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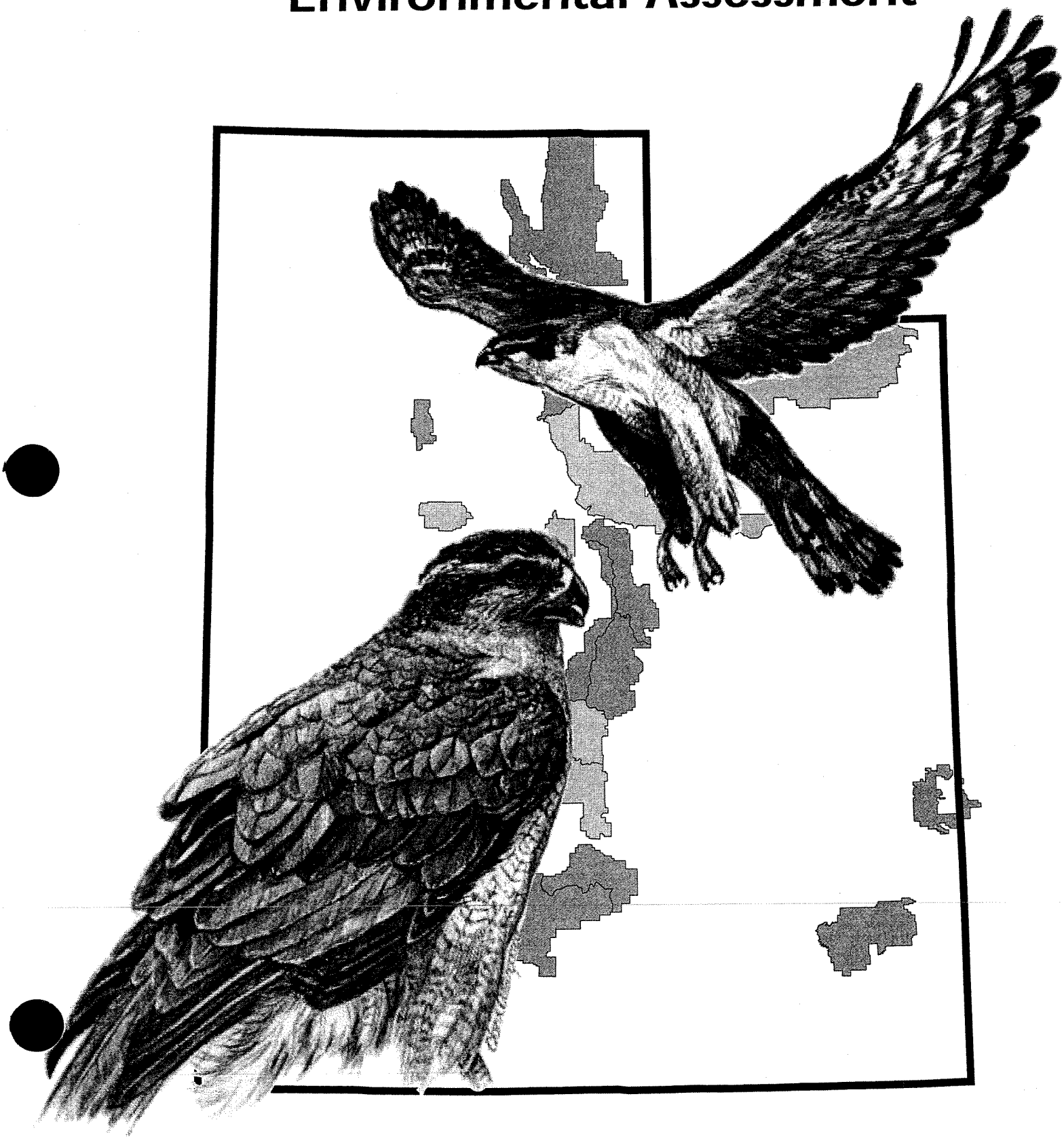
# Utah

# Northern Goshawk Project Environmental Assessment



# UTAH NORTHERN GOSHAWK PROJECT

## Environmental Assessment

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## ABSTRACT

This action will amend the management direction established in current land and resource management plans for the Ashley, Dixie, Fishlake, Manti-LaSal, Uinta, and Wasatch-Cache National Forests. The direction will be in the form of goals, objectives, standards, guidelines, and monitoring requirements.

This is a programmatic environmental assessment that examines 6 alternatives (including No-Action) which address issues identified through the scoping and public involvement phases of the project. Alternative F has been identified as the agencies preferred alternative.

# Utah Northern Goshawk Project
# Environmental Assessment

## Table of Contents

## *List of Tables*



## *List of Figures*

# CHAPTER 1
# PURPOSE OF AND NEED FOR ACTION

## 1.1 INTRODUCTION

In compliance with its own laws and regulations, and in accordance with the Council of Environmental Quality regulations (40 CFR §1500-1508) for implementing the procedural provisions of the National Environmental Policy Act (NEPA), the Forest Service is proposing to modify or delete current programmatic direction, and add direction in response to new information concerning management of habitat for the northern goshawk and its prey. Direction developed as part of this project will be in the form of an amendment to specific Land and Resource Management Plans (Forest Plans).

Under the National Forest Management Act (NFMA), each unit of the National Forest System (NFS) is managed under a comprehensive land and resource management plan, or forest plan. Forest plans are programmatic documents; they determine the overall direction under which a national forest will operate. Much like a county master plan or zoning ordinance, a forest plan sets broad goals and identifies standards, or requirements, under which specific projects must be carried out. Decisions on individual projects, based on site-specific analysis, then allow the agency to proceed with a specific activity in a certain place and time, given adequate funding, resources, and so forth.

Forest plans describe goals, objectives, standards and guidelines which are collectively referred to as "management direction." Goals describe a desired condition of a resource component. They are timeless and are usually expressed in broad, general terms. Objectives are concise, time-specific statements that are typically a measurable planned result that respond to a pre-established goal. Standards and guidelines comprise "sideboards" that the agency must work within. Essentially they operate like city zoning ordinances permitting, prohibiting, and/or regulating activities designed and implemented to further achievement of related goals and objectives.

Forest plans provide, among other things, direction to manage fish and wildlife habitat to maintain viable populations of existing native and desired non-native vertebrate species in the particular planning area. Habitat must be provided to support, at least, a minimum number of reproductive individuals in habitats that are well distributed so that those individuals can interact with others in the planning area as required by the regulations that implement NFMA (36 CFR §219.19).

## 1.2 BACKGROUND

The northern goshawk (*Accipiter gentilis*) is the largest North American member of the genus *Accipter*. It breeds in coniferous, deciduous, and mixed forests throughout much of North America. The goshawk is a forest habitat generalist that uses a variety of forest types, forest ages, structural conditions, and successional stages. It preys on small to medium-sized birds and mammals.

In October 1991, the USDA Forest Service, Intermountain Region designated the goshawk as a sensitive species. In March 1997, the Utah Division of Wildlife Resources classified the goshawk as a sensitive species. Both actions identify the goshawk as a species vulnerable to population declines or habitat loss and prompts management actions for its conservation.

In 1992 and 1993, the Intermountain Regional Forester directed Forests to draw from the intent of the Reynolds et al. (1992) management recommendations for management of habitat for goshawk and its prey, as well as other pertinent scientific information. Forests were to continue to do this until such time that a Utah-specific habitat assessment and conservation strategy was developed. The assessment and strategy for Utah was completed in 1998; the assessment was published in 1999.

Based on findings documented in Supplemental Information Reports (SIRs) completed by each national forest in Utah the Intermountain Regional Forester decided that amendments to Forest Plans were required to address new information found in the assessment and strategy.

### 1.2.1 The Assessment Of Habitat In Utah

Managers rarely have all the information needed to conduct a fully quantitative population viability analysis (PVA); this is the case for the northern goshawk. In the face of missing demographic information, one practical alternative is to use inventories of the quality, quantity and distribution of suitable habitat as a surrogate for PVA. The primary assumption is that if vegetative communities and their processes are similar today to those occurring historically, then conditions approximate those under which species evolved. Presumably, therefore, the full complement of species will persist.

In July 1998, Dr. Russell T. Graham (research forester, Rocky Mountain Research Station, a recognized expert in the field of developing large scale habitat assessments, and experienced in management of habitat for the northern goshawk) along with an interagency team of biologists from Utah, completed an *Assessment of Habitat Conditions in Utah for the Northern Goshawk and its Prey* (hereinafter referred to as Assessment). This Assessment was pubished in 1999 (Graham et al. 1999). In the Executive Summary, Graham et al. state "at the local level (forest level and lower) this assessment outlines a process that should be used to describe goshawk habitat, proper functioning condition, or other forest or woodland characteristics of interest. At this level, fine resolution data should be used to describe these characteristics, and this assessment can be used to provide context. In addition, at this level, the *Management Recommendations for the Northern Goshawk in the Southwestern United States* (Reynolds et al. 1992) should be used to help prepare site prescriptions. Data in this assessment are too coarse for making site prescriptions and should only be used to provide context and describe processes when used at these levels." (Graham et al. 1999).

Graham et al. (1999) continue by emphasizing that "this assessment does not prescribe implementation methods. It describes desired conditions, with managers needing to decide how and if they will be used." At the scale (i.e., state level) of the Assessment, it was inappropriate to address local level site prescriptions/recommendations; it was outside the scope of the assessment project. In addition, site prescriptions/recommendations were already provided in Reynolds (1992), and did not require duplication in the Graham et al. Assessment.

The Assessment found that goshawk habitat quality was declining. It concludes:

> "Because of fire exclusion, insect and disease epidemics, timber harvest, livestock grazing, or a combination of these factors the forests and woodlands of Utah have changed drastically since the early 1900's. Forests are now dominated by mid- to late successional species (Douglas-fir, white fir and subalpine fir) rather than the early successional species (lodgepole and ponderosa pine). Along with these changes came suspected declines in goshawk populations ...The present conditions of forests and woodlands of Utah are prone to insect and disease epidemic in addition to the risk of stand replacing fires. To ensure the goshawk's continued existence in Utah will require the restoration of these degraded habitats and the protection of native process." (Graham et al. 1999)

Though the Assessment could not directly answer the question of goshawk population viability because of inadequate demographic data, the authors state:

> "Most of the currently forested lands were rated as medium or high value for both nesting and foraging habitat. Where surveys have been conducted, goshawks are present and are nesting successfully. Furthermore, all available habitat patches are connected, and no known population is isolated. In general, existing habitat appears to be capable of supporting a viable population of goshawks at the State spatial scale." (ibid.)

However, the authors also caution:

> "Current management policies ... provide for a wide range of implementation options, with a correspondingly wide range of possible effects on goshawk habitat ... Current management policies have the potential to degrade habitat if any one activity is overapplied or misapplied." (ibid.)

### 1.2.2 The Conservation Strategy and Interagency Agreement

Following completion of the Assessment, the interagency team (without Dr. Graham) prepared a "Conservation Strategy and Agreement for the Management of Northern Goshawk Habitat in Utah" (HCS). The HCS was designed to maintain "adequate nesting and foraging goshawk habitat that is well connected throughout the State of Utah in order to sustain a viable population of goshawks." (Utah NFs et al. 1998)

In the HCS, the authors state "when developing site specific prescriptions the ecological principals and assessment process found within the *Management Recommendations for the Northern Goshawk in the Southwestern United States* (Reynolds et al. 1992) should be used. The recommendations from Reynolds et al. (1992) represent the best available scientific information for forming the development of site prescriptions and should be considered a component of this HCS when designing project level prescriptions." (ibid.)

Later in the strategy, the authors state "the Reynolds recommendations do not address all cover types, growth conditions, fire regimes, or historic vegetative patterns found in the State of Utah." (ibid.) Because of this, the interagency team proceeded to identify habitat attributes found in Reynolds, or Utah cover types not addressed in Reynolds, that had to be modified/added to address habitat conditions in Utah. In addition, the team also identified Utah-specific interagency coordination needs for habitat assessment and monitoring.

This team also recognized that better local data may indicate that site conditions in some areas of an administrative unit will differ from those described in the HCS or Reynolds recommendations. In these cases, they suggested that administrative units modify identified habitat values (i.e., canopy, snags, etc.) in recommendations using the better local data and the Reynolds habitat evaluation process. Essentially, units should use the best data available to determine the habitat value that is most appropriate on a site to meet the intended habitat need; if better data is *not* available, use the HCS or Reynolds recommended value should be used. (ibid.)

The HCS was completed in October 1998. The accompanying "Interagency Agreement," signed in October 1998 by the participating agencies, stated: "The signatory agencies agree that this strategy

represents the best available scientific information on the northern goshawk and its use of habitat in the State of Utah, and recommend that field offices apply the strategy through their own processes with National Environmental Policy Act (NEPA) compliance where appropriate." (ibid.) Participating agencies were the Forest Service (FS), Bureau of Land Management (BLM), US Fish and Wildlife Service (FWS), and the Utah Division of Wildlife Resources (UDWR).

Speaking to the issue of viability, the HCS states:

> "Based on the findings in Graham et al. (1998) that good quality habitat is well distributed and connected throughout the State of Utah, the absence of evidence of a population decline on National Forest System lands since 1991, and consistency with findings by the FWS, we believe the current goshawk population is viable in the State of Utah." (ibid.)

The HCS suggests additional site specific measures to ensure that habitat for the goshawk is managed consistently across federal and state lands in Utah. According to the authors, "consistency in management of habitat is key to providing a reasonable probability of goshawk persistence." (ibid.)

### 1.2.3 Supplemental Information Reports (SIRs)

In signing the interagency agreement attached to the HCS, the Forest Service committed to:

> "... initiating NEPA procedures which consider adopting the recommendations in the strategy as interim direction through amendments to the Regional Guide and Utah National Forest Plans, as appropriate. Alternatives to recommendations in the strategy will be considered during the appropriate NEPA compliance process." (ibid.)

Since the Assessment determined that more than 80% of the suitable habitat for the northern goshawk in Utah occurs on NFS lands, Intermountain Regional Forester Jack A. Blackwell directed Utah Forest Supervisors to assess the sufficiency of management direction in current forest plans to allow use of new information, including management recommendations, found in the Assessment and HCS. The Forest Supervisors determined that while current management direction will allow for use of the recommendations at the project level, some direction was so broad that it also allowed actions that could degrade goshawk habitat. As a result, they determined that amendments were needed to delete or modify current direction, or add new direction, to provide reasonable assurance that goshawk habitat will be maintained or restored. Amendments were also needed to provide consistency in management of habitat among and across national forests and other land management agencies in Utah. These decisions are documented in each national forest's SIR (project record, exhibit K, section c).

Regional Forester Blackwell assigned an Interdisciplinary (ID) Team, led by Uinta National Forest Supervisor Peter W. Karp, to develop management direction for NFS lands on the Ashley, Dixie, Fishlake, Manti-LaSal, Uinta, and Wasatch-Cache NFs. This direction will incorporate new information from the Assessment and HCS.

## 1.3 PURPOSE AND NEED

### 1.3.1 Purpose

This project was initiated not because the agency was concerned that we would lose a viable population of goshawks prior to revision of Forest Plans in Utah (projected to be 4 years), but in response to identified concerns that current management strategies permitted actions that could degrade habitat and did not emphasize some actions needed to maintain or restore goshawk habitat. In addition, new direction was needed to provide greater consistency in management of habitat for the goshawk. Current direction is not sufficient to provide consistency, resulting in a variety of interpretations on how to manage goshawk habitat. For a far-ranging species such as the goshawk that spans multiple national forests and other jurisdictional boundaries, consistency in habitat management is an essential component of actions needed to provide reasonable assurances that habitat to support viable goshawk populations can be sustained in the future.

Due to the important role NFS lands play in restoring or maintaining habitat for the northern goshawk in Utah, the Intermountain Region elected to take action to determine how to incorporate principles recommended in the HCS into management actions proposed in the future. This action will contribute to on-going interagency efforts to prevent the goshawk from being listed as threatened or endangered. Once a species is listed as endangered or threatened, options for management can be reduced.

### 1.3.2 Need

A habitat assessment and management recommendations for the northern goshawk and subsequent habitat conservation strategy were developed for the State of Utah in response to suspected downward trends in goshawk habitat and/or populations. Due to the important role NFS lands play in restoring or maintaining forested habitat for the northern goshawk, there is an immediate need to incorporate the principles and recommendations from these documents into management direction, for the reasons stated below.

Changes in forest structure, especially large tree removal and other forest management activities singly or in combination, may negatively affect goshawk populations (Crocker-Bedford 1990). In addition, fire exclusion has resulted in an ingrowth of forest stands by shade tolerant species. This in and of itself would likely not lead to goshawk population declines. In the short term the increase in older seral conditions may actually be beneficial. The main issue is the changes in fire severity and risk of large scale habitat losses from catastrophic fire and insect events that would ultimately lead to a loss of nesting habitat (Bloom et al. 1986, Herron et al. 1985, Kennedy 1989) [Graham et al. 1999].

Each of the six national forests identified in Chapter 1.4.1 completed a Supplemental Information Report (SIR). The SIRs assessed the sufficiency of management direction in current forest plans to allow use of new information, including management recommendations, found in the Assessment and HCS. While current management direction would allow for use of the recommendations at the project level, some direction was so broad that it also allowed actions that could degrade goshawk habitat. As a result, it was determined that amendments to current forest plans are necessary to address new information found in the assessment and strategy.

## 1.4 GEOGRAPHIC RANGE AND SCOPE

### 1.4.1 Geographic Range

The Proposed Action provides management direction for affected forested habitats on NFS lands within the Ashley, Dixie, Fishlake, Manti-LaSal, Uinta, and Wasatch-Cache National Forests (NF) (hereinafter referred to as Utah's NFs) of the Intermountain Region. Specifically, the geographic area described includes the majority of NFS lands in the State of Utah, with small portions of Wyoming and Colorado. The total NFS lands within these six national forests is approximately 8.1 million acres; 7.98 million acres in Utah, 90,000 acres in Wyoming and 30,000 acres in Colorado. Coniferous and aspen forests occur on approximately 3.9 million acres of this 8.1 million acres.

### 1.4.2 Scope

Under the provisions of the NFMA, this action will amend current management direction in six forest plans. It will provide consistency in future project design, implementation and monitoring on the Ashley, Dixie, Fishlake, Manti-LaSal, Uinta, and Wasatch-Cache NFs where habitat for the goshawk and its prey is involved. When forest plans for the affected national forests are revised, the management direction adopted through this amendment will be integrated as needed to best meet the intent of the conservation strategy and assessment (Figure 1).

## 1.5 SUMMARY OF THE PROPOSED ACTION

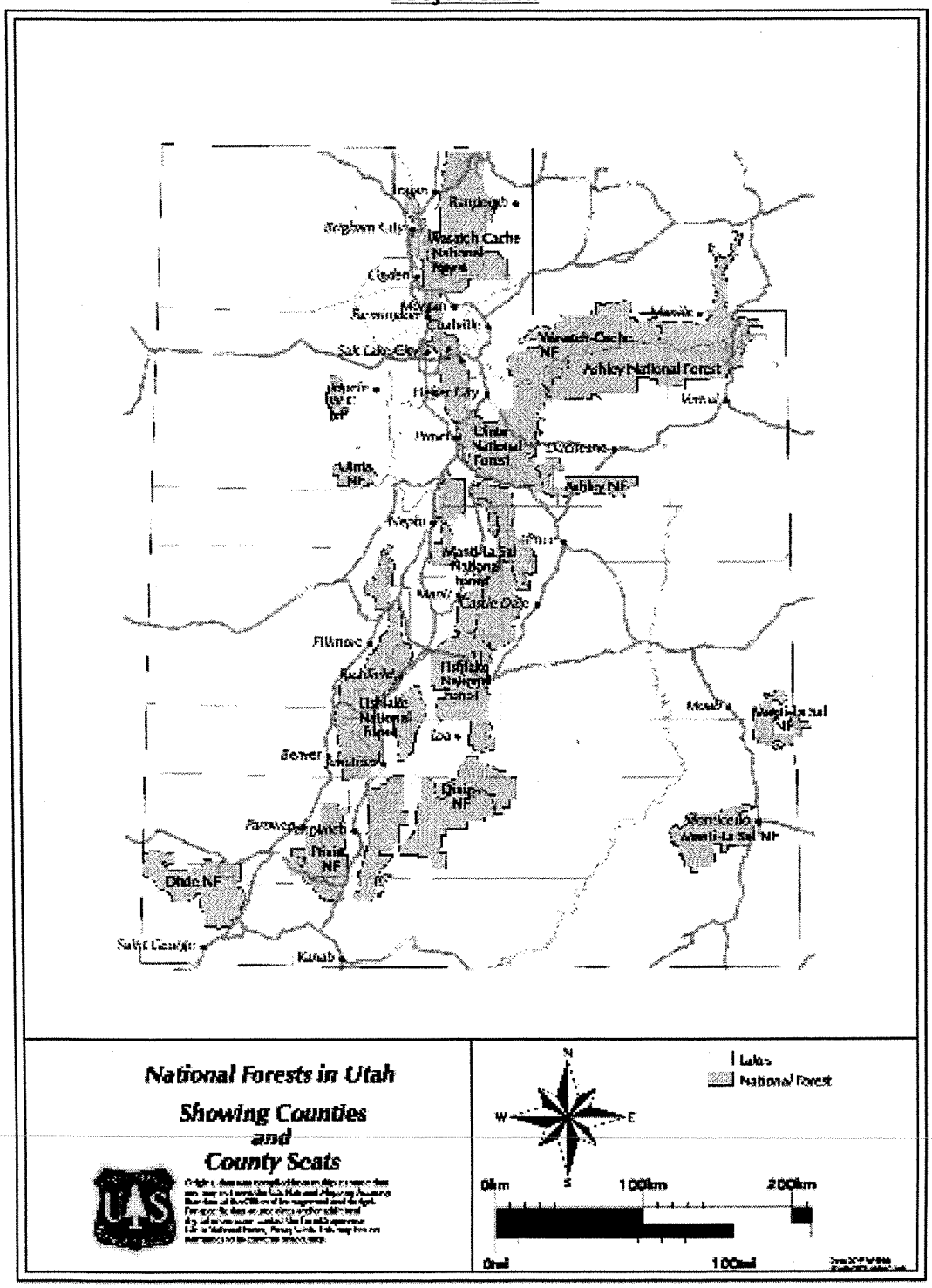
The Proposed Action (Alternative B) consists of goals, standards and guidelines necessary to implement *The Utah Northern Goshawk: Habitat Assessment and Management Recommendations (*Graham et al. 1999) and "The Conservation Strategy and Agreement for the Management of Northern Goshawk Habitat in Utah" (Utah National Forests et al. 1998). The Proposed Action allows management which mimics the variability of size, intensity, and frequency of native disturbance regimes within the full historic range of variation, including extreme events.

There are four aspects of the Proposed Action:

1. Desired Habitat Condition (DHC): This is a portrayal of land conditions expected to result from implementing the proposed management direction. It describes the desired habitat quantity, quality and distribution for the goshawk and its prey that the agency intends to strive for over time. This DHC is provided because current forest plan Desired Future Condition (DFC) descriptions lack the detail relating to the desired habitat for goshawk and its prey. A more detailed description is needed to understand the purpose of the proposed "management direction." This DHC is intended to be an integral part of current forest plan DFC discussions, not replace it.
2. National Forest System lands affected: This is a description of the NFS lands within the geographic area described above where the proposed management direction will and will not be applied.
3. Application of management direction: This describes what projects the management direction in the Proposed Action will be applied to, if adopted.
4. Proposed Management Direction and Monitoring Requirements: Forest plans include goals, objectives, standards and guidelines, collectively referred to as "management direction." Management direction found in the Proposed Action will supplement the current broader forest plan goals, standards and guidelines. A monitoring plan is also included.

**FIGURE 1**

**Project Area**



## 1.6 DECISIONS TO BE MADE

The decision to be made through this project is how much and what type of management direction is needed to guide project design and implementation until forest plans are revised to provide reasonable assurance that we will:

- maintain or restore sufficient habitat needed to support the currently viable population of goshawks for the interim period;
- retain goshawk habitat management options so that they can be considered during forest plan revision.

Each alternative considered for detailed study (2.3.2) includes varying amounts and types of management direction addressing these factors. The Intermountain Regional Forester will decide either to adopt the Proposed Action, an alternative to the Proposed Action, or select the No Action Alternative. The alternative selected will specify the management direction that will amend the six Utah forest plans (Ashley, Dixie, Fishlake, Manti-LaSal, Uinta, and Wasatch-Cache).

It has already been determined, based on the best information available, that there is a viable goshawk population in Utah and sufficient habitat is currently available to support this population (Graham et al. 1999, Utah National Forests et al. 1998). Retaining a viable population depends on the agency's ability to maintain sufficient amounts of suitable habitat. Though long term direction for management of habitat for the goshawk will be addressed in future forest plan revision efforts, current planning direction must be modified sufficiently to carry forests through the interim period between the present and when the decision documents for their revised plans are signed.

The management direction adopted through this project will not change the physical environment; there is no irretrievable or irreversible commitment of resources. Any subsequent site-specific action that may change the environment, and which uses this direction to guide project design and implementation, will be subject to appropriate site-specific analyses required by NEPA.

## 1.7 ORGANIZATION OF THE REMAINDER OF THIS DOCUMENT

Chapter 2 describes internal and external public involvement activities, issues and concerns with the Proposed Action identified through these efforts, and how the issues and concerns are addressed or resolved. Alternative management direction responding to identified issues and concerns is included in this chapter. Described in-depth are the alternatives considered but eliminated from detailed study (2.3.1) and alternatives considered in detail, including the Proposed Action (2.3.2). The Chapter ends with a comparison of alternatives (2.4) providing a synopsis of the effects disclosure (Chapter 4) for each alternative.

Chapter 3 describes the existing condition of specific resources potentially affected by the amendment.

Chapter 4 describes the effects of changing, or not, management direction which guides future project design and implementation relative to achievement resource goals and objectives, and ultimately the desired habitat condition. Direct, indirect, and cumulative effects for all alternatives carried for detailed study, including no action, are discussed.

The list of preparers, references used within the document and glossary are provided after Chapter 4, prior to the appendicies.

The Appendices contain (a) specific management direction by alternative; (b) monitoring requirements by alternative; (c) maps of exempted areas on each national forest corresponding with discussions at section 2.3.2; (d) detailed discussions of HRV and PFC, and canopy closures; (e) relevant tables corresponding to discussions in Chapter 3; (f) goshawk habitat maps referenced in Chapter 3; (g) the biological resources cumulative effects map showing geographic area considered for vegetation and wildlife; (h) biological assessments and evaluations; (i) example of the biological pre-field survey form referenced in proposed management direction (Appendix A, s-5).

# CHAPTER 2
# ALTERNATIVES

## 2.1 INTRODUCTION

This chapter describes and discusses internal and external public involvement activities that have occurred to date, issues and concerns with the Proposed Action identified through these efforts, and how the issues and concerns were addressed or resolved. Alternative management direction responding to identified issues and concerns are included in this chapter. Described in-depth are the alternatives considered but eliminated from detailed study (2.3.1) and alternatives considered in detail, including the Proposed Action (2.3.2).

The purpose and need for action resulted in the development of the following questions relative to how habitat needed to continue to support goshawk viability will be evaluated and compared in various alternatives.

- To what extent will the alternative affect goshawk population viability during the remainder of the current planning period?
- To what extent will an alternative reduce risk to loss of habitat needed to support the currently viable population of goshawks in Utah?
- How will implementation of an alternative affect management activities, and at what cost (including social and economic costs)?

In addition, seven indicators (components) were identified in the Assessment and HCS as important considerations in the management of the northern goshawk and will be used as the basis for deriving management direction and comparing alternatives. These are:

1. Native processes
2. Forest composition
3. Forest structure
4. Nest and post-fledgling areas
5. Other miscellaneous areas of concern
6. Treatment prioritization
7. Monitoring requirements

## 2.2 PUBLIC INVOLVEMENT

### 2.2.1 Scoping

The Intermountain Region filed a notice in the **Federal Register** (**FR**) on September 4, 1998, stating, that in cooperation with the USDI, Bureau of Land Management and Fish and Wildlife Service (FWS) and Utah Division of Wildlife Resources, the Forest Service was reviewing the latest Utah state-wide information relating to the sustainability of habitat for northern goshawk (*Northern Goshawk in Utah: Habitat Assessment and Recommendations* [Graham et al. 1999]) and the FWS 12-month finding on a petition to list the northern goshawk (**FR**, June 29, 1998). This notice stated that the Intermountain Region was proposing to amend management direction in the forest plans to incorporate interim direction in the form of goals and objectives, desired habitat conditions, standards and guidelines, and monitoring requirements developed in response to new scientific information concerning the management of forested habitat for the northern goshawk and its prey in Utah. Further, it sought information and comments from federal, state and local agencies, and other individuals and organizations interested in or affected by the Proposed Action. Ten comment letters were received and analyzed.

In late December 1998, more than 2500 flyers were mailed to tribal governments, Congressional representatives, federal, state and local agencies, and other individuals and organizations interested in or affected by the Proposed Action. The flyer announced the project, important dates, and how to access background information and updates, and how to submit comments. A homepage on the World Wide Web was established February 1, 1999 (www.fs.fed.us/r4/goshawk) as well as an e-mail address (goshawk3/r4_uinta@fs.fed.us).

The Intermountain Region posted a second notice in the **FR** on February 5, 1999 announcing that it was proposing to amend management direction in specific Forest Plans. That notice also (1) described the proposed management direction; (2) stated the desired habitat condition; (3) announced a series of open houses to be held across Utah in February 1999; and (4) provided the location of the Internet website for the project. At the same time, approximately 2,500 packages providing information on the Proposed Action and soliciting comments were sent to Tribal governments, Congressional representatives, federal, state and local agencies, and other individuals and organizations interested in or affected by the Proposed Action.

In February and March of 1999, ten open houses were held throughout Utah. Individuals attending the open houses represented a wide variety of interests, including state, federal, and county agencies, the Utah Congressional delegation, special interest groups, utility companies, academia, falconers, and others. Total attendance was approximately 138 people. Sessions were conducted in an open house format to provide maximum opportunity for informal discussion between ID Team members, local Forest Service representatives, and the public.

A total of 445 comments were received in response to scoping activities. These comments were compiled from the ten public meetings, 88 letters, oral comments, and e-mail comments received between February and April, 1999. The record of these comments is maintained at the Regional Office, Planning, Appeals and Litigation Staff, Ogden, Utah.

### 2.2.2 Comments Resulting From the Scoping Process

Significant issues and themes of other concerns were identified from the comments received. The issues provided the foundation for alternative development (see 2.3.1 and 2.3.2) and are discussed below first. Other concerns received that were not used to generate alternatives have been grouped under common themes and discussed following issues used to generate alternatives.

**Issues Used to Generated Alternatives**

- *Management direction in the Proposed Action is not consistent with recommendations found in its own science foundation and conservation strategy; not correcting these inconsistencies will likely result in continued habitat degradation and loss of management options in the future.*

  Respondents called attention to inconsistencies in elements of the Proposed Action and the science it claimed to use as its foundation (Graham et al. 1999; Reynolds et al. 1992) and HCS. In their opinion, these inconsistencies will result in habitat degradation and loss of future management options. The specific concerns are:

  ~ The range of percent canopy closures found in the HCS are not indicated in the Proposed Action. Percent canopy closures are below, or could exceed, those recommended in some cover types and habitat areas;
  ~ Nest surveys are not required prior to habitat-disturbing activities;

- ~ Extreme disturbance events allowed under the full range of historic range of variation are not desirable (i.e., landscape scale bark beetle or wildfire events);
- ~ Landscape assessments must address more than just the balance of forest structure classes to fully understand the broader context and effects of project level decisions; and
- ~ Effectiveness of standards and guidelines in preventing territory abandonment during habitat disturbing activities must be emphasized in monitoring.

Alternative C responds to this issue by incorporating all of the identified factors. In addition, the Proposed Action (Alternative B) was updated to include direction on the need to conduct nest surveys (see 2.3.2).

- *The Proposed Action does not contain all the recommendations for habitat management found in the science document used as its foundation; this will result in continued habitat degradation and loss of future management options*

Respondents identified additional habitat management recommendations found in Reynolds et al. 1992 that were not included in the Proposed Action for this project. By not including these additional recommendations respondents contend that habitat degradation will continue and management options will be lost.

Respondents used the agency's previous recommendations relating to goshawk habitat management (USDA Forest Service 1995) as evidence of why these additional measures are needed. Respondents contended that the agency already recognized the importance of these additional recommendations by including them in previous amendments; therefore, they should have been included in the Proposed Action to amend Utah's forest plans. The specific concerns are:

- ~ Percent canopy closures are not differentiated between cover types or goshawk habitat area (nest, post fledgling area (PFA) and foraging area);
- ~ Priority of slash disposal is not identified;
- ~ Road use and construction are not restricted in foraging areas;
- ~ Nest surveys are not required prior to habitat-disturbing activities;
- ~ Opening sizes are not restricted in the foraging area;
- ~ Groups of mature and old live trees are not emphasized for retention throughout territories;
- ~ Current livestock utilization requirements are unchanged; and
- ~ Extreme disturbance events allowed under the full range of historic range of variation are not desirable (i.e., landscape scale bark beetle or wildfire events).

Alternative D responds to this issue (see 2.3.2).

- *Use of the wrong management recommendations for management of goshawk habitat will result in habitat degradation and loss of future management options.*

Respondents noted the ongoing debate in the biological community, as well as among credible agencies, on how habitat for the goshawk and its prey should be managed. Credible agencies such as Arizona Game and Fish Department (AGFD) and the USDI's Fish and Wildlife Service (FWS Region 2, Arizona and New Mexico), professional societies such as The Wildlife Society, biologists such as Crocker-Bedford and Chaney (1988) with published documents relating to raptors, and other individuals claiming expertise in areas of habitat management, were cited. The debate brought forward varied from questioning the sufficiency of different aspects of the Graham et al. (1999) and

Reynolds et al. (1992) recommendations for management of habitat for goshawk and its prey to the scale at which the recommendations should be applied. The specific concerns are:

- Percent canopy closures are inadequate and will not provide for the needs of the goshawk and its prey;
- Existing mature and old forest is key to preserving management options; it should not be treated or only minimally; human disturbance should be minimized, if not eliminated, in mature and old forest groups/patches within landscapes;
- Open understories are not needed or desirable in the older forest structural classes; inadequate understory cover could be adverse to prey habitat.
- Allowance for use of non-native species in management activities will contribute to habitat degradation;
- The full range of native disturbance processes should be allowed; goshawks and their prey have evolved with extreme events;
- Some scientists, such as those who completed a review of the Reynolds' et al. (1992) recommendations for The Wildlife Society (Braun et. al. 1996), generally agree with the concepts in the Reynolds' recommendations, but question their broad application and recommend further research to test the effectiveness of the Reynolds recommendations. They believe implementation should move at a slower pace until some of the premises of the Reynolds' recommendations are verified through monitoring.

Alternative E responds to all items under this issue. See 2.3.2.

- *Management activities should concentrate on maintenance of at-risk habitat areas to provide for the greatest opportunity to minimize any further degradation of habitat, and loss of management options*

  Some respondents believe that projects should be prioritized to first treat landscapes where systems are functioning-at-risk, relative to desired habitat conditions for goshawk and its prey. Respondents believe that by treating these areas first, the greatest benefits to goshawk will be gained, and the lowest risk of losing currently functioning suitable habitat will be realized.

  Alternative F responds to this issue, see 2.3.2.

- *If current goshawk habitat is sufficient, then additional exemption areas should be added to minimize impacts to other uses; conversely, areas such as wilderness should not be exempted because the two uses are compatible.*

  Some respondents wrote that the basis for exempting certain areas may not be sound, and is not justified. While some respondents suggested that some areas, such as wilderness, should not be exempted, others believe no area should be exempt. And a third segment suggest that lands designated as suitable timber lands should be added to the exemptions.

  An alternative responding to this issue was considered but dropped from detailed analysis. See discussion in 2.3.1. However, a statement was added to the discussion of exemption areas (common to all alternatives, 2.3.2) which states: "When the direction adopted for management of goshawk habitat does not conflict with the primary use in the exemption area, it will be applied."

- *All currently identified roadless and undeveloped areas should be maintained to minimize any further disturbance to habitat for goshawk and its prey; minimizing disturbance is key to preventing further habitat degradation.*

Some respondents believed this project provided an opportunity to designate more wilderness and/or change management area prescriptions within identified roadless areas on national forests to preserve their roadless and undeveloped character. Retention of these areas in their current condition was needed to help reduce risk to further habitat degradation and loss of management options.

An alternative responding to this issue was considered but dropped from detailed analysis, see 2.3.1.

- *Due to the far-ranging nature of the northern goshawk, to properly address needs for providing sufficient habitat to support a viable population of goshawks other national forests with lands in Utah, as well as other national forests outside Utah, should be included in this amendment process.*

  While some respondents commended the Forest Service for their work in providing connected corridors within each of the six national forests involved in the amendment process, they questioned why the limitation. They believed there was a need for connectivity across landscapes throughout the state and throughout neighboring states in order to truly provide for adequate habitat, recruitment, and migration to nesting sites.

  An alternative responding to this issue was considered but dropped from detailed analysis, see 2.3.1.

**Concerns which were not determined to raise significant issues:**

- *Add long-term monitoring to monitoring plan.* The value of establishing long-term monitoring processes to further understanding of goshawk population trends and prey availability is recognized, but is outside the identified purpose and need of this amendment. Some of the suggested monitoring was also research level monitoring and is outside the scope of this project. Though data collected during the life of this amendment could add to data sets that will be used to assess long term trends, this data will not contribute to maintaining or restoring habitat needed to support the currently viable goshawk population during the interim period. Nor is the establishment of this long-term monitoring needed to retain habitat management options that could, again, be considered during forest plan revision.

  However, population data is proposed to be collected through monitoring activities under each action alternative which will contribute to long-term data sets to evaluate trends. The data proposed for collection is as outlined in the HCS.

- *Leave homes (nest sites) for the goshawk, but still use timber harvest to remove forest habitat as needed to support timber industry.* One respondent suggested that direction be designed to harvest the timber but leave abundant "homes" for the hawks. The suggestion was to require those who cut timber to leave goshawk homes. Homes were described as "strategically placed or located hollow trees" with holes drilled. Or, if this was not an adequate "home," the Forest Service could design a better home.

  A "home" includes more than just a location for a nest. It must provide all the components for which the goshawk needs to reproduce, grow, competitively hunt, and provide habitat for the prey on which it feeds. The proposed management direction provides for all the components the agency believes is needed for a "home" to support northern goshawks in Utah.

- *Adjust snag and down woody guideline to follow recommendations from other studies.* Two respondents referred to a study done by Kennedy (1989) which recommended that 4 snags per acre be maintained near goshawk nest sites in the Jemez Mountains of New Mexico. One of these

respondents also discussed recommendations from Bull et al. (1997) that recommended 4.8 snags (>10 inches DBH) per acre in ponderosa pine forests, and in mixed conifer as many as 48 per acres. This respondent also felt the recommended 3-5 down logs per acre was to few.

Recommendations in the Proposed Action were developed from the best information available for Utah at the current time. Bull, Kennedy, Reynolds and Graham all recognize that limited information is available to determine exact snag or down log densities in Utah or Arizona/New Mexico. All these researchers' recommendations are based on the limited information available for the habitats they are working with. Future monitoring and research will help validate current recommendations and may result in changes in the future.

- *Adjust guidelines for aspen and lodgepole pine (LPP) forests to require that they be managed for small openings as described for other forest cover types in alternatives*

  The proposed direction calls for following current direction for aspen and LPP in goshawk home ranges. Current forest plan direction allows for openings up to 40 acres.

  Respondents believe that allowing openings of the size discussed above will degrade habitat important to goshawk and its prey in aspen and lodgepole cover types. Thus habitat will not be maintained as needed to support the currently viable goshawk population, nor will management options be retained. They felt that opening size in aspen and lodgepole forests should be consistent with open sizes described for ponderosa pine, mixed conifer and spruce/fir forests addressed in the Reynolds et al. (1992) recommendations.

  Unlike the forests addressed in the Reynolds et al. (1992) recommendations, managing aspen and lodgepole forests through use of small openings (i.e., 1/2 acre to 4 acres) will not be within the historic range of variation (HRV) for these types. Managing for disturbance patterns and intensity levels that are outside HRV will put sustainability of these cover types at risk. The likelihood of events occurring that may degrade habitat for the goshawk and its prey becomes higher and less predictable when managing outside HRV. Managing for conditions (i.e., opening sizes, etc.) that are within HRV is our best indicator of what is sustainable (USDA 1999).

- *Direction to protect habitat for the goshawk and its prey should not be lost in a trade-off with resource outputs.* A concern was voiced that the direction needed to maintain species viability will lose out to a trade-off in resource outputs. Many of these respondents voiced the opinion that the proposed management direction was simply a justification for continuing commercial timber harvest.

  The effects on habitat as it pertains to resource outputs and services are disclosed in Chapter 4.

- *Consider the full economic and social effects of a change in management direction, especially in light of other recent policies and pending changes.* Respondents from rural communities voiced concern that the analysis and decision will not consider the affect on other resources, especially timber and range management, along with the affect on communities and families dependent on the use of related resources. They feared that new direction will result in a shut-down of activities, which will not only have a detrimental effect on forest health, but also have a direct effect on their jobs and life-style. They believed this proposed change, in combination with other recent or pending changes (i.e., interim roads policy, future long term roads policy, formal and informal policies for roadless areas, lynx strategy) could be devastating.

  The social and economic effects are disclosed in Chapter 4.

- *An EIS is needed.* Some respondents felt an Environmental Impact Statement (EIS) should be prepared for an assessment of this magnitude, especially considering the debate in the scientific community on how to retain habitat for the northern goshawk and its prey.

  Based on a review of information available at this point in the process and the "severity of impact" that this proposal will have to items identified in regulations at 40 CFR §1508.27, the Regional Forester believes that an Environmental Assessment (EA) and its corresponding Finding of No Significant Impact (FONSI) is appropriate. Included with this document is a draft FONSI. Comments received on these documents during the 60-day comment period will be used by the Regional Forester in making a final decision on the level of documentation needed to disclose effects and make a decision. The rationale for continuing with an EA and Decision Notice/FONSI, or moving to disclosure under an EIS with a Record of Decision, will be included in the decision document.

- *Prospective vs. retroactive application of management direction.* As described in the scoping package, the direction will be prospective only. That is, it will only apply to future projects for which decisions have yet to be made. Responsible officials will not be required to revisit decisions on completed projects to be consistent with the amendment. Some respondents identified current projects that are in the planning stages, or for which a recent decision has been issued, that are likely to impact habitat for the goshawk and its prey because of the type of treatments proposed, the extent of areas impacted or the spatial location. Respondents believed that allowing these activities to proceed may result in loss of options for habitat management that could be considered during forest plan revision.

  Projects with decisions made prior to completion of this project underwent the NEPA process, including environmental analysis and completion of a Biological Evaluation (BE), disclosing effects to the goshawk (if applicable) based on the best information available at the time.

  In an October 13, 1992, letter, the Intermountain Regional Forester recommended that forests use the *Management Recommendations for the Northern Goshawk in the Southwestern United States* (Reynolds et al., 1992) as important information to be considered along with other goshawk and ecosystem management information that may be available for their specific habitat types. Also, the Regional Forester directed that all forests having potential goshawk habitat ensure that adequate goshawk surveys are undertaken to identify any goshawk occupancy of the area prior to implementation of a habitat disturbing action. A second letter (August 2, 1993) directed forests to use a formal goshawk survey protocol tailored to meet Regional needs as well as continue to draw from the intent of the Reynolds et al. (1992) management recommendations and other pertinent information until an assessment and management strategy is developed specific to the needs of Region 4.

- *Need for further public review.* Many respondents felt strongly that they should have an opportunity to review the alternatives and effects of alternatives documented in the environmental assessment. They have come to expect this under current regulations at 36 CFR §215 which govern project-level analyses. This project falls under forest planning regulations (36 CFR §217). While these regulations do not require a public notice and comment period for an environmental assessment, this distinction is not recognized and/or accepted by the public.

  In response to this concern, a 60-day review and comment period of the Environmental Assessment is provided. Comments received will be used by the deciding officer to make a more informed decision.

More specific information concerning public involvement is included in the project record (Exhibit D).

## 2.3 DEVELOPMENT OF ALTERNATIVES

The ID Team held several team meetings to review the significant issues identified during the internal scoping and public involvement participation activities. Using a process that addressed both agency and public issues, the ID Team developed a range of preliminary alternatives. Of these, six were carried through a detailed analysis process (2.3.2), and three alternatives were eliminated from further study for various reasons (2.3.1).

### 2.3.1 Alternatives Considered But Not Analyzed In Detail

- *All currently identified roadless and undeveloped areas should be maintained to minimize any further disturbance to habitat for goshawk and its prey; minimizing disturbance is key to preventing further habitat degradation.* Some respondents thought this project afforded them an opportunity to designate more wilderness and/or change management area prescriptions within identified roadless areas on national forests to preserve their roadless and undeveloped character. Elimination of all mining, cattle grazing, logging, road construction and obliteration of existing roads is outside the scope of this project, and it is not consistent with the Forest Service mission, "To sustain the health, productivity and diversity of the land to meet the needs of present and future generations" (GPRA, 1999). Providing for these outputs and services within the capability of the available resources is important to furthering that mission. Further, it is not needed to meet the purpose and need for this project. Therefore, alternatives including these items were considered but dropped from detailed study. However, wilderness and roadless area allocations will be reviewed and considered during forest plan revision.

