15
30. Investment Costs							16 - 25
31. Forage Improvement *	\$1,000	\$0	\$750	\$0	\$1,500	\$1,500	\$0
32. Structural Improvements *	\$8,500	\$3,375	\$1,750	\$0	\$0	\$0	\$0
33. Total Investment Costs *	\$9,500	\$3,375	\$2,500	\$0	\$1,500	\$1,500	\$0
34. (a) Discount Factor	0.04000	0.9615	0.9246	0.8890	0.8548	3.8054	3.1278
35. (a) Present Value Econ. Inv. Costs	\$9,500	\$3,245	\$2,311	\$0	\$1,282	\$5,708	\$0
36. (b) Total Present Value							\$22,047

Operational Costs (Ave./Yr)

	C. Analysis Time Period						
	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25		
37. Maintenance	\$0	\$0	\$0	\$0	\$0		
(a) Forage Improvement *	\$500	\$500	\$500	\$0	\$0		
(b) Structural Improvement *	\$500	\$500	\$500	\$0	\$0		
(c) Total	\$0	\$0	\$0	\$0	\$0		
38. Other Permittee Costs *	\$500	\$500	\$500	\$0	\$0		
39. Total Economic Costs	0.04000	4.1160	4.5611	4.6838	16.2470		
40. Discount Factor	\$1,443	\$2,058	\$2,281	\$0	\$0		
41. (a) Present Value							\$5,782
(b) Total P.V. Econ. Oper. Costs							\$27,829
42. TOTAL P.V. ECONOMIC COSTS							

PART IV B/C SUMMARY

43. Benefits Present Value		\$45,591
44. Costs Present Value	\$30,151	
(a) Budget Costs	\$27,829	
(b) Economic Costs		\$57,980
(c) Total Costs		
45. BENEFIT/COST RATIO		0.79 : 1
46. PRESENT NET VALUE (B - C)		-\$12,388
47. ALLOTMENT PROJECT RATING:		
Highly Favorable	1.50	0
Favorable	1.00	0
Marginal	0.60	0.99

ECONOMIC ANALYSIS-RANGE ALLOTMENT PROJECT REGION 04
 DIXIE NATIONAL FOREST
 CEDAR CITY DISTRICT

ALLOTMENT BOWERY ALTERNATIVE IV DATE 09/04/91
 PART I BENEFITS OUTPUTS "WITH PROJECT"

BENEFITS Constant 1 - 3 4 - 8 9 - 15 16 - 25
 Items

	B. Analysis Time Periods (Year)				
	1 - 3	4 - 8	9 - 15	16 - 25	
GRAZING AUM'S					
1. Permitted graz. AUM's (a) Increase *	0	0	0	0	0
annual/year for period. (b) Sustain *	480	480	480	480	480
(c) Total *	480	480	480	480	480
2. AUM Value Coefficient \$/AUM *	\$2,918	\$2,918	\$2,918	\$2,918	\$2,918
3. Total Value, AUM	2.77509	6.73274	11.11839	15.62208	
4. Discount Factor *	3.95765	4.38564	4.50369		
5. AUM Present Value	\$8,099	\$11,550	\$12,799	\$13,144	\$45,591
TOTAL GRAZING BENEFITS					

RESOURCE RELATED BENEFITS

6. Watershed *	\$0	\$0	\$0	\$0	\$0
7. Wildlife	0	0	0	0	0
(a) Wildlife/Fisherman Use Day *	\$0.00	\$0	\$0	\$0	\$0
(b) Value WFUD *	\$0	\$0	\$0	\$0	\$0
(c) Benefit *	\$0	\$0	\$0	\$0	\$0
8. Fuelwood, other products *	\$0	\$0	\$0	\$0	\$0
9. FS Operational Cost Savings *	\$0	\$0	\$0	\$0	\$0
10. TOTAL RESOURCE BENEFITS	\$0	\$0	\$0	\$0	\$0
11. Discount Factor	0.04000	\$0	\$0	\$0	\$0
12. Present Value	\$0	\$0	\$0	\$0	\$0
13. Total Benefits	\$8,099	\$11,550	\$12,799	\$13,144	\$0
14. Total Benefits P.V.					\$45,591