- *If current goshawk habitat is sufficient then additional exemption areas should be added to minimize impacts to other uses; conversely, areas such as wilderness should not be exempted because the two uses are compatible* Alternatives excluding all exemptions and one that added all suitable timber lands were considered and dropped, as discussed below.

  Of the total 8.1 million acres of NFS lands within the six Utah National Forests affected by this proposal, 1.2 million acres, or 15%, are exempt. Of the 1.2 million acres exempt, 65% is in category 1 (wilderness) and 11% is in category 2 (other Congressionally or Administratively-designated areas). Acres in both of these categories are likely to continue to provide habitat for goshawk, as described below. Current forest plan direction and regulations for management of these areas are not inconsistent with achievement of the desired habitat condition.

  A point of clarification. There appears to be a misunderstanding about the exemption areas, especially the wilderness area exemption. An exemption from applying direction from this amendment does not mean an area will not provide habitat, or in some cases continue to provide habitat, in the future. For example, designated wilderness areas on NFS lands in Utah will likely continue to provide suitable habitat for goshawk because management direction for wilderness areas is generally consistent with the needs of the goshawk.

  The remaining 292,000 acres in exemption categories 3, 4 and 5 (concentrated recreation use and development, urban interface areas, and mining/special use permits) represent less than 4% of the total 8.1 million acres. Generally, these areas have been heavily manipulated already to meet their intended purpose and will not provide any more or less habitat value to goshawks than they currently

provide over the life of this amendment. Essentially, over the short time period of this amendment there is little the agency could do in these areas to improve habitat. Also, the Assessment determined that sufficient amounts of habitat currently exist in Utah to support a viable goshawk population; thus, restoration of these acres is not needed to meet the purpose and need for this project.

Conversely, adding a category which exempts all suitable timber lands is not consistent with the purpose and need for this amendment. Exempting these lands, which is where the majority of suitable habitat occurs, will not provide reasonable assurances that sufficient amounts of habitat needed to support viable populations of goshawks in Utah will be maintained.

As stated previously (**FR,** February 5, 1999), managing these exempt areas consistent with current management direction is important to meeting other goals and objectives in the forest plan and the basis for the proposed exemption areas (2.3.2) is still sound. Managing these areas pursuant to current management direction will not result in the loss of habitat needed to support viable populations of goshawks in Utah nor reduce options for habitat management that could be considered during revision. Further disclosure of the effects of these exclusions is in Chapter 4.

- *Include other national forests with lands in Utah, as well as other national forests outside Utah, in this amendment process.* This action was initiated to amend forest plans in Utah, as needed, to provide reasonable assurance that management options that could be considered in forest plan revision or subsequent amendment processes for the six Utah National Forests were retained. The foundation for preserving options is primarily based on retaining current habitat connections in Utah. While some respondents commended the Forest Service for their work in providing connected corridors within each of the six national forests involved in the amendment process, they questioned why the limitation. They believed there was a need for connectivity across landscapes throughout the state and throughout neighboring states in order to truly provide for adequate habitat, recruitment, and migration to nesting sites. This was considered but dropped from detailed study.

  The habitat assessment was completed for the State of Utah, only. The amendment was based on information found within this assessment. Therefore this amendment only addressed national forests with the majority of lands within Utah.

  Further, the HCS states, "The scientific committee presently evaluating the need to change future National Forest System planning regulations equated species viability with self sustaining populations (Committee of Scientists Report, 1998 DRAFT). It is our professional judgement based on home range sizes of goshawks and recent population viability analysis (PVA) literature that a large scale is required to identify a self sustaining population because of the far-ranging nature of the goshawk. The State of Utah is one of the scales at which population viability analysis and determinations may be appropriate. It is our belief that the use of the state scale (i.e., its aggregation of landscapes) to conduct a habitat based analysis for PVA will provide us with the information needed to understand the different ecological processes that influence the life histories of this far-ranging, broadly distributed species." (Utah NFs et al. 1998)

  National forests in surrounding states are in the process of developing strategies for goshawk habitat management through other integrated resource efforts. Idaho's NFs are responding to the needs of the goshawk through the Interior Columbia Basin Ecosystem Management Project (ICBEMP) and ongoing, or completed, forest plan revision efforts. Wyoming and Colorado have initiated the assessment phase for goshawk habitat; findings from the assessment will determine their next step. Arizona and New Mexico have completed amendments to all forest plans relative to habitat needs for the goshawk (USDA Forest Service 1995). Nevada is addressing the needs of the goshawk, in

part, through the on-oing broad scale assessment referred to as the Sierra Nevada Framework Project. All efforts are drawing from the same base of scientific data, where applicable.

There was also a specific question of why the Caribou and Sawtooth NFs were not included in the Utah effort. While these Forests include small amounts of acreage within Utah, the majority of their acreage is in Idaho. And, they are actively in forest plan revision as well as being a part of the ongoing ICBEMP. In addition, the Graham et al. Assessment (1999) did not classify lands in Utah within the administrative boundaries of the Caribou or Sawtooth NFs as high or optimum habitat at the current time, though some acres were considered suitable habitat. Habitat had to be rated as high or optimum to be integral to maintaining habitat connectivity at the present time. Based on these findings in the Assessment (ibid.), and the fact that these forests are actively engaged in forest plan revision, they were not included in this amendment process along with Utah's NFs.

There was no identified need to include additional national forests with lands in Utah or outside Utah to preserve options for management direction that the six Utah National Forests may want to consider during forest plan revision or subsequent amendment processes. Based on the efforts and findings discussed above as well as budget, personnel, and time constraints, the Intermountain Regional Forester limited the scope of this project to the six Utah National Forests identified in the purpose and need.

### 2.3.2. Alternatives Considered In Detail, Including The Proposed Action

Described below are the specific features of the six alternatives (including the No Action Alternative) that respond to the issues (2.2.2) as well as the purpose and need (1.3.1 and 1.3.2, respectively). Components of the alternatives as well as features common to all alternatives precede alternative description summaries. For a detailed description of proposed management direction in each alternative refer to *Appendix A;* refer to *Appendix B* for the monitoring plan associated with each alternative.

**Components of the Action Alternatives** - The proposed management direction will apply to all forested habitats on the affected national forests except as exempted (see "Features Common to All Action Alternatives"). Seven categories of management direction/requirements have been developed. These management direction categories are:

1. *Native processes.* This category applies to all aspects of a goshawk home range[1]. Natural disturbances (i.e., fire, insects, disease and wind) are integral processes in many systems. Species like the goshawk and its prey have evolved in response to environmental changes triggered by disturbance. Restoring or mimicing these disturbances is one of the best indicators of ecological sustainability, including sustaining populations of goshawks (Graham et al. 1999; Utah NFs et al.1998; USDA Forest Service 1998).

2. *Forest composition.* This category applies to all aspects of a goshawk home range. Forest composition focuses on the importance of seral species and native species in landscape diversity. Landscape diversity is the variety of plant communities evaluated at the landscape level (including their identity, distribution, juxtaposition, and seral stage). The diversity of plant species present within a landscape, especially seral and native species, can have a profound influence on the resiliency of a system and the ability of a system to renew or maintain and propagate itself after disturbance. The continuing productivity of an ecological system, including

[1] A home range refers to all non-exempt forested acres within nest, post-fledgling (brood rearing) and foraging areas where management direction under the category will apply.

its ability to produce desirable outputs such as habitat for goshawk and its prey, depends upon potential renewal (ibid.).

3. *Forest structure.* This category applies to all aspects of a goshawk home range. Alternatives address biological landscape structural attributes (i.e., vegetative structural stage, snags, down logs and woody debris, and canopy closure) important to habitat for the goshawk and its prey. The sizes, shapes, patterns, and connectivity of these habitat attributes all influence the ability of the goshawk and its prey to exist in landscapes (Graham et al. 1999; Utah NFs et al. 1998; Reynolds et al. 1992).

4. *Nest and post-fledgling areas only.* This category applies only to non-exempt forested acres within defined nest and post-fledgling areas. Direction provides additional requirements/guidance specifically designed to sustain nest and post-fledgling areas (ibid.).

5. *Other miscellaneous areas of concern.* Some alternatives provide a mix of additional direction addressing other areas of concern that may be important to sustaining habitat for the goshawk and its prey. When management direction is included in this category, it applies to all aspects of a goshawk home range, all forested acres except as exempted. Alternatives address items such as road disturbance, grazing practices, and the need to do landscape assessments to provide context for future project design and implementation (Graham et al. 1999; Utah NFs et al. 1998; Reynolds et al. 1992; Arizona Game and Fish 1993; Braun et al. 1996; conservation biologist for Forest Guardians and Southwest Center for Biological Diversity).

6. *Treatment prioritization.* Alternative F specifically addresses the importance of providing direction to prioritize treatments in areas requiring restoration or areas at high risk to being lost or degraded for the remainder of the current planning period. Management direction is applied to all aspects of a goshawk home range (Graham et al. 1999).

7. *Monitoring Requirements.* Key features in any adaptive management strategy are implementation monitoring and, to a lesser extent, effectiveness monitoring; validation monitoring is not addressed. The short-term nature of this direction (remainder of the current planning period) will not allow for meaningful validation monitoring. Monitoring is incorporated into all alternatives, but will not be used to compare alternatives. Monitoring associated with this proposal does not preclude established monitoring efforts by the individual national forests (Utah NFs et al. 1998).

**Features Common to All Action Alternatives (B-F)**

*Desired Habitat Condition:* The Assessment (Graham et al. 1999) states that all forested landscapes in Utah are potentially suitable as goshawk habitat for some portion of their life cycle. Forested landscapes include those areas dominated by coniferous and aspen forest; but not woodlands such as pinyon-juniper.

In general, when forested landscapes of Utah are in a properly functioning condition (USDA Forest Service 1998) they will provide excellent habitat for the goshawk and its prey (Graham et al. 1999). Desired habitat attributes important to the home range of the goshawk and its prey, as stated in the HCS, include :

1. Diverse forest cover types with strong representation of early seral tree species dominate the landscape.

2. High quality habitat patches that are no more than 60 miles apart, preferably less than 20 miles apart, exist throughout landscapes (connected habitat).
3. Forested landscapes have 40% of the coniferous land area and 30% of the aspen land area dominated by large trees (*older vegetative structural stages (VSS) 5 and 6)*, well distributed. Large trees are defined based on the average size of trees found in the area and by the site potential.
4. Habitats for prey and other associated species are present to meet their needs as described by Reynolds el al. 1992 and Graham et al. 1999 (e.g., snags, down woody, cover, etc.).
5. A variety of structural stages as recommended by Reynolds et al. (1992) are present.

A balance of structural stages across the landscape is needed to ensure the larger structural stages are sustained over time. Tree densities in the smaller structural stages should promote accelerated tree growth into the larger structural stages and maintain crown development important to meeting desired canopy closures in the larger stages. Outside of nest areas, there should be open understories in the larger structural stages with trees irregularly spaced (Reynolds et al. 1992; Graham et al. 1999).

Nesting habitat is an essential component of goshawk home range. With the associated post-fledgling family area, it contributes to habitat connectivity across landscapes and the continuous recruitment of goshawks into the population (Graham et al. 1999). Both habitat connectivity and continuous recruitment are important components for sustaining viable populations of the northern goshawk in Utah. Thus, it is desirable to have nesting habitat and the associated post-fledgling areas well-distributed within and across forested landscapes. Desired nest area habitat varies from the overall home range habitat in that it typically occurs in older-aged stands that have a higher density of large trees, high tree canopy cover, and higher understory tree density.

To understand relationships of these desired habitat conditions they must be viewed in scales at tens of thousands of acres or larger. Scales greater than hundreds of thousands of acres are too large to ensure that desired habitat connectivity attributes are sufficiently distributed.

*Where the Proposed Management Direction Will and Will Not Be Applied:* The proposed management direction will apply to NFS lands within the Ashley, Dixie, Fishlake, Manti-LaSal, Uinta, and Wasatch-Cache NFs found within the State of Utah, with small portions of these forests in Wyoming and Colorado.

This direction will apply to forested habitats found within the approximately 8.1 million acres of National Forest System lands within the six Utah National Forest identified, *except* in the following areas:

1. Designated wilderness areas;
2. Administratively or Congressionally designated areas with a defined purpose (e.g., Research Natural Areas, National Recreation Areas, etc.);
3. Areas currently managed or allocated for concentrated recreation use and development (does not include ski resorts; ski resorts included under category #5 below);
4. National Forest System lands that are significantly influenced by lands in other ownership (e.g., high use urban interface areas); or,
5. Areas allocated for leasable mineral activities in current forest plans[2], areas under existing special use permits (includes ski resorts) which allow vegetative disturbance or treatments

[2] ***Areas Allocated for Mineral Activities under a Forest Plan***: Areas designated by existing Forest Plans with management emphasis on mineral activities. For example: This includes MMA management units (Minerals Management Area) on the Manti-La Sal National Forest where coal mine facilities exist or are reasonably foreseeable and are specifically managed for leasable mineral activities.

(vegetation will be managed to meet the intent of the permit), or current administrative site uses and development.

In these areas, current forest plan direction will still apply. However, *when the direction adopted for management of goshawk habitat through this amendment does not conflict with the primary use in the exemption area, it will be applied.* Refer to Table 1 for acres by forest and exemption area.

While the direction adopted in this amendment will only be applied when it does not conflict with the primary use of an area, the contribution of these areas to sustaining habitat components for the goshawk and its prey are still important and will be analyzed and evaluated through the landscape assessment process. For example, areas such as wilderness may provide suitable goshawk habitat which may influence how habitat attributes in areas outside the wilderness are managed through time. However, vegetation in the wilderness is managed to meet the goals of the wilderness resource which may or may not be contrary to suitable goshawk habitat.

Areas where the proposed direction will and will not apply (#1-5 above) are shown on Maps 1 through 7 in Appendix C, when of sufficient size to be mapped. Due to the small size of some areas included under #5, all areas are not shown on the attached map. Examples of these types of areas include existing electronic sites, Federal Aviation Administration (FAA) sites, research plots, and some utility corridors and rights-of-way.

In addition to areas defined in #1-5 above, any valid, prior existing rights on NFS lands will not be affected by this amendment. Also, locatable, mineral material or leasable mineral activities and facilities[3] that have been authorized for such use under existing plans, licenses or permits[4], or have been leased or authorized for leasing[5] prior to the decision date of this amendment, will not be affected by this amendment. Restrictions required on mineral activities in these situations must be consistent with the mining laws, lease rights, and existing lease stipulations. Leasable mineral uses and activities that will not be affected include both on and off-lease activities and facilities[6] reasonably required to exercise rights granted by the mineral leases. However, appropriate measures will be taken to protect goshawk habitat and nesting activity to the extent agreed to by the lessee, permittee, or operator and/or within the legal authorities of the responsible agencies.

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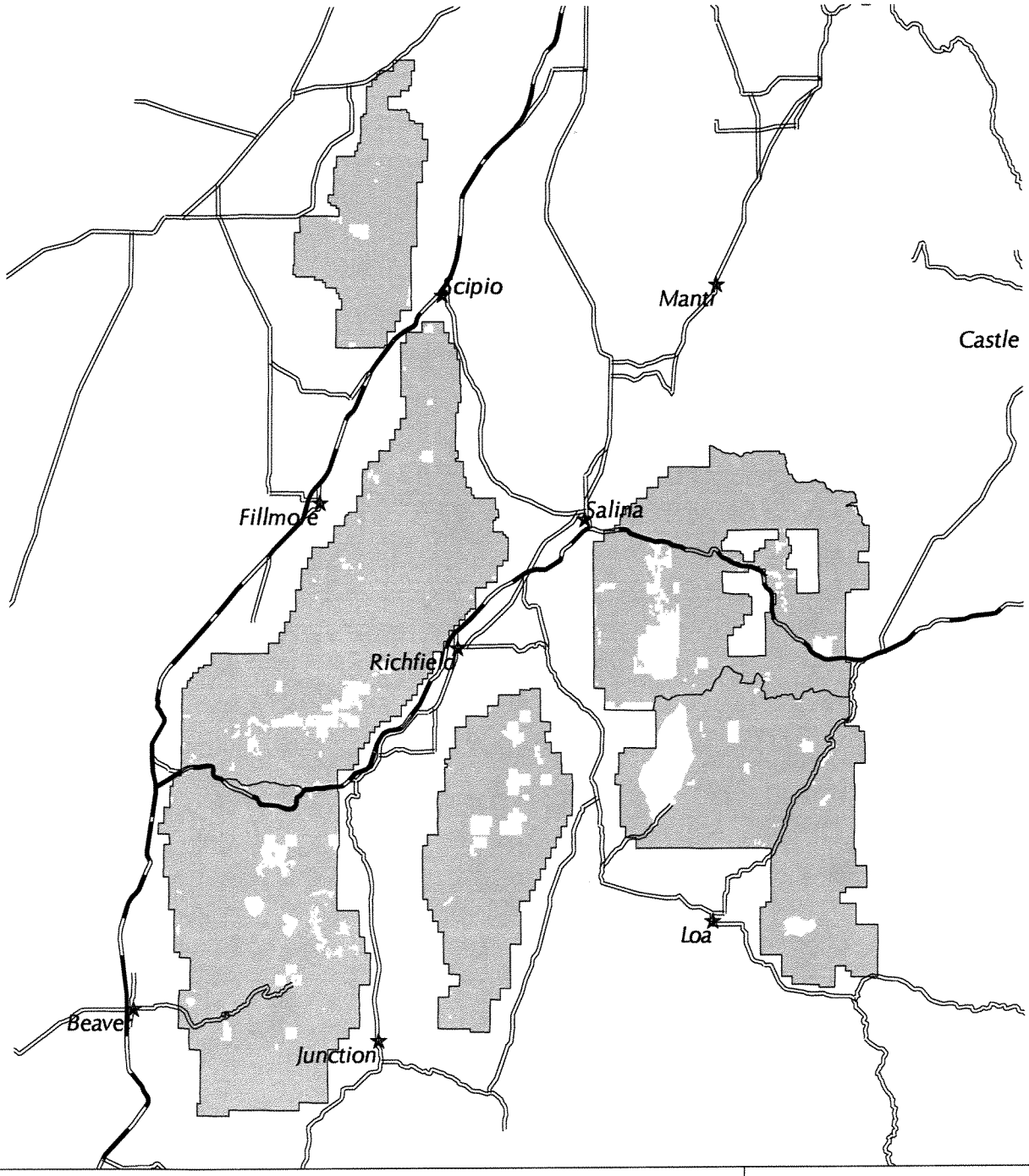
[3] ***Mineral Activities and Facilities***: Those activities and facilities needed to reasonably explore for and produce locatable and leasable minerals and mineral materials consistent with the rights granted by a plan of operation, permit, license, lease and requirements of applicable laws, regulations, and lease terms, conditions, and stipulations.

[4] ***Plans or Permit Areas***: Areas where plans, licenses or permits have already been approved or issued for mineral related activities. They will include the permit areas for mines, oil and gas fields, oil and gas exploratory and development wells, preliminary exploration activities such as geophysical surveys, as well as ancillary facilities within or outside of existing leases, including (but not limited to) access roads, sediment ponds, staging or office facilities, pipelines, ventilation breakouts/shafts, etc.

[5] ***Areas Authorized for Leasing***: Area included within existing leases and those areas authorized and forwarded to the responsible agency for leasing by the Forest Service prior to the date of the Goshawk decision. This does not include all areas potentiality available for mineral leasing under Forest Plans.

[6] ***Activities/Facilities Required to Exercise Rights Granted by a Lease***: This will include such activities and facilities within or outside of existing leases reasonably necessary to exercise pre-existing rights granted by a lease and subject to existing lease terms, conditions, and stipulations. They will include exploration and production facilities, reconstruction of existing Forest Service roads for access to leases/facilities, and construction of new access/transportation facilities (roads, pipelines, powerlines).

APPENDIX C




# Fishlake National Forest
## Lands Where Management Direction Applies

Scale 1:919767

0km 10km 20km 30km 40km

0mi 10mi 20mi

- Lands Where Management Direction Applies
- Lands Where Management Direciton Doesn't Apply
- Other Ownership within National Forest Boundary
- National Forest Boundary
- Interstate
- State Highways

N W E S

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. For specific data source dates and/or additional digital information contact the Forest Supervisor, Uinta National Forest, Provo, Utah. This map has no warranties to its contents or accuracy.

Date: 16-JAN-1999
/gis/ghawk/aml/test.map

**Table 1:** Acres by forest and exemption category

| National Forest | Total National Forest Acres (millions) | Acres (Millions) and Percent of Total Acres Direction *Will* Apply | Acres Direction will not apply (acres rounded to thousands) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total Acres (Millions) and Percent of Total Acres | #1 Wilderness | #2 i.e., RNAs, NRAs, etc. | #3 Developed Recreation[7] | #4 Urban Interface | #5 MMAs, Special Uses[8] |
| Ashley | 1.3 | 0.9 -- 70% | 0.4 -- 30% | 273,000 | 83,000 | 57,000 | 0 | 6,000 |
| Dixie | 1.9 | 1.8 -- 94% | 0.1 -- 6% | 83,000 | 14,000 | 13,000 | 0 | 7,000 |
| Fishlake | 1.5 | 1.4 -- 96% | 0.1 -- 4% | 0 | 10,000 | 37,000 | 0 | 8,000 |
| Manti-Lasal | 1.3 | 1.2 -- 94% | 0.1 -- 6% | 45,000 | 20,000 | 5,000 | 0 | 9,000 |
| Uinta | 0.9 | 0.8 -- 88% | 0.1 -- 12% | 58,000 | 4,000 | 20,000 | 11,000 | 6,000 |
| Wasatch-Cache | 1.2 | 0.8 -- 64% | 0.4 -- 36% | 313,000 | 6,000 | 9,000 | 51,000 | 53,000 |
| Totals | 8.1 | 6.9 -- 85% | 1.2 -- 15% | 772,000 | 137,000 | 141,000 | 62,000 | 89,000 |

[7] Total Forest acres includes both forested and non-forested. Though recent Forest Inventory and Analysis (FIA) work has estimated that approximately 3.9 million acres of the total 8.1 million acres are forested (not including woodland), there is no data set currently available to spatially tie this data set to locations on the ground. GAP data was considered for this purpose, but based on reviews was determined not to be accurate enough for addressing location information of items in categories 3,4 and 5; and marginal in categories 1 and 2. GAP data was intended to be used at the state scale; use at smaller scales has mixed results. Therefore, direction relates to any forested acres found outside exemption areas within the total 6.9 million acres it will be applied to.

[8] #5 - Includes ski resort acres. Several special use permit areas are of small spatial area and highly dispersed. It is impractical to map these small special use areas at the scale of maps contained in Appendix C and forestwide mapping of these areas is still being developed; therefore they are not included on these maps. However, these areas are in the acreage calculation in Table 1 based on acres estimated under permit. Refer the special uses section in chapter 3 and 4 of this document (3.5.6 and 4.5.6, respectively) for a discussions relating to this subject.

The proposed direction will not apply in areas 1-5 above, or relative to existing uses or rights discussed, because:

- the forested habitats in these areas are managed for other purposes as defined by current policy, permits or regulations; or,
- the existing use permitted under the current forest plan will not always allow for the management of habitat as outlined in the proposed management direction; or
- the degree of influence resulting from adjacent lands in other ownership may preclude application of this direction.

Managing these areas consistent with current management direction and allowing for uses discussed above is important to meeting other goals and objectives in the forest plan. Doing so will not result in the loss of sufficient habitat needed to support the currently viable population of goshawks in the State of Utah (refer to Chapter 4, section 4.3.2).

*Application of Management Direction:* The management direction in the selected alternative will only apply prospectively, i.e., to projects for which there has not been a decision document issued prior to the effective date of this amendment.

**Alternative Descriptions** - Each alternative discussion below summarizes the issues addressed and the key factors that differentiates it from other alternatives. Appendix A contains the detailed management direction for each alternative in table format. The table assigns each goal, objective, standard, and guideline a unique number (ID). The format is: Goal - "G-# of goal"; Objective - "O-# of objective"; standard - "s-# of standard"; and, guideline - "g-# of guideline. Appendix B contains monitoring requirements associated with each alternative in table format. The table in Appendix B assigns each monitoring requirement a unique number (ID); format is "m-# of monitoring requirement". Following the alternative discussions, Table 2 provides a quick view of what goals, objectives, standards, guidelines and monitoring requirements are included in each alternative for a quick comparison.

*Alternative A:* This is the current management alternative, No Action. This alternative continues the current management direction; goals, objectives, standards and guidelines in each forest plan. Individual projects are evaluated by current NEPA and NFMA requirements. No specific landscape analyses are required. Since the goshawk is designated a sensitive species in the Intermountain Region, biological evaluations (BEs) will continue to be prepared for all projects to disclose any potential impacts.

This alternative responds to those that questioned the need to change management direction given the current good condition of the goshawk populations in Utah. For a more complete description of how current forest plan direction provides for the habitat needs of the northern goshawk (as described in the HCS (Utah NFs et al. 1998) and the Assessment [Graham et al. 1999]), refer to the SIRs completed by the Ashley (10/30/98), Dixie (10/28/98), Fishlake (12/16/98), Manti-LaSal (1/29/99), Uinta (12/8/98) and Wasatch-Cache (11/9/98) National Forests (Project Record, Exhibit K)

As part of the No Action alternative, the Regional Forester will require the establishment of a statewide monitoring strategy with the State of Utah and other interested agency partners. This will not require an amendment to the six Utah National Forest plans. Statewide habitat and population monitoring strategies will provide for:

- Habitat Monitoring: This will be done to track changes in goshawk habitat over time. Within one year following the decision for this action, the Intermountain Region will

establish a monitoring protocol with the State of Utah for tracking changes in suitable goshawk habitat across the State. The processes used in Graham et al. (1999) for assessing habitat quality, quantity and connectivity at the state scale will be used.

- Population Monitoring: Concurrent with habitat monitoring, the Intermountain Region will establish a monitoring protocol with the State of Utah for tracking changes in identified goshawk territory occupancy. Territory occupancy data currently collected and analyzed at the national forest level will be shared with the UDWR for aggregation and analysis at larger scales, including the State.

Results from these monitoring efforts will be used, in part, to:

- assess impacts of management activities across interagency boundaries;
- continue to assess and refine what role NFS lands play in maintaining habitat needed to support viable goshawk populations in Utah; and
- the need to change management direction at some future date.

*Alternative B (Proposed Action):* This is the alternative proposed by the Forest Service in response to the project's purpose and need and released for public review and comment on February 5, 1999 (**FR,** Vol. 64, No. 24, pgs 5758-5764). The Proposed Action provides reasonable assurance that key habitat elements at greatest risk to change during the life of this amendment will be maintained on areas affected by management, as well as providing greater consistency in management of the habitat elements across all six Utah National Forests. A series of goal statements depict the desired condition of habitat elements that pertain to the maintenance of goshawk habitat over time.

The key elements of the Proposed Action are:

1. It allows the design and implementation of actions which mimic the variability in size, intensity, and frequency of native disturbance regimes within the full historic range of variation, including extreme events.
2. Direction addresses the importance of using native plant species and provide for a full range of seral stages in forest cover types within landscapes.
3. Direction is also provided that addresses the importance of sustaining mature and old structures in the landscape and that landscape assessments must be completed to describe existing structural conditions and determine opportunities to move toward desired structural habitat conditions.
4. Additional direction for protection of nest and post fledgling areas (PFA) is also provided. This includes requirements for pre-project territory occupancy surveys 1 year prior to activity, 2 years preferred. These surveys are essential and have been regional policy since 1993.

A clarification of the guideline (*g-21*) concerning restrictions on permitted human uses in active nest areas makes it clear that the restricted permitted human uses are only those for which the Forest Service issues permits; and, clarifies that permitted livestock grazing is not affected.

Four areas are to be monitored: (1) Goshawk Territory Occupancy (m-1); (2) Goshawk Habitat Connectivity and the relationship of mature and old forests to habitat diversity (m-3); (3) Snag Management and its relationship to habitat diversity (m-4); and, (4) Down Woody Material and its relationship to habitat diversity (m-5).

*Alternative C*: This alternative responds to those that said "Management direction found in the Proposed Action is *not consistent* with recommendations found in its own science foundation and conservation strategy; not correcting these inconsistencies will likely result in continued habitat degradation and loss

of management options in the future." Similar to the Proposed Action, this alternative provides reasonable assurance that key habitat elements at greatest risk to change during the life of this amendment will be maintained on areas affected by management, as well as providing for consistency in management of the habitat elements across all six Utah NFs. A series of goal statements depict the desired condition of habitat elements that pertain to the maintenance of properly functioning habitat over time.

The key elements in this alternative that differ from the Proposed Action (Alternative B) are:

1. Guideline g-1 was modified (g-2) to make it clear that the desire to work within disturbance events characteristic of HRV will be as defined by PFC (refer to Appendix D); this means landscape scale disturbance events are not desired.
2. Goal G-3 was modified (G-4) to reflect the desire to maintain structures in landscape patterns that are within HRV as defined by PFC.
3. Goal G-7 was modified (G-8) to reflect the desire to maintain clumps of trees with interlocking branches/crowns to achieve desired canopy closures.
4. Guideline g-13 was modified (g-15) to direct that density of tree clumps in stands be used to achieve canopies and that it was desired to have a range of densities to achieve canopy closures versus a minimum as described in Alternative B.
5. A guideline (g-33) was added concerning the need to do landscape assessments for more than just balance of forest structure classes.

The four monitoring requirements in Alternative B (m-1; m-3; m-4; m-5) are included. In addition, a monitoring requirement is included which requires post-vegetative treatment goshawk territory occupancy surveys, m-2. Requirement m-2 will assess the effectiveness of standards and guidelines in preventing territory abandonment.

*Alternative D*: This alternative responds to the issue that "The Proposed Action does not contain *all* the recommendations for habitat management found in the science document used as its foundation; this will result in continued habitat degradation and loss of future management options." This alternative provides direction similar to Alternative B and C, but adds additional and more prescriptive direction developed from recommendations identified in Reynolds et al. (1992) as important to the maintenance and enhancement of goshawk habitat *over the long term.*

The key elements in this alternative that differ from the Proposed Action (Alternative B) are:

1. Guideline g-1 was modified (g-2) to make it clear that the desire to work within disturbance events characteristic of HRV will be as defined by PFC (refer to Appendix D); this means landscape scale disturbance events are not desired;
2. The same two goals modified in Alternative C are included in this alternative (G-4 and G-8);
3. A more prescriptive canopy closure guideline was added (g-16) that differentiates between cover types and goshawk habitat area (nest, PFAs and foraging area);
4. A guideline was added (g-12) which prioritizes slash disposal treatments that should be used;
5. Two guidelines were added (g-31 and g-32) to manage road use and development throughout all habitat areas (the Proposed Action only restricted this in active nest sites and PFAs);
6. A standard was added (s-7) which requires 2 years of nest surveys prior to habitat-disturbing activities;
7. A guideline was added (g-8) which restricted opening sizes (1-4 acres) resulting from mechanical treatments throughout all habitat areas except in aspen and lodgepole cover types (the Proposed Action only restricted this in active nest sites and PFAs);

8. Two standards were added (s-3 and s-4) requiring retention of groups of mature and old live trees throughout territories;
9. An ungulate grazing guideline was added (g-27) that includes a single average and maximum utilization standard for forage (20% and 40%, respectively) and shrubs (40% and 60%, respectively) on the six Utah National Forests;
10. A guideline was added (g-33) concerning the need to do landscape assessments for more than just balance of forest structure classes; and

Monitoring requirements are the same as Alternative C (m-1 through m-5), plus an additional monitoring requirement is added (m-6) concerning ungulate grazing and utilization. Requirement m-6 will assess whether utilization direction was implemented and if it was effective.

*Alternative E*: This alternative responds to the issue that the "Use of the wrong management recommendations for management of goshawk habitat will result in habitat degradation and loss of future management options." Respondents noted the debate in the biological community, as well as among credible agencies, on how habitat for the goshawk and its prey should be managed.

Because this issue was based on the disagreements between Reynolds et al. (1992) and others in the biological community, direction in Alternative D was used as the base. Direction was modified in Alternative D to address disagreements, resulting in more prescriptive and less flexible direction than found in Alternative D, as well as other action alternatives. The key elements in this alternative that changed from Alternative D are:

1. Goal (G-3) and guideline (g-1) allow for the full range of native disturbance processes, including extreme events (this is the same as Alternative B);
2. The canopy closure guideline (g-14) reflects higher desired canopies, higher than any other alternative;
3. A standard was added (s-2) which prohibits treatment in existing mature and old forest structures;
4. A standard was added (s-1) requiring the use of *only* native species in management activities;
5. A standard was added (s-10) that prohibits any human disturbance (as permitted by the Forest Service, excluding livestock grazing) in active nesting areas during the breeding period. Other alternatives provide flexibility through a guideline that will allow disturbance if it is determined that the disturbance will not likely result in nest abandonment.
6. A guideline was added (g-30) concerning restrictions for treatments in lands classified as unsuitable timber lands.
7. The grazing guideline was eliminated, and current forest plan requirements will be followed (this is the same as Alternatives B and C).

Monitoring requirements are the same as Alternative C and D (m-1 through m-5), except the grazing monitoring requirement (m-6) was deleted.

*Alternative F*: This alternative responds to the issue that "Management activities should concentrate on maintenance of habitat areas at risk to provide for the greatest opportunity to minimize any further degradation of habitat and loss of management options." This alternative focuses management on goshawk habitat acres at-risk. Acres at-risk are defined as those that, during the life of this amendment, may lose sufficient habitat elements important to the goshawk and its prey, such that they will no longer be rated as high and optimum habitat based on the Graham et al. (1999) rating process. By focusing management on those forested acres that are at greatest risk of dropping from high and optimum goshawk habitat to low or moderate, the agency will do the most it can do in over the projected 4 year life of this amendment to minimize any further loss of key habitat areas.

Graham et al. (1999) use the current distribution and connectivity of high and optimum habitat as their basis for determining if sufficient amounts of habitat are available in the State of Utah to support the currently viable population of goshawks.

This alternative is similar to Alternative C. The key elements that changed in this alternative are:

1. All long term goals common to Alternative C and other action alternatives were deleted and replaced with a single goal which focuses on short-term maintenance or restoration of high or optimum habitats (per Graham et al. 1999 assessment process);
2. Unlike other action alternatives, an objective was added which emphasizes the need to treat at least 1000 acres per year on each administrative unit to further achievement of the short term goal previously discussed.
3. This alternative includes grazing direction. The focus is on the need to change grazing practices only in those areas where landscape assessments determine grazing is a factor in putting a landscape at-risk relative to habitat needs of the goshawk.

Six monitoring requirements are included under this alternative, m-1 through m-5, and m-7. This is the same as Alternatives C, D and E except the grazing requirement under Alternative D, m-6, is replaced with m-7.

**Table 2: Applicable Goals (G), Guidelines (g), Standards (s), Objectives (o), and Monitoring Requirements (m) for Alternatives. Refer to Appendix A for a detailed description of the proposed management direction and Appendix B for alternative monitoring requirements.**

| Indicator | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Native Processes | current plan direction variable | G: 1<br>g: 1, 3 | G: 1<br>g: 2, 3 | G: 1<br>g: 2, 3 | G: 1<br>g: 1, 3 | g: 2, 3 |
| Forest Composition | current plan direction variable | G: 2<br>g: 4, 5 | G: 2<br>g: 4, 5 | G: 2<br>g: 4, 5 | G: 2<br>g: 5<br>s: 1 | g: 4, 5 |
| Forest Structure | current plan direction variable | G: 3, 5, 6, 7<br>g: 6, 7, 9, 11, 13 | G: 4, 5, 6, 8<br>g: 7, 9, 11, 15 | G: 4, 5, 6, 8<br>g: 7, 8, 9, 10, 11, 12, 16<br>s: 3, 4 | G: 3, 5, 6, 7<br>g: 8, 9, 10, 11 12, 14<br>s: 2, 3, 4 | g: 7, 9, 11, 15 |
| Nest and PFA | current plan direction variable | G: 9<br>g: 17, 18, 19, 20, 21, 22, 24, 25<br>s: 5, 6, 8, 9 | G: 9<br>g: 17, 18, 19, 20 21, 22, 24, 25<br>s: 5, 6, 8, 9 | G: 9<br>g: 18, 19, 20, 21, 22, 24, 26<br>s: 5, 7, 8, 9 | G: 9<br>g: 18, 19, 20, 23, 24, 26<br>s: 5, 7, 8, 9, 10 | g: 17, 18, 19, 20 21, 22, 24, 25<br>s: 5, 6, 8, 9 |
| Other Misc. | current plan direction variable | None | g: 33 | g: 27, 31, 32, 33 | g: 30, 31, 32, 33 | g: 28, 29, 33 |
| Treatment Prioritization | current plan direction variable | None | None | None | None | G: 10<br>g: 34<br>o: 1<br>s: 11 |
| Monitoring Requirements | current plan requirements variable | m: 1, 3, 4, 5 | m: 1, 2, 3, 4, 5 | m: 1, 2, 3, 4, 5, 6 | m: 1, 2, 3, 4, 5 | m: 1, 2, 3, 4, 5, 7 |

## 2.4 Alternative Comparison

1. *To what extent will the alternative affect goshawk population viability during the remainder of the current planning period?*

   None of the alternatives, including the No Action Alternative, will result in the loss of goshawk population viability during the short time frame of this amendment. Habitat in Utah is of sufficient quality, quantity and distribution to continue to support this viable population (Graham et al. 1999).

2. *To what extent will an alternative reduce risk to loss of habitat needed to support the currently viable population of goshawks in Utah?*

   Each alternative varies in its ability to reduce risk to loss of habitat needed to support the currently viable population of goshawks in Utah. Looking at the alternatives in a very broad perspective, they can be rated from highest to lowest reduction in risk to habitat. The alternative with the highest risk reduction provides the greatest opportunity for maintenance, and possibly restoration and enhancements.

   Highest reduction in risk <----------> Lowest reduction in risk
   Alt. F  Alt. C  Alt. D  Alt. B  Alt. E  Alt. A

   This is a very simplistic comparison of alternatives; additional insight into the reasons for this rating of risk reduction follow. The discussion briefly highlights key differences in each alternative found through the detailed analysis. For a more in-depth discussion of all aspects of each alternative, refer to Chapters 3 and 4.

   *Alternative F*: Based on this assessment, this alternative provides direction that focuses management activities for the remainder of the planning period on those areas at greatest risk to falling from high or optimum goshawk habitat to low or moderate, *thus providing the greatest reduction in risk in the short-term.*

   *Alternative C*: This alternative also offers a high level of risk reduction; however, it is lower than Alternative F because it does not focus on high and optimum habitat areas that are currently at-risk. As a result, more of these at-risk areas could fall into low to moderate quality habitat over the projected 4 year life of the amendment.

   Alternative C, unlike Alternative F, does not address grazing practices. The analysis determined that during the short life of the amendment, not changing grazing practices from what is currently allowed under direction in forest plans is not likely to result in any measurable difference in terms of maintenance of goshawk populations that are currently viable in Utah.

   *Alternative D*: This alternative has a lower level of risk reduction over the projected 4 year life of the amendment than Alternatives C or F because of the degree of complexity involved with future project design and implementation. This complexity causes two things to happen:

   1. It costs more in time and funds to implement and reduces the overall number of acres that may be treated over the amendment period; and

2. The complexity of implementation may affect the degree of success and ability to duplicate actions (consistency).

As a result, more of the high and optimum habitat quality areas identified as at-risk could drop in to lower quality habitat over the time period of the amendment.

The ungulate utilization guideline is a conservative approach to dealing with potential goshawk habitat problems that can be attributed to grazing. Though this adjustment will likely resolve many of the effects caused by grazing on more acres than Alternative F, in many cases it may not be the only resolution to the problem and, in some cases, will be applied to areas where grazing is not a problem.

*Alternative B*: Alternative B is similar to Alternative C, with differences in why landscape assessments are done, canopy closures retained and allowing treatments to mimic conditions within the full range of the Historic Range of Variation (HRV). Because of these three items, it provides a slightly lower level of risk reduction for maintenance of habitat than Alternative C and D.

*Alternative E*: This alternative provides direction similar to Alternative D, except grazing direction is deleted and treatments in groups of mature and old forests are prohibited. Also, treatment of unsuitable acres is restricted when treatments are designed to foster goshawk habitat needs only, and treatments are allowed to mimic patterns within the full range of HRV, including extreme events. Finally, this alternative will promote substantial increases in canopy closure requirements throughout forested acres not exempt from application of this direction.

By applying direction in this alternative in future project design and implementation, the effects analysis determined that it will likely promote conditions that are not sustainable over the long-term in patterns and landscape scales desired, and will be at high risk to loss over time.

*Alternative A*: The No Action alternative is the most variable in terms of risk. Direction in current plans for project design and implementation concerning the aspects addressed in the action alternatives is either lacking or too broad. Current direction allows decisions to be made that may adversely affect goshawk habitat, or direction is not sufficient to provide consistency in habitat management across NFS lands.

3. *How will implementation of an alternative affect management activities, and at what cost (including social and economic costs)?*

Though an alternative may provide the most risk reduction to habitat needed to support viable populations of goshawks, it may have moderate to high costs socially and economically. The relative degree of social impacts will follow the same degree of change as the economic impacts experienced by that group. There is a close tie between economic and social factors. For example, Alternatives D requires the greatest change to grazing and could impact some grazing interests economically at the point it is integrated into a grazing permit. The primary basis for determining the effects to the social environment is the economic changes that may result from each alternative.

Looking at the alternatives in a very broad perspective, they can be rated from lowest to highest in terms of social and economic costs based on the assumptions stated above.

Lowest costs <----------> Highest costs
Alt. A Alt. C ~ Alt. B Alt. F Alt. D Alt. E

This is a very simplistic comparison of alternatives; additional insight into the primary reasons for this rating of costs follows. For detailed disclosures, refer to Chapters 3 and 4.

*Alternative A*: Because activities are likely to continue as planned it is expected that this alternative will result in the lowest costs socially and economically.

*Alternative C*: Of the action alternatives, this alternative results in the lowest costs socially and economically. Recreational and scenic resources are retained to support tourism and recreational uses on National Forests. Current plan direction protecting heritage resources, soil, water, air quality and human health and safety are unaffected. Current direction on grazing management does not change. Current special use permits, mining and mineral leases currently with plans or permits, and developed recreation facilities are not affected because they are exempt. The output likely affected is commercial wood products. However, as discussed in 4.6.1, no measurable change in overall outputs is expected at the state or forest scale over the period the amendment will be in effect, though potential product size changes could occur.

Administrative costs associated with future project design and implementation will not measurably change. Though some increases may result, many aspects of the alternative are already being implemented under different parameters. Direction in this alternative may change how things are looked at but not add substantially to the workload. Monitoring will add some additional costs but not beyond capabilities of current Forest programs.

*Alternative B*: The primary difference in the social and economic environment between this alternative and Alternative C is the ability to design and implement actions which include extreme events. This variance results in a potential for higher costs to the social and economic environment. Due to the short time frame of this amendment and the corresponding low probability that an extreme disturbance will manifest itself at a scale that will be noticeable across the analysis area, a large difference was not identified. Administrative costs are similar to Alternative C, with slightly lower costs resulting from the reduction in one of the monitoring requirements (m-2) found in Alternative C.

*Alternative F*: This alternative projects slightly greater costs socially and economically over Alternatives C and B but, again, not likely to be measurable over the amendment period. Recreational and scenic resources are retained to support tourism and recreational uses on national forests. Current plan direction protecting heritage resources, soil, water, air quality and human health and safety is unaffected, and current special use permits, mining and mineral leases currently with plans or permits, and developed recreation facilities are not affected, as they are exempt.

The outputs that may be affected are commercial wood products and livestock grazing. While measurable change in overall outputs at the forest or state scale are not likely over the amendment period, the potential for localized effects are identified (see 4.5.2). For example, where grazing is determined to be contributing to an at-risk condition, grazing practices will be changed as needed to initiate correction of the identified problem. Because this guideline will only be implemented when and if problems are found where grazing is contributing to habitat degradation as landscape assessments are done, the degree of change that will occur at

the forest or state scale during the life of the amendment is not likely to be measurable (see 4.5.2).

When and if grazing practices are modified, administrative costs will likely be slightly higher due to the modifications. Monitoring will add some additional costs but not beyond capabilities of current Forest programs (see 4.5.7).

*Alternative D*: This alternative imposes substantially more restrictions to project design and implementation than other alternatives. The restriction that results in the most noticeable change to the social and economic environment is the substantial reduction in grazing utilization across all non-exempt forested acres within Utah's NFs. Based on the analysiss in Chapter 4, the effects will be measurable at the state scale with an estimated reduction of approximately 23% in permitted animal unit months (AUMs) across Utah's NFs. Measurable reductions are expected at the forest and local scales as well; however, the % reduction will be variable depending on site specific conditions. In some cases, livestock grazing permits could be reduced to a level where it may no longer be economically viable for a permittee to continue to graze livestock on some allotments.

Administrative costs are likely to increase as a result of the complexity of integrating proposed direction in future project design and implementation. Monitoring will add some additional costs but not beyond capabilities of current Forest programs.

*Alternative E*: This alternative imposes many of the same restrictions as Alternative D, except:

- it eliminates grazing restrictions; current forest plan direction will apply.
- it prohibits vegetative management activities in all forested groups dominated by mature and old forests and on unsuitable forest lands for purposes of promoting habitat for the goshawk and its prey.

The key social and economic impact of this alternative results from prohibiting any further commercial harvest in forests dominated by mature and old trees for the period the amendment is in affect (the time frame between now and when current forest plans are revised). This will have local, forest, and state level impacts to timber industry. These impacts will be measurable, resulting in reductions from current levels of wood product outputs by an estimated 30% of total volume offered in a year.

These discussions highlight the key differences between the effects of alternatives. Table 3 provides an easy comparison of key outcome differences expected from each alternative. Other refinements were made and their effects are discussed in Chapter 4.

## Table 3: Key Outcome Differences Among Alternatives

| | ALTERNATIVE | | | | | |
|---|---|---|---|---|---|---|
| **Indicator** | **A** | **B** | **C** | **D** | **E** | **F** |
| **Native Processes** | Variable depending on Forest Plan | allows for mimicing extreme disturbance events within HRV | does not attempt to mimic extreme disturbance events (PFC) | does not attempt to mimic extreme disturbance events (PFC) | allows for mimicing extreme disturbance events within HRV | does not attempt to mimic extreme disturbance events (PFC) |
| **Forest Composition** | Variable depending on Forest Plan | prefer the use of locally adapted native species in management activities when and where practical | prefer the use of locally adapted native species in management activities when and where practical | prefer the use of locally adapted native species in management activities when and where practical | *requires* use of locally adapted native species in management activities | prefer the use of locally adapted native species in management activities when and where practical |
| **Forest Structure** | Variable depending on Forest Plan | 40%+ canopy closure in foraging area, 50%+ in nest and PFAs as measured within the stand;<br><br>1-2 acre opening limit in only the Nest and PFA; | 40-70% of stand covered by clumps of trees with interlocking branches in foraging and PFAs, 50-70% of stand covered by clumps in nest areas to provide desired canopy closure;<br><br>1-2 acre opening limit in only the Nest and PFA; | 40-70%+ canopy closure as measured within the stand and is specific by cover type and goshawk habitat area (see g-16);<br><br>1-4 acre opening limit within entire territory (home range);<br><br>1-2 acre opening limit in Nest and PFA;<br><br>retains green tree clumps in vegetative management areas | 60%+ canopy closure in foraging area, 75%+ in nests and PFA areas; as measured within the stand;<br><br>1-4 acre opening limit within entire territory;<br><br>1-2 acre opening limit in Nest and PFA;<br><br>retains green tree clumps in vegetative management areas<br><br>prohibits any treatment in older structural stages | 40-70% of stand covered by clumps of trees with interlocking branches in foraging and PFAs, 50-70% of stand covered by clumps in nest areas to provide desired canopy closure;<br><br>1-2 acre opening limit in only the Nest and PFA; |
| **Nest and PFA** | Variable depending on Forest Plan | 1 year required/ 2 years preferred of surveys prior to treatment | 1 year required/ 2 years preferred of surveys prior to treatment | 2 years of surveys required prior to treatment | 2 years of surveys required prior to treatment;<br><br>requires the least disturbance in nest and PFAs | 1 year required/ 2 years preferred of surveys prior to treatment |

| | ALTERNATIVE | | | | | |
|---|---|---|---|---|---|---|
| **Indicator** | **A** | **B** | **C** | **D** | **E** | **F** |
| **Other Misc.** | Variable depending on Forest Plan | none | requires landscape assessments to help identify opportunities for project proposals; | requires landscape assessments to help identify opportunities for project proposals;<br><br>flat ungulate utilization guidelines, 20% average, 40% max of grass/forbs within forested habitats;<br><br>Where timber harvest is prescribed manage transportation system to minimize territory disturbance (likely to result in nest abandonment). | requires landscape assessments to help identify opportunities for project proposals;<br><br>no treatment in unsuitable forest lands for the sole purpose of goshawk habitat management;<br><br>Where timber harvest is prescribed manage transportation system to minimize territory disturbance (likely to result in nest abandonment). | requires landscape assessments to help identify opportunities for project proposals;<br><br>application of livestock grazing practices guideline if grazing is contributing to at-risk condition; |
| **Treatment Prioritization** | Variable depending on Forest Plan | none | none | none | none | Management activities prioritized in habitats at-risk |
| **Monitoring Requirements** | Variable depending on Forest Plan | none | post-treatment occupancy monitoring | post-treatment occupancy monitoring<br><br>ungulate grazing monitoring required on % of all allotments | post-treatment occupancy monitoring | post-treatment occupancy monitoring<br><br>ungulate grazing monitoring required where landscape assessment identifies problem |

# CHAPTER 3
# AFFECTED ENVIRONMENT

## 3.1 INTRODUCTION

None of the alternatives examined in the environmental assessment will, on its own, change the physical environment of the affected national forests.

To provide the decision maker with a means of comparing the possible effects of the alternatives, the ID Team evaluated components of the environment that could be affected by the decision/proposed management direction.

## 3.2 PHYSICAL COMPONENTS

A brief description of the current condition of the physical components potentially affected by the decision to be made follows. A more complete description of the affected physical environment is included in the specific Land and Resource Management Plan (Forest Plan) for the six affected national forests.

### 3.2.1 Soil

Soil is a non-renewable resource. One inch of soil is developed from bedrock in several hundred to more than a thousand years. When soil is lost through erosion, soil productivity is reduced and essentially lost forever. Excessive removal of vegetation and ground cover from a site would expose the soil to erosion and loss of plant nutrients Long-term soil productivity is the capability of soil to sustain the inherent, natural growth potential of plants and plant communities over time. Ecosystem structures and functions ultimately depend on a productive soil resource. Maintenance of long-term soil productivity is widely recognized as a basic requirement of forest and rangeland ecosystem management. The extent to which long-term soil productivity is affected by management activities is variable, depending on the type of soil, the climatic conditions at the time of the activities and the intensity of the activity. Natural resource land management activities and uses on forest and rangelands have the potential to reduce natural productivity if certain operating guidelines are not followed. Soil productivity is reduced when erosion removes soil; management activities displace soil; soil porosity is Areduced; or when surface organic mater in the form of large and small organic debris (e.g., down logs) is removed in excess, from the forest floor (typically, after some form of vegetative manipulation).

Land area within the NFS boundaries in Utah is composed of rugged, glaciated mountains in the north and high plateaus in the southern part of the State. The tallest peaks in the mountains are more than 13,000 feet high. Many of the southern plateaus are more than 10,000 feet above sea level. With elevation changes ranging from 3,000 to 7,000 feet, the soil temperature and moisture gradients are highly variable. The land area is semiarid and most of the soil moisture comes as snow in the winter. Yearly precipitation ranges from 10 to 20 inches in the lower valleys to over 40 inches in the higher mountains. Moderately well developed soils with soil moisture regimes at the higher elevations are generally sufficient to support the growth of subalpine fir and spruce forest as well as lodgepole pine and aspen. In the southern plateau areas, soils may be somewhat weakly developed, with moisture regimes that support ponderosa pine, aspen, and some Douglas-fir. The lower woodland zone has only enough soil moisture and temperature regimes to support pinyon-juniper and mountain brush of oak and maple species. Many areas of low soil moisture support sagebrush, grasses and desert shrubs.

Because of the complexity of the geologic formations, steep slopes, and the parent materials, land stability in the form of landsliding and mass wasting occurs in many areas within Utah. The presence of these hazards and limitations within the soil mantle, coupled with high erosion hazards in some areas, influence

the management activities that can be applied to the landscapes. Materials from which the soils were derived have a great influence on the inherent soil characteristics. Sedimentary bedrock materials, such as those which make up the interbedded shales and siltstones in the North Horn and Wasatch geologic formations, weather into fine texture soil materials which are susceptible to mass movement.

Soil is a highly variable and complex layer of unconsolidated material. The combined influences of time, parent material, climate, living organisms, and the topography of a site interact to form soils with unique sets of physical and chemical properties that determine the productivity of each soil. Natural soil productivity varies widely across Utah due to soil properties (e.g., nutrient status, depth, coarse fragment content, texture) and site characteristics (e.g., elevation, aspect, slope gradient). The soil resource on the six Utah NFs varies considerably within and between watersheds, river basins and Forests. Historic use as public domain lands severely impacted the soil resource, with areas of extensive soil loss, compaction, and in some places changing the soil hydrologic function. Some soil ecosystems which support high elevation alpine vegetative communities and soils that once supported tall forb communities, are currently rated as "functioning at risk" when reviewed from a properly functioning condition concept.

Soil directly or indirectly supports all other resources. It serves as a growth medium for plants, filters biological and chemical substances and regulates water transmission. The long-term productivity of forest and rangeland resources is dependent upon the soil resource.

Direction for soils and watershed management is contained in many federal laws. The Organic Act of 1897 requires protection of natural resources including soils and water. The NFMA (16 USC §1604) requires the management of public lands in a manner that will not impair the long-term soil productivity of the land. A major goal for soil resource management is long-term maintenance and sustainability of soil productivity and watershed protection. This requires avoiding management actions that would irreversibly impair soil productivity. Maintaining soil productivity also requires restoring or improving soils in areas where they have been degraded.

### 3.2.2 Water

Water quality and ecosystem health are closely linked. Changes in any of the chemical, physical, and biological properties of water can directly affect people, fish, wildlife, and overall ecosystem functions and values. The State of Utah's surface water resources include 16,457 miles of rivers and streams, nearly 3,000 lakes and reservoirs, including the Great Salt Lake, and approximately 510,039 acres of wetlands and 1,902 linear miles of wetlands (Utah Division of Water Quality 1998).

Waters flowing from forested areas administered by the Forest Service in Utah have a number of beneficial uses, including providing domestic, industrial, and agricultural water, recreation opportunities, fish and wildlife habitat, and power production. And, one unique aspect of the water resource in the project area is that a large percentage of water flows into the Great Salt Lake. Water quality plays an important role in ecosystem function on federal lands. Primary factors affecting water quality are erosion and subsequent sedimentation resulting from natural and management-induced disturbances such as vegetation manipulation, road construction, stream crossings, high intensity fires and increased temperatures resulting from removal of riparian vegetation that shades streams. NFS lands in Utah are extremely important to the maintenance of water quality in the state as they provide the cleanest source of water as well as the main source of all drinking water.

The headwaters of the major drainages are found on NFS lands which means that the quality of water flowing from NFS lands into the Great Salt Lake could also affect the Great Salt Lake ecosystem. Proper management and use of water resources, combined with care for the watershed lands from which they originate, are fundamental to managing all other resources on these national forests. The primary water resource issue on NFS lands is water quality. The goals are to maintain the soil mantle and to provide water for human, wildlife, fish, and vegetative needs. Water is used on the Utah NFs for livestock, dust abatement on roads during timber hauling, human consumption, maintenance of in-stream flows, and wildlife needs, including wetland habitat.

Since the scope of this analysis is limited to NFS lands within Utah and small portions of Colorado and Wyoming, most of the streams and rivers can be characterized as lower order streams, including their headwaters. The 1st, 2nd, and 3rd order streams tend to be high energy, fast-moving water courses that are often confined or partially confined within limited flood prone areas; and, they are often structurally controlled. The higher order streams (typically 4th and 5th order) can be expected to have moderate energy and slopes and they are usually weakly confined by their valleys.

Streamflows from the headwaters generally is snow-dominated. A significant snowpack accumulates from late fall through spring. Snow melt in spring and early summer results in a notable runoff surge that usually is sustained well into the summer. Water temperatures tend to be cool year-round. Generally, water quality is excellent in the headwaters. Rivers and streams are relatively steep in the headwaters, controlled by bedrock and glacially-derived formations. High mountain lakes are common in the headwaters.

The Clean Water Act directs federal agencies to comply with state water quality requirements to restore and maintain water quality necessary to protect beneficial uses such as public water supply, recreation in and on the water, and protection and propagation of fish, shellfish, and wildlife. Under the Clean Water Act, Utah adopted water quality standards. Water quality standards consist of designated beneficial uses for the waters of the state as delineated in Utah's administrative rules, and criteria to protect the beneficial uses. Criteria may be constituent concentrations (e.g., turbidity, temperature), levels, or narrative statements (e.g., no discharge of materials in concentrations harmful to human health or aquatic life) representing water quality that supports a particular use. The water quality standards also include an antidegradation policy protecting existing uses and waters of high quality. Best management practices (BMPs) are water quality protection measures developed by the Forest Service to attain and maintain state water quality goals and objectives. BMPs are certified by the state agency with water pollution control authority, approved by the Environmental Protection Agency, and also included in current plans.

## 3.3 BIOLOGICAL COMPONENTS

A general discussion of the current condition of the biological components that could be affected by the decision to be made follows. A more detailed, Forest-specific discussion can be found in each of the Forest Plans for the six affected national forests.

### 3.3.1 Forest Vegetation

Throughout Chapter 3, Affected Environment, and Chapter 4, Environmental Consequences, reference is made to "historic range of variation (HRV)" and "properly functioning condition (PFC)" when discussing vegetative conditions. While these two concepts share many commonalities, they do differ. A detailed explanation can be found in Appendix D.

The discussion below summarizes information on vegetation important to goshawk habitat. Additional information on vegetation on Utah's NFs is available from numerous sources, including the vegetation resource report in the Project Record (Exhibit L), the *Region 4 Properly Functioning Condition Assessment* (USDA Forest Service 1996), the Properly Functioning Condition Assessments for the Uinta Mountains (USDA Forest Service 1998b), the Wasatch Mountains (USDA Forest Service 1998a), the Dixie NF (USDA Forest Service 1997), the Utah High Plateaus and Mountains Section (USDA Forest Service 1996a), and the Manti-LaSal NF (in draft, USDA Forest Service 1998c), *Aspen Community Types of the Intermountain Region* (Mueggler, 1988), *Coniferous Forest Habitat Types of Northern Utah* (Mauk and Henderson, 1984), and *Coniferous Forest Habitat Types of Central and Southern Utah* (Youngblood and Mauk, 1985).

The best single source for information on vegetation types used by the northern goshawk is in *The Northern Goshawk in Utah: Habitat Assessment and Management Recommendations* (Graham et al. 1999) which describes the current and potential vegetation types across Utah and the value of these types to the northern goshawk. The information contained therein is herewith incorporated by reference.

National forest vegetation types that could potentially be affected by the decision associated with this environmental document include all forest types with the exception of woodlands (pinyon-juniper, oak, oak-maple) and brushlands. Included within the affected forested types are understory species and small openings (generally less than 1 acre in size) that contain non-arboreal vegetation species. Non-arboreal vegetation provides important habitat for prey species of the goshawk.

**Spruce-Fir** - This vegetation type ranges from pure Engelmann spruce to pure subalpine fir forests. In most instances, however, it occurs as a mixed species forest. Blue spruce is a component of this type.

Structural stages are not balanced throughout the project area in this type because the majority of the type is in mature to old age classes. Due to the high elevation, short snow-free growing season, and moist environment, these ecosystems have relatively few fires. The primary disturbance agents in these spruce-fir ecosystems are most likely insects, with fire as a secondary agent.

The potential is high for major changes in the current stand structure and composition for this type. Changes occur naturally as overstory trees age and die from agents such as insect epidemics, stand-replacing fires, or a combination of the two on broad landscape scales (USDA Forest Service 1996). Smaller scale changes may be induced by minor events such as wind throw, small fires, avalanches, etc. Depending on edaphic conditions and insect populations, small scale disturbances can lead to major spruce beetle outbreaks. These change agents influence vegetative structure, species composition, and successional dynamics in spruce-fir communities (Habeck and Mutch 1973, Aplet et al. 1988, Baker and Veblen 1990, Veblen et al. 1991, Veblen et al. 1994). Based on research in northern Utah, Jenkins et al. (1998) describes four potential successional pathways for spruce-fir forests after stand-replacing fire. Major shifts from old, late seral to young forests in spruce beetle epidemic areas are currently occurring in portions of the Fishlake, Manti-LaSal, and Dixie NFs.

**Aspen** - Quaking aspen is distributed throughout the project area, with the largest concentrations in central and northern Utah. Age generally varies from 60 to 120 years. Aspen is considered an early seral species on most sites but may be long-persistent or "stable," forming an edaphic climax on others. Where aspen is seral, fire has been the most important disturbance factor influencing changes in structural stages and composition and minimizing dominance by conifer species (USDA Forest Service 1996). The fire return

interval is less frequent today compared to historical averages due to the combined effects of fire suppression and fuels reduction by herbivory (Bartos and Campbell 1998). Where aspen is stable, the mechanisms that keep aspen are not fully understood and may be site dependant and variable.

Most of the quaking aspen (both seral and stable) is in a mid to late seral stage and is dominated by older age classes. Many areas are becoming dominated by conifers through plant succession (seral sites), reducing quaking aspen area. Decline in aspen is due to a number of factors including succession to conifers, grazing, and fire suppression.

Changes in the abundance of aspen-dominated landscapes have occurred over the past 125+ years partly as a result of exclusion of fire in combination with herbivory (ibid.). Bartos and Campbell (1998) conclude that of the 2.1 million acres of NFS lands in Utah that were once dominated by aspen, aspen now dominates the landscape on only 800,000 acres. This equates to an approximate 60% decline in aspen-dominated landscapes on NFS lands in Utah. Decline in aspen is due to a number of factors including succession to conifers, grazing, and fire suppression.

If current trends continue, it is likely that significant acres of seral aspen cover types will convert to dominance by coniferous species by following plant succession. The ability of aspen to recolonize the site may be limited or lost by long-term site dominance of conifers. Loss can occur since aspen in Utah regenerates by suckering and not through seedling establishment. This, in turn, could affect the resiliency of the site to disturbance. Aspen has been replaced on some stable sites by sagebrush (ibid.1998). This seems to be related to fire prevention and grazing pressure on aspen seedlings where aspen is on the edge of its range. Given recent and current conditions and trends, there is a risk to loss of some stable aspen as well as seral aspen.

**Lodgepole Pine** - Lodgepole pine is typically an early seral tree species ranging over extensive areas of northern Utah. It readily regenerates naturally after fire and is often found in pure, even-aged stands. Lodgepole pine has a history of extensive mountain pine beetle epidemics at elevations generally below 9,600 feet, where the more susceptible sites are located (Amman et al. 1973); Dwarf mistletoe is the most common disease (Van Der Kamp and Hawksworth 1985). Currently lodgepole pine structural stages are not balanced within the analysis area; thus, these systems are not within the "properly functioning condition," defined in the *Region 4 Properly Functioning Condition Assessment* (USDA Forest Service 1996). Most lodgepole pine forests are in the mature and old age classes, except for recently harvested and burned areas, which account for less than 20% of total lodgepole acres (O'Brien 1999). The historical fire regime is one of lethal, stand-replacing fires.

The percentage of the type under intensive management is small (<15-20% of the cover type), and where clearcutting has been concentrated harvest has resulted in a landscape highly fragmented when compared to the historical pattern (i.e., patch size is much reduced over the historical pattern).

The primary short-term risk is related to stand structural changes in the mature age class caused by bark beetle epidemics. Following these epidemics, risk of unwanted wildland fire increases. Long-term risks are related to large, rapid swings from mature-aged and late seral forests to grass/seedling and early seral stages. Current fragmentation within some areas will pose a risk to species that are dependant on the historical pattern of stand structures and habitat sizes and shapes.

**Mixed Conifer** - This cover type typically includes a mix of coniferous species. The mix is variable depending on site, elevation, and geographic location. Stands are dominated by one or more of the

coniferous species. Aspen is a component of many mixed conifer stands; however, it is not the principal species in this type. In southern Utah and adjacent areas of Colorado this type may contain as many as seven species; in northern Utah and adjacent areas of Wyoming, there may be only two to three species. Mixed conifer cover types may include Engelmann spruce, blue spruce, subalpine fir, white fir, Douglas-fir, ponderosa pine, lodgepole pine, limber pine, aspen, and occasionally bristlecone pine. In this assessment, stands dominated by Douglas-fir and/or white fir are included in the mixed conifer group.

Site conditions vary from dry white fir and Douglas-fir sites to generally moist, high elevation sites dominated by spruce and lodgepole pine in the Uinta Mountains. Sites classify as subalpine fir, white fir, or Douglas-fir habitat types, indicating that these species are the potential "climax" species for the site.

In the high elevation mixed conifer sites of the Uinta Mountains, the fire regime is little altered over much of the area. In these areas, the fire regime shares more in common with the spruce-fir regime than with the lower elevation, drier mixed conifer sites.

On the drier, warmer mixed conifer sites, more fire-adapted seral species such as ponderosa pine, Douglas-fir, aspen, and lodgepole pine historically were common due to fire history throughout these types (USDA Forest Service 1996). Fire suppression during the first part of this century has eliminated most of the non-lethal "cleaning" fires and allowed the more shade-tolerant late seral species to increase, increasing stand densities and ladder fuels. The current conditions, where stand densities are higher than historic, puts additional competitive stress on what large, seral trees remain.

The most significant risk is to the mid- and lower elevation portions of the mixed conifer type and is associated with fire and the long-term exclusion of fire. Fire exclusion has affected stand structure and increased ladder fuel development. Stand-replacement fires, outside of historical ranges of intensity and size, are likely (USDA Forest Service 1996). The historic balance of patterns and structures could be compromised by large stand-replacing fires, or continued exclusion of frequent non-lethal fires.

**Ponderosa Pine Type** - This cover type is found on the Ashley, Dixie, Manti-LaSal, and Fishlake NFs. In southern Utah this type is found between gambel oak/sagebrush or pinyon/juniper at lower elevations and mixed conifers (Douglas-fir and white fir) at higher elevations. Ponderosa pine sites are generally warm and dry with annual precipitation of 16 to 24 inches. Structures are normally multi-layered with a range of tree sizes. Much of the historical type (on seral sites) is now dominated by mixed conifer due to the exclusion of non-lethal, "cleaning" fires and succession. Structures are predominantly made up of larger late seral species in the mid to mature-aged classes, and are overly dense (as compared to historic conditions).

Climax ponderosa pine forests characteristically have very low numbers of trees per acre and very little dead material on the forest floor because of the short time between fire events (Covington and Moore 1994). Those portions of the ponderosa pine type in southern Utah were historically park-like and open forests, where crown closure was never achieved due to site quality and moisture limitations (strong root competition occurs before crown closure on these sites). Climax ponderosa pine stands might better be termed "woodlands" than "forests." On such sites, the average crown closures that might be achieved are in the neighborhood of 30 to 40%. An increase in pinyon and juniper has been noted on some climax pine sites, a result of the lack of fire.

Most of the type has had various levels of timber harvest during the past century, removing much of the large ponderosa pine component (Graham et al. 1999). Harvest, in combination with pine beetle outbreaks

during the 1970s, has resulted in a decrease of "old-growth" ponderosa pine stands. Most stands have regenerated well, and there are many fully stocked stands of relatively small sized trees.

The risk is high in this cover type for uncharacteristic, lethal wildland fires which may compromise the historical balance of patterns and structures. Replacement of ponderosa pine by more competitive late seral species such as Douglas-fir and white fir results in a net loss of ponderosa pine forest; such vegetation patterns are outside the historical range of conditions (USDA Forest Service 1996).

### 3.3.2 Non-Arboreal Understory Vegetation

Non-arboreal vegetation that may be affected by the decision associated with this environmental assessment include species that are associated with the forested vegetation types described above as understory species, species within small openings (generally less than 1 acre in size), and species located on forest/non-forest ecotones (generally within 200 feet of the forest canopy). Detailed lists of understory species may be found in Mueggler 1988, Youngblood and Mauk 1985, and Mauk and Henderson 1984. Understory vegetation provides habitat for goshawk prey species; changes in understory species composition, distribution, and structure may have impacts on prey species and consequently on goshawks.

Recent forest inventory data (O'Brien 1999) summarized the percent of canopy cover for understory shrubs, forbs, and grasses associated with various forested cover types (see Appendix E, Table 1). Because of fire exclusion, trees have expanded into some areas that were historically non-forest or only contained scattered trees. Examples of this can be found throughout the analysis area.

**Shrubs** - Shrubs are most common in understories of early seral stands where adequate sunlight reaches the forest floor. As forested stands progress through successional stages and forest canopies close, the associated shrub species may shift to more shade tolerant species or may diminish on the site. In fire-adapted ecosystems, periodic low intensity fires kill the above ground portion of most shrubby species, allowing sprouting species to develop young, vigorous stems and non-sprouting species to regenerate from seed. Periodic fires maintain a diverse, vigorous understory while keeping shade tolerant tree species in check. In the absence of fire, many shrubs have declined or aged and become decadent.

**Graminoids** - Grasses and sedges are an understory component in most forested types. Graminoids are generally more plentiful in early seral forests or young forests in early vegetative structural stages. As most graminoid species do not tolerate dense shading, they are most common along forest edges and in small openings within forested stands. Graminoids generally respond favorably to fire by regenerating from the roots and/or from seed.

**Forbs** - Forbs are a common understory component of virtually all forest stands. Some forb communities are considered the potential natural vegetation for the site. That is, they will dominate the site in perpetuity under proper management. Tall forbs make up the understory of some of the more productive aspen sites. The aspen/tall forb cover type is one of the most commonly encountered aspen cover types in the project area and is most prevalent in northern Utah (Mueggler 1988).

Approximately 50% of the tall forb type was lost due to improper grazing during the early euro-American settlement era, which caused a significant loss of the deep, rich soils (USDA Forest Service 1996). Site restoration is very difficult, or nearly impossible, because of the soil loss.

### 3.3.3 Riparian and Wetland Vegetation

Riparian areas are highly productive and heavily utilized by humans and animals. Riparian zones are characterized by sedges, grasses, shrubs, trees, and other vegetation. They maintain relatively high water tables and act as "sponges" by holding water in streambanks, thereby raising the water table in the surrounding areas and providing a more stable stream flow (GAO, 1988). Diversity of vegetation is an important characteristic of riparian areas in good condition (Chaney et al. 1990). Unlike adjacent terrestrial communities, water is more readily available for plant uptake in riparian zones, and duration of this free, unbound water may influence community composition (Youngblood et al. 1985).

Late seral riparian communities are stable by nature; they are dominated by deep rooted, often rhizomatous, species which generally take several years (5-7 years) to show the effects of changes in management. Late seral riparian communities may show improvement more quickly because the desirable plant communities are already in place. In contrast, early to mid-seral greenline communities will show downward trends more quickly because they are typically dominated by weakly rooted species that are more easily displaced through continued surface disturbance and through water action against stream banks lacking adequate protection because of the weak rooting systems. Early seral greenlines will take more time to improve because the species necessary to colonize and develop into communities stable enough to hold streambanks are not well represented (Padgett 1995).

Riparian areas occupy relatively small areas, are fragile, and are vulnerable to severe alteration due to the combination of restricted area, distinct microclimate, distinct vegetative structure and composition, and water quantity and quality (Thomas 1979). Riparian areas have been significantly affected over the past century (USDA Forest Service 1996). Most of these effects have been negative, including: lowering of water tables, erosion of stream channels, exotic plant encroachment, removal of beaver populations, concentrated runoff and increased sediment from road construction, sedimentation caused by increased overland flow and soil erosion from upland areas that are outside of properly functioning condition, changes in vegetation composition, and often a loss of the historic fire disturbance patterns that served to regenerate riparian vegetation. All have contributed to degradation of riparian areas (ibid.).

The Properly Functioning Condition Assessment reports (ibid.) and the High Utah Plateaus and Mountains Section (USDA Forest Service 1996a) conclude that riparian areas throughout the Region have been significantly affected over the past several decades, indicating a pattern of riparian systems being lost to encroachment of spruce-fir, ponderosa pine, Douglas-fir, and sagebrush. Increases in tree encroachment into riparian areas can be attributed to reduced influence of fire on landscapes. The riparian complex in the Intermountain Region is considered to be generally at a high state of departure from properly functioning condition. This is not to suggest that all riparian complexes in the Intermountain Region are necessarily in a downward trend. Where direct human induced factors are involved, conditions have improved in recent years.

Dr. Fee Busby (1978) reported that "Probably the poorest rangeland conditions--including riparian and stream ecosystems and trout habitats--occurred between 1885 and 1935" when large numbers of sheep and cattle were allowed to graze the intermountain area as unregulated "free range." He found that "Today most of our western range is in fair condition and is stabilized in that condition." Dr. Alma Winward concurs, indicating that although there are continuing impacts on riparian systems, they are generally holding their own or improving (1997).

### 3.3.4 Wildlife and Fish

The climate and vegetation within the project area is highly influenced by elevation and latitude. In general, the elevations of the six affected national forests range from 3,000 to 13,000 ft., with rugged and broken topography. In addition to the major mountain ranges, such as the Uintas and Wasatch, major plateaus are found in the project area, such as the Markagunt and Tavaputs. Precipitation on NFS lands ranges from 10 to more than 40 inches annually. With this variation in topography, climate, soils and geology, a wide range of forest compositions and structures are typical. These diverse landforms and plant communities support a large number of wildlife species including goshawks and their prey.

**Goshawk Habitat and Abundance** - The goshawk is the largest of the three species of Accipiter in North America. Members of this genus inhabit coniferous, deciduous, and mixed forests. Distribution of the goshawk is Holartic with three recognized subspecies breeding in North America: the northern goshawk (*Accipiter gentillis atricapillus*), Queen Charlotte (*A.g. laingi*), and the Apache (*A.g. apache*) (USDI Fish and Wildlife Service 1997). Little information exists on the historical distribution of goshawks in the project area. Early records indicate that it was an uncommon permanent resident, primarily found in montane conifer and quaking aspen habitats throughout the State (Behle et al. 1985). Occasionally it nested in cottonwood (*Populus* spp.) cover types in lower valleys (White and Lloyd 1965). Studies and surveys over the past 20 years indicate that the goshawk occurs across the project area in a wide variety of forest cover types. While goshawks have been observed foraging in pinyon-juniper type during the winter months, goshawk use of pinyon pine and juniper, along with winter habitat use, is poorly understood. Similarly, while observations of nests have been reported during the winter months, there are no documented nests occurring in the pinyon-juniper type (ibid.). Because of this the pinyon-juniper type was not included in alternative direction and will not be discussed further.

The northern goshawk is managed as a regionally sensitive species by the Intermountain Region of the USDA Forest Service. It is also a State of Utah sensitive species. It has had these designations since 1991 and 1997, respectively. The northern goshawk has also been identified as a management indicator species (MIS) on four of the six affected national forests - Ashley, Dixie, Fishlake and Uinta NFs. Owners or administrators of forests inhabited by the goshawk include the USDI National Park Service (NPS), USDI Bureau of Land Management (BLM), USDA Forest Service, State of Utah, as well as Native American tribal lands and private lands. The USDA Forest Service administers the majority of the lands that were ranked by Graham et al. (1999) as containing high and optimum valued goshawk nesting habitat (Appendix E, Table 2); and the majority of important foraging habitat. The largest proportion of overall high and optimum habitat (has both high quality nesting and foraging habitat) is managed by the Forest Service, with BLM, NPS, State, private and Native American entities managing smaller amounts (Appendix E, Table 3).

In Utah, all forested landscapes were identified as potentially suitable habitat for some portion of the northern goshawk's life cycle. Currently, the majority of suitable habitat is considered to be of medium or high value, well connected and distributed throughout the state (Graham et al. 1999, USDI Fish and Wildlife 1998). Although all forested landscapes are used to some extent, certain forest cover types appear to be occupied by goshawks more than others (Graham et al. 1999). Cover types most often occupied by goshawks (based on sightings and nest locations) are Engelmann spruce, subalpine fir, lodgepole pine and quaking aspen, either single or mixed species forests (ibid.). Ponderosa pine can be a locally important species, particularly in riparian areas where the species is mixed with quaking aspen.

Important internal components of forests include snags, multiple canopies, and down woody debris (Reynolds et al. 1992; Graham et al. 1999). These components are important to goshawks both directly and indirectly as nesting habitat as well as habitat for prey species and tend to vary across forest type. For example, spruce/fir forests have complex forest structures with multiple canopies and large amounts of down woody debris. Lodgepole pine forests have simple forest structures, single canopies and have small amounts of down woody debris except in very old forests.

Forests are complex and dynamic. Each forest cover type important to the goshawk and its prey has a wide range of biophysical attributes that result in a variety of stand structures and compositions which are influenced by a wide range of disturbance factors. Disturbances in these cover types range from those induced by wind, snow, ice, and fire to those that are human-caused. The affected national forests are widely used for human habitation, timber extraction, recreation, livestock grazing, as well as being important sources of water. Disturbances which occur within each of the forest types discussed in the vegetation section (3.3.1) occur in varying amounts/degrees and present their own unique threats to the goshawk and its habitat. The degree of the threat depends on where, when, how intense, and how long the disturbance occurs.

The forests and woodlands in the project area are dominated by late seral species (Appendix E, Table 4). Depending upon the type, white fir, subalpine fir, Douglas-fir, pinyon pine, and juniper often dominate these forests. In addition, most forests contain many seedlings and saplings, creating very dense forests, which are prone to insect, disease, and stand replacing fires. Ponderosa pine, quaking aspen and lodgepole pine, which are early and mid-seral species, are often poorly represented. Forests dominated entirely by late seral species, in general, are more unsuitable than those dominated by a variety of early mid and late seral species. In addition to being unsuitable and at a higher risk to stand replacing fires and insect and disease problems, these dense stands may become undesirable for both nesting and foraging by goshawks. Little is known about goshawk habitat use in nonbreeding habitat (Graham et al. 1999)

The current condition of specific cover types addressed above (3.3.1) affects goshawk use of habitat in the following ways:

- *White fir* - Current structural attributes make this cover type undesirable for the goshawk compared to the more open ponderosa pine, Douglas-fir, or quaking aspen forests typical of this cover type historically. Key factors limiting the values to goshawks is the current dense stocking levels and multiple canopy layers, and large trees for nesting are limited. Dense, multistory canopies are likely to hinder foraging opportunities by obstructing flight and sight lanes (Graham et al. 1999).
- *Subalpine fir* - Late seral species dominate, primarily subalpine fir and Engelmann spruce mixed with lodgepole pine (ibid.). Without some form of stand-replacing disturbance the two major early seral species of the type, quaking aspen and lodgepole pine, will continue to decline from their already low representation. Quaking aspen is one of the more important tree species in Utah to wildlife species, including goshawk and its prey. The decline in aspen and lodgepole in this type has impacted goshawks. Where this cover type is dominated by late seral species, such as subalpine fir, it provides poor to marginal habitat due to cluttered multistory stands and the lack of prey (except for snowshoe hare).
- *Lodgepole pine* - Past bark beetle activity has killed many trees in this cover type. However, the present condition of this cover type appears to be part of a normal cycle and most stands will continue to develop naturally. Surface fires that have frequented these forests could once again thin the even-aged structure (ibid.). Goshawks are currently nesting successfully in lodgepole pine

stands with predominantly dead overstories. However, habitat values are expected to decrease as the standing dead trees fall.

- *Engelmann spruce* - The current high proportion (79%) of mid- and old-aged trees in this type make these stands highly susceptible to infestations of spruce bark beetles (Graham et al. 1999, USDI Fish and Wildlife Service 1998). Bark beetles have attacked and killed many large trees within the several thousands of acres infested over the last several years. As a result, goshawk habitat, especially nesting habitat, has been adversely affected where high bark beetle mortality has occurred.
- *Ponderosa pine* - This cover type is dominated by ponderosa pine even though gambel oak and quaking aspen are important seral species (Graham et al. 1999). The majority of acres within this cover type have been partially cut in the past due to its high economic value, removing mature trees important for goshawk nesting. Domestic livestock grazing, along with the exclusion of fire, has disrupted native fire cycles and probably has contributed to the decrease of early seral species (ibid.) which are important to the habitat quality in this type. Forests have also become more dense (though less than other cover types) which is also adversely altering goshawk foraging habitat for the same reasons as stated above for other types.
- *Quaking aspen* - This cover type, and the quaking aspen it supports, is probable the most valuable goshawk habitat in Utah and is currently relatively stable. Many successional changes occur in the grass, forb and shrub layers as they respond to the different disturbances. But these changes are not of great influence on habitat quality for goshawks. The primary threats to quaking aspen stands growing on this type are browsing by domestic and wild ungulates and stand-replacing fires that ignite from adjacent types (Graham et al. 1999, USDI Fish and Wildlife Service 1998). Without a major disturbance or overgrazing, these stands should remain relatively stable, resilient, and available for goshawks, both in the short- and long-term (Graham et al. 1999).
- *Douglas-fir* - This cover type is dominated by Douglas-fir or Douglas-fir mixed with other species. Less than 2 percent of the type is occupied by ponderosa pine (ibid.), one of the primary seral species. The current multiple canopies and dominance by Douglas-fir within this type, make it very susceptible to root diseases and insects. As a result, current forests of this cover type are relatively unstable and are at risk to wide spread stand replacing disturbances including epidemics of insects and diseases. Without the reintroduction of fire or restoration activities to stabilize conditions and promote seral species, these forests will continue to be unstable and decrease in value for the goshawk (Graham et al. 1999).

The northern goshawk nests in a wide range of forested cover types. Most of the 421 known nests located during project level surveys occur in mid-elevation (6,000 ft.) to high-elevation (10,000 ft.) sites occupied by mature quaking aspen or coniferous forests. There are some regional differences in goshawk use of certain forest cover types. For example, few nests were found in the northeastern national forests high elevation Engelmann/subalpine fir forests; while in southern national forests, Engelmann spruce was used frequently for nesting. In the project area's northern national forests, the greatest proportion of the known nests occurs in mixed lodgepole pine and quaking aspen forests; in southern Utah, the greatest proportion of nests occur in Engelmann spruce, and ponderosa pine (Appendix E, Table 5). Goshawk use of ponderosa pine for nesting is moderate when compared to use in lodgepole pine/quaking aspen (ibid.). In contrast, goshawks extensively use the ponderosa pine cover type in northern Arizona (Reynolds et al. 1994). However, Reynolds et al. (1992) and Graham et al. (1999) found that goshawks nest in sites with similar structural characteristics within each cover type in Utah and Arizona/New Mexico; generally, mature to old forests with relatively large trees, high canopy closure (relative to surrounding areas), sparse ground cover and open understories (Appendix E, Table 6).

This limited use of ponderosa pine forests may be due to the current forest conditions on national forests. These forests were partially cut following mountain pine beetle outbreaks in the 1970s and 1980s. With many large trees removed, nesting habitat for goshawks was reduced. In northeastern national forests, historical nests were observed in ponderosa pine forests but no active nests have been located since the forests were harvested in the late 1980s (Graham et al. 1999). And, there is limited evidence of goshawk nesting activity in southern national forests ponderosa pine forests which were also partially harvested during the 1970s-1990s resulting in large areas of low density, relatively small diameter trees.

However, there are differing opinions in the biological community on the importance or role of habitat attributes associated with the goshawk and its prey. These differences, described by AGFD (1993); FWS Region 2 (1992), and Crocker-Bedford and Chaney (1988), focused primarily on canopy closures, the need for open understories, and the amounts of mature and old forests in some home ranges. They contend that higher canopy closures are needed than promoted by Reynolds et al. (1992), dense understories are not necessarily a problem, and the amount of mature and old forest recommended in Reynolds et al. (1992) or how it's impacted by activities is inappropriate.

Also, in 1996 The Wildlife Society completed a technical review of Reynolds et al. (1992) *Management Recommendations For The Northern Goshawk In The Southwestern United States* (Braun et al. 1996). It asserted that these recommendations represented an innovative approach to forest management because they encouraged forest managers to consider forest ecosystems as assemblages of interacting species of plants and animals. It went on to state that prescriptions for habitat management to benefit northern goshawk needed to be ecosystem-specific, realizing that prescriptions may need to be tailored to the watershed scale. But, it cautioned against the widespread implementation of the recommendations without additional management direction to insure consistency and monitoring of their effects on the goshawk, and other components of the forest system (ibid.). Reynolds et al. (1992) was one of the foundation documents of Graham et al. (1999).

Reynolds et al. (1992) defined desired conditions for goshawk foraging habitat on the basis of prey ecology. The "food web" approach to habitat management received support from the technical reviewers (Braun et al. 1996). This same approach was used by Graham et al. (1999) to characterize goshawk foraging habitats in Utah. Important prey species described by Graham et al. (1999) include avian and mammal species, such as snowshoe hare, woodpeckers, jays, and grouse. For a list of selected goshawk prey species refer to Appendix E, Table 7. These species were identified from field observations made during the breeding season, including several mammals identified as dominant prey by Squires and Reynolds (1997). However, due to the lack of data based on direct observations, the variety of mammals in goshawk diets may be underestimated (Boal and Mannan 1994). Important habitat attributes for maintaining populations of selected prey include large down woody debris, snags, large trees, understory vegetation, openings, mix of structural stages, and interlocking tree crowns (ibid.). For a more complete description of these attributes and their relation to selected prey species, refer to Appendix E, Table 8.

Graham et al. (1999) concluded that, in general, existing habitat appears to be capable of supporting a viable population of goshawks at the state spatial scale. These finding were consistent with the FWS's Twelve-Month Finding On The Petition To List The Northern Goshawk which concluded that while forest management (e.g., timber harvest and fire exclusion) has changed the vegetation characteristics throughout much of the western United States, the goshawk continues to be well-distributed throughout its historic range. And, no evidence was found to indicate that the goshawk population is declining in the western United States, that habitat is limiting the overall population, that there are any significant areas of

extirpation, or that a significant curtailment of the species habitat or range is occurring (**FR**, June 29, 1998, Vol. 63, No. 124, pages 35183-35184).

However, differing opinions from the biological community exist on the subject of declining populations. Reynolds et al. (1992), Braun et al. (1996), USDI Fish and Wildlife Service (1998), Graham et al. (1999), and Kennedy (1997) found no evidence from the information they reviewed to indicate that northern goshawk populations are declining either in the State of Utah or in the western United States. Their findings differed from those of Smallwood (1998) and Crocker-Bedford (1990 and 1998) who believed evidence of decline does exist. The debate centers around the methods and variables that are most appropriate for assessing whether a species has declined significantly to warrant listing under the Endangered Species Act (ESA). DeStefano (1998), recognizing the strengths from approaches described by Kennedy (1997), Smallwood (1998) and Crocker-Bedford (1998), recommended more research and management at all levels -- populations, communities, and ecosystems, and felt the goshawk is a good candidate for this multilevel approach.

Based on determinations found in the HCS *(*Utah NFs et al. 1998*)* and the Assessment (Graham et al. 1999), the absence of evidence of a population decline on NFS lands since 1991, and the FWS findings (**FR**, June 29, 1998, Vol. 63, No. 124, pages 35183-35184), the Goshawk Technical Team concluded that the goshawk population in the State of Utah is viable.

**Threatened, Endangered, and Proposed Plant and Animal Species** - Section 2 of the ESA states that "...all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." Section 7 of the ESA directs Federal departments and agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of their critical habitats.

Several threatened, endangered, and proposed (TEP) species found on the six Utah NFs are occasionally observed in forested habitats; however, they do not require them for foraging or reproduction. Only two TEP species require forest habitat for foraging and/or reproduction, or may be affected by disturbances in adjacent forested habitat -- the Canada lynx and Mexican Spotted Owl. Therefore, only these two species are discussed in detail.

Historically, the Canada lynx is known to occur in the northern part of Utah, primarily in the Uintas and Bear River Mountain Ranges. Therefore, the Canada lynx discussion in Chapter 4 only addresses potentially suitable habitat in northern Utah.

The Mexican Spotted Owl has been documented nesting in southern Utah only. A documented occurrence was made in northeastern Utah, however no nest was located. Unlike the Pacific Northwest's Northern Spotted Owl, the Mexican Spotted Owl has only been documented nesting in steep walled canyon complexes in Utah . Thus, further discussions concerning the Mexican Spotted Owl in Chapter 4 focus on potentially suitable habitat in these steep-walled canyons or along the surrounding canyon rims.

Refer to Appendix E, Tables 9 and 10 for a complete list of TEP species that occur on the six Utah NFs .

**Management Indicator Species and Sensitive Plant and Animal Species** - Many other wildlife, fish and rare plant species inhabit Utah's NFs other than those discussed above. The NFMA directs that on NFS lands, habitats for all existing native and desired non-native plants, fish, and wildlife species will be

managed to maintain at least viable populations of such species. In achieving this objective, habitat must be provided for the number and distribution of reproductive individuals needed to ensure the continued existence of a species throughout its geographic range and the maintenance of diverse and productive habitats for wildlife, fish and sensitive plants (FSM 2601-2603).

Because it would be impossible to monitor the effects of management on every individual species that occurs, NFMA specified that "certain vertebrate species ... shall be identified for selection as indicators of the effects of management." Management indicator species (MIS) have been identified in each of the six Utah forest plans. Sensitive species, economically or socially important species, species that have special habitat needs, and other species have typically been designated as MIS. Effects to MIS species is the basis for disclosure of effects to all wildlife species found on NFS lands affected by this amendment. However, only those MIS and sensitive species which occur in habitats used by goshawks are discussed. A complete listing of sensitive plant and animal species is in Appendix E, Tables 11 and 12, respectively. Table 13 in Appendix E provides a complete listing of MIS species for each national forest affected, with those species which occur in habitats used by goshawks identified.