COSTS

	PART II VARIABLE COSTS					
	B Year Period					
	1	2	3	4	5	6 - 10 11 - 15 16 - 25
Investment Costs						
15. Forage Improvement Acres *	0	0	0	0	0	0
(a) Installation *	\$2,000	\$0	\$1,500	\$0	\$2,500	\$0
(b) Support *	\$0	\$0	\$0	\$0	\$0	\$0
(c) Subtotal	\$2,000	\$0	\$1,500	\$0	\$2,500	\$0
16. Structural Improve. (No.Structures) *	0	0	0	0	0	0
(a) Installation *	\$4,750	\$5,275	\$3,650	\$0	\$0	\$0
(b) Support *	\$0	\$0	\$0	\$0	\$0	\$0
(c) Subtotal	\$4,750	\$5,275	\$3,650	\$0	\$0	\$0
17. Total Investment Costs	\$6,750	\$5,275	\$5,150	\$0	\$2,500	\$0
18. Discount Factor Percent	1.0000	0.9615	0.9246	0.8890	0.8548	7.4353 10.5631 15.2470
19. Present Value, Investment Costs	\$6,750	\$5,072	\$4,761	\$0	\$2,137	\$0
Total P.V. Investment Costs						\$29,234

S/YEAR/PERIOD	C. Analysis Time Periods (Year)						
	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25	16 - 25	1 - 25
20. Analysis and Plans *	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21. Resource Management *	\$650	\$650	\$650	\$0	\$0	\$0	\$0
22. Maintenance Forage Impr. *	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23. Maintenance Structural Impr. *	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24. Support *	\$0	\$0	\$0	\$0	\$0	\$0	\$0
25. FS Other Operational Costs *	\$0	\$0	\$0	\$0	\$0	\$0	\$0
26. Total Operational Costs	\$650	\$650	\$650	\$0	\$0	\$0	\$0
27. (a) Discount Factor	0.04000	6.0021	10.5631	15.2470			
(b) Present Value	2.8861	4.1160	4.5611	4.6838	16.2470		
(c) Total P.V. Operational Costs	\$1,876	\$2,675	\$2,965	\$0	\$0		\$7,516
29. Total P.V. Budget Costs Inv. & Oper.							\$35,750

PART III ECONOMIC COSTS (Permittee, Cooperator)

	B. Year Period						
	1	2	3	4	5	6 - 10	11 - 15
30. Investment Costs							
31. Forage Improvement *	\$1,000	\$0	\$750	\$0	\$1,500	\$1,500	\$0
32. Structural Improvements *	\$8,500	\$5,275	\$3,650	\$0	\$0	\$0	\$0
33. Total Investment Costs *	\$9,500	\$5,275	\$4,400	\$0	\$1,500	\$1,500	\$0
34. (a) Discount Factor	1.0000	0.9615	0.9246	0.8890	0.8548	3.8054	3.1278
(b) Present Value	\$9,500	\$5,072	\$4,068	\$0	\$1,282	\$5,708	\$0
(c) Total Present Value							\$25,631

Operational Costs (Ave./Yr)

	C. Analysis Time Period						
	1 - 3	4 - 8	9 - 15	16 - 25	1 - 25		
37. Maintenance							
(a) Forage Improvement *	\$0	\$0	\$0	\$0	\$0	\$0	\$0
(b) Structural Improvement *	\$400	\$400	\$400	\$0	\$0	\$0	\$0
(c) Total	\$400	\$400	\$400	\$0	\$0	\$0	\$0
38. Other Permittee Costs *	\$0	\$0	\$0	\$0	\$0	\$0	\$0
39. Total Economic Costs	\$400	\$400	\$400	\$0	\$0	\$0	\$0
40. Discount Factor	2.8861	4.1160	4.5611	4.6838	16.2470		
41. (a) Present Value	\$1,154	\$1,646	\$1,824	\$0	\$0		\$4,625
(b) Total P.V. Econ. Oper. Costs							\$30,256
42. TOTAL P.V. ECONOMIC COSTS							