Species associated with aquatic and riparian habitats only are not discussed. Current direction in forest plans is not affected by this amendment and will continue to protect these systems.

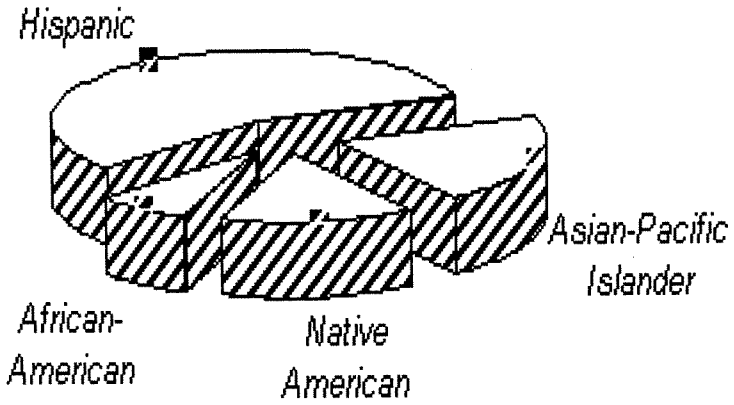
## 3.4 SOCIAL COMPONENTS

The population base affected by this project is primarily Utah as well as small portions of southwestern Wyoming, and western Colorado. Although the area of influence includes states other than Utah, the social components focus on Utah with the analysis focusing on the changes that have occurred since those forest plans were developed in the early and mid-1980s. A more detailed, Forest-specific discussion on social components is in each of the Forest Plans for the six affected national forests.

### 3.4.1 Environmental Justice

Environmental justice ensures that Forest Service programs, policies, and activities affecting human health or the environment do not exclude minorities and low income groups from participation in or the benefits of programs or activities based on race or economic status.

In 1990, minorities made up about 9 percent of the state's total population. By mid-1998, Utah's minorities made up almost 12 percent (252,000) of the total population (2,100,000), putting it above the national average (Ogden Standard Examiner 1999).




African-Americans make up 0.9 percent of the population (18,900); Hispanics, 6.8 percent (142,800); Asian/Pacific Islands, 2.5 percent (52,500); and Native Americans 1.8 percent (37,800) (ibid.). The majority of minorities and the greatest concentration of African Americans, Asians, and Hispanics reside in Salt Lake, Davis, Weber, and Utah Counties. The majority of Native Americans live in Salt Lake, San Juan, Uintah, Duchesne, and Utah Counties. Minority groups live throughout Utah and are employed in the full spectrum of occupations. Some work for industries related to forest products or services and may be dependent on forest products or services for their livelihood (Utah Governor's Office 1999).

There are seven Native American tribes living on reservations in Utah. The largest reservation groups are the Uintah and Ouray tribes (17,200+) in Duchesne and Uintah Counties. The Navajo Nation reservation located in San Juan County has approximately 5,500 people. And, there are approximately 645 Paiutes living on reservations in Iron, Millard, Sevier, and Washington Counties; 251+ Ute Mountain tribal members live on reservations in San Juan County and on Trust Land; 76+ Goshute tribal members are in Juab and Tooele Counties; and 32+ Skull Valley Goshute tribal members are in Tooele County. Representatives from 26 other tribes also live in counties throughout the State (ibid.).

Most of the Ute Nation is located in or adjacent to the Uinta Mountain Range and the Ashley NF. The Navajo Nation is in southeastern Utah and northern Arizona with strong interests in land management activities on the Manti-LaSal, Dixie, Ashley, Fishlake, Uinta, and Wasatch-Cache NFs. The White Mesa Ute tribe has cattle permits on the Manti-LaSal NF (ibid.). Native Americans have both non-traditional (economic) as well as traditional ties to the land, religious/heritage sites located on various national forests.

Utah has a low poverty rate. Statistics (ibid.) show 8.9% of the total population of Utah in poverty. Only six states have lower poverty rates. The national average was 13.3% in 1997. The majority of low income residents live in the highly populated counties including Salt Lake, Utah, Weber, and Davis. Some small towns and communities adjacent to national forests have a greater percentage of low income residents due to a dependency on agriculture or trade industries for income. Of the rural counties, San Juan and Duchesne Counties have the highest percentage of low income residents (28.3% and 20.7%, respectively).

Some low income residents could be dependent on forest products or resources for their livelihood, but data is not available to substantiate.

### 3.4.2 Social Groups, Values, and Systems

Although most Utah residents live in urban environments and work in non-agricultural jobs, Utah's NFs are important to them for water, recreation, and other resources. While people living within and adjacent to national forests can be extremely influenced by forest management activities, forest management activities can also affect other individuals and groups on a local, regional, and national basis.

Increasingly, rural communities are diversifying their economies and expanding their interest in and uses of national forests. Communities that once depended almost exclusively on commodity production from the forests for their economic well-being are now capitalizing on a wider range of goods and services.

Cities are important links in the delivery of recreation services and information because national forest visitors use urban lodging and restaurant facilities, equipment suppliers, and outfitting services before traveling to recreation destinations. Urbanites are an increasingly important constituency of the national forests.

Key social groups influencing forest management activities include industry and agriculture (loggers, ranchers, farmers, miners), recreation (ski resorts, outfitted recreationists, hikers and backpackers, motorized recreationists, non-motorized recreationists, water recreationists, hunters, anglers, etc.), environmentally-oriented groups, and business interests. It should be noted that an individual may fit into several groups, depending on the issue or activity of concern.

The following descriptions of the various groups and their value systems are in general categories developed for analytical purposes; individuals may not perfectly fit a specific group. Cross ties may exist between these groups because of such factors as religious affiliations, family relations, social organizations, and recreational preferences.

**Ranching-Farming** - This group is comprised of individuals involved in livestock production and the growing of grain crops, hay and pasture, and vegetable crops. Many are long-time residents of Utah with ranches and farms having been passed to successive generations. This group also includes ethnic minorities, usually Hispanics, who provide manual labor to the ranchers and farmers. In some instances, the land sustains this group's life style and livelihood. Livestock production declined overall in Utah for 1998 as compared to 1997. Currently, economic instability in ranching and farming creates uncertainty in this group. Grazing on public lands is an integral part of many ranch operations.

**Timber Operators/Wood Product Manufacturing** - This group includes individuals involved in logging, the manufacturing of wood products, and commercial firewood cutting. Although these industries are not major employers in Utah, all six of the affected national forests have commercial wood production.

The traditional timber industry in the project area is comprised primarily of small, family-operated business ventures. These small businesses are scattered across Utah and in adjacent areas in southeastern Wyoming and western Colorado. They generally operate close to their home base, where products are available nearby. This makes it possible for working family members to spend their evenings and weekends at home, rather than camped at a work site.

Several company-owned mills are located in Utah. These qualify as ''small businesses'' according to the rules of the Small Business Association. These companies employ both local and out-of-state loggers and workers. Their ties to local communities are not as strong as with the traditional family-based operations.

While no large industry is located within the project area, large industry is a player in the timber market in Utah. Louisiana-Pacific (operating out of Colorado and Wyoming) and Boise Cascade (operating from Idaho) actively seek opportunities and occasionally purchase sales in the State. Both companies have become more active in the State in recent years.

**Recreationists** - Easily the largest and most visible on national forests, this group includes local residents as well as visitors from throughout the United States and the world. They use forests seasonally for a wide variety of recreational purposes including hunting, fishing, camping, hiking and backpacking, rock-climbing, water skiing, mountain biking, river-running, snowmobiling, and snow skiing. Another important recreational group are falconry clubs, located primarily in the Uintah Basin.

Scenic quality is the landscape character (the visual combination of natural and cultural attributes) that provides landscape identity, sense of place, and scenic integrity (the completeness of the desired character). Landscapes with variety in vegetative patterns, water features, and rock and land forms can tolerate human-built elements or natural events and have high scenic integrity. Conversely, landscapes with monotonous character reveal deviations quickly and have low scenic integrity. All resource management activities attempt to achieve long-term sustainable goals within the scenic integrity objectives identified in the forest planning process.

**Retail Trade, Tourism, and Service** - This group sells merchandise, provides lodging, amusement and professional services, and works in finance, insurance, and real estate. They include long-time residents and newcomers to the area. Although employment opportunities for this group are not directly dependent on commodity outputs from national forests, they are dependent on the economic stability and growth of the area, especially recreational opportunities. Their employment, life style, and income can be linked to the strength of other activities in or around national forests. For example, winter skiing conditions that attract large numbers of skiing enthusiasts directly affects incomes for communities adjacent to ski resorts and the hotels, food services, transportation, and entertainment services offered.

**Mining/Minerals Production** - Utah's NFs contain significant mineral deposits in amounts usable for commercial production. Less than one percent of Utah's population are employed in this industry (Utah Governor's Office 1999).

### 3.4.3 Heritage Resources

The Heritage program protects and interprets the historic and cultural heritage of NFS lands and shares related information with the public for its enjoyment and education. Utah's NFs manage for a wide diversity of uses and users including interpretation for the general public, conservation for scientific values and future generations and access for Native American traditional practices. A more detailed, Forest-specific discussion on heritage resources is in each of the Forest Plans for the six affected national forests.

**Legal Framework** - The Forest Service is required to inventory and evaluate cultural resources on NFS lands and to protect, enhance and nominate significant cultural resources for listing in the National

Register of Historic Places (NRHP). The criteria for listing in the Register refer to the qualities of significance in American history, architecture, archaeology and culture. Once a site has been evaluated for its National Register significance, management activities are generally focused on those determined to be eligible for the NRHP.

Section 106 of the National Historic Preservation Act of 1966, as amended, requires the Forest Service to determine if federally funded, permitted, or licensed activities will affect significant cultural resources. An undertaking is any project that can result in changes to the character or qualities of a site that make it eligible for the National Register. For most projects, consideration of the effects of an undertaking on cultural resources proceeds in sequential steps of inventory, evaluation and determinations of effect. Consultation with the State Historic Preservation Office, the Advisory Council on Historic Preservation and interested parties occurs during these various phases to assist in identification efforts and to find ways to lessen impacts if adverse effects are anticipated.

For large or complex projects or classes of undertakings that would require numerous individual requests for comment or where effects cannot be fully determined in advance of an undertaking, the implementing regulations for Section 106 allow agencies to develop programmatic procedures and to implement phased compliance programs [36 CFR §80013(a)].

**Cultural Resources** - Cultural resources consist of sites, structures and objects used by prehistoric and historic peoples. These phenomena represent the physical remains of past human lifeways and activities in the forests. Prehistoric representations may include scatters of chipped stone tools, groundstone artifacts and ceramics (termed lithic and ceramic scatters), pithouse depressions, pueblo ruins, stone and mud food storage granaries, living trees which were peeled by native peoples to obtain inner bark for food, rockshelters, stone tool quarries, sweat lodges, projectile points and other manifestations of aboriginal life styles spanning the last 12,000 years. Historic site types may include trails from Spanish exploration, pioneer settlement, and early military use, structures and modified landscape features from mining, ranching, homesteading, railroading, and recreation activities and developments during government administration of the forests.

The Forest Service seeks to provide the American people and future generations with opportunities to enjoy and appreciate the nation's rich and diverse cultural heritage. The affected national forests offer unique opportunities to protect and interpret the nation's shared American heritage contained within archaeological and historical sites. Their cultural resources represent both ancient lifeways and the traditions of living peoples. Some ceremonial sites are still in use by Native Americans today. For example, Bears Ears Peak is an important site to Native Americans.

Human habitation of the mountains, valleys, canyons and mesas of the Utah NFs has been continuous for the last 10,000 years and probably longer. Remains of past human lifeways are found throughout the forests. Since the mid-1970s, the Forest Service has conducted cultural resource inventories to identify and evaluate cultural resources. These surveys have been conducted largely in advance of proposed undertakings on federal lands. Since that time, approximately 244,000 acres of NFS lands have been examined inventoried at various survey intensities resulting in the identification of over 8,300 sites.

Appendix E, Table 14 provides data on the status of cultural resource inventories and inventoried sites. Using this Table, it is tempting to generalize about the number of sites that should be expected to be located within the Utah NFs. However, because many of the surveys to locate cultural resources were conducted in support of other land developments, and not strictly to gain data that could be used to predict

the numbers, types and location of sites in the forests, it is not possible to provide accurate estimate of the total number of expected sites in each of the Forests without much more detailed analysis/data.

The affected national forests contain sites which are also listed in the National Register of Historic Places. On the Dixie NF these include the Mountain Meadows Massacre Site, the Pine Valley Chapel and Tithing Office and the Long Flat Prehistoric Stone Tool Quarry. In the Fishlake NF, the Gooseberry Historic District containing approximately 175 individual prehistoric properties and the Aspen Cloud Rockshelters have been nominated to the National Register. On the Manti-LaSal NF, the historic Great Basin Range and Watershed Research Station containing approximately 10 buildings and associated features and the Pinhook Battlefield Site are listed in the National Register. In addition, an area within the Monticello Ranger District of the Manti-LaSal NF containing prehistoric Anasazi pueblo sites may be eligible for listing as a Historic District.

Interpreted historic sites in the Utah NFs include Swett Ranch and the Ute Fire Lookout (Ashley NF), Bullion Canyon Gold and Silver Mining Sites (Fishlake NF), the Great Basin Research Station, Stuart Ranger Station, Dry Wash and Devils Canyon Ruins (Manti-LaSal NF), and Wildcat Ranger Station (Dixie NF).

A more complete discussion of cultural resource is included in the individual Forest Plans.

## 3.5 ECONOMIC COMPONENTS

The geographic area described in this Environmental Assessment includes the entire State of Utah, with small portions of Wyoming and Colorado, and is economically complex. There are substantial amounts of timber, forage, recreation, water, fish, wildlife, minerals, and other resources or resource uses provided from NFS lands in the area under consideration. The economic value associated with these resources and uses is substantial. State and private lands provide additional amounts of many of those resources and resource uses, but those uses are not addressed in this document because the management direction applies only to lands administered by the Forest Service. The total geographic area also encompasses many cities, towns, and rural populated areas. Each of these population centers or areas has its own economic structure, which is integrated with a wider subregional economy, which, in turn, is part of an even larger regional economy. All are affected by State, national, and international economic activity and events.

The state with the largest area affected is Utah, thus economic sectors in this state are most likely to be affected by changes in management direction proposed. Though changes may have some effects to the economies of Colorado and Wyoming, due to the limited area affected (less than 1% of either state) the change will not measurably affect economic sectors in those states. Therefore, discussions below will focus on the economic sectors in the State of Utah, with limited discussions concerning the economies in Wyoming and Colorado.

Of the industry groups contributing to Utah's economy, the services sector is the largest. It accounts for one-third of all employment and is expected to claim 417,000+ jobs by 2001 (Utah Governor's Office 1999). Service-producing industries contain many diverse activities including transportation, communication, and utilities; trade (wholesale and retail); finance, insurance and real estate; services and government.

The smallest job category is agriculture with about 23,950 workers, 2% of total employment. It includes nursery workers, animal caretakers, gardeners and grounds keepers as well as farm and ranch occupations.

Although it is expected that agriculture will grow by 2,000+ new jobs over the 1996 to 2001 period, this is the smallest rate of growth of any of the job categories and growth will occur mostly in job titles related to landscaping and lawn services (ibid.).

A more detailed, Forest-specific discussion on economic components is in each of the Forest Plans for the six affected national forests This analysis focuses on the changes that have occurred since those forest plans were developed in the early and mid-1980s.

### 3.5.1 Wood Products

The traditional timber industry in the project area is comprised primarily of small, family-operated business ventures. These small businesses are scattered across Utah and in adjacent areas in southeastern Wyoming and western Colorado. They generally operate close to their home base, where products are available nearby. Production for each mill varies from only a few hundred thousand to a few million board feet per year. Their markets are generally local and may often be limited by product type.

Several company-owned mills are located in Utah. These qualify as ''small businesses'' according to the rules of the Small Business Administration. These companies employ both local and out-of-state loggers and workers. It is not unusual for these operations to truck logs from 100 miles or more from their mills. Their markets are both local and regional.

While no large industry is located within the project area, large industry is a player in the timber market in Utah. Louisiana-Pacific (operating out of Colorado and Idaho) and Boise Cascade (operating from Idaho) actively seek opportunities and occasionally purchase sales in the State. Both companies have become more active in the State in recent years due, in part, to relatively large salvage sales being offered as the Forest Service has tried to cope with epidemic levels of insects that have not previously been experienced within the State. The volume offered in these sales has exceeded previous norms.

Congress mandates that national forests be managed for multiple uses. Timber commodity production is one of the identified uses. While Utah's forest lands are not the high-producing lands of some other parts of the country, they do produce some quality wood. Until recent years nearly all of the lumber produced from Utah's forests was used locally. In recent years, with harvest productions down in some of the traditional lumber producing portions of the West, Utah logs and lumber have become more attractive and are being trucked to neighboring states. From 1994 through 1998 Utah's NFs produced approximately 150 million board feet (averaging 30 million per year) for a value of approximately $22,000,000 ($4.4 million per year) (Paroz 1999). This production contributed jobs to local economies, and approximately 25% of these funds are returned to the counties for use in schools and on local roads (Payments in Lieu of Taxes). For Fiscal Year 1997, the State of Utah received in payment from national forest receipts totalling $1,598,864.83 (USDA Forest Service 1997a).

### 3.52 Grazing

Vegetation management on NFS lands helps meet the goal to provide multiple benefits within the capabilities of ecosystems. The program continues to reflect an ecosystem perspective emphasizing restoration and long-term health of rangelands. The Forest Service manages rangelands for multiple uses. The balance among these uses and values has changed over time in response to changes in demands for these various goods and services

Where livestock grazing is a use, many factors affect the supply and demand for forage for livestock. One factor that influences supply of forage for grazing available on a national forest is the limitations applied to grazing where it occurs. A general framework for these constraints is contained in the affected Forest Plans. Specific grazing capacities, and therefore, maximum supply potential on the national forest, is established through the allotment planning process on individual allotments. The maximum amount of use determined for an allotment is established considering the desired vegetation conditions for the allotment area, range productivity and trends, other resource conditions and uses. Allotment management plans are updated periodically, as funds are available and as resource conditions and other factors warrant.

The lands most commonly associated with providing forage for grazing by both wild and domestic ungulates are grasslands and shrublands, but forest lands (especially aspen) also support an understory of grasses, shrubs, and forbs. The demand for domestic animal grazing is a derived demand, depending ultimately on the demand for sheep and cattle products. The limiting factor on grazing is supply. Examining demand for forage presents some difficulties because less than 10 percent of forage consumed by livestock is leased or sold in an observable market. The price for forage from private lands is usually not determined by competitive bidding within a market system because this forage is often produced within the farm or ranch enterprise. Prices for forage from NFS lands is set by federal laws. In Utah, most of the grazing land base is federally owned and not competitively leased. Grazing fees that permittees pay, which is determined by a formula, has been $1.35 per head month for the past few years.

Livestock grazing on the Utah NFs is a historic and traditional use of the forage resource. Early settlers grazed livestock in Utah long before the establishment of the national forests. The national forests issue term grazing permits for livestock that specify the type and number of livestock and the season of use. There are 539 active allotments on the six Utah NFs and 12 vacant allotments

Demand for cattle and sheep is primarily a function of domestic demand. In the nation and throughout the project area, overall demand for beef is increasing in response to population increases, while per capita demand continues to decrease. Associated with this, the inventory of cattle has been increasing. Consequently, the amount of forage needed for cattle is increasing. On the six affected national forests, supply is at capacity. In FY 1997, these national forests permitted use of forage for 634,000 animal unit months (AUMs) of privately owned livestock on NFS lands.

### 3.5.3 Mineral Resources

The Forest Service and Intermountain Region are mandated to foster economic activity by facilitating energy and mineral development on NFS lands, and to protect historic and natural values. Exploration, development, and production of energy and minerals within NFS contributes to economic growth, creates jobs in rural communities, and raises revenues for the Treasury and States. The unique geology of Utah's NFs contributes significantly to the amount of mineral activity that will occur within its boundaries.

Mineral activities and Forest Service authority to manage them depends on the types of commodity and the legal status of the NFS lands on which they occur.

In general, mineral commodities can be classified into three categories:

- Mineral Materials
- Leasable Minerals
- Locatable Minerals

In addition, land status affects the legal authorities which apply to management and disposal of these minerals.

- NFS lands reserved from the public domain.
- Acquired lands. All minerals on acquired lands are disposed of through leases issued by the BLM. In all cases the BLM must obtain FS consent prior to issuing leases on acquired lands. Since the acreage of acquired lands is small and activities discretionary, this category of land status is not discussed further in this EA.
- Lands with outstanding or reserved rights.

The following describes the mineral activities in these categories which are occurring on the National Forests in Utah.

**Mineral Materials** - Mineral materials are common minerals such as stone, gravel, cinders, and decorative rock whose disposal is authorized under the The Materials Act of July 31, 1947. This Act provided for the disposal of mineral materials on the public lands through bidding, negotiated contracts, or free use. The Forest Service has full authority to make decisions regarding disposal of mineral materials on all categories of NFS lands.

In FY98, approximately 200,000 tons of mineral materials were removed from NFS lands in Utah, with approximately 1/2 of that volume removed by the Forest Service for its own use. This level of use is expected to grow as the demand for construction and maintenance of public and private infrastructure increases.

Activities associated with the removal of mineral materials include excavation, temporary storage and transport of the materials. Typical sites are small, from less than 1 acre to 5 acres. Most mineral material sites are adjacent to or near existing access roads, and do not require signicant amounts of new access construction.

Authority for disposal of mineral materials for both Aquired and NFS lands are similar, but on certain acquired lands disposal is limited to certain public agencies and purposes.

**Locatable Minerals** - These are minerals which are disposed of on NFS lands under the authority of the General Mining Law of 1872. This law grants individuals a statutory right to explore for and develop these minerals, unless the land is formally withdrawn from mineral entry. Forest Service authority to manage locatable mineral activities is limited to some extent, in that we may not deny proposed operations, or make them impossible through imposing restrictive management requirements or conditions. However within those sideboards, the Forest Service may require mitigation and conditions to minimize adverse impacts on surface resources.

The primary locatable mineral activity on the national forests in Utah is exploration and mining for lode gold, silver, copper, and other metals. Exploration and mining for these commodities typically occurs in areas where historic mining has occurred, or where the geology is conducive to the discovery and production of economically valuable mineral deposits.

Typical surface disturbing activities associated with locatable minerals include:

- *Prospecting* - Identifying an area that has potential for mineral development involves activities with limited surface disturbance such as geologic mapping, soil or water sampling.
- *Exploration* - Physically searching for a mineral deposit within an area. Typical exploration activities include construction of roads, drill pads, underground adits and trenching.
- *Development* - Gathering information to determine whether a deposit can be mined/developed involves activities described under exploration, and also include construction of mine facilities such as adits, open pits, waste dumps, milling and other support facilities.
- *Production* - Production of minerals from the deposit involves use of the facilities constructed under development
- *Reclamation* - Restoration of the area following production of areas disturbed by mining.

Most locatable mineral activity in the recent past involves maintenance of existing facilities with hopes of improved economics for the specific commodity, with limited new exploration and production of minerals. There are no large (defined as requiring more than 1/2 person years of administration) locatable operations on NFS lands in Utah. The Manti-LaSal NF contains a gypsum mine and the Uintah NF contains a limestone mine reporting significant mineral production.

Future locatable mineral activity is likely to occur in areas of existing operations and where the geology is favorable for the formation of economic mineral deposits. Significant future exploration or development is not expected and the potential for future mineral discovery is considered low.

On acquired lands, minerals which are locatable on NFS lands are disposed of by prospecting permit (exploration) and leasing rather than under the 1872 Mining Law. The BLM issues prospecting permits and leases for hardrock minerals on aquired lands, but must obtain the consent of the Forest Service to do so. The amount of leasable hardrock activity in Utah is insignificant.

**Outstanding And Reserved Mineral Rights** - Outstanding and reserved minerals rights are rights to the mineral estate held by an entity other than the holder of the surface rights, in this case, the Forest Service. Two such areas are within the affected environment: on the Evanston Ranger District, Wasatch-Cache NF, where the railroad has retained the mineral rights for the railroad grant lands and around Strawberry Reservoir on the Uinta NF where the Water Users Association has the right to lease the minerals and collect royalties.

The Forest Service may impose reasonable restrictions on persons exercising outstanding or reserved mineral rights, but may not deny or unreasonably restrict such activities. The reserved mineral rights may include all minerals.

Leasable Minerals - The Mineral Lands Leasing Act of February 25, 1920 was the first law which authorized the Secretary of the Interior to issue leases for certain minerals (currently applies to coal, phosphate, sodium, potassium, oil, oil shale, gilsonite, and gas). This law removed these minerals from the operation of the General Mining Law of 1872 and applies to NFS lands. In 1970 the Geothermal Steam Act added geothermal steam to the list of minerals that could be leased on National Forest System Lands by the Secretary of the Interior.

Most leasable activities except for oil and gas, occur on lease, after a lease has been issued. The exception is prospecting which is described below. Prospecting activities are approved through issuance of a prospecting permit or exploration license issued by the BLM or the FS. The BLM must have the FS consent for prospecting permits and exploration licenses issued for coal. The Forest Service issues prospecting permits for oil and gas. The BLM does not need FS consent to issue prospecting permits and exploration licenses for solid, non-energy leaseable minerals (phosphates for example); however, the BLM generally accepts Forest Service recommendations.

The BLM is responsible for issuing all leases on Federal lands and on private lands for which the Federal government retains mineral rights. The BLM cannot issue oil and gas, coal leases for lands administered by the Forest Service without their consent. Leases are issued for a 10-year period and can be extended if discoveries and production occur.

For solid, non-energy, leasable minerals such as phosphate or sodium, the Forest Service does not have consent authority over leasing and lease operation decisions except on acquired lands. The authority rests with the BLM. However, the BLM generally accepts Forest Service recommendations on lease issuance and lease operations.

The Forest Service identifies areas on NFS lands which are available for leasing either through the NEPA process and individual environmental statements, or through the forest planning process. In areas where exploration and development of leasable minerals would adversely affect other resources or public uses, the NEPA or forest planning process is used to identify measures to mitigate impacts. Such mitigation measures are then applied to leases as either stipulations to uses or as restrictions on surface occupancy.

Once a lease is issued, the lessee obtains legal rights to exploration and development subject to the terms of the lease and applicable state and federal law. Post-lease activities (exploration, development, production, reclamation) on the lease must be approved by the Forest Service and BLM. At this time, site specific resource protection measures are developed through the NEPA process and applied through conditions of approval to the surface use plan of operations. Such measures must be within the scope of the rights granted under the terms of the lease.

Typical activities which may occur in exploration and development of leasable minerals are:

- *Prospecting* - Prospecting for solid leasable minerals include activities similar to that described for locatable minerals.

  Prospecting for oil and gas typically involves collection of seismic data. This activity consists of a source of ground induced vibration, typically by explosives or mechanical, truck-mounted thumper," and a listening or receiving device. These methods require vehicular access, but typically utilize existing roads where necessary. Prospecting may occur off-lease as well as on-lease.

  All prospecting, whether on or off lease, is authorized by issuance of a prospecting permit or exploration license. Prospecting activities on-lease are considered part of the legal right granted by the lease and may not be denied, while off-lease prospecting is discretionary on the part of the Forest Service, except in of solid, non-energy minerals where FS authority is limited to recommending to the BLM, measures to protect surface resources. In all cases measures to protect

surface resources are applied to the to activities through conditions imposed in the prospecting permit or exploration license.

- *Exploration* - Solid leasable exploration is similar to that described for locatable minerals, and typically occurs on-lease, after a lease has been issued.

  Oil and gas exploration is typically done by drilling an exploratory well. This typically involves road and drill pad construction and operation of drilling rig and support facilities. This activity typically on-lease, after a lease has been issued.

  Such exploration activities are regulated by the FS or BLM through conditions of approval which are applied to operating or surface plans. For oil & gas and coal, the FS must approve these plans, for solid, non-energy leasable minerals the FS recommends such measures to the BLM. These measures are designed to minimize adverse surface resource disturbance. The extent to which exploration activities can be regulated is controlled by the terms of the lease as well as other state and federal legal requirements.

- *Development* - Develop of solid leasable minerals is similar to that described for locatable minerals. Phosphate is typically developed with open pit mining methods, while in Utah, coal is developed via underground mining methods. The FS can regulate (in the case of coal), or recommend regulation to the BLM through requiring conditions of approval to be included in operating or surface plans, so long as the basic legal right to development which was granted the lessee is not impaired.

  Oil or gas development occurs through a series of production wells. The number and spacing of production wells and associated road access depends on the characteristics of the oil or gas resource discovered. The Forest Service can regulate the location of roads and drill pads through requiring conditions of approval in operating or surface use plans, so long as the basic legal rights to development granted the lessee are not impaired.

- *Production* - Production of leasable minerals from the deposit involves use of the facilities constructed under development

- *Reclamation* - Restoration of the area following production of areas disturbed by exploration, development and production activities.

Significant leasable mineral activity on NFS lands in Utah include exploration and development of phosphate, coal and oil and gas.

**Oil and Gas** - The following table displays the acreage on Utah's National Forests which are under oil and gas lease:

**Table 4: Acreage under oil and gas lease on Utah's National Forests**

| Forest | Pending | To BLM | Issued & Extended | Producing | Available 2-Yrs Noncomp. | Suspended Leases | Forest Totals |
|---|---|---|---|---|---|---|---|
| Ashley | .00 | .00 | 97,107.50 | 5,200.16 | .00 | .00 | 102,307.66 |
| Dixie | .00 | .00 | 1,850.00 | 9,370.43 | .00 | 3,501.00 | 14,721.43 |
| Fishlake | .00 | .00 | 1,280.00 | .00 | .00 | .00 | 1,280.00 |
| Manti-LaSal | .00 | 33,422.32 | 209,486.47 | 16,409.88 | 115,584.78 | .00 | 376,983.45 |
| Uinta | .00 | .00 | 880.00 | .00 | .00 | .00 | 880.00 |
| Wasatch-Cache | 10,621.81 | .00 | 52,969.39 | 16,838.24 | 27,654.30 | 40.00 | 108,123.74 |
| **TOTALS** | **10,621.81** | **33,422,32** | **363,573.36** | **47,818.71** | **143,239.08** | **3,541.00** | **604,296.28** |

**Future Oil & Gas Activity** - Three EISs have been prepared by the Forest Service for oil and gas leasing on Utaho Forests:

- *Ashley and Uinta NFs*: In September 1997, the Ashley and Uinta NFs issued a Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Western Uinta Basin Oil and Gas Leasing (USDA Forest Service 1997). The area involved is approximately 401,000 acres of adjacent portions of the Uinta and Ashley NFs. The area encompasses lands with high and moderate potential for oil and gas occurrence located on the south unit of the Duchesne Ranger District, Ashley NF, and a portion of the Uinta NF's Heber and Spanish Fork Ranger Districts south and west of Strawberry Reservoir. Of the 401,000 acres of NFS lands, approximately 204,000 acres are within the Ashley NF and 197,000 acres are within the Uinta NF. The study area included portions of Duchesne, Wasatch, and Utah counties.

- *Manti-La Sal NF*: In January, 1993, a ROD was signed in connection with a FEIS concerning oil and gas leasing (USDA Forest Service 1993). The decision was made to resume oil and gas leasing on lands administered by the Forest. The FEIS considered site specific resources and land areas. The selected alternative allows for oil and gas leasing in those areas where lease stipulations and site-specific requirements would be effective in preventing or mitigating impacts and would preclude leasing in those areas where post-lease activities could result in unacceptable impacts. It addition, it provides a reasonable opportunity to explore for and produce oil and gas reserves.

- *Wasatch-Cache NF*: In 1994 an EIS was prepared by the Wasatch-Cache and Ashley NFs (USDA Forest Service 1994) that identified non-Wilderness Federal lands with Federal mineral rights that should or should not be made available for oil and gas exploration, development, and production on the North Slope of the Uinta Mountains. The Forest Service proposed to make most of the NFS lands on the North Slope available for oil and gas leasing and to authorize the BLM to offer certain lands for leasing. That decision was implemented on 160,000 acres. The BLM proposed to offer for lease all lands authorized by the Forest Service.

**Other** - For solid, non-energy, leasable minerals such as phosphate or sodium, the Forest Service does not have consent authority over leasing and lease operation decisions. The authority rests with the BLM. However, the BLM generally accepts Forest Service recommendations on lease issuance and lease operations. Leases for all other leasable minerals on NFS lands and acquired lands, such as coal, may not

be issued without Forest Service consent. Once a lease is issued, operating or surface use plans and surface use protection measures are approved by the Forest Service.

**Solid, Leasable Minerals** - The following table displays existing leases, licenses, or prospecting permits for other leasable minerals on NFS lands in the project area:

**Table 5: Acres under leases, licenses, or prospecting permits for other leasable minerals on NFS lands in the project area.**

| Forest | Mineral Commodity | Type | Acres |
|---|---|---|---|
| Manti-LaSal | Coal | Lease | 98,009.132 |
| | Coal | License | 4,760.46 |
| Fishlake | Coal | Lease | 5,681.49 |
| Ashley | Phosphate | Lease | 4,716.36 |
| Uinta | Phosphate | "Other" | 840 |

**Future, Solid Leasable Minerals** - Two new coal leases are currently being evaluated on NFS lands administered by the Manti-La Sal NF. They include the Cottonwood Canyon Tract (9,244 acres State coal) and the Flat Canyon Tract (2,692 acres Federal coal). If leased, these areas would add additional coal reserves to already existing underground mining operations. Only one large coal lease tract remains which would require the development of a new portal facilities complex. This is the North Horn Tract (21,000 acres) which would most likely be accessed from NFS lands in Rock Canyon MMA (Minerals Management Area) Management Unit. At the present time, there are no applications to lease this area but receipt of a lease proposal from industry for this area is reasonably foreseeable within the next 10 years. There are other areas available for further consideration for coal leasing on NFS lands in the Wasatch Plateau Coal Field, however leasing of these areas at the present time is not reasonably foreseeable. They would generally require new portal complexes to develop and do not contain sufficient reserves to warrant development considering the current market and mining technology. Other expansions of existing mining operations would occur by adding existing adjacent leases to the permit area or increasing the size of existing leases via lease modifications. Modifications to existing leases are limited to 150 acres per lease.

There is limited potential for phosphate exploration and development activities to expand onto the NFS leases. However, there is a limit to possible expansion as teh depth to the phosphate deposits increases with increasing elevation, as one moves onto NFS lands.

### 3.5.4 Recreation/Tourism

Recreational activities by residents and tourists alike is the fastest growing use of the national forests and grasslands. In 1997, about 43 percent of the outdoor reaction use on public lands in the nation was hosted by the Forest Service. This included 60 percent of the nation's skiing and significant percentages of hiking, camping, hunting, fishing, and driving for pleasure. The Forest Service generates many benefits through the sustainable management of national resources. Recreation on national forests is big business. Nationally, the national forests and grasslands contribute $134 billion to the gross domestic product, with the largest share associated with outdoor recreation and travel/tourism (USDA Forest Service 1999b).

Outdoor recreation is an important activity to many Utah residents and a primary use of Utah's NFs. Established recreation sites (camping and picnic sites, ski resorts, lakes, and other areas) attract many recreation visitors. Scenic travel through the color country of southern Utah and through the Uinta Mountains is popular as is a wide variety of other recreational pastimes. Ski resorts, once only open during

winter months, are rapidly becoming four season resort locations and are offering customers a wide variety of summer activities including mountain biking, hiking, golf, alpine slides, and more. Some ski resorts in the region are receiving more visitors in summer months than in the regular ski season.

Skiing is an important industry in Utah with six major ski resorts on NFS lands attracting 1,675,743 skier visitors days in 1998 (Contreras 1999). These resorts include Brian Head, Alta, Brighton, Snow Basin, Snowbird, and Solitude. Other ski resorts, such as Park City, Deer Valley and Beaver Mountain, are on private land but adjacent to national forest land.

It is projected that outside visitors spend an average of $300 per day which mean millions of dollars in revenue to the Utah economy (Utah Governor's Office 1999). In addition, the 2002 Olympics will be held throughout the Wasatch Range. This event is already bringing increased national and international attention to skiing and other recreational activities in Utah.

### 3.5.5 Transportation/Access

Access is the opportunity to enter NFS lands for personal and reasonable use of other lands and rights within the NFS lands. Road access to NF-administered lands is important to many users, supports the bulk of economic activity generated from agency lands, and represents a substantial public investment. While very minor construction might be necessary, no major new routes are known or planned.

The National Forest Transportation System for the project area, approximately 12,116 miles of roads, includes 3,826 miles of arterial or collector roads, that serve all users and 8,290 local roads, that are typically passable by high-clearance vehicles. Access to the remaining 248 miles of roads is restricted by gates or other methods. Forest Service vehicles drive system roads daily to accomplish a variety of administrative tasks such as fire suppression, contract administration, resource projects, and law enforcement. Where the primary purpose identified for road construction and reconstruction is for access, the majority of future reconstruction will address user safety and mitigation of resource damage (backlog of deferred maintenance).

In March, 1999, the Chief of the Forest Service announced an 18-month suspension of permanent and temporary road construction and reconstruction in unroaded areas of NFS (referred to as interim roads policy) (USDA Forest Service 1999a) through issuance of a proposed interim rule to a new 36 CFR §212.13.

### 3.5.6 Special Uses

The special use program authorizes the use of NFS lands for more than 200 different types of activities, providing benefits to other Federal State and local governments; commercial and industrial entities; and private individuals. Many special use permits authorize use of facilities and services necessary for public health, welfare, safety, convenience, and national security, such as pipelines, highways, and telephone lines. These authorizations may be of short-term or long-term duration. There are nine broad categories of special uses authorizations, with several types of uses in each broad category (Project Record, Exhibit U):

- Recreational
- Agricultural
- Community & Public Information

- Feasibility, Research, Training, Cultural Resources & Historical
- Industrial
- Energy Generation & Transmission
- Transportation
- Communication
- Water (non-power generating)

Utah's NFs have issued approximately 3,675 special use permits (affecting approximately 82,314 acres) in these broad categories. The majority are recreational permits. See Appendix *E*, Table 15 for a detailed listing.

Several permitted ski resorts have requested expansion on their operations.

### 3.5.7 Administrative Considerations

Utah's NFs have typically has been weighted toward support of recreation, vegetation management, and rangeland related programs, in terms of program size and number of personnel employed. The vegetation (timber) management program is small on most forests. The Ashley and Dixie NFs have traditionally had the largest programs. Limited numbers of full-time personnel manage the vegetation program.

Much of the on-the-ground work is accomplished by temporary, seasonal employees under the direction of permanent staff. By the nature of temporary employment, there can be substantial turn over of employees from year to year. This necessitates the maintenance of a continual training program to insure that technical application and implementation of projects are within acceptable bounds. The Office of Personnel Management places a 6-month limitation on season of employment for temporary employees. Additionally, many seasonal employees are college students, which may further reduce the potential season of work. These limitations make it necessary for managers to balance the need for training with the need for field work in order to accomplish work necessary for the implementation of projects.

# CHAPTER 4
# ENVIRONMENTAL CONSEQUENCES

## 4.1 INTRODUCTION

This chapter describes the environmental consequences of implementing each of the six alternatives presented in Chapter 2 (see 2.3.2). Material from Chapter 2 is not repeated here, and it may be helpful to refer to that chapter while considering the environmental consequences described below. Environmental consequences of resources are presented in the same order as Chapter 3 to facilitate locating items of interest. A summary of effects precedes each resource discussion to assist the reader in determining which detailed effects disclosures are important to their interests.

The discussion that follows discloses the probable direct, indirect and cumulative effects of using management direction in each alternative in future project design and implementation. The information presented pertains to those aspects of the biological and physical resources on NFS lands, and the outputs and services projected to come from use of those resources, that are likely to be most directly affected within the geographic scope of the proposed action. The time frame for the disclosures is the life of the amendment, the time period between when the amendment is implemented and forest plans in Utah are revised (projected to be 4 years or less). Longer term effects will be discussed that may result from use of management direction during the life of the amendment, as appropriate.

It should be noted that on its own the management direction adopted through this project would not change the physical environment nor is there irretrievable or irreversible commitment of resources. Any subsequent site-specific action that may change the environment, and which uses the direction adopted to guide project design and implementation is subject to appropriate site-specific analyses required by the NEPA, as well as any other relevant planning regulations.

### 4.1.1 Incomplete or Unavailable Information

There are less than complete inventories and knowledge about many of the relationships and conditions of wildlife species, forests, and the economy. Management of large forests is a complex and developing discipline. The biology of the northern goshawk prompts questions about population dynamics and habitat relationships. The interaction among resource supply, the economy, and rural communities is also the subject of an inexact science. The ID Team examined the available data and the best available information was used to evaluate the options and alternatives. When encountering a gap in information, the question implicit in the CEQ regulations on incomplete or unavailable information was posed: "Is this information 'essential' to a reasoned choice among alternatives?" [40 CFR §1502.22(a)]. While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would be unlikely to reverse or nullify understood relationships. Though new information would be welcome, no missing information was evaluated to be essential to a reasoned choice among the alternatives as they are constituted.

Nonetheless, the precise relationships between the amount and quality of habitat and the future populations of species are far from certain; there is a certain level of risk inherent in the management of forest lands even to standards based on conservative application of those relationships.

All other things being equal, the less the information the greater the risk attributable to incomplete knowledge. That relationship is an impetus for the monitoring, research and adaptive management that is part of these alternatives. Should there be new scientific information on change in habitat conditions not projected under the selected alternative, there are provisions for changing management of the affected national forests to reflect the new information and the management practices for which it calls.

This adaptive management process, which is guided by monitoring, provides additional assurance of compensating for possible catastrophic changes.

### 4.1.2 Cumulative Effects

Cumulative effects are those impacts on the environment which result from the incremental effects of a proposal added to other past, present, and reasonable foreseeable future actions regardless of which agency or person undertakes them (see 40 CFR §1508.7). The cumulative effects area considered in analyses of biological resources encompasses the majority of Utah and contiguous forested lands in the adjoining States of Colorado and Wyoming (Appendix G). The cumulative effects area represents habitat that goshawks use during their normal life cycle of spring, summer, and fall. No measurable direct or indirect effects were identified for physical resources, therefore no cumulative effects area was identified. The social and economic cumulative effects assessment area was the State of Utah. Though small portions of lands in Wyoming and Colorado may be affected by this action, the area in these states was not believed to be sufficiently large enough where actions taken at this programmatic level would measurably affect their social or economic environment at the state scale. The paragraphs below summarize the key conclusions from the full effects disclosure that follows in the subsequent resource sections.

**Summary of Key Conclusions** - The Assessment (Graham et al. 1999) is the basis for the effects analyses which indicates that current conditions are sufficient to support viable populations of goshawk in Utah. The discussion here is how the alternatives will affect goshawk habitat, over time and space, and identify the risks and assurances of maintaining the sufficient habitat currently present. Cumulative effects may result from use of any of the proposed goshawk direction (Alternatives B-F) in combination with past, present and reasonably foreseeable actions and policies. Other current programmatic efforts, including the roads policy (currently interim with a final expected by the end of 1999), Utah Fire Amendment (approximately on the same time line as this project) and lynx strategy (USDA Forest Service 1999, affects only the northern Utah Forests) will add more prescriptive management direction for land managers to follow. Cumulative effects from these prescriptive management directions may result in changes in opportunities available to user groups (i.e., ranchers, loggers, recreationists). For example:

- If tighter grazing utilization standards in Alternative D are implemented, ranchers will likely need to find other options for supplemental forage to make up for loss of forage on NFS lands, reduce grazing season or herd size, or both. In some cases, grazing permits will be reduced to a level where it may no longer be economically viable for a permittee to continue to graze livestock. When looked at in combination with restrictions that may result from other programmatic efforts underway, cumulatively the effect will increase the already measurable effect identified for Alternative D at the state scale (i.e., estimated 23% reduction in total permitted AUMs on NFS lands affected).

  Alternative F may affect grazing practices as well though to a lesser degree than Alternative D. Alternative D will impact more areas than Alternative F due to the blanket application of a common utilization standard across all forested acres. Alternative F will change grazing practices only in areas where grazing has been identified as contributing to an at-risk condition relative to goshawk or prey habitat. The grazing practice changed in Alternative F to address an identified problem may or may not affect current and future permits. Cumulatively, when the effects of Alternative F are looked at in combination with those that may result from other programmatic efforts, the effects are also likely to increase. However, unlike Alternative D, the

cumulative effects of Alternative F in combination with other programmatic efforts are not likely to be measurable at the forest or state scales during the interim period of the amendment.

- In all alternatives, there may be shorter time periods to accomplish timber harvest in some areas, given the guidelines regarding protection of goshawk nests and PFAs in combination with other direction protecting lynx habitat. Though nests and PFAs only represent 10% of any given territory, due to overlap of some territories or the location within timber sale areas, restrictions on these acres may indirectly impact activities in other areas due to restrictions on road access or other factors.

- A final example would be recreational use of an ATV trail that may be shortened or rerouted to protect an active goshawk nest. Though this has rarely happened in the past through application of similar restrictions, it may happen on occasion. The most likely effect would be the need to reroute a new trail during construction if an active nest is found.

These effects, when realized, will be disclosed during the site-specific analysis of effects for projects which use direction adopted through this action to guide project design and implementation. As stated in Chapter 1, the adoption of management direction through this project will not change the physical environment; there is no irretrievable or irreversible commitment of resources. Any subsequent site-specific action that may change the environment or result in the use impacts described in examples above will be subject to appropriate site-specific analyses required by NEPA.

**Cumulative Effects and Monitoring** - Cumulatively, assessment and monitoring are key at the broad scale to testing the effectiveness of prescribed management and validating estimates of results due to that management (or nonmanagement).

Monitoring item m-1 is designed to provide an indication of the effects from planned and unplanned activities on goshawk population trends over time. Monitoring item m-2 (applicable to Alternatives C, D, E, F) is designed to track the effectiveness of mitigation measures in preventing territory abandonment by goshawks during planned fire or mechanical vegetative treatments. Monitoring item m-3 (applicable in all alternatives except A) is designed to track goshawk habitat connectivity. Goshawk habitat connectivity is largely dependent on the spatial dispersion and patch size of mature and old forest groups within a 5th and 6th order watershed. Monitoring items m-4 and m-5 (applicable to all alternatives except A) are designed to track the effectiveness of mitigation measures in maintaining snags and down woody material important to goshawk prey species. And finally, monitoring items m-6 and m-7 (applicable to Alternatives D and F, respectively) are designed to track if mitigation measures for ungulate grazing utilization or other grazing practices are being met and whether they are effectively contributing to the maintenance of forage, mast and seed important to goshawk prey species.

Over time, monitoring items m-3 through m-5 (applicable to alternatives B-F) will contribute to assessing the success of direction adopted in maintaining or restoring habitat needed to support goshawks and their prey. In Alternatives D and F, m-6 and m-7 (respectively) will also contribute to this understanding. Monitoring item m-1 will contribute to assessing the effects of management activities on goshawk population trends over time.

Cumulatively, timber harvest and fire (both unplanned and planned) have annually impacted less than one percent of forested habitat in recent years. This pattern is unlikely to change until plans are revised (projected to be within 4 years). During the interim period it is estimated that less than 4 percent of the forested habitat on Utah's NFs would likely be affected by timber harvest and fire management. Due to the minimal acres estimated to be affected by these activities/events, it is difficult to detect any

measurable cumulative effects at the state scale during the interim period. Long-term trends of risks to goshawk population viability and risks to habitat quality from planned and unplanned habitat changes have been identified within alternative effects disclosures. Other land ownerships and less regulated forest management on State and private lands were considered in assessing these risks.

Alternative A, over time, would increase the risk of population declines at lower goshawk population levels. Current direction in Forest Plans does not provide for the consistent management of forest vegetation which promotes the structural, species and spatial diversity across multiple landscape scales that are key to the maintenance of stable habitat conditions. Promoting stable habitat conditions is important to reducing the risk of goshawk population declines. Monitoring item m-3 (applicable to all action alternatives) would track this diversity as landscape assessments are completed, keying in on the spatial dispersion and patch size of the mature and old forest groups.

Alternative E, because it would prohibit vegetation treatment in older aged timber stands, could result in the loss of future management options if vegetation changes occur in the near future from insect epidemics, diseases or wildfire that might have been prevented with treatment. The current bark beetle epidemics throughout the central and southern portions of the state are resulting in increased mortality that is expected to continue during the next decade. Alternative E may indirectly reduce future management options because the management direction to provide for goshawk habitat would perpetuate vegetative conditions that are not sustainable over time, increasing the risk of a "boom-bust" pattern of succession occurring. Monitoring items m-1 and m-3, described above, would be especially important to track if Alternative E is implemented.

In Alternatives D and F, aspen is predicted to respond with more growth in the understories because, in part, of the tighter restrictions on ungulate grazing utilization or other grazing practices. These changes in ungulate grazing practices would also be expected to increase the fine fuel loadings in aspen and ponderosa pine stands, resulting in a potential trend toward more frequent, low intensity wildfires. In the long-term this would promote conditions that have historically been more prevalent in Utah. In the shorter term, increased understory vegetation would be more noticeable under Alternative D than F due to the broad application of new grazing standards across all forested habitats in Alternative D, where new grazing guidelines in Alternative F would only affect limited areas where at-risk conditions are identified. While the immediate effects of increased understory vegetation would be noticeable during the planning period, the long-term and cumulative effects of more frequent understory fires would not be noticeable for several decades. Site specific changes in understory vegetation and associated ecological processes would likely be more evident under Alternative F due to the emphasis placed on addressing landscapes where grazing is contributing to at-risk conditions. Monitoring items m-6 (Alternative D) and m-7 (Alternative F) are designed to track success of implementation of prescribed adjustments in grazing practices. Successful implementation of prescribed changes in grazing practices will help managers determine if changes made were appropriate to address longer term effects to habitat for goshawk and their prey.

Alternatives C and F provide management direction that, over time, would tend toward more productive, sustainable habitat conditions across multiple landscapes for greater population stability and statewide goshawk abundance. These alternatives address all the key habitat elements identified in the Assessment and HCS as important to supporting viable populations of goshawks, especially as they pertain to the interim period of this amendment. Alternative F would likely provide more measurable short-term gains than Alternative C due to the emphasis in Alternative F to work in areas where key habitat elements are considered to be at-risk.

Alternative B will provide similar conditions to Alternatives C and F, but could cause less stability in desired habitat conditions within smaller scale landscapes due to the allowance of management for

extreme disturbance events (within the full range of historic range of variability). Under all alternatives, extreme disturbance events would occur as a natural part of the ecological process, but only Alternatives B and E would allow land managers to initiate events that mimic these extremes. Management for these extreme events may cause locally undesired conditions in the short-term within smaller scale landscapes. Also, this alternative provides greater flexibility in addressing site specific conditions. However, in some cases this greater flexibility may not provide for the consistent achievement of desired habitat. For instance, the canopy closure guideline in this alternative may not result in the range of canopy closures actually desired in the variety of cover types and habitat areas identified in the Assessment and HCS versus the guideline in Alternatives C and F which indicate the need for a range.

Alternative D closely follows the defined habitat conditions described in the HCS and Reynolds et al. (1992). However, in contrast to Alternative B, Alternative D provides less flexibility to address the variety of conditions encountered at the site-specific scale. This may lead to the application of treatments that will not achieve the desired habitat outcome for some sites. Also, the increase in the amount of prescriptive direction that must be addressed during the project design and implementation phase may actually reduce implementation success due to complexity and inappropriateness to some sites and will likely reduce the number of acres treated that may be at-risk.

## 4.2 PHYSICAL COMPONENTS

### 4.2.1 Soil

**Effects Summary** - Current forest plan direction and Best Management Practices (BMPs) designed to protect the soil resource would not be superceded by any direction proposed under the action alternatives; the no action alternative would continue to use current direction. There would be no negative direct, indirect or cumulative effects to soils. Alternatives D and F may result in some beneficial indirect and cumulative effects, but they are not likely to be measurable in 4 years.

**Discussion** - Preventive planning is the key to successful maintenance of the soil resource. Prescriptions and forestwide standards and guidelines for soil and water mitigate long-term consequences related to the soil resources. Specifications for conserving the soil are found in contract and permit provisions and guidance on the effects of management activities on the soil resource is found throughout the FSM and various FSHs. And, each of the six affected national forests applies many erosion control procedures (Soil and Water Conservation Practices or BMPs, when they are adopted by the State of Utah and the Forest Service in response to Section 208 of the Clean Water Act). Although designed to protect water quality, BMPs indirectly maintain the watershed and soil resource.

Three major activities impacting soil productivity are vegetative manipulation, livestock grazing, and road construction.

- *Vegetative manipulation* activities have a potential to cause soil disturbance, soil displacement, increase soil compaction and soil loss through erosion. Changes in vegetative ground cover and compacted soils reduce water infiltration and rates of water runoff. High rates of overland runoff increase soil loss as water moves soil particles. The use of fire as a tool to change vegetation successional stages can have detrimental effects on the soil resource if it becomes too hot and consuming, however, when implemented within the proper prescription window of soil moisture, effective results can be achieved. The organic surface horizon of the soil contains most of the nutrients available for plant growth. When this horizon is removed, the soil loses much of its capacity to supply nutrients.

- *Improper livestock management* and improper season of use can result in excessive soil compaction and loss of natural vegetative cover. Water runoff increases, more soil erodes, and nutrients are lost.

- *Road construction* exposes disturbed soil to erosional forces, interrupts drainage patterns, and can intercept subsurface water flows.

The types of management activities, and conditions under which they occur, determine effects on soil productivity. Determining the suitability of specific soils for management practices is an important first step in preventing or minimizing soils-related adverse impacts. This determination is accomplished during the NEPA process each national forest conducts for specific projects.

*Effects Common to All Alternatives* - When assessing the effects of applying proposed direction under each alternative on NFS lands within the project area no negative direct, indirect or cumulative effects were identified. Applying direction proposed under action alternatives, or use of current plan direction, will maintain the soils resource and related long-term productivity. Current forest plan direction and BMPs designed to protect the soil resource will not be superceded by any direction proposed under action alternatives; the no action alternative continues current direction.

*Alternatives D and F* -Though no negative effects to the soil resource are anticipated, indirect and cumulative beneficial effects could occur by using direction in these alternatives during future project design and implementation, though unlikely to be measurable within the 4 years this amended direction would be in place.

Overall, soil productivity and watershed condition could improve under Alternative D as a result of applying guidelines for wildlife and livestock utilization of grasses, forbs and shrubs. Where livestock grazing is contributing to problems related to soil productivity, this direction may contribute to meeting restoration objectives. However, if utilization is not the aspect of grazing practices resulting in an identified problem, this alternative would not result in any greater indirect beneficial effects to this resource.

Under Alternative F improved soil productivity and watershed conditions are likely to occur because it sets priority on treatment of landscapes where systems are functioning-at-risk. For instance, if landscape assessments determine grazing is contributing to an at-risk condition related to habitat for goshawk and its prey, modifying grazing practices (i.e., utilization, season of use, grazing system, etc.) to meet habitat objectives may indirectly benefit soil productivity. Other indirect benefits to the soil resource may also be achieved by improving other habitat elements in these at-risk landscapes that are related to maintenance of soil productivity, such as cover, down logs and woody debris. Other action alternatives would also result in these improvements where treatments designed to meet habitat needs overlap areas that could benefit the soils resource. However, by focusing on landscapes at-risk under Alternative F, the greatest indirect benefits to this resource are likely to occur over the next 4 years, compared to other alternatives.

### 4.2.2 Water

**Effects Summary** - Current forest plan, FSH and FSM direction and BMPs designed to protect the water resource will not be superceded by any direction proposed under action alternatives; the no action alternative continues current direction. Therefore, there will be no negative direct, indirect or cumulative effects to this resource. Alternatives D and F may result in some beneficial indirect and cumulative effects, but they are not likely to be measurable in 4 years.

**Discussion** - Prescriptions and forestwide standards and guidelines for soil and water mitigate long-term consequences relating to the water resources. Policies and specifications pertaining to water can be found throughout the FSM, in various FSHs, and in Forest Plans. Current management direction in each of the Forest Plans focuses on water quality and securing favorable conditions of in-stream flows sufficient to maintain the stability of stream channels for favorable conditions of water flow and protection against the loss of productive timber lands adjacent to the stream channels. This includes the volume and timing of flows required for adequate sediment transport, maintenance of stream bank stability and proper management of riparian vegetation.

*Effects Common to All Alternatives* - When assessing the effects of each alternative on NFS lands within the project area, none of the alternatives will degrade existing uses and waters of high quality. The direction contained in the action alternatives is programmatic and does not supercede any of the direction currently in the Forest Plans concerning BMPs. Future project design and implementation will continue to assess the success of site-specific projects in meeting water quality standards by applying those BMPs.

*Alternatives D and F* - Though no negative effects to the water resource are anticipated, indirect and cumulative beneficial effects could occur by using direction in these alternatives during future project design and implementation, though unlikely to be measurable within the 4 years this amended direction will be in place. The reasons for this are similar to that discussed under the soil resource for these alternatives.

## 4.3 BIOLOGICAL COMPONENTS

### 4.3.1 Vegetation

The following analysis of environmental consequences on vegetation follows the formatting in Chapter 2 (2.3) and discusses environmental consequences in terms of the "Management Direction" categories (2.3.2). Whenever possible, the cover types in Chapter 3 are discussed in total with specific cover types highlighted when appropriate or differing from the overall discussion. The elements of ecosystem process, composition, and structure are discussed throughout the sections and are not limited to the discussions under Native Processes, Forest Composition, and Forest Structure.

**Effects Summary**

*Alternative A*: Alternative A allows the widest range of options for managers. Vegetation management could range from remaining within sustainable conditions (as defined by HRV and/or PFC) to falling outside of these criteria. Managers would continue to have the option to balance resource concerns and select which concern would take precedence if conflicts were present.

*Alternative B*: Alternative B is the most flexible of the action alternatives. It is, however, less flexible than Alternative A and thus would limit decision space, removing the option to manage outside of sustainable conditions, as defined by HRV. The lower canopy closure requirements translate to lower density requirements and thus would allow treated stands to be managed for improved tree growth and vigor. This would allow stands to be managed for lower insect susceptibility, relative to all other action alternatives.

*Alternative C*: Alternative C is the second most flexible of the action alternatives. Some of the recommended stand densities (which are the same in C and F) are higher than Alternative B, but are more flexible than Alternatives D and E. This alternative contains an upper density limit as well as a lower. By virtue of this flexibility, managers would have greater decision space to balance resource concerns, while managing stands to remain within PFC. PFC remains within HRV, but is a more conservative approach that better allows managers to insure ecosystem elements are sustained (see ''Understanding HRV and PFC'' below).

*Alternative D*: Alternative D is the second least flexible alternative. Stand density guidelines, although similar to C and F, are substantially more prescriptive in this alternative than in any other, and this may affect the ability to successfully implement the guidelines (see 4.5.7 Administrative Considerations). This alternative and Alternative E contain guidance on roads on all forested acres, which may serve to restrict access to some areas. By virtue of reduced treatment acreage and increased complexity of density management, this alternative is second to Alternative E in its potential to foster stand conditions that may not always be sustainable, due largely to insect susceptibility and uncharacteristic wildland fire.

*Alternative E*: Alternative E is the least flexible alternative. Through the maintenance of high overstory densities, the elimination of mangers' options to manage VSS 5 and 6 classes, and access restrictions; this alternative would promote stand conditions that would likely not be sustainable over time, largely due to high susceptibility to insect epidemics and uncharacteristic wildland fire. Additionally, Alternative E would promote landscape conditions that would continue along the current trends of increased dominance by late seral communities, a condition that has been identified as outside of PFC (USDA Forest Service 1996) and possibly outside of HRV.

*Alternative F*: Alternative F is the third most flexible of the action alternatives. While it shares many of the same guidelines as Alternative C, it does restrict management activities to those ecosystems (or portions thereof) where ''at-risk'' conditions can be treated to maintain or enhance ecosystem function. Some of the recommended stand densities (which are the same in C and F) are higher than Alternative B, but are more flexible than Alternatives D and E. This alternative contains an upper density limit as well as a lower. By virtue of this flexibility, managers would have greater decision space to balance resource concerns, while managing stands to remain within PFC. Alternative F focuses management attention on problem or potential problem areas, it does reduce the manager's decision space by removing the option to treat functioning systems when goshawk habitat management is the primary objective.

**Assumptions for and Basis of Effects** - Some commonalties exist between all alternatives, some between all "action" alternatives, and some between specific alternatives. Commonalities between all alternatives are discussed first, followed by Alternative A ("no-action''), then by all action alternatives, with specific discussions for each alternative following. Where two or more (but not all "action'') alternatives share common environmental consequences, these discussions are placed near the individual discussions for the specific alternatives.

Effects on vegetation are evaluated relative to indicators of sustainability as defined by historic range of variability, properly functioning condition, and insect susceptibility. The potential each alternative has to affect vegetation structure, vegetation composition, and ecosystem process is evaluated in this light. Stand density, intra-tree competition, species composition, seral stage, and successional pathways are considered and alternatives are compared to the Alternative A, No Action, as well as to each other.

Direct, indirect, and cumulative effects of each alternative are discussed; however, separate sections are not provided for these discussions. Direct effects are considered on NFS lands; indirect and cumulative effects are considered for all forested lands within the analysis area. The cumulative effects area for vegetation is the same as that described in the wildlife section and displayed on the Cumulative Effects Map. It includes all or portions of the following ecosections as described in Bailey (1994) (Appendix G): Overthrust Mountains, Uinta Mountains, Bonneville Basin, Uinta Basin, Tavaputs Plateau, Southeastern Great Basin, Utah High Plateaus and Mountains, Northern Canyon Lands, and Grand Canyon Lands Sections.

Without intervention from natural or human-caused disturbance, vegetation structural and compositional changes are relatively slow and unnoticeable within a 4-year period in ecosystems within the Intermountain area, due largely to short growing seasons and relatively slow growth rates.

Effects to vegetation resulting from management, or protection, may be short term, long term, and cumulative. Both short and long-term impacts may be realized where treatments are heavily impactive, such as complete stand removal. Light treatments, such as stand thinning, underburning, and some fire suppression treatments, may have minimal short-term impacts but more subtle long-term and cumulative effects. Species composition and vegetative structure may be modified for long periods. These effects tend to be long-term and cumulative over long time frames, typically in excess of 100 years.

During the 4-year analysis period, effects would occur at the project level. Effects would be unlikely to be noticeable at the State level (the analysis area) due to the limited potential amount of activity that would occur in the next four years. On NFS lands, timber harvest averaged approximately 10,600 acres annually from 1990-1997 or approximately 0.2% of the nonwilderness, forested acres on national forest (exclusive of woodland forests). From 1994-1998 the number of acres in Utah burned in wildland fires averaged 22,500 acres, and the number of acres burned by prescribed fire averaged 20,400 acres per year (these acres include all fires on national forests including wilderness and fires in nonforested habitats). Cumulatively, timber harvest and fire have annually impacted less than 1% of forested habitat during recent years. This pattern is unlikely to change during the planning period (the next 4 years).

Where vegetative management is practiced, reentries into mechanically treated areas are generally not planned for long periods of time (ranging from 15 to 30 years between treatments). Thus any prescriptions initiated during the planning period (four years) would likely carry through until the next entry cycle (15 to 30 years). Cumulative effects may affect treatment areas where the applied management practices continue into future cutting cycles.

Refer to Appendix D for discussions on "HRV and PFC" and "Canopy Closure and Stand Density Index." Concepts described in this discussions lay the foundation for the analysis of effects that follows. A sound understanding of these concepts is needed to fully understand the effects analysis section that follows.

## Discussion of Effects

### Native Processes

*Alternative A:* Other than Alternative A, all alternatives recommend that management actions emulate natural disturbance regimes as defined by HRV and/or PFC. Management within PFC gives land mangers their best estimate of maintaining landscapes within sustainable conditions ecosystems while remaining within socially acceptable limits. Management outside of PFC would put ecosystems at greater risk of uncharacteristic disturbance. Recently completed Regional and local PFC assessments

have identified that many of the State's ecosystems are skewed toward late seral conditions and that these conditions are outside of PFC for many areas. Alternative A gives no guidance on the use of either HRV or PFC, thus managers have the option to manage within or outside these parameters.

The current Forest Plans do not give direction regarding natural disturbance regimes nor do they address ecosystem management. In recent years, ecosystem management has become a national emphasis item as part of the Natural Resource Agenda. Implementation of ecosystem management varies by Forest across the State. Under Alternative A, this variability in application would continue, and current direction would continue unless altered by other analysis. One such analysis is currently under consideration. A draft Prescribed Fire Amendment for the national forests in Utah is under development that would likely amend all Forest Plans in the State to increase the use of prescribed and wildland fire, primarily for the reduction of hazardous fuels. This amendment is following recent federal wildland fire policy.

*All Action Alternatives:* All action alternatives recommend that management actions emulate natural disturbance regimes as defined by HRV. Alternatives C, D, and F add PFC as a criterion. Guidance is for actions to remain within the variability of size, intensity, and frequency of native disturbance regimes characteristic of the subject landscape and ecological processes. Management actions within disturbed ecosystems are to be designed with restoration in mind. The general guidance in these alternatives is applicable across all vegetation cover types.

Due to social, political, and legal constraints, the two guidelines in this portion of the document may not always be attainable at all scales (thus they are "guidelines" and not "standards"). For example, NFMA opening size limitations on even-aged forest management did not take into account natural disturbance regimes and patterns, thus for systems where disturbance patterns were large, legal considerations may not allow for management to fully emulate these larger events. Management direction to emulate the smaller scale events can be achieved.

The current Forest Plans do not give direction regarding natural disturbance regimes nor do they address all components of ecosystem management. In recent years, ecosystem management has become a national emphasis item as part of the Natural Resource Agenda. Implementation of ecosystem management varies by Forest across the State. All action alternatives would similarly provide for greater consistency. The draft Prescribed Fire Amendment for the National Forests in Utah is another analysis currently under consideration that would potentially provide additional direction for the implementation of ecosystem management. It would likely amend all Forest Plans in the State to increase the use of prescribed and wildland fire, primarily for the reduction of hazardous fuels. This amendment is following recent federal wildland fire policy.

Management within HRV provides managers with an estimate of maintaining ecosystems within their natural bounds, which may include broad swings in ecological amplitudes. These broad swings may or may not be socially or economically acceptable within any given landscape. Management within PFC is a more conservative approach and provides managers with their best estimate of managing and maintaining sustainable ecosystems while remaining within socially acceptable limits. To manage outside of PFC would put ecosystems at risk. Risk may be from uncharacteristic disturbance, soil loss, and/or species loss (plant and animal) from within that ecosystem. To manage landscapes outside of HRV may subject ecosystems to irreversible change.

Additional discussion below on the proposed management direction details how actions are consistent with HRV and PFC. See 4.3.1 above for a discussion on the use of HRV and PFC concepts in assessing landscape conditions.

**Forest Composition**

*Alternative A:* While it is well recognized within the State that aspen systems are at-risk, treatment acreage remains low, largely due to economic feasibility. It is likely that reductions in aspen cover would continue their current trend. The prescribed burning program has the greatest potential to beneficially impact this type. This alternative allows management for aspen, but does not emphasize the need.

Current Forest Plan direction does not address the use of native vs. nonnative species, with the exception of reforestation guidelines for timber management areas (where native trees of locally adapted seed source are to be used unless Regional variance is granted). Under Alternative A, no emphasis would be added to current management direction, and the use of native or nonnative species would remain at the discretion of the local land manager. National and Regional guidance is currently being developed that would likely result in a native plants policy with recommendations similar to that proposed under Alternatives B-D and F. Nonnative species have the potential to replace or (in some cases) hybridize with natives, and thus could alter ecosystem process, composition, and structure over time. The use of native plants is the most conservative approach to insuring that ecosystem processes are not inadvertently altered. The cover types that have been most impacted are generally in lower elevation areas and usually in closer proximity to human population centers. However, all vegetation types have the potential to be impacted by non-native and exotic species.

Current management direction generally does not discuss seral stages, with one exception. Neither do Plans identify the general need to maintain "early seral species," although most recommend specific species. Forest Plans generally recognize the need to maintain vegetative diversity at the forest scale, however, they are very general in nature and do not discuss the need at a landscape level. Maintenance of a variety of seral stages in each cover type would help insure that all ecosystem components remain on landscapes. As identified in PFC documents, this is needed for ecosystem resiliency to disturbance.

*All Action Alternatives:* Guidelines recommend maintenance of the full range of seral stages, by cover type, across landscapes with "strong representation of early seral species." This guideline is the same for all alternatives except Alternative A. Maintenance of a variety of seral stages in each cover type would help insure that all ecosystem components remain on landscapes, and would thus help maintain ecosystem resiliency to disturbance.

*Alternatives B, C, D, and F:* Proposed guidelines recommend using native plants from locally adapted seed sources preferentially over nonnatives when and where they are available. Nonnatives may be used if their use can be justified to maintain or restore treated areas to functioning conditions. Nonpersistent, nonnative species can be used to help address short term, site-specific problems. Justification could include (among other considerations) seed availability, the ability of the seed mix to achieve project goals in a timely manner, and economics.

*Alternatives B and C:* While it is well-recognized within the State that aspen systems are at-risk, treatment acreage remains low, largely due to economic feasibility. This alternative is unlikely to have an impact on these factors, either positive or negative. The recognition of natural disturbance regimes and the need to manage for seral species may help to emphasize the need to manage for this species. This alternative would allow management for aspen, but does not specifically emphasize the need. The prescribed burning program has the greatest potential to beneficially impact this type.

*Alternative D:* While it is well recognized within the State that aspen systems are at-risk, treatment acreage remains low, largely due to economic feasibility. Restrictions (opening size and green tree

retention) in this alternative would exacerbate this by reducing management options, and it is likely that reductions in aspen cover would continue. Reduced grazing pressure may benefit aspen regeneration in some areas, and the recognition of natural disturbance regimes and the need to manage for seral species may help to emphasize the need to manage for this species. This alternative would allow management for aspen but restrictions may make mechanical treatments uneconomical. It does not specifically emphasize the need to manage for aspen. The prescribed burning program has the greatest potential to beneficially impact this type.

*Alternative E:* While it is well recognized within the State that aspen systems are at-risk, treatment acreage remains low, largely due to economic feasibility. Restrictions (opening size, green tree retention, and limitations on management of VSS 5 and 6 classes) in this alternative would exacerbate this by reducing management options. It is likely that reductions in aspen cover would continue their current trend or increase. Under Alternative E, the prescribed burning program would not be available to treat VSS 5 and 6 class aspen. Alternative E allows for the fewest management options in the cover type.

Alternative E differs from B-D and F in that the use of native species becomes a requirement rather than a guideline. The use of native plants from locally adapted seed sources is required. Nonnatives may not be used. The inability to use nonnatives may have some impact on a limited number of projects temporarily and economically. Depending upon the species mix required and the project location, limited native species are generally available though prices are normally somewhat to substantially higher than for nonnatives. Native species may not germinate and grow quite as rapidly as nonnatives, thus disturbed sites (such as road cuts) may be left exposed somewhat longer when using only natives. Under this alternative, the use of nonpersistent, nonnative species to help address short term, site-specific problems would not be permitted.

*Alternative F:* While it is well recognized within the State that aspen systems are at-risk, treatment acreage remains low, largely due to economic feasibility, and it is likely that reductions in aspen cover would continue. Reduced grazing pressure may benefit aspen regeneration in some areas, and the recognition of natural disturbance regimes and the need to manage for seral species may help to emphasize the need to manage for this species. The prescribed burning program has the greatest potential to beneficially impact this type. Through the focus on ecosystems-at-risk, this alternative would likely emphasize the need to manage for the aspen cover type, thus Alternative F has the greatest potential to stimulate projects beneficial to aspen cover types.

**Forest Structure**

*Alternative A:* Other than Alternatives A and E, all alternatives recommend the same distribution of vegetation structural stages. Most current Forest Plans do not contain direction on the maintenance of structural stages, other than general guidance to maintain forest diversity and guidance to maintain 5-10% of the forest in old structures. Where guidance is provided on rotation length, the rotation ages may not provide sufficient time for the development of the desired VSS 6 class structures. This may necessitate that areas be designated for mature and old classes and managed for different rotation lengths than the surrounding forest. This may make it difficult for areas managed for mature and old structures to change spatially across landscapes over time, which is needed to plan for replacement stands.

The ability to maintain large trees is allowable under current Forest Plans. However, current forest plans do not stress the need, and should treatments remove large trees from a landscape or reduce the percentage of area of mature and old below the desired 40%, these VSS classes would likely take years to replace.

All action alternatives recommend the same snag retention guidelines. These guidelines generally exceed the number and size of snags contained in current Forest Plan direction. Under Alternative A, the current guidance would continue. While standing, snags have a neutral effect on vegetation, over time snags contribute to down woody debris and the benefits that debris has to soils and vegetation (as discussed below).

Other than Alternative A, all alternatives recommend the same guidelines for the retention of woody debris. The recommended guidelines in Alternatives B-F exceed that required in most Forest Plans. Several plans have no specific direction on the maintenance of woody debris. Down woody debris is an important component of ecosystems, providing for nutrient recycling, helping to build desirable soil properties, providing erosion control, and providing important microsites for establishment, protection, and growth of forest regeneration. Most current silvicultural prescriptions recognize this and incorporate retention of woody debris to benefit the above attributes without contributing to excessive fuel loadings. Size requirements vary by prescription and may only require that specified in Forest Plans (where Plans specify) or a set number of tons per acre in debris greater than three inches in diameter. Vegetative needs for woody debris may not always be met under current Plan direction, however, the proposed guidance in Alternatives B-F meet these needs without creating excessive fuel loadings.

Other than Alternative A, all alternatives recommend density guidelines for vegetative treatments designed to maintain VSS 4, 5, and 6 classes, using either (1) canopy closure or (2) percent of area covered by clumps of trees with interlocking crowns as the measure of density. No Forest Plan included either measure as a part of forest management criteria. Currently forests are directed by Regional guidance to use SDI (stand density index) in the development of silvicultural prescriptions to manage stand density. Basal area is commonly used in coordination with SDI for field application, as basal area can be measured directly in the field using standard instrumentation and without additional calculations. Under Alternative A, current direction would continue without an added density management guideline. Crown closure would undoubtedly continue to be included in some stand examinations as an important wildlife habitat attribute.

Under current conditions, many of the mature and old stands are susceptible to insect epidemics. While current direction permits management to reduce insect susceptibility, it should be noted that treatments to reduce stand densities and associated susceptibility/risk are too few and scattered to reduce landscape level disturbances. Treatments are often effective at the stand or project scale, however, landscape level disturbances have the potential to override these small scale ecosystem alterations. Where tree diameters and stand densities result in susceptibility ratings of moderate or higher, susceptibility to insect epidemics is further increased when stands are dominated by a single species. This alternative would not modify current guidance and therefore current treatment options would still be permissible. Alternative A allows managers the widest latitude to reduce stand densities and thereby reduce susceptibility/risk. Comparatively for treated acres insect susceptibility increases as follows: Alternative A < B < Alternatives C = F < D < E.

*All Action Alternatives*: All action alternatives recommend the same snag retention guidelines. These guidelines generally exceed the number and size of snags contained in current Forest Plan direction. The recommended guideline is, by cover type, to maintain snags of a certain number (per 100 acres) and size when initiating vegetation management. This allows for small areas to be deficit if the average is obtained over the treated stand. Sub-stand level treatments would need to provide for snags only if such treatments, without snag retention, would result in a deficit at the stand level. It is allowable to substitute green trees for snags should snags not be available. The guideline does not discuss a preference system for the selection of green trees as snag replacements (using criteria such as tree decadence); this is left up to project planning to determine. This guideline would allow for treatments

such as precommercial or stand-improvement thinning in young stands that may not have the snag characteristics outlined in the guideline. The guideline allows for smaller snags should the desired size class not be available on the site. This allows for variance in younger stands and where site conditions do not produce trees of the desired size. While the snag recommendations for climax ponderosa pine (only) exceed recommendations in the *Region 4 Old Growth Definitions* (Hamilton 1993), research by Graham et al. (1994) has shown that these guidelines are obtainable and are not outside of HRV (Hamilton's work only addressed a per-acre figure). R4's Properly Functioning Condition (USDA Forest Service 1998) does not discuss snags and down woody; thus, it is assumed that remaining within HRV for these factors is appropriate. While standing, snags have a neutral effect on vegetation, over time snags contribute to down woody debris and the benefits that debris has to soils and vegetation (as discussed below).

All action alternatives recommend the same guidelines for the retention of woody debris. The recommended guidelines exceed that required in most Forest Plans. Several plans have no specific direction on the maintenance of woody debris. Down woody debris is an important component of ecosystems, providing for nutrient recycling, helping to build desirable soil properties, providing erosion control, and providing important microsites for establishment, protection, and growth of forest regeneration. The recommended retention guidelines would benefit these attributes without contributing to excessive fuel loadings. The guideline allows for deviation in down log size where the desired minimum is not attainable.

All action alternatives recommend density guidelines for vegetative treatments designed to maintain VSS 4, 5, and 6 classes. There are no density guidelines for VSS 1, 2, and 3 classes. Alternatives B, D, and E use canopy closure as the measure of density. Alternatives C and F use percent of area covered by clumps of trees with interlocking crowns. Using either measure differs from current plan direction as no Forest Plan included these measures as a part of forest management criteria. For Alternatives B, D and E, the recommended densities are considered to be minimums, that which would be present immediately after any vegetation treatment; there are no maximum recommendations. The guideline allows a variance where it can be demonstrated that the recommended densities are not consistent with HRV for the site. This occurs on some climax ponderosa pine sites, where root competition occurs before canopy competition. This may also occur on sites that were not historically forested, such as shrub lands dominated by oak brush that have had a conifer component increase due to fire exclusion (this typically is Douglas-fir or white fir). This variance would allow these areas to be managed for historic patterns and structures.

Percent of area (Alternatives B and F) is roughly equivalent to canopy closure (Alternatives C, D, and E) as measured by the drip-line of trees. In order to assess what the density requirements for each alternative mean to tree growth and vigor and to insect susceptibility, it is necessary to convert the canopy closure guidelines to more traditional measures of density. There is no widely accepted translation between canopy closure and the traditional measures of density, and having to measure canopy closure within each group is unnecessarily time-consuming (Smith and Long 1999). For purposes of this analysis, the Forest Vegetation Simulator (FVS) (Crookston and Stage 1999) is used to develop and display the potential relationships. Tables 6 and 7 following were empirically derived from FVS runs. Foraging areas are represented by all forested habitat, other than post-fledgling and nest areas. Post-fledgling areas comprise approximately 600 acres, or 10% of a goshawk territory. Nest areas comprise a sum of at least 180 acres, or approximately 3% of a territory.

The Region 4 PFC Process recommends that stands should be managed below a maximum of 50% SDI% max (climax ponderosa pine should be managed at 35% SDI%max or lower) in order to maintain properly functioning condition. It also recommends maximum basal areas for each cover type as

follows: ponderosa pine - 120; mixed conifer - 160; spruce-fir - 150; lodgepole pine - 90; and aspen - 140 square feet per acre (1998).

**Table 6: Approximate range of stand density indices* (and percent of maximum SDI) for various canopy closures (CC) by cover type.**

| Cover Type | 40% CC | 50% CC | 60%CC | 70% CC | 75% CC |
|---|---|---|---|---|---|
| Ponderosa Pine | 75-125 SDI<br>16-28% max SDI | 140-165<br>31-37% | 190-215<br>42-48% | 245-280<br>54-62% | 290-305<br>64-67% |
| Mixed Conifer | 80-85<br>13-15% | 110-115<br>18-20% | 150-160<br>25-27% | 185-200<br>31-34% | 210-225<br>35-38% |
| Spruce-Fir | 110-130<br>16-20% | 145-170<br>21-25% | 200-225<br>29-34% | 260-290<br>38-44% | 305-325<br>46-48% |
| Lodgepole Pine | 90-110<br>12-16% | 125-150<br>18-22% | 170-200<br>24-29% | 220-250<br>31-36% | 255-280<br>33-40% |
| Aspen | 65-120<br>10-20% | 100-145<br>16-24% | 115-190<br>19-32% | 175-240<br>29-40% | 215-280<br>36-47% |

*Developed from stand simulation runs using the forest vegetation simulator.

**Table 7: Approximate range of basal areas* for various canopy closures (CC) by cover type.**

| Cover Type | 40% CC | 50% CC | 60% CC | 70% CC | 75% CC |
|---|---|---|---|---|---|
| Ponderosa Pine | 50-60 BA | 75-90 BA | 100-110 BA | 140-165 BA | 160-170 BA |
| Mixed Conifer | 30-50 | 45-75 | 60-115 | 80-130 | 100-135 |
| Spruce-Fir | 50-75 | 75-105 | 110-130 | 140-180 | 160-185 |
| Lodgepole Pine | 40-50 | 55-75 | 80-95 | 105-130 | 125-145 |
| Aspen | 45-50 | 55-65 | 75-90 | 100-115 | 115-135 |

*Developed from stand simulation runs using the forest vegetation simulator.

*Alternatives B, C, D, and F:* Other than Alternatives A and E, all alternatives recommend the maintenance of a balanced range of structural stages needed to maintain either 40% of the coniferous stands or 30% of the aspen stands in mature and old stages (VSS 5 and 6). Guidance does not extend to the percent of area in the younger VSS classes; this is left up to forest managers to determine what would be appropriate in order to obtain or maintain the VSS 5 and 6 class structures. This direction is consistent with recommendations developed in local and Regional PFC documents. Achievement of these conditions in a landscape would help maintain or improve system stability and sustainability for all forested cover types. All alternatives require the retention of some mature and old trees on landscapes.

*Alternative B:* Canopy closure guidelines call for 40% canopy closure in foraging areas and 50% in post-fledgling and nest areas in VSS classes 4, 5, and 6. This is consistent in this alternative across all cover types.

A potential problem area (identified using criteria developed in the Region 4 PFC process document for density management) is with climax ponderosa pine in post-fledgling and nest areas (approximately 10% of a goshawk territory) where 50% canopy closure is recommended. FVS runs indicate that ponderosa

pine stands initially thinned to prescription would exceed the PFC recommended 35% SDI%max within 5 to 30 years, depending on site and stand condition prior to treatment. This may occur before the next planned treatment entry. However, where these conditions can be demonstrated to be outside of HRV for climax ponderosa pine, this alternative allows a variance to manage these sites within HRV. Where management activities are proposed on such sites and variance is necessary, documentation would need to be done during the NEPA planning process.

For most coniferous types, susceptibility to insects rates as "moderate" under this alternative. Aspen stands would not be placed at risk from insects due to density guidelines. Where ponderosa pine is managed in excess of 50% SDI%max, it would be more susceptible to mountain pine beetle, with moderate-high or high susceptibility ratings in the VSS 5 and 6 classes. Treatments designed to manage larger size trees (VSS 4, 5 and 6) in small groups may relieve competitive stress, depending on surrounding stand conditions and the absence of environmental stresses. Susceptibility would not be moderated for trees that are on the interior of groups which are not affected by ''edge effect'' to relieve competitive stress. However, where higher densities are required (post-fledgling and nest areas) susceptibility would remain at least moderate. Managing treatment areas and adjacent landscapes for a mosaic of stand conditions and species mixtures would alleviate insect susceptibility and reduce the likelihood of large scale landscape disturbances. Comparatively for treated acres insect susceptibility increases as follows: Alternative A < B < Alternatives C = F < D < E.

Canopy closure affects understory species mixture and production. Field measurements have shown that understory species (composition and abundance) are reduced once overstory canopy closure reaches 40% (Winward 1999). At this point, shade tolerant species would begin to dominate. One study in the ponderosa pine type in Arizona indicates a sharp drop in understory vegetation production as canopy closure goes from 0% to 20% and a continued drop from 20% to 100% canopy closure (Deiter 1990). High canopy closures would favor the establishment of advance regeneration of shade tolerant tree species beneath the existing canopy. Without management intervention, this shade tolerant regeneration would persist. Other than Alternative A, Alternatives B, C, and F would have the least detrimental effects on understory vegetation as they allow maintenance of the lowest canopy closures. Alternative B does not have an upper canopy closure, which could result in some cases of higher canopy closures than reflected in the guideline. Project planning would determine the mix of desirable canopy closures.

*Alternatives C and F:* Density guidelines call for a variety of densities ranging from 40% to 70% of the VSS 4, 5, and 6 groups to be composed of clumps of trees with interlocking crowns. Alternatives C and F do not contain the specificity (by cover type and VSS class) of Alternative D, and are therefore somewhat more open to interpretation by managers and may therefore allow somewhat greater latitude to account for differing site conditions when developing management plans.

Potential problem areas (identified using criteria developed in the R4 PFC Process [1998] for density management ) are in climax ponderosa pine and spruce-fir stands.

Where climax ponderosa pine in nest areas (approximately 3% of a goshawk territory) is managed for a minimum of 50% canopy closure, FVS runs indicate that stands initially thinned to prescription would exceed the PFC recommended 35% SDI%max within 5 to 30 years and the basal area recommendation within 20 to 25 years, depending on site and stand condition prior to treatment. This may occur before the next planned treatment entry. However, where these conditions can be demonstrated to be outside of HRV for climax ponderosa pine, this alternative allows a variance to manage these sites within HRV. Where management activities are proposed on such sites and variance is necessary, documentation would need to be done during the NEPA planning process.

Where spruce-fir stands are managed for a minimum of 70% canopy cover in nest areas, FVS runs indicate that stands initially thinned to prescription would exceed the PFC recommended 50% SDI%max within 15 to 30 years and basal area recommendations could be exceeded immediately to 5 years after stands reach 70% canopy cover, depending on site and stand condition prior to treatment. This may lead managers to reduce the time frame between treatment entries in order to maintain stands with acceptable risk ratings.

For coniferous cover types (except mixed conifer), susceptibility to insects rates at least "moderate" or "moderate-high" under this alternative in VSS 4-6. For mixed conifer stands, if Douglas-fir comprises a majority of the stand, bark beetle susceptibility would be "moderate-high" for VSS 4-6. Aspen stands would not be placed at risk from insects due to density guidelines. Where coniferous cover types are managed in excess of 50% SDI%max, they would be more susceptible to some species of bark beetles, with moderate-high or high susceptibility ratings in the VSS 5 and 6 classes. Treatments designed to manage larger size trees (VSS 4, 5 and 6) in small groups may relieve some competitive stress, depending on surrounding stand conditions and the absence of other environmental stresses. Susceptibility would not be moderated for trees that are on the interior of groups which are not affected by "edge effect" to relieve competitive stress. However, where higher densities are required (post-fledgling and nest areas) susceptibility would remain at least moderate and perhaps high. Managing treatment areas and adjacent landscapes for a mosaic of stand conditions and species mixtures would alleviate insect susceptibility and reduce the likelihood of large scale landscape disturbances. Comparatively for treated acres insect susceptibility increases as follows: Alternative A < B < Alternatives C = F < D < E.

Canopy closure affects understory species mixture and production. Field measurements have shown that understory species (composition and abundance) are reduced once overstory canopy closure reaches 40% (Winward 1999). At this point, shade tolerant species would begin to dominate. One study in the ponderosa pine type in Arizona indicates a sharp drop in understory vegetation production as canopy closure goes from 0% to 20% and a continued drop from 20% to 100% canopy closure (Deiter 1990). High canopy closures would favor the establishment of advance regeneration of shade tolerant tree species beneath the existing canopy. Without management intervention, this shade tolerant regeneration would persist. Alternatives B, C, and F would potentially have the least detrimental effects on understory vegetation as they allow maintenance of the lowest canopy closures. Alternatives C and F provide a range of canopy closures with upper ends, which may help to reduce project specific impacts over Alternatives B and D. Project planning would determine the mix of desirable canopy closures.

*Alternatives D and E*: Adds guidelines for ponderosa pine, mixed conifer, and spruce/fir cover types for regeneration opening size (mechanically created) and green tree retention in regeneration treatments (not restricted to mechanical treatments). Mechanical opening size is restricted to 1 acre in size in spruce/fir and 4 acres in ponderosa pine and mixed conifer (lodgepole pine and aspen cover types are not affected by this guideline). Project managers would need to apply this guideline with caution where overstory trees are infected with dwarf mistletoe to avoid causing young regeneration to become infected. Opening width is also restricted by this same guideline in the same cover types. This is consistent with uneven-aged stand conditions often found in these cover types and would promote establishment of regeneration of desirable species in these types. However, the green tree retention requirements in regeneration treatments in spruce/fir and mixed conifer cover types may be counterproductive to obtaining regeneration of early seral species. By requiring groups of mature trees to be left in each opening greater than 1 acre in size (mixed conifer) or 1/2-acre in size (spruce/fir), the establishment of late seral species regeneration would be favored. These two guidelines may not be fully consistent with the even-aged conditions found in many of Utah's mixed conifer (dominated by even-aged Douglas-fir and/or white fir) and spruce/fir stands.

The standards for green tree retention in regeneration treatments do not distinguish between mechanical and fire treatments. It may be difficult to impossible to meet these guidelines if fire treatments are used to create the openings.

Alternatives D and E add a guideline for the retention of mature and old trees when initiating mechanical thinning (nonregeneration treatment). This guideline applies to all forested cover types. This is consistent with uneven-aged conditions found in many of Utah's cover types (ponderosa pine, spruce/fir, mixed conifer, and some "stable" aspen stands). It is not consistent with even-aged conditions and historic patch size found in lodgepole pine and many aspen stands. For all forested cover types, where even-aged conditions exist, such treatment would, over time, result in a conversion to uneven-aged stands.

Alternatives D and E add additional guidance for the maintenance of down woody material following logging. These guidelines identify preferred slash treatments in order of priority. They identify common practices that are currently used throughout the State, although this priority system is not in current Plans. By specifying an order of priority, they serve to emphasize the needs of the goshawk and its prey. These guidelines would be unlikely to alter current slash treatments as they are consistent with current silvicultural prescriptions, BMPs, and Soil and Water Conservation Practices.

*Alternative D:* Density guidelines call for a variety of canopy closures ranging from 40% to 70% of the VSS 4, 5, and 6 groups. Alternative D contains a very specific table of guidance that delineates canopy closure by cover type, VSS class, and goshawk habitat area. The detail of the guideline may make it impractical to implement, as discussed in 4.5.7.