PART IV B/C SUMMARY

43. Benefits Present Value		\$45,591
44. Costs Present Value		
(a) Budget Costs	\$35,750	
(b) Economic Costs	\$30,256	
(c) Total Costs	\$66,006	
45. BENEFIT/COST RATIO		= 0.69 : 1
46. PRESENT NET VALUE (B - C)		-\$20,415
47. ALLOTMENT PROJECT RATING:		
Highly Favorable	1.50	0
Favorable	1.00	0
Marginal	0.60	1

APPENDIX I



United States Department of the Interior

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FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
UTAH STATE OFFICE
2078 ADMINISTRATION BUILDING
1745 WEST 1700 SOUTH
SALT LAKE CITY, UTAH 84104-5110

RECEIVED	
Cedar City Ranger District Dixie National Forest	
FEB 26 '91	
<input checked="" type="checkbox"/> ADER	
<input type="checkbox"/> REC/LANDS STF	
<input type="checkbox"/> TAB/FIRE STF	
<input type="checkbox"/> RANG/WL STF	
<input checked="" type="checkbox"/> RESOURCE SPECIALIST	
<input type="checkbox"/> BUS. MGT. STF	
<input type="checkbox"/> T/F FORESTER	
<input type="checkbox"/> T/F TECH	
<input checked="" type="checkbox"/> R/L TECH	
<input type="checkbox"/> R/W TECH	
<input type="checkbox"/> RESOURCE CLERK	
<input type="checkbox"/> RECEPTIONIST	
<input type="checkbox"/> FILE	

In Reply Refer To
(FWE)

February 25, 1991

Mr. Ronald S. Wilson
Dixie National Forest
Cedar City Ranger District
82 North 100 East
P.O. Box 0627
Cedar City, Utah 84721-0627

Dear Mr. Wilson:

We have received your letter of January 18, 1991 concerning a proposal to revise the Bowery Cattle Allotment Management Plan and the Cedar Canyon Sheep Allotment Management Plan. The materials provided have been reviewed and we find nothing of significant concern to the Fish and Wildlife Service. Therefore we will offer no comments.

We would be pleased to address specific issues identified by you if necessary at a later date.