Areas of concern (potential problem areas) are the same as those discussed for Alternatives C and F, except that Alternative D expands the higher density guidelines from just the nest area (as in C and F) to include the post-fledgling area, thus making the higher density guidelines applicable to 10% (rather than 3%) of a goshawk territory. In some of Utah's landscapes where forests are discontinuous, this could be the majority of the manageable forestlands.

Canopy closure affects understory species mixture and production. Field measurements have shown that understory species (composition and abundance) are reduced once overstory canopy closure reaches 40% (Winward 1999). At this point, shade tolerant species would begin to dominate. One study in the ponderosa pine type in Arizona indicates a sharp drop in understory vegetation production as canopy closure goes from 0% to 20% and a continued drop from 20% to 100% canopy closure (Deiter 1990). High canopy closures would favor the establishment of advance regeneration of shade tolerant tree species beneath the existing canopy. Without management intervention, this shade tolerant regeneration would persist. After Alternative E, Alternative D would potentially have the second highest detrimental effects on understory vegetation as it requires maintenance of high canopy closures. Alternative D does not have an upper canopy closure, which could result in some cases of higher canopy closures than reflected in the guideline. Project planning would determine the mix of desirable canopy closures.

*Alternative E:* Other than Alternatives A and E, all alternatives recommend the maintenance of a balanced range of structural stages needed to maintain either 40% of the coniferous stands or 30% of the aspen stands in mature and old stages (VSS 5 and 6). Alternative E has a goal to achieve these same percentages, however, it adds a standard that prohibits any treatment of VSS 5 and 6 classes for the planning period. Guidance does not extend to the percent of area in the younger VSS classes; this is left up to forest managers to determine what would be appropriate in order to obtain or maintain the VSS 5 and 6 class structures. Direction to maintain the stated percentage of mature and old is consistent with recommendations developed in local and Regional PFC documents, however, direction that prevents treatment of mature and old structures is not, and over time would tend to result in an increase in mature

and old classes at the expense of the younger structural stages. All alternatives require the retention of some mature and old trees on landscapes.

Alternative E prohibits all vegetative management treatment in VSS 5 and 6 class groups. In the short term, this would inhibit treatment of many forested areas that are deemed at risk of significant structural changes, mostly due to insect epidemics. In some areas this could result in the loss of future options if, by management, insect epidemics could have been prevented and, by inaction, substantive vegetative changes occurred. If continued over time, this type of exclusionary treatment would lead to unbalanced stand structures that are skewed toward the old classes (since as soon as a group developed from VSS 4 to 5, it would become off-limits to management and would remain so until natural disturbance patterns removed the dominating VSS 5 and 6 component). Over time, this could favor the dominance of late seral species in both the understory and overstory, and over time, this type of treatment could push stands and landscapes outside of both HRV and PFC through the reduction and potential loss of early seral species. Comparatively for treated acres insect susceptibility increases as follows: Alternative A < B < Alternatives C = F < D < E.

Under this alternative, the elimination of the option to remove mature and old VSS classes may limit management options in the lodgepole pine type during the 4-year implementation period. Trees 9 inches in diameter and greater would not be available for removal through management (harvest, prescribed fire, or other methods). The lower merchantability limit for sawtimber for lodgepole pine is 7 inches. Post, pole, and house log sales would still be possible, however, it is likely that managers would need to rely primarily on natural disturbance events to regenerate the type.

The elimination of the option to remove mature and old VSS classes may also affect the ability to manage aspen stands. Trees 12 inches in diameter and greater would not be available for removal through management. While the minimum merchantability limit on aspen is 8 inches, trees less than 10 inches in diameter are generally not desirable by industry due to high processing costs vs. low return values. Options may be reduced during the 4-year implementation period should this alternative be selected, and natural disturbance events would likely be the primary regeneration events for aspen.

Canopy closure guidelines for Alternative E call for 60% canopy closure in foraging areas and 75% in post-fledgling and nest areas in VSS classes 4, 5, and 6. This is consistent in this alternative across all cover types. Foraging areas are represented by all forested habitat, other than post-fledgling and nest areas. Post-fledgling areas comprise approximately 600 acres, or 10% of a goshawk territory. Nest areas comprise a sum of at least 180 acres, or approximately 3% of a territory.

Potential problem areas (identified using criteria developed in the R4 PFC Process [1998] for density management) may occur with ponderosa pine (climax and seral stands) in foraging, post-fledgling, and nest areas. And with spruce-fir cover types, potential problems occur in areas managed as post-fledgling and nest areas (approximately 10% of a goshawk territory). While SDI figures do not show potential problems with lodgepole pine, basal area figures do (see Table 7 in Effects Common to All Action Alternatives, Category 4).

Unless a variance is obtained, climax ponderosa pine stands would always exceed the PFC recommended 35% SDI%max. This is thought to be outside of HRV for these types. Where these canopy closures can be demonstrated to be outside of HRV for climax ponderosa pine, this alternative allows a variance to manage these sites within HRV. Where management activities are proposed on such sites, documentation of the necessity of a variance would need to be completed during the NEPA planning process.

Seral ponderosa pine stands or groups within foraging areas managed for at least 60% canopy closures can be expected to exceed 50% SDI%max within 5 to 10 years of treatment and basal area recommendations within 10 to 15 years, as indicated by FVS runs. Stands or groups managed at 75% and greater canopy closures would always exceed basal area recommendations and would exceed 60% SDI%max and thus would be continually stressed by intra-tree competition.

Spruce-fir stands or groups within post-fledgling and nest areas that are managed at minimum canopy closures of 75% can be expected to exceed 50% SDI%max within 5 to 10 years of treatment while basal area recommendations would always be exceeded in these areas, as indicated by FVS runs. Such densities would favor establishment of subalpine fir regeneration at the expense of Engelmann spruce by maintaining conditions with overhead shade.

Alternative E would produce sites that are the most susceptible to bark beetle disturbances for the VSS 4, 5, and 6 spruce/fir and ponderosa pine types. Both high density requirements and the standard that does not allow management treatments in VSS 5 and 6 groups can result in higher susceptibility ratings and a higher probability of insect caused disturbances within landscapes. When coupled with the current spruce bark beetle epidemics occurring within the State, elimination of the option to treat VSS 5 and 6 classes could result in increased tree mortality and a continued rapid shift in structural stages (from old to young) throughout much of the State in the spruce-fir type. Aspen stands would not be placed at risk from insects due to density guidelines. In mixed conifer stands where Douglas-fir dominates the overstory, bark beetle susceptibility would be "moderate" or "high." Treatments designed to manage larger size trees (VSS 4, 5 and 6) in small groups may relieve competitive stress, depending on surrounding stand conditions and the absence of environmental stresses. Susceptibility would not be moderated for trees that are on the interior of groups which are not affected by "edge effect" to relieve competitive stress. However, where higher densities are required (post-fledgling and nest areas) susceptibility would remain at least moderate and perhaps high. Managing treatment areas and adjacent landscapes for a mosaic of stand conditions and species mixtures would alleviate insect susceptibility and reduce the likelihood of large scale landscape disturbances. Comparatively for treated acres insect susceptibility increases as follows: Alternative A < B < Alternatives C = F < D < E.

The reduction in temporary roads in Alternatives D and E may reduce management options which, in turn, could potentially allow insect populations to increase, causing additional mortality. Expanded insect populations could potentially affect adjacent treated areas.

Canopy closure affects understory species mixture and production. Field measurements have shown that understory species (composition and abundance) are reduced once overstory canopy closure reaches 40% (Winward 1999). At this point, shade tolerant species would begin to dominate. One study in the ponderosa pine type in Arizona indicates a sharp drop in understory vegetation production as canopy closure goes from 0% to 20% and a continued drop from 20% to 100% canopy closure (Deiter 1990). High canopy closures would favor the establishment of advance regeneration of shade tolerant tree species beneath the existing canopy. Without management intervention, this shade tolerant regeneration would persist. Alternative E would have the greatest potentially detrimental effects on understory vegetation by requiring the maintenance of the highest canopy closures.

**Nest and Post-Fledgling Areas Only**

*All Alternatives:* Current Forest Plan direction does not contain direction on conducting surveys for goshawks and identifying habitat. However, Regional guidance directs Forests to conduct these activities prior to vegetation management project implementation. All alternatives include direction for conducting surveys for goshawk nests and identifying habitat (nest areas). While these guidelines vary

somewhat between alternatives, the effects on vegetation do not. It is unlikely that any direct or indirect effects on vegetation would occur as a result of surveys or habitat identification.

Current Forest Plan direction does not contain direction to protect goshawk habitat; however, all Forest Plans include direction to protect the habitat of sensitive species, and Regional guidance directs forest managers to take measures to protect goshawk habitat. While interpretation and application may vary somewhat across the State, general direction is the same: active nest sites are protected from vegetation treatments and timing restrictions are imposed around nest areas. These restrictions sometimes extend to the post-fledgling area. All alternatives include similar restrictions within and around active nest areas. Alternative E is slightly less flexible with regard to "permitted human activities." All alternatives have similar guidance in regard to allowable opening sizes within post-fledgling areas. Alternatives D and E add opening width guidance. The effects (direct, indirect, or cumulative) on vegetation by these various protection standards and guidelines summarized above would not be measurably different from one alternative to the next, including Alternative A (the current condition). All have similar guidance with regard to the types of vegetative treatments allowable and the timing of treatments.

All alternatives include a guideline recommending the restriction of management activities within post-fledgling areas during the active nesting period. This guideline has been variably applied across the State sometimes restricting activities within the nest area only and sometimes restricting activities within the entire post-fledgling area. Depending upon the on-site application and the size of the area restricted, this may or may not have impacts on vegetative treatment options and the timing of these treatments beyond the nest area. At the extreme, restrictions have the potential to raise the costs of operations or to make portions of a sale or whole sale areas economically inoperable. Alternatives A through F apply this guideline equally.

**Other Miscellaneous Areas of Concern**

*Alternative A:* Landscape assessments provide for improved coordination of management activities and improve the analysis of cumulative effects. Current Forest Plan guidance does not require the use of landscape assessments. However, all forests in Utah currently use some form of landscape assessment for some planning processes. Under Alternative A, it is likely that the use of landscape assessments would continue to be inconsistent between Forests and Districts.

*All Action Alternatives:* All action alternatives contain guidelines recommending the use of landscape level assessments during pre-project planning. Alternative B contains this recommendation for assessing landscape structure only. Alternatives C-F contain this recommendation for assessing landscape process, composition, and structure. Forest Plans do not require landscape assessments, and implementation of guidance to complete landscape assessments before project planning and implementation is a change from current direction. Many projects are currently implemented without the benefit of formal landscape level analysis, and landscape assessments are needed to coordinate project treatments to insure landscape level HRV and PFC parameters are not exceeded. The necessity to complete landscape analyses may increase the time needed to plan projects and may increase administrative costs. Implementation of the guideline would require most national forests in Utah to increase their current database on landscape condition. All national forests in Utah are currently instituting some form of landscape assessments that are designed to help answer this question and others. Forests are currently beginning to do this to better assess cumulative effects and overall ecosystem need.

Implementation of the various guidelines that require the maintenance and knowledge of a variety of structural and seral vegetation stages across landscapes would require most national forests in Utah to

increase their current knowledge base of landscape condition and trend. All national forests in Utah are currently instituting some form of landscape assessments that are designed to help answer these questions. However, implementation of guidance to complete landscape assessments before project planning and implementation is a change from current direction. While forests are currently beginning to do this in order to better assess cumulative effects and overall need, many projects are currently implemented without the benefit of formal landscape level analysis.

Under Alternative B, guidance to do landscape assessments will determine the structural stage class mix across the landscape. While this will help managers conduct improved planning processes, it will not be as beneficial as Alternatives C-F that provide guidance to conduct assessments for ecosystem structure, composition and process.

*Alternatives C, D, E, and F:* Additional guidance concerning the use and determination of HRV and PFC is added. Managing landscapes to remain within HRV and PFC is a conservative approach that is intended to insure that all ecosystem components remain upon the landscape, thus not eliminating future options while preserving ecosystem resiliency to perturbations.

*Alternative D:* Implementation of the various guidelines that require the maintenance and knowledge of a variety of structural and seral vegetation stages across landscapes would require most national forests in Utah to increase their current knowledge base of landscape condition and trend. All national forests in Utah are currently instituting some form of landscape assessments that are designed to help answer these questions. Guidance to complete landscape assessments before project planning and implementation is a change from current direction. While Forests are currently beginning to do this in order to better assess cumulative effects and overall need, many projects are currently implemented without the benefit of formal landscape level analysis.

Alternative D and F add grazing utilization guidelines, but the two alternatives differ in their approach. For both, the guidelines would be applied only where grazing coincides with goshawk habitat. This would be applied to forested understories and vegetation in small openings (generally less than 1 acre in size) that are surrounded by forested habitat. The Alternative D guideline reduces utilization from current grazing standards (that generally allow averages of 45-65%) to an average of 20% not to exceed 40% in any one area. In order to accomplish this, managers may have to reduce grazing on adjacent areas where livestock cannot be effectively herded. Alternative D only focuses on utilization guidelines to promote the desired understory forage, seed mast, and cover. Changes in grazing practices such as season of use or grazing system are other tools that in some cases may be more effective than simply focusing on utilization.

Vegetatively, this would reduce some of the grazing impacts to understory vegetation, including grazing/trampling pressure on tree seedlings. Aspen could be expected to respond favorably to reduced grazing pressure. This guidance would promote a reversal of the negative impacts to herbaceous vegetation as noted in Graham et al. (1999). Although some research debates whether livestock grazing would or would not have short and/or long term effects on forest structure and understory vegetation (Latham 1999, Jorritsma et al. 1999, Kienast et al. 1999, Reimoser et al. 1999), in Utah's environment, it is unlikely that substantial changes in vegetation would be notable on drier upland sites within the 4-year planning period. Within riparian sites, improved vegetative conditions could be expected to be measurable within the planning period. Should such practices continue, substantial changes in vegetation composition and structure might be expected where understories had previously been grazed more heavily by livestock. Cumulatively, this could have an effect on fine fuel loadings and fire frequencies, allowing more frequent fires to burn through the understories of affected stands. This effect would be most noticeable in aspen, ponderosa pine, and mid to low elevation mixed conifer cover types.

*Alternatives D and E*: Add guidelines concerning road management and the use of skid trails. These would not have any direct affect on vegetation. Indirectly they may affect economic viability of potential vegetation treatments by reducing access and may therefore limit management options in some areas. Such areas may go untreated if mechanical treatments are the only option.

*Alternative E*: Adds a guideline that would eliminate the possibility of conducting vegetation treatments on "unsuited" timberlands for the sole purpose of promoting goshawk habitat. This may serve to limit managers' options should treatment of such areas be desirable for habitat improvement or mitigation for activities in other portions of a goshawk territory. However, it is unlikely that this would affect vegetation treatment proposals, as typical treatment proposals on unsuited lands are done with broader purposes in mind (such as regeneration of seral species, fuels treatments, and/or watershed concerns).

*Alternative F*: Alternative D and F add grazing utilization guidelines, but the two alternatives differ in their approach. For both, the guidelines would be applied only where grazing coincides with goshawk habitat. This would be applied to forested understories and vegetation in small openings (generally less than 1 acre in size) that are surrounded by forested habitat. Alternative F provides guidance that wildlife needs for forage should be determined through the landscape assessment process and that, if this process determines livestock grazing is contributing to an identified functioning-at-risk or nonfunctioning condition (relative to PFC), modifications to grazing practices should be determined and implemented. In order to accomplish this, managers may have to reduce grazing on adjacent areas where livestock cannot be effectively herded, although this would affect fewer acres than Alternative D. Compared to Alternative D, which only focuses utilization guidelines to promote the desired understory forage, seed mast, and cover, Alternative F allows for managerial decisions to utilize various livestock management tools to address site specific problems and improvements. These may include alteration of grazing systems, alteration of the season of use, or other appropriate management needed to achieve the guideline. This may improve the managers' ability to correct problems.

Vegetatively, this would likely help to identify site-specific grazing-related resource problems and help to correct these. On identified sites, this would reduce some of the grazing impacts to understory vegetation, including grazing/trampling pressure on tree seedlings. Aspen could be expected to respond favorably to reduced grazing pressure. This guidance would promote a reversal of the negative impacts to herbaceous vegetation as noted in Graham et al. (1999). Although some research debates whether livestock grazing would or would not have short and/or long term effects on forest structure and understory vegetation (Latham 1999, Jorritsma et al. 1999, Kienast et al. 1999, Reimoser et al. 1999), in Utah's environment, it is unlikely that substantial changes in vegetation would be notable on drier upland sites within the 4-year planning period. Within riparian sites designated for protection, improved vegetative conditions could be expected to be measurable within the planning period. Should such practices continue, substantial changes in vegetation composition and structure might be expected where understories had previously been grazed more heavily by livestock. Cumulatively, this could have an effect on fine fuel loadings and fire frequencies, allowing more frequent fires to burn through the understories of affected stands. This effect would be most noticeable in aspen, ponderosa pine, and mid to low elevation mixed conifer cover types.

**Treatment Prioritization**

Only *Alternative F* provides direction on the prioritization of projects. These priorities are stated as objectives. Current Forest Plan objectives are generally focused on goods and services, not on restoration and maintenance of ecosystems. The addition of these objectives focus the six affected national forests on prevention, restoration, and maintenance of ecosystems for properly functioning condition. Application of such a priority system should, over time, have a positive effect on vegetation

and ecosystems. During the 4-year planning period, they would serve to direct these national forests where to concentrate management proposals, which would likely result in the greatest benefits to identified functioning-at-risk and nonfunctioning portions of ecosystems.

Compared to *Alternatives A-E* that allow projects to be implemented in functioning systems, Alternative F strives to implement projects only in functioning-at-risk or nonfunctioning systems, and these projects must be designed to improve ecosystem structure, composition, and process relative to PFC. Thus Alternative F would have the least potential to cause degradation of ecosystems and the greatest likelihood to protect and/or enhance functioning-at-risk and nonfunctioning ecosystems or portions thereof.

**Monitoring Requirements**

*All Alternatives:* Alternative A adds no new monitoring requirements over what current Forest Plans contain. Alternatives B-F add several monitoring requirements that are not in current Forest Plans. These requirements are designed to insure that vegetation treatments accomplish desired results and do not cause degradation of goshawk habitat or populations. Even though monitoring varies somewhat by alternative, the requirements would have no direct impact on vegetation. Indirect impacts could occur if monitoring revealed the need to change management direction, thus affecting management practices and their effects on vegetation composition, structure, and process. Alternatives C-F add monitoring requirements for post-treatment occupancy and the requirement to change should projects result in goshawk territory abandonment. Alternatives D and F add monitoring requirements that coincide with the grazing guidelines in the two alternatives. Other than the post-treatment occupancy monitoring, monitoring is to be reported on a 3 to 5-year schedule, and it is unlikely that monitoring would reveal the need for change within the 4-year planning period.

### 4.3.2 Wildlife

**Effects Summary** - Alternatives A-F vary in their ability to reduce risk to loss of habitat needed to support the currently viable population of goshawks in Utah. When looking at them in a very broad perspective only, they can be rated from highest to lowest reduction in risk to habitat. The alternative with the highest risk reduction provides the greatest opportunity for maintenance, and possible restoration and enhancements.

Highest reduction in risk <----------> Lowest reduction in risk
Alt. F Alt. C Alt. D Alt. B Alt. E Alt. A

This is a very simplistic comparison of alternatives; detailed disclosures for this rating follow.

**Assumptions for and Basis of Effects** - The HCS describes the habitat needed to support goshawks and variety of prey species, and provides a good model of habitats used by forest wildlife communities (Utah NFs et al. 1998). The foundation of the HCS was the Assessment (Graham et al. 1999) and the Management Recommendations for the Northern Goshawk in the Southwestern United States (Reynolds et al. 1992). The basis for evaluating the effects of an alternative is a comparison between the desired habitat conditions (DHCs) found in the HCS and management recommendations in the Assessment relative to how well management direction in each alternative provides for consistency in project design and implementation to further the achievement of the DHC described in 2.3.2 and the HCS.

For threatened, endangered, and proposed (TEP), and management indicator (MIS) and sensitive species groupings, the effects disclosure is relative to how using alternative management direction to guide

future project design and implementation will affect habitat associated with these species. Only those species known to be associated with forest habitats that may be affected by changes in management direction are discussed. For TEP species, the habitat for Canada lynx and Mexican spotted owl (MSO) is evaluated. For MIS and sensitive species it is more variable depending on the category (1-7) of management direction (2.3.2); MIS and sensitive species are identified as needed. Appendix H contains the Biological Assessments and Evaluations for TEP and sensitive species, respectively.

The debate in the biological community about the appropriateness of some habitat attributes described in the DHCs and management recommendations in the Assessment is disclosed in Alternative E only, where the debated direction is incorporated.

Cumulative effects are addressed separately in subsection (4). The cumulative effects analysis area (Appendix G) represents areas on the six affected national forests where goshawks are known to occupy in their normal life cycle during spring, summer and fall. Goshawks are occasionally observed during winter months in pinyon/juniper that may overlap adjacent areas; however, little information exists on winter habitat use in Utah. Because information on winter habitat use is very limited, it was not included in this effects analysis.

Although there is no one area that is perfect for all wildlife species, the cumulative effects area used should be sufficient to address effects. Therefore, the same area is used for MIS, sensitive and TEP species.

This analysis addresses cumulative effects in potentially suitable habitat on federally-administered lands and nonfederal lands for the species groupings discussed under direct and indirect effects. The alternatives provide management direction across lands administered by the Forest Service on the six affected national forests including lands in Utah, Colorado and Wyoming. This analysis assumes that all agencies that were signatory to the HCS will be implementing the intent of the recommendations contained therein.

It is my professional judgement that existing data on the number of goshawk young removed by permitted falconers has no biological effect on goshawk habitat or populations in Utah; this judgement is also supported by UDWR (1999). Their removal is not included in the analysis because it is a UDWR permitted action and is not affected by this action.

**Effects to Goshawk Population Viability, All Alternatives Including No Action (Alternative A) -** None of the alternatives will result in loss of goshawk population viability during the time frame of this amendment (projected to be 4 years). Based on the best information available, the current goshawk population is viable and habitat in Utah is of sufficient quality, quantity and distribution to continue to support this viable population (Utah NFs et al.1998) during the life of this amendment regardless of the alternative selected.

**Effects of Exemption Areas and Exempted Uses, All Action Alternatives (Alternatives B-F) -** Direction in action alternatives apply to all lands except wilderness, research natural areas (RNAs), national recreation areas (NRAs), special uses, urban interface, and developed recreation sites (see 2.3.2). The alternative direction would be implemented in exemption areas when it does not conflict with primary use. However, where implementation would conflict with the primary designated use in the exempted areas, implementation would not be required.

Wilderness, RNAs, NRAs account for the majority of the acreage in exempted categories (see 2.3.2). The largest NRA in Utah is the Flaming Gorge NRA in northeastern Utah, which is dominated by desert shrub habitats and Flaming Gorge Reservoir. Very little of this NRA is considered to be suitable

goshawk habitat (Paulin 1999). Wilderness and RNA areas often include lands that are suitable habitat for goshawks. Management in these areas is typically designed to allow native processes to be the dominant influence on the landscape, which is consistent with the goal of restoring natural disturbance regimes and other ecological processes on lands that are covered by the geographic range of alternative proposals. The goshawk habitat assessment did not identify any problems or negative trends in lands in the wilderness, RNA or NRA management categories. Overall, habitat and trends within these management categories are presumed to be stable, and would probably continue to be stable even if recommendations in the HCS are not fully implemented in these areas over the interim period of this amendment. However, over the long term, this becomes more uncertain (Graham et al. 1999).

On a statewide basis, acreages of the other exempted areas (#s 3, 4 and 5) are small (less than 4% of the total NFS lands in the project area) when compared to the total available suitable habitat (see 2.3.2). Because such a small amount of forested land is affected by these exemptions that are outside wilderness, RNAs and NRAs, variations in habitat suitability on these lands is not expected to cause a measurable change in goshawk abundance or population trends at the state level over the life of this amendment.

In addition to areas defined above, use related to locatable, mineral material or leasable mineral activities and facilities that have been authorized for such use under existing plans, licenses or permits, or have been leased or authorized for leasing prior to the decision date of this amendment, will not be affected by this amendment. Exempting these uses will not result in any measurable impacts to existing habitat. As documented in the project record (Exhibit P) these uses typically only result in disturbance to approximately 1% of the surface acres under lease or permit. The timing of use of surface facilities are generally of more concern. However, appropriate measures will be taken to protect goshawk habitat and nesting activity to the extent agreed to by the lessee, permittee, or operator and/or within the legal authorities of the responsible agencies. Therefore, little impact to habitat or the viability of the statewide goshawk population is expected to result from existing mineral activities over the life of this amendment.

**Discussion of Direct and Indirect Effects** - Effects are discussed by the three species groupings found in Chapter 3:

- Goshawk habitat and abundance;
- Sensitive and MIS Species; and
- TEP species.

Under each species grouping effects are described by the seven categories of management direction, including the monitoring requirements described in Chapter 2 (2.3.2).

*Goshawk Habitat and Abundance*

***Native Processes*** (Goshawk Habitat and Abundance)

*Alternative A:* Forest plans allow, and in some cases specify, management actions that are not consistent with historic disturbance regimes. Current forest management does not ensure large tracts of mature and old forests scattered across the landscape. This has resulted in landscapes with varying amounts of mature and old forests, which help provide goshawk nesting habitat. In addition, it has created an abundance of mid and late-seral forests and a lack of early seral species. Fire suppression, and to so degree past timber management activities, have been the primary agents contributing to this condition. This has resulted in areas of unstable conditions where large tracts of forests are susceptible to insects, disease and fire and areas where mature and old seral species dominated forests are lacking. Although

these are native processes they are occurring on very large scales. This may create widely varying degrees of goshawk habitat availability across both time and space. Goshawk abundance will be similarly variable with an increased risk of extinction at lower population levels, compared to more stable habitat conditions, such as those described in the regional PFC assessment (USDA, 1996). The effects of this alternative from human caused disturbance events such as prescribed fire and timber harvest are difficult to predict because no specific direction is contained in Forest Plans regarding whether activities should remain within the variability of size, intensity, and frequency of native disturbance regimes characteristic of the subject landscape and ecological processes.

*Alternatives B and E*: These alternatives differ from the "No Action" in their effects on patch size and distribution of structural stages. They will create a more diverse pattern of habitat patches across landscapes. Where prescribed fire and timber harvest are used, there will be less of a tendency for large areas of forest to follow a ''boom and bust'' pattern of succession due to large scale insect, disease and/or fire events. This translates to productive, sustainable habitat conditions for both goshawks and their prey, and greater stability in state wide goshawk abundance.

Because HRV will be the base line management direction, ecosystem sustainability will help provide habitat for the goshawk and its prey throughout time. This will help provide the habitat base for sustainable goshawk populations.

*Alternatives C, D and F*: These alternatives incorporate the Assessment and HCS recommendations to emulate natural disturbance regimes and define a "natural" event or process as one that falls within HRV as defined in PFC. Refer to Appendix D for a detailed discussion of HRV versus PFC.

They differ from the "No Action" in their effect on patch size and distribution of structural stages and species composition. It will create a more diverse pattern of habitat patches at watershed and larger scales. Where prescribed fire and timber harvest are used, there will be less of a tendency for large areas of forest to be in a ''boom and bust'' pattern of succession due to large scale insect, disease and/or fire events. This translates to productive, sustainable habitat conditions for both goshawks and their prey, and greater stability in the state wide goshawk abundance.

Working within the bounds of HRV as defined by PFC will have an added benefit for goshawk habitat in smaller scale landscapes than may not be realized under Alternatives B or E. Extreme disturbance events that may alter landscapes at a 5th or 6th order HUC or larger scale are not desired within the range of HRV as defined by PFC (refer to Appendix D for a detailed discussion); though they may be within the full range of HRV. Retaining habitats across landscapes as small as 5th or 6th order HUCs (10s to 100s of thousands of acres) will promote a more constant supply of habitat throughout the state of Utah. Retaining a good mix of habitat at these smaller scales will help reduce risks to losing habitat needed to support meta-populations throughout Utah important to sustaining the viability of the population at the State scale through time.

***Forest Composition*** (Goshawk Habitat and Abundance)

*Alternative A*: The Assessment and HCS recommend active promotion of early seral tree species. A good mix of early seral species in cover types is recommended because of their value to certain goshawk prey species, and because many goshawk nests have been found in cover types dominated by those species. Most of the LRMPs in Utah contain general direction to maintain vegetative diversity and/or to maintain all the habitats needed to support the existing array of wildlife species on the planning unit. Presumably all existing vegetative types will be maintained in order to meet the broad diversity goals. However, the LRMPs do not take into account the range of cover types that may be possible on forested

lands. Therefore, determining what constitutes satisfactory vegetative diversity is rather narrowly defined to the range of conditions currently found on the landscape, and may not represent the full arrangement of cover types that occurred historically. Furthermore, the scale at which diversity is to be maintained is the management area or National Forest. No provision is made for maintaining diversity at the scale of an ecological unit such as a potential vegetation type, watershed or land type.

Management for early seral tree species is permitted but is not a specific objective. This leaves a greater opportunity for differing interpretations and management priorities. This will result in a wide range of seral stages and species, which could result in high fluctuations in goshawk and prey species habitat. Under current management direction, achievement of the forest composition elements of the Assessment and HCS is likely to be inconsistent from forest to forest, and trends in cover type availability and distribution at the state level will be hard to predict. Current direction could result in landscapes dominated by late and/or early seral species; emphasis on early seral species is not provided. Continued trends of landscapes dominated by late seral species are likely to result in unstable habitat conditions, which support goshawks and their prey.

This alternative will allow the use of native plant species, however, no existing forest plan direction exists which recommends the use natives species over nonnative species. Without direction to favor the use of native species over nonnative species the progression towards desired habitat conditions will likely be at greater risk and management options may be reduced.

*All Action Alternatives*: All action alternatives have direction which promote cover types such as aspen and lodgepole pine, which are of high value to certain goshawk prey species and in which many goshawk nests have been found. Landscapes with early seral communities, such as aspen and lodgepole, tend to be more resilient and less susceptible to large scale mortality events (e.g., insect outbreaks; see vegetation discussion). Thus, landscapes in which early seral species are represented with a mix of mature and old forests will provide valuable habitat for goshawk nesting and prey species. This will support more goshawks, their prey and be a more stable source of habitat over time than landscapes dominated by late seral communities.

*Alternative B, C, D and F*: These alternatives also contain direction to use native plants rather than nonnative when and where available, thus avoiding disruption of natural successional pathways, unless nonnatives are needed to meet specific restoration or maintenance objectives. The preferred use of native plants in management activities will benefit goshawk habitat by helping to maintain or restore landscape systems back to a functioning condition. This will help support long-term sustainability for goshawks and their prey.

Promoting early seral species and using native species will tend to improve ecosystem resilience and may increase vegetative species diversity over current conditions. This will help provide the habitat base for sustainable goshawk populations.

*Alternative E*: In addition to the benefits of seral species discussed above, the standard to only use native plant species from locally adapted seed sources in this alternative will likely have short and long term benefits to the overall function of native processes, composition and structure within and among landscapes. Because native processes are very complex and take a considerable amount of time to cycle through a landscape, initiating the use of native species will have short and long-term benefits to the ecosystem. Once nonnative species are established it can be very difficult to change species composition back to natives. This alternative will have short and long lasting effects to goshawk habitat and the sustainability of that habitat over time. However, because native seed from locally adapted seed

sources can sometimes be difficult to obtain, this requirement may not be practicable to achieve all the time.

***Forest Structure*** (Goshawk Habitat and Abundance)

*Alternative A*: The Assessment and HCS provide specific direction on key structural attributes at the stand level. These components include down woody debris, snags, and canopy closure. At the landscape level the HCS recommends mixes of structural stages by cover type, including 40% mature and old in coniferous forests, and 30% of mature and old in aspen landscapes. All forest plans contain direction on down woody debris and snag retention. However, they differ with respect to the required tons of woody debris as well as snag numbers and diameters per acre. In several cases forest plans recommend lower tons or numbers than described in the HCS. Two of the six forests have identified desired mixes of structural stages. The other forests plans contain no specific direction for structural stages other than mature and old forest structure. No forest plans contained direction on canopy closure.

All forest plans provide for the retention of some mature and old forests, ranging from 5-10% in selected management units. However, several forest plans specify rotation ages for selected forest cover types that may be too short to allow the development of complex mature and old forest stand structures desired. This means that in some active timber management areas mature and old forest structures will not occur outside of the areas designated to meet the minimum retention levels of 5-10%. For example, four of the six forest plans define desired rotation lengths ranging from 80-200 years depending on cover type. The Assessment and HCS indicate that several of these same cover types will take more than 200 years to achieve mature and old forest structure.

Therefore, forest plans permit, but do not ensure, implementation of the recommendations in the Assessment and HCS. Minimal implementation of current forest plan direction will result in smaller diameters and fewer tons of down woody debris, fewer snags, and potentially more open canopies and less mature and old forest than recommended in the HCS. Since these conditions are linked to prey abundance and the occurrence of goshawk nests, failure to implement these recommendations will result in a decrease in goshawk habitat effectiveness and suitability. The lack of these attributes across the landscape may reduce management options in the future. This will result in uncertainties concerning goshawk distribution and abundance. Although these conditions will be difficult to detect over the next four years, habitat conditions will not be trending in a direction to maintain or improve goshawk habitat.

*All Action Alternatives*: While some aspects of structure vary by action alternatives (i.e., balance of structural stages across landscapes, canopy cover, retention of mature and old live trees and other treatment restrictions/prioritizations), direction for snags, down logs and woody debris are the same in Alternatives B-F. Snags, down logs and woody debris will be managed at levels that are beneficial to prey species and goshawks (Reynolds et al. 1992; Utah NFs et al. 1998; Graham et al. 1999). Incorporating the size and amounts of these habitat elements into future project design and implementation will have short-term positive effects on these species. And, application of this direction across all six Utah NFs in a consistent manner addresses state scale habitat needs with the resulting effect of continuing to support the currently viable population of goshawk (Utah NFs et al. 1998).

*Alternative B*: In addition to the benefits of snags, down logs and woody debris previously described, Alternative B also promotes forest management practices throughout Utah that will provide at least 40% canopy closure for prey and goshawk habitat and at least 40% mature and old forest in conifer and 30% in aspen. These attributes are all important to goshawks and their prey. Direction in this alternative will help ensure that these structural attributes are consistently available throughout the state. By providing a desired mix of structural stages, Alternative B will provide for continual recruitment of new stands into

the mature and old category. This will tend to create a more constant, sustainable supply of suitable habitat for nesting goshawks. Even though little difference will be apparent in the short term (four years), it is my professional judgement that goshawk habitat effectiveness will gradually improve and statewide goshawk abundance will be more stable over the long-term than with the no action alternative. The retention of at least 40% canopy closure in all cover types will provide habitat for some prey species, however this will not likely provide adequate canopy for some primary prey such as squirrels. Therefore, the canopy closure recommended may not meet all the habitat requirements for some goshawk prey, and may not be adequate in the long term.

*Alternatives C and F*: In addition to the benefits of snags, down logs and woody debris previously described, Alternatives C and F provide similar direction to maintain at least 40% mature and old forest in conifer and 30% in aspen as discussed under Alternative B. Direction will help ensure that habitat is treated consistently, and that forest management practices throughout Utah will provide the structural attributes important to goshawks.

The key difference in these alternatives compared to other action alternatives is the direction for canopy closure (g-15). It is my professional judgement that the approach for achieving canopy closures through retention of a percentage of acres in 2-9 tree clumps of VSS 4,5, and 6 class trees with interlocking crowns will help create sustainable habitat for goshawk prey species better than Alternatives A, B, and E. Managing for a range of canopy closures, compared to the minimum described in Alternative B, will provide improved habitat conditions for the goshawk and its prey.

The structural attributes promoted by direction under these alternatives will provide a more constant, sustainable supply of suitable goshawk nesting and foraging habitat. It is my professional judgement that goshawk habitat effectiveness will be improved and goshawk abundance will be more stable statewide than under Alternatives A and B.

*Alternative D*: In addition to the benefits of snags, down logs and woody debris previously described direction in this alternative, like that found in Alternatives B, C and F, provides a desired mix of structural stages that will ensure continual recruitment of new stands into the mature and old category (Reynolds et al 1992). The mix of structural stages desired is that needed to sustain 40% mature and old in coniferous forests, and 30% of mature and old in aspen forests within landscapes.

Direction for variable canopy closures by cover type and habitat area (g-16), retention of groups of mature and old trees with interlocking crowns (g-10, s-3 and s-4), created small openings (g-8), and priority for activity slash treatments (g-12) in this alternative differs from that found in Alternatives B or C. These modifications or additions will provide some enhancements to habitat effectiveness for goshawks and their prey. This alternative may provide a higher quality of structural attributes than that provided for under current plan direction (Alternative A) and slightly higher amounts than Alternatives B, C, and F due to the higher canopy closures desired in some habitat areas.

This alternative includes the most prescriptive direction for specific canopy closures by cover type and goshawk habitat area found in any alternative. Though the canopy covers reflected in this alternative are those desired where achievable, the lack of flexibility in this direction may constrain the ability of the agency to adapt to the variety of site conditions found. Therefore, this may reduce the effectiveness of management actions to promote desired canopy conditions within the capability of a specific site.

Alternative D also includes direction for the retention of at least six live mature and old trees in groups with interlocking crowns, in vegetation treatment areas including regeneration treatments. This will have positive effects on squirrel habitat. As a result of the emphasis on maintaining or restoring clumps of trees with interlocking crown, direction provided in this alternative will provide for the needs of prey,

optimizing habitat conditions for species such as squirrels. This approach to achievement of canopy closure is similar to that found in C and F throughout home ranges, and will provide better habitat than that under Alternatives A and B. It will be better that Alternatives C and F, only in that it may provide for more cover in distinct habitat areas when combined with the direction for canopy closure.

Alternatives B, C, and F contain recommendations on opening size in the nest and PFAs but not in the foraging area (g-25). Alternatives D and E are the only alternatives that recommend opening size guidelines to be applied throughout the home range (g-8). Alternatives D and E also modify the guideline on opening size in nest and PFAs (g-26) to include a width requirement and further cover type breakdowns. Implementation of these guidelines may result in a higher interspersion of structural stages important to several goshawk prey species. Though these guidelines will likely result in enhanced conditions for goshawk prey, these enhancements will be difficult to detect in the life of this amendment. Therefore, it is my professional judgement that these guidelines are not essential over the interim period in order to maintain management options for future actions.

All action alternatives provide direction on retaining woody debris and downed logs. However, this alternative (as well as Alternative E) establishes a list of tools to attain these attributes and the priority for which these tools should be implemented. Fire was identified in this alternative and by Reynolds et al. (1992) as the first priority of treatment to help achieve the desired amounts of woody debris and downed logs followed by mechanical treatments. Although other alternatives do not make recommendations as to the priority of which tools should be used to attain the goal for woody debris and downed logs, it is my professional judgement and experience that the goals and guidelines for down logs and woody debris will be attained regardless of the prioritization through direction in this alternative. Current plans already have direction in place for other resource protection that will meet the same intent. In addition, due to site specific variations and individual site needs, how to achieve the guidelines for down logs and woody debris should be decided at the time of the project.

*Alternative E*: Structural direction in this alternative differs from Alternative D in two key aspects. First it contains a standard (s-2) that requires the retention of all mature and old forest groups over the next 4 years to provide for the immediate protection of goshawk nesting and foraging habitat. This will have short-term positive effects on goshawks and their prey, and an unknown effect on the long-term sustainability of mature and old forests. Because this alternative does not allow the removal of any mature and old (VSS 5 and 6) forest management induced disturbances (i.e., timber harvest, prescribed fire) will only occur in VSS classes 1-4. Forest composition and structure is not expected to change over the short life of this amendment, however, this may likely create conditions for "boom and bust" events to occur within the mature and old forests. These "boom and bust" patterns could create similar patterns in goshawk populations. Only natural disturbances (i.e., wildfire) will be allowed to occur in these areas to create early seral conditions within the mature and old forests.

The second key difference is that Alternative E provides direction for minimum canopy closures from 60-75% depending on the goshawk habitat area (g-14). The long-term sustainability of landscapes managed with 60-75% canopy closures will create additional unknown risks to habitat due to increased risk and susceptibility to wildland fire, insects and disease. Goshawk habitat effectiveness over the interim period of this amendment may improve, but will not likely be measurable. Like other action alternatives, this alternative, even with its inherent risks, will likely create an opportunity for the maintenance of a stable population of goshawks statewide, more so than the use of current plan direction (No Action) during the life of this amendment.

Measurable differences in effects between this alternative and others will be difficult to detect and monitor over the life of this amendment. However, there is a probability that long-term effects to forest composition and structure could occur, such as those currently being experienced on the Manti-LaSal

and Dixie NFs from bark beetle epidemics. Therefore, it is my professional judgement that goshawk habitat effectiveness will be sustained or improved over the life of this amendment; however, long-term effects regarding habitat and goshawk population sustainability will be a concern. Therefore, this alternative will likely have the greatest risk of the action alternatives for reducing management options in the future, due to habitat sustainability issues.

***Nest and Post-Fledgling Areas Only*** (Goshawk Habitat and Abundance)

*Alternative A*: None of the forest plans contain specific management direction regarding nest or post fledgling areas. Although existing forest plan direction exists to maintain or enhance habitat for all sensitive species, there is a lack of specific forest plan management direction for the goshawk.

To date, most Utah NFs are implementing the intent of the scientific principals contained in the HCS and other scientific information on goshawks, however, application has been inconsistent. The lack of specific direction to manage habitat for the goshawk and its prey has resulted in an inconsistent application of protection measures, due to differing interpretations and management priorities on the six National Forests in Utah.

Forest Plans in Utah do not contain specific direction regarding recommendations on goshawk territory occupancy surveys. National Forests are currently conducting surveys as the result of a letter sent out by the Intermountain Regional Forester in 1991 which directed forests to conduct surveys in suitable habitat. However, different interpretations and implementation of the Regional Foresters letter as resulted in a lack of consistency in collecting survey information. Consistency is needed to aggregate this information from districts and forests to a statewide database. Thus, though existing survey efforts do accommodate for adequate data collection to provide the necessary information needed to complete a biological evaluation, this information is not easily aggregated up to the state scale to help us assess population trends over time.

Therefore, under this alternative, Utah's NFs will continue to implement goshawk management strategies that draw from the intent of various science publications. This allows the continuation of different interpretations of the existing science, and inconsistent application of protective measures in nest and post-fledgling areas. Inconsistencies in the application of science principles and management interpretations will have a negative effect on these goshawk habitat areas and, most likely, populations in the future. As a result, this alternative may eventually preclude future management options.

*Alternatives B, C and F*: These alternatives recognize behaviorally important subsets of goshawk home ranges (nest and post fledgling areas) which were not specifically addressed in the no action alternative. These areas are important because they are the principle areas used for nesting and raising young. Direction provided will maintain, restore or enhance habitat for breeding goshawks more effectively than the no action alternative because it provides specific management direction for habitat conditions thought to help protect young goshawks from predators and prevent nest abandonment and promote successful reproduction. Specifically, these alternatives direct that nest areas be composed of mature and old structure with somewhat higher canopy closure than other parts of the home range. Dense understories in nest and PFAs will be provided in order to protect fledglings from predators. It also directs that proposed project areas be surveyed for goshawk nests and their associated post fledgling areas at least one year prior to habitat disturbing activities (s-5, s-6 and g-17). If an active nest is found, then direction is provided to protect this areas from disturbance during critical phases of reproduction. This direction minimizes disturbances that could cause reduced parental care or abandonment. Additional direction also directs that when treatments are proposed in these areas they should be designed to create smaller openings in order to enhance prey populations and habitat, thus providing

foraging opportunities near the nest for the adult female and fledglings. Providing this direction will help ensure consistent application statewide, whereas the no action alternative left protection of the nest and post-fledging areas up to the discretion of the project biologist.

*Alternative D*: This alternative is similar to Alternatives B and C with the exception of two points. First, direction for surveys (s-5 and s-7) requires 2 years of surveys prior to vegetation treatments; this direction is also found in Alternative E. This survey information will be used to determine territory occupancy prior to project implementation and implement direction designed to minimize potential effects to goshawks in active territories. This information is needed to fully address effects in biological evaluations (BE) supporting project design and implementation. Requirements to do 2 years of surveys will provide some reduction in risk of misidentifying activity in a territory over the 1-year requirement. However, requiring 2 years of surveys could limit a managers flexibility to respond to time dependent events that were not foreseen. It is my professional judgement that the variation between action alternatives is not likely to yield measurable differences in effects over the short life of this amendment.

An additional change is modification to direction concerning created opening size. The guideline (g-26) in this alternative not only requires an overall size limit, but also opening width limit. Though opening width requirements may be an enhancement to this guideline, a standard width may not be applicable to all sites. How openings are configured will be better left to the project decision. Therefore, though this guideline may provide some enhancements, a single value may not be appropriate for all sites and the benefits of this addition are not likely to yield measurable differences with other alternative direction (g-25) over the time frame of this amendment.

*Alternative E*: While this alternative is similar to Alternative D, it changes the active nest restriction guideline (g-21) to a standard (s-10) and removes some of the flexibility within a guideline (g-23 versus g-22). This removes some flexibility to allow for adapting to the variable site conditions that may be encountered. Without this flexibility progression toward desired conditions may not be as effective, or in some cases possible, over time.

***Other Miscellaneous Areas of Concern*** (Goshawk Habitat and Abundance)

*Alternative A*: The effects of additional direction in this category, compared to the lack of or differing direction under current plans will be discussed under each action alternative below.

*Alternative B*: No additional direction is added.

*Alternatives C, D, E and F*: These alternatives recommend landscape assessments be conducted at the 5th and 6th order HUC or equivalent ecological scale (10's to 100's of acres) to help determine opportunities for habitat maintenance or enhancement for the goshawk and its prey (g-33). These assessments provide information concerning resource conditions, risks, and opportunities in a systematic way, thereby enhancing the agency's ability to estimate direct, indirect, and cumulative effects of management actions that may affect habitat for the goshawk and its prey. With this information in hand, managers have a better opportunity to balance the needs of resources and humans and are less likely to negatively impact far-ranging species such as the northern goshawk. The information gathered at this level will identify opportunities to either move existing vegetative conditions toward the desired habitat conditions, or to leave an area alone and allow time to progress an area towards the desired condition. This will have positive indirect effects on managing habitat for the goshawk and its prey.

*Alternatives D and E*: While Alternatives B, C and F include direction concerning skid trails (g-31 and g-32) versus roads and road densities for the nest and PFA areas only (g-25), these alternatives expand this

direction to include the entire home range. Currently in Utah a variety of practices regarding skid trails and roads are included in plan direction in order to keep road densities and skid trails at a minimum (i.e., current direction for soil and water and wildlife). Effects vary by forest as projects are designed and implemented. Roads and skid trails themselves have minimal or no effects on goshawks. Effects to goshawks and their prey are the result of the construction of the road or skid trail, the type of use a road or skid trail receives, and the timing of the use or construction. These effects can be substantial if construction or use occurs during the critical breeding or nesting season.

The benefits of minimizing disturbance, including use and construction of small permanent skid trails and roads during vegetative treatments, in nest and PFA areas is important to avoid nest abandonment. However, the benefits of this level of restrictions across the entire home range is less clear and measurable. Use of this direction across the entire home range will likely have an unknown favorable effect on goshawks and their prey. However, these effects will be difficult to monitor and determine in the short four years that this amendment will be in place. Therefore, because most National Forests currently have direction to keep open road densities at a minimum and disturbance caused by roads and skid trails are also accounted for under current direction to protect soil and water, this guideline is not critical to preserve future management options.

*Alternative D*: Unlike other alternatives, this alternative recommends specific changes in ungulate grazing utilization guidelines (g-27). Little information exists on the effect of grazing practices, including total ungulate utilization, on habitat used by goshawk and their prey.

The utilization guideline in this alternative was based on work done by Reynolds et al. (1992). Reynolds based his recommendations for average and maximum ungulate utilizations on a limited base of information, drawing primarily from the work done by Schmutz (1978) and Wasser (1982). Reynolds and other researchers agree that work in this area is still in its infancy and require more research to fully understand how best to address problems that can be associated with grazing.

Based on the information available, it is my professional opinion that where ungulate grazing occurs in the small openings within forested landscapes, and utilization exceeds those prescribed in this alternative, implementation of the utilization guideline will likely improve habitat for goshawk prey species. However, due to the limited information available it also makes it difficult to assess the degree of benefits to forest composition and structure of reducing utilization by ungulates in forested landscapes used by goshawk and their prey. Although improvements in vegetation will likely occur in areas where utilization was identified as the problem, it will be difficult to monitor and detect any change in prey species abundance, distribution and composition and corresponding changes in goshawk populations over the life of this amendment at the forest or state scale. Changes in wildlife species numbers will be several years behind improvements in the understory vegetation.

Therefore, it is my professional judgement that, though changing utilization direction will likely maintain or enhance habitat for goshawk and their prey in localized areas, by not implementing this guideline is not likely to measurably degrade habitat needed to support currently viable populations of goshawk at the state scale over the time frame of this amendment. Nor will it result in any measurable improvements in reducing risk to loss of management options over the time frame of this amendment than alternatives not addressing grazing.

*Alternative E*: Over the short life of this amendment, direction concerning treatments on unsuitable timberlands for purposes of achieving goshawk habitat objectives (g-30) is not likely to make a measurable difference. Generally, acres proposed for treatment occur on lands classified as suitable for timber production. However, if treatment were proposed on unsuitable lands and they followed the

intent of direction for goshawk habitat management found in other action alternatives, the goshawk and its prey should not be impacted and in some cases will likely benefit.

*Alternative F*: This alternative includes ungulate grazing direction *(*g-28 and g-29*)*; however, it focuses on the need to change grazing practices only in those areas where landscape assessments determine grazing is a factor which is putting a landscape at-risk relative to habitat needs of the goshawk and its prey. It also recognizes that there are several aspects of grazing practices that could be causing the at-risk condition; changing utilization (Alternative D) may or may not address the real problem. This alternative allows the manager to approach solutions to problem areas by changing grazing practices that are causing the downward trend (i.e., utilization, fencing, season of use, grazing system, range health, etc.).

With the limited information available, it is difficult to assess the degree of benefits to forest composition and structure of modifying ungulates grazing practices within forested landscapes used by goshawk and their prey. Although improvements in vegetation will likely occur in areas where grazing is identified as the problem in localized areas, it will be difficult to monitor and detect any response in prey species composition, distribution and abundance and corresponding changes in goshawk populations over the next 4 years at the state or forest scale. Changes in wildlife species numbers will likely be several years behind improvements in vegetation.

Therefore, it is my professional judgement that, changing utilization direction may help improve at-risk habitat areas related to the goshawk and their prey. However, not implementing this guideline is not likely to measurably degrade habitat needed to support currently viable populations of goshawk at the state scale. Nor will using it result in maintenance of more management options over the next 4 years than those alternatives not including this direction.

***Treatment Prioritization*** (Goshawk Habitat and Abundance)

*Alternatives A, B, C, D and E*: The effects of additional direction in this category, compared to the lack of prioritization direction under other alternatives, will be discussed under Alternative F.

*Alternative F:* Through the landscape assessment process, this alternative looks at all aspects of habitat important to the goshawk and its prey and determines what factors (natural or human-caused) are affecting desired habitat conditions. It then determines if current conditions and activities occurring within a landscape are putting it at-risk of dropping out of what Graham et al. (1999) considered high and optimum goshawk habitat. Based on this assessment, this alternative provides direction that focuses management activities for the remainder of the planning period on those areas at greatest risk.

Prioritization of management in forested landscapes at greatest risk to dropping out of a high or optimum habitat condition (per the Graham et al. assessment process [1999]) is expected to help maintain management options in the future, better than other action alternatives because it will concentrate on the areas identified as a concern first. Though localized benefits will likely be measurable during the interim period of this amendment, measurable improvement in goshawk habitat at the state scale will not be likely in this short time frame. However, this alternative provides the greatest opportunities for gains in risk reduction of all the alternatives.

***Monitoring Requirements*** (Goshawk Habitat and Abundance)

*Alternative A*: This alternative relies on existing monitoring approaches as written in Forest Plans. A variety of monitoring approaches can be found in existing Forest plans, ranging from no requirements for goshawks to completion of nest surveys and defining minimum viable population numbers or acres of suitable habitat.

This alternative does not provide consistency in goshawk nest occupancy surveys, and does not promote the aggregation of district and forest-level data to a statewide database. Without this consistency a clear pathway for tracking changes in habitat availability and goshawk abundance and distribution over time would not be possible. It will be difficult or impossible to develop a rationale to make inferences on population trends. Therefore, the lack of detailed monitoring will not provide the information feedback loop necessary for validation and adaptive management.

*All Action Alternatives*: A consistent statewide monitoring approach is proposed under all action alternatives. The consistency in data collection for monitoring item m-1 will allow for aggregation of district and forest-level data to a statewide database. This will allow biologists to track changes in habitat availability, abundance and distribution of goshawks over time and infer trends relating to population viability.

Monitoring requirements m-1, m-3, m-4 and m-5 will provide the information feedback loop necessary for validation over the long term and adaptive management in the short term of items monitored. However, though some localized improvement may be realized, in 4 years changes prompted from monitoring are not likely to result in a measurable improvement to maintaining habitat or populations across the state. Data collected during the amendment period will be added to databases that will be maintained with the UDWR for assessing habitat and population trends over longer periods.

*Alternatives C, D, E and F*: These alternatives also require post treatment monitoring (m-2) for goshawk territory occupancy. This monitoring will help provide valuable information on the continued use by goshawks of project areas after treatment. Post treatment monitoring is not recommended in Alternatives A, and B, and therefore Alternative A and B will not establish a process to gather this much needed information. This information will be used by wildlife biologists to recommend adjustments to management practices if they are determined to be ineffective. As with the other monitoring requirements already discussed, this monitoring requirement provides an information feedback loop necessary for validation and adaptive management over time.

*Alternatives D and F*: Alternatives D and F include an additional monitoring requirement relating to impacts of grazing on habitat (m-6 and m-7, respectively). Similar to other monitoring requirements, these requirements may be an improvement and will assist in understanding effectiveness of grazing direction in maintaining habitat over time. However, though some localized improvement may be realized, in the projected 4 years this amendment will be in place, changes prompted from monitoring are not likely to result in a measurable improvement to maintaining goshawk or prey species habitat across the state of Utah.

*Sensitive and MIS Species*

***Native Processes*** (Sensitive and MIS Species)

*Alternative A*: Sensitive species that are affected by patterns (patch size and distribution) in forest habitat include boreal, great gray and flammulated owls. All three use small openings within landscapes for

foraging, but are unlikely to occur in landscapes dominated by large openings. Deer and elk (MIS) have some sensitivity to patch size, since larger forest patches provide better thermal and security cover. Deer and elk are also more likely to forage in openings if patches of cover are located nearby. By creating conditions where large disturbance events are more likely, the no action alternative increases the probability that some landscapes will become less suitable for these species over time.

The other sensitive and MIS species associated with forests are less affected by patch size than certain forest structure or composition attributes, such as snags, down woody debris or the presence of certain tree species such as aspen. Likewise, species associated with riparian zones are dependent on specific features such as willows or streamside vegetative communities rather than large, landscape level attributes. However, over the long term, landscape level processes may affect the availability and distribution of these features. Although measurable effects to sensitive and MIS is difficult to measure, the effects of management which does not mimic historic disturbance patterns may result in a downward trend in habitat quality for sensitive and MIS species associated with forested habitats.

*Alternatives B and E*: Sensitive species that are affected by patterns (patch size and distribution) in forest habitat include boreal, great gray and flammulated owls. All three use small openings within landscapes for foraging. Deer and elk (MIS) are also affected by patch size, since larger forest patches provide better thermal and security cover. Big game species are more likely to forage in openings if patches of cover are located nearby. Therefore management direction in this alternative will ensure projects that alter landscape patterns will be designed with this in mind. By creating conditions where disturbance events are more likely to be within HRV, Alternative B increases the probability that landscapes will remain suitable for these species over time. Over the effective life of this amendment, patterns in forest habitats are unlikely to change substantially. However, reductions in current risk factors will begin a trend toward greater stability in habitat for these species.

The other sensitive and MIS associated with forests are less sensitive to patch size than to certain forest structure or composition attributes, such as snags, down woody debris or the presence of certain tree species such as aspen. Likewise, species associated with riparian zones are dependent on specific features such as willows or streamside vegetative communities rather than large, landscape level attributes. Over the long term, landscape level processes do affect the availability and distribution of these features. The effects of management which mimics historic disturbance patterns in forests will affect a relatively small proportion of Utah's forested lands over the next four years. However, this alternative may establish a more favorable trend in forest conditions than the no action alternative.

*Alternatives C, D and F*: Working within the bounds of HRV as defined by PFC will have an added benefit for sensitive and MIS species for the same reasons as described for goshawk habitat. Extreme disturbance events that may alter landscapes at a 5th or 6th order HUC or larger scale are not desired within the range of HRV as defined by PFC (refer to Appendix D for a detailed discussion); though they may be within the full range of HRV. Retaining habitats across landscapes as small as 5th or 6th order HUCs (10s to 100s of thousands of acres) will promote a more constant supply of habitat throughout the state of Utah for many species. Retaining a good mix of habitat at these smaller scales will help reduce risks to losing habitat needed to support populations of other MIS and sensitive species across NFS lands affected by this amendment.

***Forest Composition*** (Sensitive and MIS Species)

*Alternative A*: Under current management direction, achievement of the forest composition elements of the Assessment and HCS is likely to be inconsistent from forest to forest, and trends in cover type availability and distribution at the state level will be hard to predict. However, some forest plans

provide direction to maintain or increase aspen, which will benefit indicator species for this type. Aspen is a seral species on several vegetation types. Management for aspen will be good for a wide array of sensitive and MIS species. For example, warbling vireos, red-naped sapsuckers, and mountain bluebirds are all common in aspen. The effects of these inconsistent habitat conditions will be difficult to evaluate on sensitive and MIS over the next four years, due to the difficulty in monitoring many of these species and the lack of long term trend information. Therefore, it is my professional judgement that this alternative will result in varying compositional conditions for sensitive and MIS species and will not likely create conditions during the short four year life of this document that will be detectable.

*All Action Alternatives:* Some forests plans provide direction to maintain or increase aspen, which will benefit indicator species for this type. Implementing any of the action alternatives will expand that direction to all forests, and provide additional details on desired conditions in aspen. This will ensure that all forests have similar direction to maintain or restore aspen and will improve the health and distribution of this cover type (and its associated wildlife community) at the state scale. In addition, direction will promote management for other early seral species such as lodgepole pine. No such direction to manage for early seral conifer species is found in existing Forest Plans.

Early seral species such as aspen provide important habitat for a wide array of sensitive and MIS. For example, warbling vireos, red-naped sapsuckers, and mountain bluebirds are all common in aspen. Most woodpeckers, including the sensitive three-toed woodpeckers, do well in lodgepole pine, which is an early seral species on subalpine fir, Englemann spruce, and Douglas fir sites. In general, management, which increases successional stages on a landscape, by ensuring that all seral stages are present, will result in a corresponding increase in wildlife diversity. Sustaining a full range of successional stages will help ensure sustainable habitat for sensitive and MIS species. This diversity will increase habitat effectiveness for these species.

*Alternatives B, C, D and F*: These alternatives also contain direction to use native plants rather than nonnative when and where available, thus avoiding disruption of natural successional pathways, unless nonnatives are needed to meet specific restoration or maintenance objectives. The preferred use of native plants in management activities will have similar benefits for sensitive and MIS species habitat as described for goshawk and their prey.

*Alternative E*: The standard to only use native plant species from locally adapted seed sources in this alternative will likely have similar short and long term benefits to other MIS and sensitive species as described for goshawk and its prey. As previously stated, because native seed from locally adapted seed sources can sometimes be difficult to obtain, this requirement may not be practicable to achieve all the time.

***Forest Structure*** (Sensitive and MIS Species)

*Alternative A*: Primary and secondary cavity nesters such as flammulated and boreal owls and three-toed woodpeckers are dependent on snags. All forest plans contain snag retention guidelines. Current forest conditions in Utah are dominated by unstable stands of late seral species. Late seral stands are typically rich in snags and it is likely that forests are exceeding current forest plan direction in many areas throughout the state. The trend of forest management will likely be to selectively harvest in these unstable stands. This will result in snag densities which are closer to the minimum values in forest plans, with the potential for reduced abundance of snag dependant species in treated areas. Based on limited data, the effects of these treatments on populations of cavity nesting birds will be difficult to measurable. This is due to the overall condition of most of the vegetation types across the state, which contain mature and old forests with snags and down woody debris mixed throughout. It is my

professional judgement that the number of acres that will likely be treated over the next 4 years will not affect population trends.

Forest plans contain direction to maintain or enhance big game habitat effectiveness. Deer and elk populations fluctuate in response to many factors, including hunting. In general, deer and elk populations are stable or increasing throughout the state. Furthermore, most forest service land is used as summer habitat by deer and elk, and summer range is not generally a limiting factor. Therefore, habitat structures promoted by the no action alternative will not measurably affect population trends over the next 4 years.

*All Action Alternatives*: Primary and secondary cavity nesters such as flammulated and boreal owls and three-toed woodpeckers will benefit from the snag retention guidelines in action alternatives. Current forest conditions in Utah are dominated by unstable stands of late seral species (Graham et al. 1999). Late seral stands are typically rich in snags and it is likely that we are currently meeting the direction outlined in action alternatives concerning snags in many areas throughout the state. The trend over the next four years will be toward reduced snag densities due to harvest and wind throw. However, direction under these alternatives will require that more snags be managed for on average than the no action alternative. This could be accomplished through higher snag retention in harvest units and/or creation of snags where existing densities are below the desired condition.

*Alternatives B, C, D and F*: Deer and elk will benefit from a mix of structural stages as specified in these alternatives, since many of the younger stand structures provide foraging opportunities. Foraging areas will have to be juxtaposed with cover patches in order to be most effective, as described under the Native Processes section (above). Although the trend toward a better mix of structural stages will be positive for deer and elk, it is not likely to have a measurable effect over the next four years. Most NFS land is used as summer habitat by deer and elk, and summer range is not generally a limiting factor. Managing for these attributes under this alternative will provide positive habitat conditions for sensitive and MIS species.

*Alternative D:* The variable canopy closures by cover type and goshawk habitat area, created small openings, retention of clumps of large trees with interlocking crowns, and fuels treatment priorities will enhance goshawk and other sensitive and MIS species habitat. This alternative will provide better structural attributes than the no action alternative and slightly better conditions in canopy closure than Alternatives A, B, C, and F. The retention of at least six mature and old trees in groups with interlocking crowns in regeneration treatment areas, will have positive effects on habitat for sensitive and MIS, some of which are prey species for goshawks. This direction will provide optimum habitat conditions for a myriad of wildlife species, some of which are sensitive and/or MIS, more so than all alternatives, except E. The concerns relative to the ability to achieve the prescriptive level of the cover guideline in this alternative expressed under the goshawk discussions would also be true here.

*Alternative E*: The benefits of this alternative would be similar to that described for Alternative D. However, the risks to long term sustainability previously discussed under the goshawk section due to the key changes from Alternative D (i.e., prohibiting removal of mature and old trees and the higher canopy closures desired) would apply to sensitive and MIS species habitat.

***Nest and Post-Fledgling Areas Only*** (Sensitive and MIS Species)

*Alternative A*: This alternative continues to manage all sensitive and MIS under current Forest Plan direction, including the goshawk, which is a sensitive species. Without specific management direction for the goshawk, conflicts between goshawks and other sensitive and MIS species may be implemented

differently on each administrative unit. Therefore, this alternative does not address the concern over the lack of management consistency and the use of new science found in the goshawk Assessment and HCS for Utah. It is my professional judgement that this alternative does not provide direction to promote a consistent approach to goshawk habitat management (a sensitive and MIS species in some forest plans), and if current inconsistencies in either habitat or species management are allowed to continue, this alternative may eventually preclude management options for the goshawk as well as other sensitive and MIS species which use forested habitats.

*All Action Alternatives*: Since management direction in this category only applies to small areas (less than 10% of any home range), it is unlikely to have a measurable effect on populations of any other sensitive species or MIS. Of those species that occur within known nest areas or PFAs, the effect of increased canopy closure and higher percentages of mature and old forest will either be neutral or favorable.

***Other Miscellaneous Areas of Concern*** (Sensitive and MIS Species)

*Alternative A*: The effects of additional direction in this category, compared to the lack of or differing direction under current plans will be discussed under each action alternative below.

*Alternative B*: No additional direction was added in this category under this alternative. The effect of additional direction in this category, compared to the lack of the direction in this alternative, is discussed under the other action alternatives below.

*Alternatives C, D, E and F*: The positive indirect effects of direction for completion of landscape assessments on managing habitat for the goshawk and its prey will be similar for other MIS and sensitive species.

*Alternative D*: Implementation of the ungulate grazing utilization guideline (g-27) will likely enhance habitat for goshawk prey species, some of which are MIS. However, it will be difficult to assess and detect this change in the 4-year life of this amendment.

The addition of this direction for skid trails in lieu of roads, and road densities (g-31 and g-32) will have similar benefits to sensitive and MIS species as discussed for goshawks and their prey.

*Alternative E*: Over the short life of this amendment, direction concerning treating or not treating unsuitable timberlands for purposes of achieving goshawk habitat objectives (g-30) is not likely to make a measurable difference. Generally, acres proposed for treatment occur on lands classified as suitable for timber production. However, if treatment were proposed on unsuitable lands and they followed the intent of direction found in other action alternatives MIS and sensitive species should not be impacted, and in some cases where habitat needs of the goshawk are similar to that of MIS and sensitive species they will likely benefit.

*Alternative F*: Although improvements in vegetation will likely occur in areas where ungulate grazing (is identified as the problem in localized areas (g-28 and g-29), it will be difficult to monitor and detect any response in MIS and sensitive species populations during the life of this amendment at the forest or larger scale. Changes in wildlife species numbers will likely be several years behind improvements in vegetation.

Therefore, it is my professional judgement that, though changing utilization direction may help improve at-risk habitat areas related to MIS and sensitive species when they overlap with habitat associated with

goshawks, not implementing this guideline is not likely to measurably effect habitat during the short life of this amendment.

***Treatment Prioritization*** (Sensitive and MIS Species)

*Alternatives A, B, C, D and E*: These alternatives contain no specific direction concerning treatment prioritization.

*Alternative F*: Because of similarities in habitat needs between many sensitive and MIS species and goshawks, prioritization of management in forested landscapes at greatest risk to dropping out of a high or optimum habitat condition (per the Graham et al. (1999) assessment process) will be expected to be beneficial to these species.

**Monitoring Requirements** (Sensitive and MIS Species)

*Alternative A*: Direct effects from monitoring goshawk habitat currently found in plans on sensitive and MIS species will not occur. Indirect effects are related to the ways monitoring information will be used to validate and adjust implementation of the management direction. Current monitoring efforts will continue to provide a limited amount of information that will be used for sensitive and MIS species.

*All Action Alternatives*: There will be no direct effects on any sensitive or MIS species as a result of monitoring goshawks and their habitat under this alternative. Indirect effects are related to the ways the monitoring information will be used to validate and adjust implementation of the management direction. However, as has been previously stated, it is not likely that monitoring will result in any measurable change to direction proposed under any action alternative during the projected 4 year life of the amendment. Therefore, there is not likely to be any measurable effect to habitat for these species resulting from changes caused by monitoring.

*TEP Species*

***Native Processes*** (TEP Species)

*Alternative A*: Of the TEP species occurring in forest habitats, the Canada lynx and Mexican spotted owls are the species most likely to be affected by the abundance and distribution of structural characteristics recommended in the Assessment and HCS. Although forest plans lack specific direction related to lynx habitat needs, additional guidance is now available through a draft lynx Conservation Assessment and Strategy (USDA Forest Service 1999). Forest management activities in the next four years will likely draw from the science contained within the Strategy during project design and implementation to avoid negative impacts to the lynx.

In Utah, Mexican spotted owls in general depend upon habitat patches of mature and old forest or woodlands for both nesting and foraging. Impacts to nesting habitat for Mexican spotted owls will be slight because they nest in steep walled canyon complexes where little management activity occurs. Forests occurring along canyon rims sometimes serve as foraging habitat. Some of the forested habitat along canyon rims is subject to timber management practices, however, impacts to habitat suitability will be avoided through implementation of the recovery plan during project design.

*Alternatives B and E*: Of the TEP species occurring in forest habitats, the Canada lynx and Mexican spotted owls are the species most likely to be affected by these moderated disturbance regimes. Impacts to lynx depend on the scale of the event. Lynx can benefit from the creation of early successional

habitats, but only if they are mixed with patches of mature forests suitable for denning. Keeping disturbance events within HRV is more likely to create a favorable mix of habitats for lynx than the no action alternative over the long term. However, it is my professional judgement that these alternatives will not differ substantially from no action over the life of this amendment.

Impacts to Mexican spotted owls will be slight because they nest in steep walled canyon complexes where very little management occurs on the Colorado Plateau. Suitable habitat in these canyons occurs in small, scattered patches so disturbance events are inherently very small in scale.

*Alternatives C, D and F*: Working within the bounds of HRV as defined by PFC will have an added benefit for TEP species for the same reasons as described for goshawk habitat. Extreme disturbance events that may alter landscapes at a 5th or 6th order HUC or larger scale are not desired within the range of HRV as defined by PFC (refer to Appendix D for a detailed discussion); though they may be within the full range of HRV. Retaining habitats across landscapes as small as 5th or 6th order HUCs (10s to 100s of thousands of acres) will promote a more constant supply of habitat throughout the state of Utah for many species. Retaining a good mix of habitat at these smaller scales will help reduce risks to losing habitat needed to support populations of other TEP species across NFS lands affected by this amendment.

***Forest Composition*** (TEP Species)

*Alternative A*: For the same reasons previously stated in Native Processes for this alternative, lynx and MSO habitat and numbers would not be impacted through implementation of current forest plan direction related to forest composition.

*All Action Alternatives*: Young lodgepole pine and mixed lodgepole/spruce/fir stands are examples of early seral communities that are good habitat for snowshoe hares. Hares are one of the primary prey species used by lynx; therefore maintaining representation of these early and mid-seral communities will provide key foraging habitat. Management direction implemented as part of the lynx conservation strategy (USDA Forest Service 1999) will supplement direction in this alternative. Where lynx recommendations overlap with this alternative, the lynx recommendations will take precedence under the ESA. Therefore, there will be no negative effects to the lynx or goshawk, or their habitat under action alternatives, and there may be positive effects due to the creation of a mix of cover types that provide foraging opportunities for lynx.

Mexican spotted owls only nest in steep walled canyon complexes where little management occurs and successional pathways are very limited. Therefore, forest composition does not vary greatly with management. Other TEP species are not strongly influenced by forest composition.

*Alternatives B, C, D and F*: These alternatives also contain direction to use native plants rather than nonnative when and where available, thus avoiding disruption of natural successional pathways, unless nonnatives are needed to meet specific restoration or maintenance objectives. The preferred use of native plants in management activities will have similar benefits for TEP species habitat as described for goshawk and their prey.

*Alternative E*: The standard to only use native plant species from locally adapted seed sources in this alternative will likely have similar short and long term benefits to TEP species as described for goshawk and its prey. As previously stated, because native seed from locally adapted seed sources can sometimes be difficult to obtain, this requirement may not be practicable to achieve all the time.

***Forest Structure*** (TEP Species)

*Alternative A*: For reasons previously stated in Native Processes for this alternative, Native Processes, lynx and MSO habitat and numbers would not be impacted through implementation of current forest plan direction related to forest structure.

*All Action Alternatives*: Of the TEP occurring in forest habitats, the Canada lynx and Mexican spotted owls are the species most likely to be affected by management for structural characteristics promoted by direction in action alternatives. Overall, the best available information indicates that implementation of direction in these alternatives for down woody debris, down logs and snags should maintain or improve habitat for lynx and its prey species. Similarly, guidelines for the retention of snags and down woody debris under these alternatives will benefit prey species taken by both goshawks and Mexican Spotted Owls, such as squirrels. However, direction in both the goshawk and lynx Assessments and Strategies and Mexican Spotted Owl Recovery Plan will be used during project design and implementation. Where lynx or MSO recommendations overlap with goshawk habitat, the recommendations for these TEP species will take precedence under the ESA. Therefore there will be no negative effects to MSO or lynx , or their habitat under these alternatives. Implementation of the lynx strategy or the MSO recovery plan will not create adverse habitat conditions for the goshawk or its prey. Lynx habitat management as described in the draft Lynx strategy are generally consistent with goshawk strategies.

*Alternatives B, C, D and F*: Lynx will benefit from the mix of structural stages promoted by these alternatives, since they require young stands for foraging and old stands with abundant woody debris for denning.

In Utah, Mexican spotted owls generally depend upon habitat patches of mature and old forest or woodlands for both nesting and foraging. Earlier structural stages are important as sources of future mature and old habitat, but are rarely directly used by owls. Impacts to nesting habitat for Mexican spotted owls will be slight because they nest in steep walled canyon complexes where little management activity occurs. Forests occurring above canyon rims serve as foraging habitat. Some of the forested habitat along canyon rims is subject to timber management practices. These forested areas along canyon rims are the only places in Utah where both spotted owl management direction (contained in the Mexican Spotted Owl Recovery Plan) and goshawk management direction (contained in the HCS and this alternative) could overlap. However, as with other direction, where goshawk and spotted owl management direction overlap, Recovery Plan recommendations will take precedence under the Endangered Species Act. It is my professional judgement that if areas of overlap occur, it is not anticipated that implementation of the recovery plan will create negative impacts to the goshawk. There will be no negative effects to the spotted owl or its habitat under this alternative.

*Alternatives C and F*: The range of canopy closures desired under these alternatives will help provide more dense habitat conditions desired by lynx for denning. Canopy closures described in this alternative will increase habitat effectiveness, and will be better for the lynx than Alternatives A and B.

*Alternative D*: The variable canopy closures by cover type and goshawk habitat area, created small openings, retention of clumps of large trees with interlocking crowns, and fuels treatment priorities will enhance TEP habitat. This alternative will provide better structural attributes than the no action alternative and slightly better conditions in canopy closure than Alternatives A, B, C, and F. The retention of at least six mature and old trees in groups with interlocking crowns, in regeneration treatment areas, will have positive effects on habitat for TEP species.

The smaller created openings promoted by g-8 in Alternative D and E throughout the entire home range (versus nest and PFA areas only in Alternatives B, C, and F) may help distribute some grazing pressure, which may indirectly improve habitat conditions for the lynx and its prey species (USDA Forest Service 1999). In addition, the small created openings recommended under this alternative may help enhance habitat diversity (early seral species mixes across landscapes) needed by lynx prey species.

*Alternative E:* As previously described, structural direction in this alternative is similar to Alternative D but differs in two key aspects. First it contains a standard that requires the retention of all mature and old forest groups over the next 4 years to provide immediate protection of goshawk nesting and foraging habitat. Secondly, Alternative E provides direction for minimum canopy closures from 60-75% depending on the habitat area.

Similar to that found for goshawks, measurable effect differs to TEP species between this alternative and others will be difficult to detect and monitor over the projected 4-year life of this amendment. However, there is a probability that long-term effects to forest composition and structure could occur that may be adverse to TEP species. Therefore, it is my professional judgement that TEP habitat effectiveness will be sustained or improved over the life of this amendment, however, long-term effects regarding habitat will be a concern.

***Nest and Post-Fledgling Areas Only*** (TEP Species)

*Alternative A:* As described for the goshawk above, no species-specific management direction exists within current forest plans, however general forest plan direction exists to maintain or enhance TEP species status and habitat conditions. This general direction will be the basis for incorporating the best available scientific information on TEP species during project design and implementation. In addition, Recovery Plans and Conservation Assessments and Strategies will be used in project design and implementation. This will continue to occur regardless of which alternative is selected.

*Alternatives B, C, D, E and F:* This additional management direction only applies to small areas within known territories (less than 10%). It will have little, if any effect on any TEP species. When a sensitive species such as the goshawk occurs in the same location as a TEP species, management direction for the TEP species will take precedence under the ESA. However, effects from managing for TEP will not likely adversely affect the goshawk or its prey.

***Other Miscellaneous Areas of Concern*** (TEP Species)

*Alternative A:* The effects of additional direction in this category, compared to the lack of or differing direction under current plans is discussed under each action alternative below.

*Alternative B:* No additional direction was added in this category under this alternative. The effect of additional direction in this category, compared to the lack of the direction in this alternative, will be discussed under the other action alternatives below.

*Alternatives C, D, E and F:* The positive indirect effects of direction for completion of landscape assessments (g-33) on managing habitat for the goshawk and its prey will be similar for TEP species.

*Alternative D:* Implementation of the ungulate grazing guideline *(g-27)* will enhance habitat for prey species for the lynx and MSO; however, it will be difficult to assess and detect this change in the short life of this amendment.

The addition of direction for skid trails in lieu of roads, and road densities (g-31 and g-32) will have similar benefits to TEP species as discussed for goshawks and their prey.

*Alternative E*: Over the short life of this amendment, direction concerning treating or not treating unsuitable timberlands for purposes of achieving goshawk habitat objectives (g-30) is not likely to make a measurable difference. Generally, acres proposed for treatment occur on lands classified as suitable for timber production. However, if treatment were proposed on unsuitable lands and they followed the intent of direction found in other action alternatives TEP species should not be impacted, and in some cases may benefit.

*Alternative F*: Although improvements in vegetation will likely occur in areas where ungulate grazing is identified as the problem in localized areas (g-28 and g-29), it will be difficult to monitor and detect any response in TEP species populations at the forest or larger scale over the short life of this amendment. Changes in wildlife species numbers will likely be several years behind improvements in vegetation.

Therefore, it is my professional judgement that, though changing utilization direction may help improve at-risk habitat areas related to TEP species when they overlap with habitat associated with goshawks, not implementing this guideline is not likely to measurably degrade habitat.

***Treatment Prioritization*** (TEP Species)

*Alternatives A, B, C, D and E*: These alternatives contain no specific direction concerning treatment prioritization.

*Alternative F*:: Because of similarities in habitat needs between TEP species and their associated prey and goshawks and their prey, prioritization of management in forested landscapes at greatest risk to dropping out of a high or optimum habitat condition (per the Graham et al. assessment process [1999]) is expected to be beneficial to these species.

**Monitoring Requirements** (TEP Species)

*Alternative A*: Effects from monitoring goshawk habitat on sensitive and TEP species will not occur. Indirect effects are related to the ways monitoring information will be used to validate and adjust implementation of the management direction. Current monitoring efforts will continue to provide a limited amount of information that will be used for TEP species.

*All Action Alternatives*: There will be no direct effects on any TEP species as a result of monitoring goshawks and their habitat under this alternative. Indirect effects are related to the ways the monitoring information will be used to validate and adjust implementation of the management direction. However, as has been previously stated, it is not likely that monitoring will result in any measurable change to direction proposed under any action alternative during the projected 4 year life of the amendment. Therefore, there is not likely to be any measurable effect to habitat for these species resulting from changes caused by monitoring from that which has already been described above.

**Discussion of Cumulative Effects** - Effects are discussed as they relate to both Federal and nonfederal lands under separate subheadings. All wildlife species described in Chapter 3 have been grouped together under these discussions below.

*All Species Groupings*

***Federal Lands***:

*Alternative A*: Over time, a lack of consistent management direction, especially direction that does not emphasize management for large old trees, will likely result in degraded habitat for goshawk and associated sensitive, MIS and TEP species. There will be no assurance that the incremental and interactive effects of site-specific actions on goshawks will continue to be considered. Negative cumulative impacts at the site-specific level may be occurring as a result of vegetative management (timber harvesting and wildland fire use), recreational, and livestock grazing activities, however, they will be difficult to detect and measure at the landscape scale prior to revision of forest plans in Utah.

However, use of current direction could also result in site-specific beneficial effects from small localized projects that were designed to restore DHC's in the future, which are currently lacking existing DHC's. An example of this may be to salvage log an area that had been burned as a result of a fire in a landscape that had already been intensively managed for timber production. While the action to salvage log the area may have negative cumulative effects relative to the fire and past timber management practices, the long-term effects to goshawk habitat will likely be beneficial.

The cumulative impacts that may result from use of current direction in combination with past, present and reasonably foreseeable actions and policies is that greater risks to loss of habitat needed to support goshawks and their prey will be assumed. This greater risk will result from a lack of specific management direction for key goshawk habitat attributes, such as dense canopy closures, and 40% mature and old in conifer and 30% in aspen within and among all landscapes. The lack of coordination among affected national forests and other federal, state and private entities will continue to have unknown effects on goshawks and their habitats. It is likely that this lack in coordination of habitat management will continue to perpetuate unstable conditions and downward trends in habitat over the long term. However, these effects are not presumed to be causing negative effects that will result in the loss of viability of the goshawk population over the short term of the proposed amendment.

Over time, a lack of consistent management direction for the goshawk that will also affect sensitive and MIS species previously discussed, especially direction that does not emphasize management for large old trees, snags and down woody material. A lack of consistent direction will likely result in degraded habitat. Negative cumulative impacts at the site-specific level may be occurring as a result of vegetative management (timber harvesting and wildland fire use), recreational, and livestock grazing activities, however, they will be difficult to detect and measure at the landscape scale prior to revision of Utah's forest plans. The cumulative impacts that may result from use of current direction in combination with past, present and reasonably foreseeable actions and policies is greater risks to loss of habitat needed to support sensitive and MIS species associated with similar habitat needs as the goshawk. This greater risk will result from a lack of specific management direction for key habitat attributes common between the goshawk and these species, such as dense canopy closures, and 40% mature and old in conifer and 30% in aspen within and among all landscapes.

TEP species are not likely to be impacted because of requirements under ESA to follow current Recovery Plans and/or Conservation Strategies during the design and implementation of any actions that may impact species habitat or populations.

*All Action Alternatives*: Alternatives B-F will provide consistent management direction that will allow for the maintenance and restoration of goshawk habitat, as well as associated sensitive and MIS species. There will be assurances that the incremental and interactive effects of site-specific actions on goshawks

will be considered in the future during project design and implementation. Negative cumulative impacts resulting from timber harvest, recreation, and livestock grazing will be mitigated by the implementation of any of the action alternatives. Negative impacts will further be minimized or avoided by coordination among and between the agencies as the selected alternative is implemented with landscape level analysis and planning. In light of the extremely broad geographic scope of the proposed action and the level of spatial resolution involved, the analysis does not address all possible cumulative effects that may result at the site-specific level. However, all ground disturbing actions will be conducted only after further site-specific environmental analysis. This site specific analysis will also analyze the impacts of the project on adjacent lands and resources within the landscape, enabling managers to design, analyze, and choose alternatives that minimize cumulative environmental effects.

If recovery plan direction or conservation strategy recommendations overlap between Federally listed species, proposed or sensitive species such as the Canada Lynx, and goshawk, precedence will be given to any Federally listed species. The Canada Lynx Draft Conservation Strategy (USDA Forest Service1999) and Recovery Plans for the listed species (described in Chapter 3) that have similar habitat requirements as the goshawk will not be expected to conflict with one another.

**Nonfederal Lands**

*All Alternatives:* Nonfederal lands include those owned and/or managed by individuals, corporations, tribes and Native Americans, states, counties, and other agencies. It is important to note that the Forest Service has no authority to regulate any activities or their timing on lands other than those they administer. However, when an action takes place on NFS lands, it may cause direct, indirect, or cumulative effects on nonfederal lands. While there are no discernible environmental effects on nonfederal lands, there are both environmental and economic interactions with adjacent nonfederal forests. Private land owners control limited amounts of suitable vegetation types, with the exception of the white fir, quaking aspen, and Douglas-fir vegetation types where over 26 percent is controlled by private land owners (Graham et al. 1999). Because there are minimal restrictions on the use of private land, there are no assurances that goshawk habitat will be sustained on these lands. These are all endemic processes that can have both positive and negative effects to goshawk habitat. It is likely that these lands will not be managed to reduce natural risks nor will they be managed to perpetuate goshawk habitat.

Nonfederal forests will continue to provide habitat primarily for those species who need early and mid-successional stage forests. When combined with early, mid, and late successional stage federal forests, a mix of successional stages and a diversity of habitat for the ecosystems within the range of the goshawk in Utah will be provided. While this mix of successional stages is affected by the management direction proposed, the overall mix of successional stages varies among the alternatives only by the variation on the lands managed by the Forest Service, BLM, and state lands; the successional mix, snags, down woody debris, and nest site protection on nonfederal lands is not expected to be affected by the alternatives in this document.

## 4.4 SOCIAL COMPONENTS

In towns adjacent to NFS lands, community well-being may be affected by social factors related to NFS land management. Unique ecosystems and habitats, outdoor recreation, scenic quality, and a sense of place are attributes and activities valued primarily for their social, psychological, and cultural significance. Some alternatives may affect specific social groups' values and beliefs but not have an economic effect on a group. For example, social groups concerned about maintaining optimum habitat

for the goshawk and its relationship to other environmental considerations, such as mature and old forests, may have concerns with any alternative that provides direction that permits habitat change.

In most cases, however, the relative degree of social impacts would follow the same degree of change as the economic impacts experienced by that group. There is a close tie between economic and social factors. For example, Alternatives D requires the greatest change to grazing and could impact some grazing interests economically at the point it is integrated into a grazing permit. This, in turn, could affect the group socially (i.e., values and way of life). As a result, the primary basis for determining the effects to the social environment is the economic changes that may result from each alternative.

### 4.4.1 Environmental Justice

**Discussion**

*Alternative A:* Continuing under the direction of current forest plans would not disproportionately affect minorities or low income groups.

*Effects Common to All Action Alternatives:* The preponderance of minority and low income groups live in the urban environment of northern Utah. These groups work in highly diverse occupations, mostly in city settings. There may be some minorities, low income residents, and Native Americans that rely on forest products or related forest activities for their livelihood. These individuals probably reside in rural communities adjacent to NFS lands. Some of these groups may be impacted by the alternatives restricting timber or range management options if the groups are economically tied to one of those industries. However, these effects would be localized and are not measurable and would not be disproportionate to low income or minority groups. It is difficult to assess the degree of impact each action alternative presents to these groups due to other variables which allow for a variety of income options. In addition, individuals or groups dependent on income related to NFS lands are considered during site-specific, project level decisions which assess the continual effect to the human environment. For these reasons, the best available information suggests that when assessing the effects of each action alternative on minority and low income groups, the effects are minimal and not disproportionate to these groups when compared to other groups.

### 4.4.2 Social Groups, Values and Systems

**Effects Summary**

*All Alternatives:* There would be no measurable direct, indirect or cumulative effects to these groups. Effects to beliefs and values of some groups may occur to a limited degree as projects using proposed direction begin to implement actions. However, effects are believed to be small considering the small number of acres that may be treated by projects using this direction in design and implementation over the next 4 years.

**Discussion** - For discussion purposes, the analysis that follows combines all groups discussed in Chapter 3 (3.4.2).

*Alternative A:* This alternative has the lowest costs, socially and economically as there is no discernible change or disruption to the current condition. Some environmental groups, however, may be affected by this alternative because of their belief that forest practices need to change in order to protect goshawk habitat.

*Alternative B:* There are no discernible effects to social groups in this alternative because of the minimal degree of change resulting in the short time frame of this amendment. In addition, recreational interests, visual resources, and exempted areas are retained, and other economic relationships with NFS lands remain basically unchanged (see 4.5).

*Alternative C:* There are no discernible effects to social groups in these alternatives because of the minimal degree of change resulting in the short time frame of this amendment. In addition, recreational interests, visual resources, and exempted areas are retained, and other economic relationships with NFS lands remain basically unchanged (see 4.5). This alternative would require management actions to be designed to keep ecosystems within PFC. Management for PFC is a conservative approach that is designed to help avoid the large scale ecosystem changes that may periodically occur naturally. PFC adds the elements of stability and balance, which are social desires, and would thus better address the social concerns of many of the public (see Appendix D, "Understanding HRV and PFC").

*Alternative D:* This alternative has the least flexibility and most noticeable effects to the social and economic environment of grazing interests. Some grazing allotments in the home range of goshawks may have to reduce carrying capacity for those allotments (see 4.5.2). Those ranchers dependent on affected lands and operating on a low profit margin may also experience some impacts. Effects would most likely be measurable at local and possibly forest level. Effects will be realized at the forest level when grazing is not allowed on entire allotments or pastures within allotments as a result of applying the utilization requirement. Management for PFC is a conservative approach that is designed to help avoid the large scale ecosystem changes that may periodically occur naturally. PFC adds the elements of stability and balance, which are social desires, and would thus better address the social concerns of many of the public (see Appendix D, "Understanding HRV and PFC").

*Alternative E:* This alternative would have little effect on most of the social groups with the exception of timber interests where there may be noticeable social and economic changes and effects. Prohibition of vegetative management activities in areas dominated by mature and old forests would measurably affect the economic and social environment of the timber industry on the local, forest, and state level (4.5.1); a potential 30% reduction in average annual volume available from NFS lands). Effects would be likely to be most felt by the family-based operators, who would likely need to travel further from home to maintain the same volume of wood supply or would need to reduce the volumes processed. However, it is difficult to assess the degree of impact based on the variables to this alternative allowing for other options and the time frame (4 years) for this direction.

The greatest beneficial affect would be realized in this alternative by those groups whose belief and values center around the need to minimize habitat disturbance and preserve large trees. However, as with other effects, it is difficult to assess the degree of benefits due the short time frame direction in this alternative would be applied.

*Alternative F:* This alternative could have slightly higher social and economic effects than Alternatives B and C. However, these effects are not likely to be measurable in 4 years. Grazing practices would change in areas where a goshawk habitat problem is identified and attributed to grazing. However, due to the short time frame of this amendment, the effects on grazing interests would likely be localized only and not measurable at the forest or state scale. Also, management for PFC is a conservative approach that is designed to help avoid the large scale ecosystem changes that may periodically occur naturally. PFC adds the elements of stability and balance, which are social desires, and would thus better address the social concerns of many of the public (see 4.3.1, "Understanding HRV and PFC").