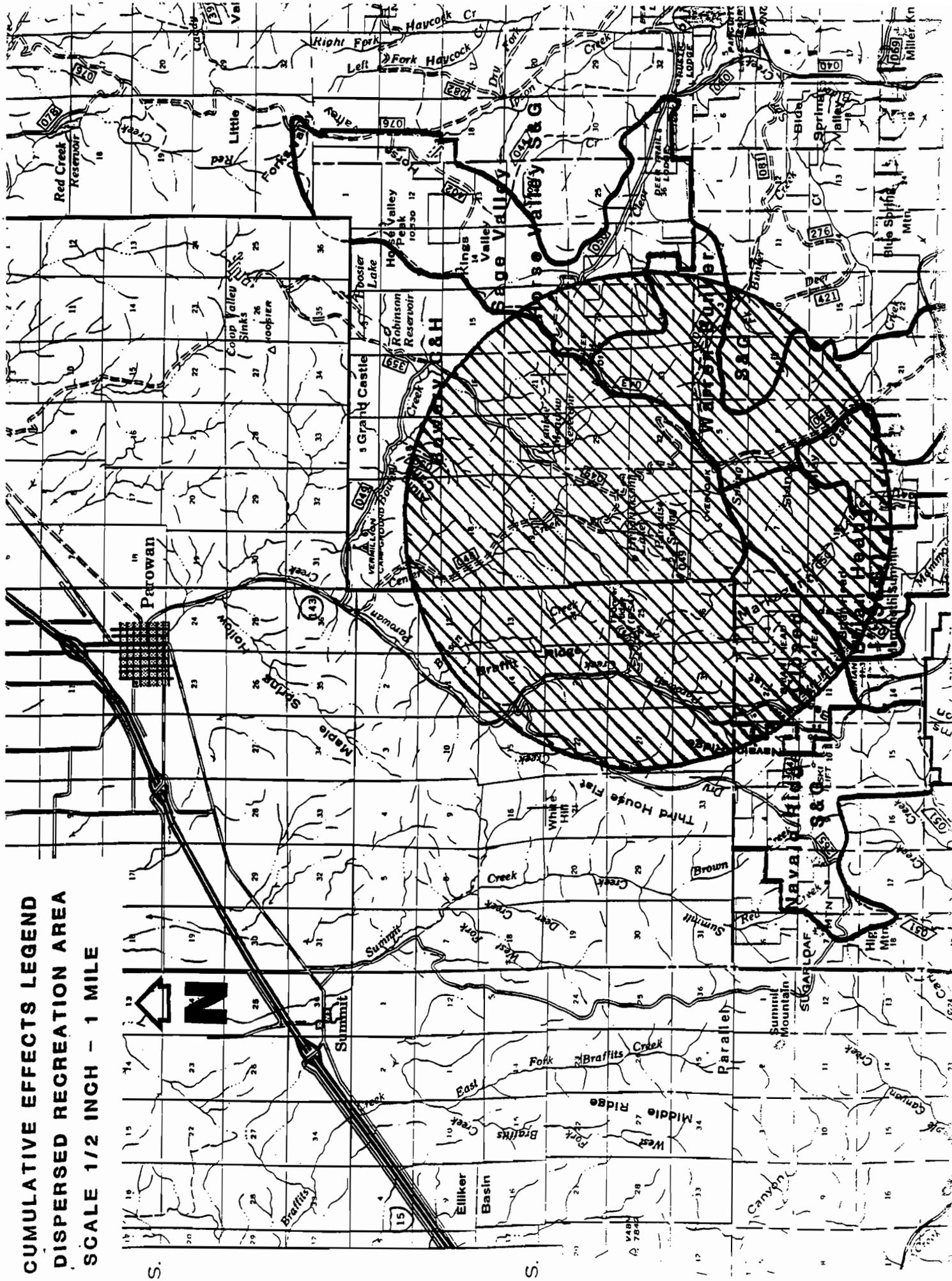
Sincerely,

Clark D. Johnson
Assistant Field Supervisor

APPENDIX J

APPENDIX K

**CUMULATIVE EFFECTS LEGEND
DISPERSED RECREATION AREA
SCALE 1/2 INCH - 1 MILE**



APPENDIX L



Reply to: 1950

Date: September 23, 1991

Subject: Cultural Resources - Revised Allotment Management

To: District Ranger

This memo is in regard to the impacts on cultural resources from the Proposed Action and alternatives to the Proposed Action which are described in the Environmental Assessment for Revised Bowery Allotment Management.

Proposed changes to the grazing system and livestock distribution methods will have no impact on cultural resources, and do not require cultural resource inventories.

However, fences, reservoirs, prescribed burns and any other ground-disturbing structural or non-structural improvements which are necessary to implement the selected alternative will require on-the-ground cultural resource clearance prior to their construction/execution.

Due to the variability of proposed improvements in the alternatives, I will conduct these inspections following selection of the alternative which will be implemented. You will be advised immediately if any historic properties are discovered in these inspections.

MARIAN JACKLIN
Forest Archaeologist



APPENDIX M

APPENDIX N

MONITORING FORM

OBJECTIVE: Measure change in riparian vegetation and soil. Analysis area would be upper two miles of stream between Yankee Reservoir and the point where the Creek leaves Bowery Valley.

ITEM TO MONITOR: Channel stability, plant density, and plant composition.

TYPE OF MONITORING: Effectiveness monitoring

METHODS/PARAMETERS: Cross section and greenline transect (R-4 Range Analysis Handbook).

FREQUENCY/DURATION: 3-year frequency

PROJECTED COSTS: \$100/annually

REPORTING PROCEDURES: Transect summary and brief narrative of results. Transect files are located in 2210 Section of Bowery Allotment Folder, Cedar City Ranger District.

RESPONSIBILITY: District Range Conservationist

MONITORING FORM

OBJECTIVE: Determine livestock impacts on dispersed recreation.

ITEM TO MONITOR: Frequency of contacts between livestock and recreationists and the effects.

TYPE OF MONITORING: Validation monitoring.

METHODS/PARAMETERS: Record comments and/or complaints.

FREQUENCY/DURATION: Bi-annually

PROJECTED COSTS: \$150/annually

REPORTING PROCEDURES: Summary of comments and brief narrative report. File located in 2210 Section of Allotment Folder, Cedar City Ranger District.

RESPONSIBILITY: District Recreation Forester and Range Conservationist

MONITORING FORM

OBJECTIVE: Measure degree of change in sagebrush/grass (pinyon- juniper) and aspen (mixed conifer) vegetation type.

ITEM TO MONITOR: Measure canopy cover of pinyon-juniper and conifer and density of understory vegetation (grass, forb and shrub).

TYPE OF MONITORING: Validation monitoring

METHODS/PARAMETERS: Before and after photos; line intercept transect to measure shrub density; site analysis transect for lbs./acre of understory vegetation.

FREQUENCY/DURATION: 5-year interval

PROJECTED COSTS: \$100/annually

REPORTING PROCEDURES: Comparison photos and summary of transect data, including brief summary of findings. File is located in 2210 Section of allotment folder, Cedar City Ranger District

RESPONSIBILITY: District Range Conservationist and Permittees

MONITORING FORM

OBJECTIVE: Determine degree of uncontrolled livestock use.

ITEM TO MONITOR: Miles of secure boundary

TYPE OF MONITORING: Implementation monitoring

METHODS/PARAMETERS: Inspect improvements and monitor permittee compliance.

FREQUENCY/DURATION: Annually

PROJECTED COSTS: \$100/annually

REPORTING PROCEDURES: Condition checklist of improvements

RESPONSIBILITY: Range Conservationist, Private Landowners and Thunder Ridge Scout Representative

MONITORING FORM

OBJECTIVE: Determine vegetation density, distribution and vigor (other than riparian areas).

ITEM TO MONITOR: Vegetation densities, composition and vigor on key benchmark areas.

TYPE OF MONITORING: Effectiveness monitoring

METHODS/PARAMETERS: Nested frequency transect on one representative site of allotment in Bowery or Yankee pasture.

FREQUENCY/DURATION: 5-year interval

PROJECTED COSTS: \$70/annually

REPORTING PROCEDURES: Transect summary and brief evaluation of findings. File located in 2210 Section of Allotment Folder, Cedar City Ranger District.

RESPONSIBILITY: District Range Conservationist

MONITORING FORM

OBJECTIVE: Measure use patterns and utilization percentages of wildlife indicator species. Indicator species are deer, elk, turkey, common flicker and goshawk.

ITEM TO MONITOR: Use patterns by vegetation type on key areas as determined by Forest and Utah Division of Wildlife Resources personnel.

TYPE OF MONITORING: Validation monitoring

METHODS/PARAMETERS: Pellet group transects on key areas; utilization cages to monitor utilization; and Bowery enclosure for baseline data.

FREQUENCY/DURATION: 2-year intervals

PROJECTED COSTS: \$200/annually

REPORTING PROCEDURES: Transect summary and narrative report filed in 2210 Section of Allotment Folder, Cedar City Ranger District.

RESPONSIBILITY: District Range Conservationist and DWR personnel