### 4.4.3 Heritage Resources

**Summary of Effects**

*All Alternatives:* Current forest plan direction designed to protect heritage resources would not be superceded by any direction proposed under action alternatives; the no action alternative would continue to use current direction. Therefore, there would be no direct, indirect or cumulative effects to this resource.

**Discussion** - Cultural resources are formed by natural and cultural processes. For example, early native peoples may have chosen a place next to a creek for a summer camp. At this location, many activities may have taken place, such as making and maintaining stone tools, making campfires, butchering and cooking wild animals, and sleeping inside of a small brush house, are all cultural processes. When the camp was abandoned, the people would have left behind numerous discarded items and the remains of fires, food-processing areas. In the spring, flooding along the creek might deposit sediment over the camp area (a natural process) and bury the discarded artifacts and camp features (a natural process). Over hundreds of years, this process might continue burying the early campsite (and subsequent campsites) deeper in soils. If such sites are located in a stable landform (geomorphic) area, the buried contents of the site could remain protected for a considerable period. However, in an unstable geomorphic setting, natural erosion processes (like stream bank cutting) may cut into the "cultural" soil layers and begin exposing and eroding artifacts from their original context. Historic structures in Utah's NFs are largely built of wood and are subject to natural deterioration, even with maintenance.

Utah's NFs contain a wide variety of cultural resource site types. These site types exist both above and below the ground surface and may contain a variety of artifacts and materials made, used or introduced into sites by past peoples. These include materials made of stone, mineral, wood, bone, clay (fired and unfired ceramics), plants (seeds, charcoal, pollens, plant parts), and other materials. The direction for cultural resource management is provided in law, regulation and policy.

As use of the national forests continues to rise due to increased local populations and nonresident visits, impacts to heritage resources are expected to increase. Unauthorized collecting, theft and illegal excavations are occurring and would continue. Natural erosion and depositional processes would also continue to affect cultural resources. Data collection through excavation to mitigate the unavoidable adverse effects caused by planned activities would occur and most likely would result in some loss of cultural resources.

As surveys are completed and projects implemented, additional cultural resources could be located that would require documentation, evaluation and protection. Some may warrant stabilization and interpretation.

Future management concerns include maintaining compliance with various laws and regulations and protecting sites until they are evaluated and/or nominated for the National Historic Register in Utah's NFs . Law enforcement and public education efforts need to continue in order to minimize unauthorized collection, excavation, theft and other acts of vandalism.

Effects to cultural resource sites include direct, indirect, and cumulative impacts that would result from either intentional or inadvertent damage of cultural resources. Such activities are constrained by forest plan standards and guidelines. Surveys for archaeological resources are accomplished prior to approval of ground-disturbing projects and activities.

*Effects Common to All Alternatives:* When assessing the effects of each alternative on all of the NFS lands within the project area as a whole, none of the alternatives have any direct, indirect or cumulative effects to cultural resource sites. The direction contained in the action alternatives is programmatic and does not supercede any of the direction currently in the Forest Plans to protect sites.

## 4.5 ECONOMIC COMPONENTS

Demand for natural resources, such as recreation opportunities, wood products, and special forest products has steadily increased on the six affected national forests. In towns adjacent to NFS lands, community well-being may be affected by economic factors related to NFS land management. Market goods such as timber, special forest products, livestock grazing, mineral leases, and commercial recreation, generate income for local economies. The focus of the economic effects discussion is to identify the incremental effects that may be expected as a result of this short-term direction. Most of the effects in the following section are described qualitatively because most are not measurable as physical or monetary impacts and are difficult to measure quantitatively because the broad scale of the analysis precludes collection of site-specific data outputs.

### 4.5.1 Wood Products/Timber Industry

**Effects Summary**

*All Alternatives:* Cumulative effects (i.e., volume and product size reductions) may occur under any alternative as Forests begin using direction in project design and implementation. This is due primarily to effects of other national policies such as the interim roads policy (USDA Forest Service 1999a) and the Lynx conservation strategy (USDA Forest Service 1999). Volume reductions on national forests may increase logging pressure on nonfederal lands. With the exception of Alternative E, which would have measurable effects, cumulative effects as a result of this management direction are not likely to be measurable over the next 4 years.

*Alternative A:* No direct or indirect effects on volume offer and product are anticipated with this alternative.

*Alternatives B, C, and F:* Direct effects may include a change in product size, product type, and lengthened rotations. Short-term volume reductions are not predicted. Long-term reductions are possible.

*Alternative D:* Direct effects may include a change in product size, product type, and lengthened rotations. Road restrictions and complexity of density prescriptions may result in short and long-term volume reductions.

*Alternative E:* Direct effects may include a change in product size, product type, and lengthened rotations. High stand density requirements, road restrictions, and restrictions on management of mature and old structural stages would likely cause substantial reductions in volume offer during the short and long-term.

**Discussion**

*Alternative A:* No direct effects on volume and product offer over current are foreseen with this alternative.

The interim roads policy (USDA Forest Service 1999a) and Lynx strategy (USDA Forest Service 1999) could result in reduced volume offer; however, selection of the no action alternative is unlikely to add

directly to these cumulative effects due to the flexibility in current direction which guides vegetative management project design and implementation. However, indirect effects could result by not implementing new guidance for management of goshawk habitat as there is a high potential of resulting lawsuits against the Forest Service. This in turn could affect the Forest Service's ability to offer wood products.

*Alternatives B and C:* Direct effects may include change in product size and lengthened rotations. Lengthened rotations may reduce the amount of volume to be offered over time. These items may have some affect on local industry and their markets.

Cumulative effects are possible when these changes are added to potential volume reductions and product changes caused by the inteirm roads policy (ibid.) and Lynx strategy (ibid.).

*Alternative D:* Direct effects may include change in product size and lengthened rotations. Lengthened rotations may reduce the amount of volume to be offered over time.

Dependent upon many factors (product value, terrain, cutting practices, skid method, etc.), replacing temporary roads with skid trails may reduce treatment acreage due to economic considerations. The two most costly items in logging contracts are the skid and the haul (Paroz 1999). To increase the skid distance, would necessarily increase logging costs and thereby reduce receipts or eliminate portions of harvest units from treatment. Thus, reductions in temporary road construction would likely result in reduced treatment acreage and corresponding volume reductions. Volume reductions cannot be readily quantified on a programmatic level, as they are dependent upon sale configuration and current road patterns. This may have cumulative effects on adjacent non-Forest Service timber lands by placing additional logging pressures on these lands as purchasers attempt to supplement volume. It should be noted that pressure to log is already high on private lands within the project area. Implementation of this alternative may result in purchasers needing to travel farther for raw products if they wish to maintain their current production level.

Additional cumulative effects are possible when these changes are added to potential volume reductions and product changes caused by the interim roads policy (ibid.) and Lynx strategy (ibid.), which could result in reduced volume offer.

*Alternative E:* In addition to the effects noted in Alternative F, the elimination of harvest from mature and old VSS class groups and stands would substantially reduce timber volume production. Based on harvest figures from the past 5 years (1994-1998) and assuming future offer would be similar, the following reductions (live only) could be anticipated by appraisal group:

**Table 8: Volume reductions by wood product appraisal group for Alternative E.**

| | |
|---|---|
| Engelmann spruce, Douglas-fir, Ponderosa pine, Subalpine fir: | 14% reduction |
| Aspen: | 45% reduction |
| Lodgepole pine: | 99% reduction |
| **Overall:** | **30% reduction** |

This equates to a value reduction of approximately $2.4 million per year and the corresponding payments to the counties. In addition to the above, 98% of dead volume could potentially be affected (Paroz 1999).

These reductions would affect local industry. Local industry would either need to find other sources for their mills, reduce production, or switch to other business operations. Implementation of this alternative

may result in purchasers needing to travel farther for raw products if they wish to maintain their current production level.

These reductions in Forest Service volume may have cumulative effects on adjacent non-Forest Service timber lands by placing additional logging pressures on these lands as purchasers attempt to supplement volume. It should be noted that pressure to log is already high on private lands within the project area.

Additional cumulative effects are possible when these changes are added to potential volume reductions and product changes caused by the interim roads policy (USDA Forest Service 1999a) and Lynx strategy (USDA Forest Service 1999), which could result in reduced volume offer.

*Alternative F:* Direct effects may include change in product size and lengthened rotations. Where Alternative F focuses management in ecosystems that are "at-risk" or "nonfunctioning" (from a PFC viewpoint), wood quality and species may also be affected over that currently offered. It could be expected that more emphasis would be placed on aspen management. It could also be expected that more emphasis would be placed on restoration of degraded systems as well as preventing epidemic insect outbreaks. Restoration objectives could place more dead and/or bug-infested wood on the market. Prevention could place more green on the market. These items may have some affect on local industry and their markets.

Cumulative effects are possible when these changes are added to potential volume reductions and product changes caused by the interim roads policy (ibid.) and Lynx strategy, which could result in reduced volume offer.

### 4.5.2 Grazing

**Effects Summary**

*Alternative A, B, C and E:* No effects, does not change utilization direction currently found in Forest Plans.

*Alternative D:* Changes estimated to result, if alternative management direction is adopted, is an average 23% reduction in currently permitted AUMs across NFS suitable rangelands on the six Utah National Forests. This reduction reflects what may occur as an average across acres affected by this alternative, based on assumptions stated below. Localized (allotment) effects are expected to be highly variable due to varying site conditions and may be more or less than this average. However, the effect is expected to be measurable at the localized, forest and state scales.

*Alternative F:* Management direction in this alternative allows the manager to approach the cure to the problem by changing the aspect of grazing practices that is causing the downward trend (i.e., utilization, season of use, grazing system, range health, etc.). Though some localized effects to grazing permits, including reductions in AUMs, may occur they are not expected to be measurable at the forest or state scale.

**Discussion** - Graham et al.'s Assessment (1999) identifies the nonforest understory vegetation in and/or associated with several forest cover types as being important goshawk prey-base habitat. The alteration by management of both structure and species composition of the grass, forb and shrub understory layers in the forested habitats is of concern with regard to effects on goshawk habitat. This Assessment noted that the majority of NFS lands are grazed by both domestic livestock and wildlife, with 27% of the high-value forest habitat on NFS lands being managed with a livestock grazing emphasis.

Available forage in nonforest and some forested habitats classified as suitable rangelands is what is used to calculate permitted AUMs. Generally speaking coniferous forest cover types, other than ponderosa pine, are typically classified as unsuitable. However, some coniferous forest may be classified as suitable rangeland depending on canopy cover and intermixing with nonforest cover types or aspen. Aspen forests are typically classified as suitable rangeland throughout the Utah NFs. In terms of forage production the aspen cover type is considered one of the most productive of any of the forest or nonforest cover types.

Forested cover types classified as suitable rangeland found within current range allotments on national forests can range from 0 to nearly 100% of the acres on an allotment. The effect of a change in utilization standards, or other grazing practices, that may result from proposed management direction primarily depends on how many forested acres are classified as suitable range within an allotment. In some cases, from an administrative standpoint, if an allotment contains a high mix of forest cover types intermingled throughout the allotment, direction for utilization in forest cover types may have to be applied to both the forest and nonforest areas to successfully meet the utilization requirement. Essentially, if it was not applied to both, in some cases there is no practical way to apply it only to the forested acres and provide reasonable assurance of compliance through current administration procedures.

*Alternatives A, B, C and E:* These alternatives do not include any management direction that will affect or supercede current forest plan management direction pertaining to livestock or wildlife grazing utilization on NFS lands. Therefore, there will be no direct, indirect or cumulative effect of using alternative management direction in future project design and implementation.

*Alternative D:* This alternative includes wildlife and livestock grazing guidelines imposing a single average and maximum utilization standard for forage (20% and 40%, respectively) and shrubs (40% and 60%, respectively) across all forested acres on Utah's NFs. Current average utilization on forage generally ranges from 45% to 55% on forage, and 30 to 60% on shrubs. The effect of this guideline will primarily be to forage utilization in forested habitats only, in areas that fall outside the exemption categories described in 2.3.2. Effects of changes in shrub utilization will not be expected because they are within the range that is currently accepted. Changes in forage utilization will be the focus of the effects disclosure.

Effects to domestic livestock grazing on NFS lands is the focus of the following analyses. The amount of domestic livestock grazing permitted on NFS lands on Utah's NFs was estimated at 634,000 animal unit months (3.52) in 1997 and 1998. Changes in permitted AUMs will result from any change in utilization requirements of nonforest vegetation beneath the forest cover types, including small openings within these forested cover types. The vegetative section of Chapter 3 (3.3.1 and 3.3.2) describes in detail these cover types.

There is not complete data available for all allotments on the six affected national forests to assess which ones have suitable range that is forested and how much is contained within an allotment to know what the effect will be. Therefore, a more simplistic approach has been taken based on the data that is available for the six Utah Forests. Assumptions for the effects analysis follows:

- Approximately 68% of the total NFS lands (8.1 million acres) is suitable rangeland, or 5.4 million acres (Johnson 1989).
- Only acres dominated by aspen and ponderosa pine will be affected by this change. Of the 5.4 million acres of suitable rangeland on these six national forests, 10% is in an aspen cover type and 2% in ponderosa pine; 540,000 acres of aspen and 108,000 acres of ponderosa pine (FIA, 1993; USDA, 1996).
- The percentage of land affected outside exemption areas (85% of the total) is the same as that found in the total acres; 85% of 540,000 or 459,000 acres of aspen; 85% of 108,000 acres or 91,800 acres of ponderosa pine.
- The number of animal unit months (AUMs) that will have to the reduced at the state scale is based on the following:
  - Currently allow an average of 50% utilization on 459,000 aspen acres and 91,800 ponderosa pine acres;
  - Average estimated total forage production in aspen is 1000 pounds/acre; on ponderosa pine is 400 pounds/acre (Grider 1999).
  - Total allowed forage used under current utilization requirements (50%): (459,000 acres X 1000 pounds/acre X 50% use) + (91,800 acres X 400 pounds/acre X 50% use) = 247,860,000 pounds
  - Total allowed forage used under proposed utilization requirements (20%): (459,000 acres X 1000 pounds/acre 20% use) + (91,800 acres X 400 pounds/acre X 20% use) = 99,144,000 pounds
  - Total forage use lost = 247,860,000 pounds (used now) - 99,144,000 pounds (proposed use) = 148,716,000 pounds lost.
  - 1000 lbs forage = 1 AUM; therefore, total AUM loss is 148,716 AUMs.
  - Total AUMs currently permitted on six Utah NFs is 634,000; a loss of 148,716 AUMs represents a potential 23% loss. This represents an estimated average loss across all NFS acres affected; any one allotment on a Forest may vary substantially from this.
- Several variables may come to play where the affected acres may decrease or increase due to administration issues. Because these variables are specific to each localized situation and highly variable, it will not be used in the comparison.
- Livestock grazing permits will be adjusted by term grazing permit modification following approval of the amendment (Alternative D). Procedures for permit modification found in FSM 2230 will be followed. Permittees will have the right to appeal any decision to adjust current term grazing permits under 36 CFR §251.8 following notification of a pending adjustment through permit modification procedures.

If this direction is adopted and permits adjusted to reflect a reduction to an average utilization of 20% by dry weight on acreage not exempt from application of direction in this alternative, it will likely cause one of the following:

1. Affected permittees will have to find other options for supplemental forage to make up the difference. In Utah, most of the grazing land base is federally owned and not competitively leased. The average cost for grazing on federal lands is currently $1.35/AUM. The average grazing fee paid in 1998 on private, nonirrigated lands in Utah was $10.00/AUM. Finding supplemental forage will likely have a measurable effect (loss) to the profitability of the current operation affected.

2. Reduced forage availability may mean a shorter grazing season and the need to sell livestock early for less than optimum price. This will also reduce profitability of an operation.

3. In some cases, grazing permits will be reduced to a level where it will no longer be economically viable for a permittee to continue to graze livestock.

Any of these consequences will likely result in measurable localized impacts, and likely Forest, multiple forest and possibly state level impacts to this economic sector.

*Alternative F:* Unlike management direction in Alternative D, this alternative focuses the need to change grazing practices only in those areas where landscape assessments determine grazing is a factor in putting a landscape at-risk relative to habitat needs of the goshawk. It also recognizes that there are several aspects of grazing practices that could be causing the at-risk condition; changing utilization (Alternative D) may or may not address the real problem. This alternative allows the manager to approach the cure to the problem by changing the aspect of grazing practices that is causing the downward trend (i.e., utilization, season of use, grazing system, range health, etc.).

Where grazing is determined to be contributing to an at-risk condition, grazing practices will be changed to initiate correction of the identified problem. However, this change may or may not result in a measurable change locally, forestwide or statewide because:

1. A change in total permitted AUMs will not always be the best or only solution to the problem attributed to current grazing practices. Changes in season of use or grazing system only may occur. Also, if a change in AUMs is required, it may or may not be substantial in terms of economic viability of an operator.
2. Changes to current permits would only occur in those landscapes where grazing can be attributed as a causal factor to an at-risk condition. Annually, only one to two landscape assessments (at the 5th to 6th order watershed, or equivalent scale) are completed in sufficient detail on each forest that may identify potential problems associated with grazing. There are several 5th to 6th order watersheds (tens to hundreds of thousands acres each), in part or in whole, on the six affected national forests. As a result, the number of allotments likely to be affected in 4 years is a small percentage of the total 539 active allotments on the six Utah NFs (4.5.2). Similar to Alternative D, livestock grazing perm will be adjusted by term grazing permit modification as needed. Procedures for permit modification found in FSM 2230 will be followed. Permittees will have the right to appeal any decision to adjust current term grazing permits under 36 CFR §251.8 following notification of a pending adjustment through permit modification procedures.

Therefore, the degree of change in terms of acres or permits affected in the 4 year life of this amendment will not likely to be measurable except possibly at a localized level (i.e., allotment or group of allotments). Broader scale effects at the forest or state scale will not be expected in 4 years.

### 4.5.3 Mineral Resources

**Effects Summary**

*Alternative A:* There would be no effect. Current practices would continue as allowed under current forest plans.

*Effects Common to All Action Alternatives:* The direction adopted through this amendment will not apply to forested habitats in areas currently managed or allocated for mining (refer to exemptions in Chapter 2, section 2.3.2). In these areas, the direction adopted through this amendment will be applied only where it does not affect the exercise of existing rights granted by special use permit, plan of operations, lease, forest plan allocation or valid, prior existing mineral right.

The effect of the alternatives on future mineral and energy resources is directly related to the constraints placed on the development of those resources, e.g., the mitigation measures attached to mineral leases

and plans for locatable mineral development designed to protect habitat for the northern goshawk and its prey. The Forest Service is limited in its authority to restrict development of outstanding and reserved mineral rights. Resource protection measures must be reasonable and not foreclose exploration or development activities. For that reason implementation of standards and guidelines adopted through this amendment is not expected to significantly affect valid prior existing mineral rights and locatable mineral activities.

Future leasable and mineral material exploration and development could be limited by the application of the direction adopted through this amendment. Leases would be limited by stipulation restricting vegetative manipulation in specific locations (active nest and PFA area) and time period (the nesting period, usually March 1-September 30). Within a goshawk home range of 6,000 acres, the nest areas are only 3% of the home range and active nest areas are only one-half of one percent of the home range. PFAs are typically another 7-8%. The effect of such prescriptions on the ability to explore for and develop leasable minerals and mineral materials are discussed in more detail below.

**Discussion of Effects**

**Mineral Materials**

*Alternative A:* There would be no effect. Current practices would continue as allowed under current forest plans.

*Effects Common to All Action Alternatives:* Future development of mineral materials could be affected to some extent but the majority of such development is adjacent to existing roads so the impact is expected to be minimal.

***Leasable Minerals***

*Alternative A:* There would be no effect. Current practices would continue as allowed under current forest plans.

*Effects Common to All Action Alternatives:* New exploration activities or leases may experience some restrictions. If the proposed exploration or leasing area is outside the area covered by the exemption, a site specific analysis must consider this direction. This does not mean exploration or lease will not be approved. However, it is possible that if the proposed mineral area is in goshawk habitat, modifications or realignment of location, or additional mitigation or stipulations to fully protect goshawk and its habitat will be required. This could have a resulting effect of higher project costs, and in combination with other restrictions (winter range restrictions) could severely delay or preclude prospecting, exploration and development in some areas.

**Oil and Gas**

Mineral activity on existing leases is exempt from the application of standards and guidelines adopted through this amendment where it would interfere with the exercise of exploration and development rights already granted by lease. It should be noted that the more recent leases contain provisions for protection of sensitive species like the northern goshawk, through the application of a Controlled Surface Use stipulation. This stipulation requires that any necessary surveys be conducted and site specific mitigation identified prior to approval of surface disturbing operations. However, this current stipulation did not specifically address the size of area or length of time that may be affected and only

applies to operations conducted by the lessee or lease operator. Older leases have been issued without such stipulations.

If/when operations such as exploratory wells are proposed on an existing lease, additional NEPA analyses will be completed as required by 36 CFR §228.107 with additional mitigation measures for protection of the goshawk and its habitat. Any additional measures must be reasonable and consistent with the terms and conditions of the existing lease.

New oil and gas activities could be affected to a greater extent by standards and guidelines for protection of the goshawk and its habitat adopted through this amendment.

Geophysical exploration for oil and gas typically precedes the drilling of wells and occurs across relatively large areas to help define geologic structures and potential reservoir traps for hydrocarbons. The proposed guidelines could have a direct effect on these activities by precluding oil and gas surveys in areas of an active nest during the time period from March 1 through September 30. This would necessitate that the survey be done during winter months or wait until the following season when the nest may not be active. This could potentially increase the cost and delay exploration plans to the point of making them unfeasible. Also, cumulatively, when timing restriction for such things as elk and moose winter range, elk calving areas, and foreseeable winter restrictions for the lynx, the overall restriction may make exploration extremely difficult if not impossible in some specific areas.

When lease proposals are received from the BLM, the Forest will conduct required reviews to determine if leasing of proposed areas is consistent with the Forest Plan and to determine if there is any significant new information that was not considered in the Oil and Gas Leasing FEIS.

The application of the proposed standards and guidelines to new leases could temporarily preclude proposed activities in specific areas; since cumulative time constraints for various species could eliminate a sufficient time window in which to conduct operations. The time constant for vegetative manipulation, which is typically required for construction of well pads and access roads, may require such activities to occur during the late fall or winter months. Cut and fill construction with frozen material makes it difficult to maintain a level drill pad and often results in high sediment loads when the pad thaws in the spring.

If proposed access roads lie within goshawk protection areas and construction cannot be delayed, it could be necessary to identify alternative road routes to avoid the protection area. This could result in trade-offs regarding impacts to other resources and cost of operations. Alternative routes could involve more road distance and associated disturbance, greater effects to other resources, and higher cost to the operator.

**Coal and Phosphates**

All of the coal mining done on NFS lands in Utah is by underground methods. Surface activities and facilities needed to support underground mining are described in Chapter 3 (3.5.3) and only involve 1% of the area under permit for underground mining.

Due to the exemptions which recognize valid existing rights granted by leases, permits, and licenses, impacts would be limited to activities and facilities proposed in or directly related to leases issued after the decision for this action. If coal exploration or development activities such as drilling and geophysical surveys are proposed within the nest protection area of an active goshawk and cannot be relocated, these activities would be delayed to the period between September 30 and the onset of winter

weather conditions. At the higher elevations, this could occur any time after October 1. In most cases, there would be sufficient reasonable weather to conduct operations in the goshawk nest protection area, but it is possible that they would be delayed to the next year or prohibited, even though not likely.

If a needed ventilation breakout/emergency escapeway lies within a canyon slope in a goshawk nest protection area, it might be required that the breakout construction be delayed or relocated and/or replaced by a much more costly ventilation shaft in the interior of the plateau above. This could cause increased cost and trade-offs regarding the amount of surface disturbance needed and impacts to other resources. For example, breakouts can usually be constructed from within the underground workings, not requiring construction of an access road. If the breakout cannot be relocated to another canyon area, drilling of a ventilation shaft could be necessary, requiring construction of an access road for drilling equipment.

There will be no measurable effects on exploration or development of phosphate resources on existing NFS leases as a result of adopting direction from any action alternative. The effects on potential future exploration and development of phosphate resources on NFS lands is also minimal. Future activities would likely occur on existing leases, and would fall under the exemption described in Chapter 2 (2.3.2). Issuance of new leases or prospecting permits could be affected, but Forest Service authority over phosphate permits and leases is limited to recommending resource protection measures to the BLM.

### 4.5.4 Recreation/Tourism

**Discussion** - Economic effects resulting from a reduction in outdoor-related recreation would have similar effects to economic downturns related to other sectors. The economic effects of adopting any of the alternatives would be manifested in a variety of ways, depending on the amount of reduction in recreational resources available to the public.

*Effects Common to All Alternatives:* No negative direct, indirect or cumulative effects to recreation and tourism were identified under any alternative.

*Effects Common to All Action Alternatives:* Some action alternatives may have some indirect and cumulative beneficial effects (i.e., more naturally appearing landscapes, more large trees), though these are not likely to be measurable economically in 4 years.

The current developed recreational sites are exempt from direction in this amendment, providing for no change in the current management and use of the sites. In addition, real change in recreational resource use during the 4-year period would be relatively small due to the planning and implementation time needed. No negative affects are expected to scenic resources in any of the alternatives because of the benefits of the protection of goshawk habitat. In fact, implementation of Alernatives B-F may actually improve scenic resource because of additional protection or improvement to the natural landscape.

Planned new developed recreational sites may experience some modifications in design, restricted use, or location due to goshawk habitat limitations, but these modification would not stop the site from being developed or used by the public. Modifications in management practices affecting habitat conditions would be on a project by project basis and would only gradually change. For a more detailed discussion of expansion options for developed recreational sites, see 4.5.6 below.

For reasons stated above, adoption of any of the action alternatives considered in this environmental assessment on planned or future projects relating to recreation would likely be inconsequential during the interim 4 year period.

### 4.5.5 Transportation/Access

**Discussion** - The goal of road system development and management is to provide Forest users safe, cost-effective transportation facilities consistent with land and resource management objectives. Timber production and recreation use place the heaviest demands on national forests' transportation systems. The six affected national forests maintain separate transportation systems to accommodate traffic needs and to prevent resource damage. In March, 1999, the Chief of the Forest Service announced an 18-month interim roads policy (USDA Forest Service 1999). Each road project would be evaluated on a case-by-case basis to determine whether the proposed temporary suspension applies or if the project qualifies under an exemption.

*Effects Common to All Alternatives:* No negative direct, indirect or cumulative effects to transportation or access were identified under any alternative.

*Effects Common to All Action Alternatives:* The direction contained in the alternatives analyzed is programmatic and does not supercede any of the current Forest Plan direction concerning transportation planning or access. Thus, when assessing the effects of each action alternative over the next 4 years, on all of the NFS lands within the six affected national forests, the effects are anticipated to be minimal.

The only direction in action alternatives that restrict access pertains to active nest and PFA areas during the breeding period only, typically between March 1 and September 30. Also, restrictions would only apply to forest service permitted uses (does not include permitted livestock grazing). It would not apply to general dispersed recreation or personal use firewood collection.

The nest and PFA areas where access is restricted is small compared to the total forest acres. Within a goshawk home range of 6,000 acres, the nest areas are only 3% of the home range and active nest areas are only one-half of 1 percent of the home range. PFAs are typically another 7-8%. Together this is approximately 10% of a total home range, or 600 acres, where restrictions would be applied during the active breeding period. If all forested acres were occupied 10% of the total acres may have restrictions applied. However, all acres are not occupied currently nor expected to be within 4 years. Therefore greater than 90% of the total forested acres would still be open for permitted uses.

Therefore, while all of the action alternatives include a guideline restricting access, there is no expectation that forest users issued permits for a specific type of use would be denied access to the national forest. The restriction in guidelines is limited to a specific location and time period. For example, one permitted use this guideline may affect is commercial firewood permits. If someone with a commercial firewood permit has a preferred area and that area is in an active nest and PFA area and the permittee wants to gather firewood during the nesting period (usually March 1-September 30), access to that location would likely be denied during the breeding period. However, if the permittee does not want to wait until after the breeding period to exercise the terms of the permit, the permit could likely be reissued for another area on the 90% or more of the forested acres not occupied by active nests and PFAs. Another example would be commercial timber sales. Activities would be restricted during the breeding period in that part of a sale area that overlaps PFAs and active nest areas, however, remaining areas within the sale boundary would remain open. These scenarios would hold true for similar types of permitted uses. Overall, access for permitted use would still be provided to meet expected demands and for the services and outputs described under current forest plans.

### 4.5.6 Special Uses

**Discussion**

*Effects Common to All Alternatives:* Overall, when assessing the effects of each alternative over the next 4 years on special uses on all NFS lands within the six Utah NFs, it is anticipated that the effects would not be measurable.

*Effects Common to All Action Alternatives:* The effect of the action alternatives on existing special uses is minimal. The direction would not apply to forested habitats in areas currently managed or allocated for special use permits allowing vegetative disturbance or treatments. In these areas current Forest Plan direction would still apply. Managing these areas consistent with current management direction is important to meeting other goals and objectives in the individual forest plan and that doing so would not result in the loss of habitat needed to maintain viable populations of goshawk in the State of Utah. While many special use permits were issued before the northern goshawk was listed as a sensitive species in Utah, current special use permits require contact with the Forest Service before any vegetation manipulation occurs.

The action alternatives contained herein could have an effect on new special use permits if the area is not managed or allocated for special use permits. For example, proposals for ski area expansions on the Wasatch-Cache NF. If the proposed expansion area is not currently allocated for this use, the site specific analysis must consider this direction. This does not mean that the expansion won't be approved. However, it is possible that if the proposed expansion is in goshawk habitat, modifications or realignment of location, or additional mitigation would be required. This could have a resulting effect of higher project costs.

### 4.5.7 Administrative Considerations

**Discussion of Effects**

**Cost of Using Standards and Guidelines in Project Design and Implementation**

*Alternative A:* This alternative can be implemented under current technology, training, and abilities of the implementation crews. Monitoring and evaluation will continues as currently planned and not result in any increase in costs over what is currently required.

*Alternatives B, C, E and F:* These alternatives can be implemented under current technology and abilities of the implementation crews. Some additional training would be necessary to implement canopy closure requirements.

Improved inventory methods would likely need to be developed. Current inventory methods typically track stand characteristics, not groups within stands. The emphasis these alternatives place on managing groups (and clumps of trees within groups) would require a finer level of detail in inventories.

At the same time, the emphasis on landscape level conditions would require a greater level of knowledge of conditions at the landscape level during the planning process. Current inventory methods allow aggregation of stand level data. This methodology, in combination with geographical information system (GIS) technology, can be used to aggregate watershed level information for VSS class groups. A current limitation is that GIS data bases do not track "groups," and the smallest map-size delineation is normally

5 acres. In order to implement guidance for the management of goshawk habitat at the group level, it may be necessary to modify the parameters within current data bases.

*Alternative D:* The highly complex canopy closure requirements may not be fully implementable or achievable under current abilities of implementation crews. Extensive training would be necessary. In order to retain trained employees (which would be necessary to make this alternative feasible), Forest Service hiring practices would have to change to allow hiring permanent implementation crew leaders.

Improved inventory methods would likely need to be developed. Current inventory methods typically track stand characteristics, not groups within stands. The emphasis these alternatives place on managing groups (and clumps of trees within groups) would require a finer level of detail in inventories.

At the same time, the emphasis on landscape level conditions would require a greater level of knowledge of conditions at the landscape level during the planning process. Current inventory methods allow aggregation of stand level data. This methodology, in combination with GIS technology, can be used to aggregate watershed level information for VSS class groups. A current limitation is that GIS data bases do not track "groups," and the smallest map-size delineation is normally 5 acres. In order to implement guidance for the management of goshawk habitat at the group level, it may be necessary to modify the parameters within current data bases.

***Cost of Incorporating Monitoring Requirements***

*Alternative A:* Monitoring will continue as presently scheduled in the six Utah forest plans. The commitment by the Regional Forester to establish monitoring protocols with the State of Utah (i.e., UDWR) for habitat and population monitoring will not result in measurable increases in monitoring cost to the agency. The majority of information for these items are already being collected by field units. The primary increase in costs will be associated with developing protocols for common methods of data collection and aggregation, and then adjusting current collection methods to meet protocols. The evaluation of data will be periodically accomplished by the State of Utah based on agreements made as part of the HCS (Utah NFs et al 1998); therefore, evaluations will not result in any measurable increase in costs to the agency over what is presently incurred in ongoing coordination efforts.

*Alternative B:* Of the action alternatives, Alternative B results in the least increase in costs for monitoring (refer to Table 9 at the end of this section). Alternative B does not include monitoring item m-2 which is common to all other action Alternatives. Nor does it include monitoring items m-6 and m-7 concerning grazing practices found in Alternatives D and F, respectively.

Monitoring costs associated with m-1, m-3, m-4 and m-5 are reasonable and within the anticipated budgetary and personnel limitations of the agency. It is anticipated that all these monitoring items can be integrated into monitoring activities presently occurring on forests with out substantial increases in costs.

*Alternatives C and E:* These alternatives have the same monitoring requirements as Alternative B, plus adds requirement m-2. Additional costs that will be incurred with the addition of m-2 will vary depending on the number of activities implemented in a given year that involve areas with active goshawk nests. Based on past experience it is expected that 1-5 nests would require monitoring per year on each forest. This would result in an additional cost of $300 to $1500 per year on each forest.

Monitoring costs associated with m-1, m-3, m-4, m-5 with the addition of m-2 are still considered reasonable and within the anticipated budgetary and personnel limitations of the agency. It is anticipated that all these monitoring items can be integrated into monitoring activities presently occurring on forests.

Requirements under m-1 are already occurring on most forests at levels required in m-1. However, protocols for a consistent approach will have to be refined to allow for data aggregation and evaluations at the state level. Costs to accomplish m-3 and m-4 will be minimized by integrating them with existing activities already occurring (i.e., timber sale administration activities; current field inventories). The variable costs associated with m-5 are already partly incurred through current broad scale assessment efforts and integration of these assessments with spatial and tabular data systems. As consistency in these current efforts evolve some forests may experience an increase in costs and others may see a decrease. In all cases the costs will not be unreasonable considering current and anticipated budgetary and personnel limitations.

*Alternative D:* This alternative contains all the monitoring requirements of Alternatives C and E, plus adds m-6 which addresses implementation and effectiveness of grazing utilization requirements. This alternative has the highest associated costs with monitoring of all the alternatives.

The addition of monitoring item m-6 will increase monitoring requirements on each forest by $7100 per year. Though the agency believes funding will likely be available to accomplish this requirement, each forest may have to shift some current funding priorities for grazing permit administration to accomplish the monitoring requirements.

*Alternative F:* Like Alternative D, this alternative contains all the monitoring requirements of Alternatives C and E, plus adds a monitoring requirement to address implementation and effectiveness of grazing practices. However, unlike Alternative D the grazing monitoring requirement in this alternative (m-7) addresses an identified grazing practice that is contributing to an at-risk landscape condition. The annual cost for completing this requirement is expected to range from $150 to $3550 per allotment per year, or a maximum cost of $7100 per year per forest. Though the costs to complete this requirement could be as high as $7100 per year, it is expected that over time the average would be less per year. The $7100 cost would be to complete utilization studies similar to that completed under Alternative D. This is the most intensive type of monitoring that would have to occur. In some cases, utilization will not be the identified grazing practice that requires adjustment to address the problem. Other practices such as season of use that may be changed will require less intensive monitoring to determine implementation and effectiveness in addressing identified problems. Therefore, costs of Alternative F should be lower than Alternative D. However, like Alternative D, though the agency believes funding will likely be available to accomplish this requirement, each forest may have to shift some current funding priorities for grazing permit administration to accomplish the monitoring requirements.

**Table 9: Alternative comparison of increased monitoring costs over that which is currently required in existing forest plans on the six affected national forests.**

| | m-1 | m-2 | m-3 | m-4 | m-5 | m-6 | m-7 |
|---|---|---|---|---|---|---|---|
| Alt A* | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Alt B | $300 per nest plus $300 for evaluation | $0 | $100-500 per 100 acres, plus $250 for evaluation | $5-10 per 10 acres, plus $250 for evaluation | variable depending on data and size of landscape | $0 | $0 |
| Alt C | $300 per nest plus $300 for evaluation | $300/nest | $100-500 per 100 acres, plus $250 for evaluation | $5-10 per 10 acres, plus $250 for evaluation | variable depending on data and size of landscape | $0 | $0 |

**Table 9: (continued)**

| | m-1 | m-2 | m-3 | m-4 | m-5 | m-6 | m-7 |
|---|---|---|---|---|---|---|---|
| Alt D | $300 per nest plus $300 for evaluation | $300/nest | $100-500 per 100 acres, plus $250 for evaluation | $5-10 per 10 acres, plus $250 for evaluation | variable depending on data and size of landscape | $7100 per forest per year | $0 |
| Alt E | $300 per nest plus $300 for evaluation | $300/nest | $100-500 per 100 acres, plus $250 for evaluation | $5-10 per 10 acres, plus $250 for evaluation | variable depending on data and size of landscape | $0 | $0 |
| Alt F | $300 per nest plus $300 for evaluation | $300/nest | $100-500 per 100 acres, plus $250 for evaluation | $5-10 per 10 acres, plus $250 for evaluation | variable depending on data and size of landscape | $0 | $150 to $3550 per allotment per year if a problem has been identified; maximum cost of $7100 per year |

* Refer to discussion under the Alternative A discussion for a qualifier concerning costs of monitoring.

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# GLOSSARY OF TERMS

**Abiotic** -- pertaining to the non-living parts of an ecosystem, such as soil particles, bedrock, air, water.

**Active nest** -- a goshawk nest know to have contained an egg. A nest need not have successfully produced fledglings.

**Active nest area** -- a goshawk nest area containing an active nest.

**Alternate nest area** -- goshawk home ranges often contain two or more nest areas, only one of which will be active in a given year. Alternate nest areas are normally historical nest areas. When historical nest areas cannot be located to serve as an alternate, designated alternates will contain habitat attributes common to the active nest area.

**Canopy Closure** -- (may also be referred to as canopy cover) expressed as a percent, canopy closure is the amount of vegetative cover as measured vertically over a point and averaged for a forested area. To date, no consistent method of measurement has emerged as the norm. Methods include ground-based ocular estimations and aerial estimations. To comply with guidelines, the recommended method to measure canopy closure in the field is to use verticle canopy projection based on forest vegetation greater than 15 feet in height. See 4.5.1, Canopy Closure and Stand Density Index, for additional methodology.

**Clump** – clumps of trees are defined as 2 to 9 trees with interlocking crowns.

**Composition** --the constituent elements of an ecosystem, e.g., the species that constitute a plan community. In the northern goshawk project information, vegetative composition is a component of a coarse filter used as an indicator of ecosystem function.

**Connectivity** -- pertaining to the extent to which conditions exist or should be provided between separate forest areas to ensure habitat for breeding, feeding, or movement of wildlife and fish within their home range or migration areas.

**Decadent tree** -- a tree that has reached that stage of development when it is declining in vigor and health and reaching the end of its natural life span.

**Down woody debris** -- any piece(s) of dead woody material, e.g., dead boles, limbs, and large root masses, on the ground in forest stands or in streams.

**Ecological process** -- see function.

**Effects** -- the environmental consequences 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 are related effects on air, 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 if on balance the agency believes that the effects will be beneficial.

**Foraging area** -- areas where prey are searched for, pursued by, and captured by goshawks.

**Forest cover type** -- a category of forest usually defined by its vegetation, particularly its dominant vegetation as based on percentage cover of trees, e.g., spruce-fir, aspen, Douglas-fir.

**Forest Health** -- the capacity for self-renewal, the ability to recover from natural and human-caused stress and disturbance.

**Forested area** -- One capable of supporting >10% canopy cover under the natural disturbance regime and within the historic range of variation.

**Functioning-at-risk** – see Properly Functioning Condition.

**Goal** - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed. (36 CFR 219.3)

**Group** – a definable area of forested vegetation made up of one dominating Vegetative Structural Stage. The area of the group is defined by either the drip-line or by the extent of the rooting zone of the outside perimeter of the trees in the group. Where the rooting zone is used, a noticeable canopy gap may be present between groups. Groups may be equivalent to a ''stand'' under even-aged conditions or, under uneven-aged conditions, they may be as small as a clump of trees. Group, as used in this document, should not be confused with the silvicultural terminology used for uneven-aged selection harvest methods, although at times the terms may coincide.

**Guideline** -- Forest-wide management direction contained in Forest Plan. Designed to promote achievement of the desired habitat condition and related goals. Developed in an operationally flexible manner so that they can respond to expected variations such as changing site conditions or changed management circumstances. A preferred or advisable course of action that is generally *expected* to be carried out. Though deviation from compliance with a guideline does not require a forest plan amendment, rationale for such a deviation must be documented in the project decision document. The rationale should clearly state why the variation is the preferred method for continuing progression toward the related goal. If the variation is for other resource objectives, the rationale should explain why it is not inconsistent with progression toward the goal it was designed to promote and how it helps to achieve the overall desired future condition for the forest.

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**Habitat** -- the place (including climate, food, cover, and water) where an animal, plant or population naturally or normally lives and develops.

**Historic range of variation (HRV)** -- refers to ecosystem composition, structure, and process for a specified area and time period (for this analysis, 100-700 years prior to current). HRV is our best estimate of the natural range of variation (NRV). Ecosystems change over time. It is assumed that native species have adapted over the last several thousands of years to natural change and that change outside of NRV may affect composition and distribution of species and their persistence. Refer to Appendix D of this EA.

**Historical nest** -- an intact nest known to have been active in the past.

**HUC** -- Hydrologic Unit Code. A standardized hierarchical classification scheme in which the lower 48 states are divided into 18 regions and each region is further subdivided resulting in a unique number for each watershed. A 5th order HUC ranges from 40,000 to 250,000 acres (60 to 400 square miles). A 6th order HUC ranges from 10,000 to 40,000 acres (15 to 60 square miles).

**Home range** -- the area that an animal habitually uses during nesting, resting, bathing, foraging, and roosting. A nesting home range contains nest areas (active and historical), the post-fledgling family area, and the foraging area.

**Indicator** -- an organism or an ecologic community that is so strictly associated with particular environmental conditions, that its presence (or absence) is a fairly certain sign or symptom of the existence of these conditions.

**Interlocking crowns** – tree crowns are interlocking when the branches of adjacent trees overlap.

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

Preliminary issue is an issue identified early in the scoping phase and is sometime referred to as a tentative issue.

Significant issue is an issue within the scope of the proposed action which is used to formulate alternatives in an Environmental Assessment (EA) or Environmental Impact Statement (EIS).

**Landscape** -- a large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts. Landscapes are often used for coarse grain analysis.

**Landscape assessment** -- an evaluation of ecosystem conditions and trends on a large land area taking into consideration the biotic, abiotic, and social influences upon ecosystems within the subject landscape. This includes consideration of ecosystem processes such as disturbance, succession, recolonization, fluxes of various ecosystem elements, and (depending on time scale) evolution and natural extinction. To assess landscape elements addressed in Forest Plans, 4th to 6th order watersheds or equivalent ecological units (10's to 100's thousands of acres) need to be used.

**Locally adapted seed source** - a location from which seed is collected that will insure biological adaptation of the plant to the site where it is to be planted. Adaptation includes environmental, morphological, and other factors that influence a plant's development over time. Elevation, lattitude, exposure, and local climatic factors help to determine a plant's adaptabilty to a site. Species may

vary widely in their ability to adapt to new sites, some species may be transported many miles from the parent location, while others will need to be collected close to the planting site to insure adaptation. For tree species, specific guidance is available from the Forest Service Seed Handbook (FSH 2409.26f, Chapter 100) and the Regional Geneticist. For non-tree species, guidance can be obtained from the Regional Genticist, Forest Ecologist, or local knowledge until such time as a data base has been developed.

**Native processes** -- the processes through which ecosystem elements interact, such as succession, the food web, fire, weather, other disturbance events, and the hydrologic cycle. Vegetative composition and structure are indicators of ecosystem function.

**Native species** -- those species that occupied a landscape during the period of time used to determine the historic range of variation (HRV). It is believed that native species adapted to and, in part, evolved with the ecological processes of the preceding several thousand years.

**Natural Range of Variation (NRV)** - Refer to Appendix D of this EA.

**Naturally occurring ecosystems** -- ecosystems present in a landscape during the period of time used to determine historic range of variation (HRV).

**Nest area** -- the nest tree and stand(s) surrounding the nest that contain prey handling areas, perches, and roosts. Nest areas are often on mesic sites (northerly facing slopes, along streams).

**Nest stand** -- the stand of trees that contains the nest tree.

**Non-functioning** – see Properly Functioning Condition.

**Non-native species** -- a species outside its historic range. The presence of a non-native species could impose environmental pressures upon an ecosystem that may not have been part of historic range of variation (HRV).

**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. (36 CFR 219.3)

**Old forest structure** -- the size and/or age of the trees in an area. See structure.

**Old growth forest** -- the (usually) late successional stage of forest development. 1. generally, structural characteristics used to describe include (a) live trees: number and minimum size of both seral and climax dominants, (b) canopy conditions: commonly including multi-layering, (c) snags: minimum number of specific size, and (d) down logs and coarse woody debris: minimum tonnage and numbers of pieces of specific size;
2. generally contain trees that are large for their species and site and sometimes decadent (overmature) with broken tops, often a variety of tree sizes, large snags and logs, and a developed and often patchy understory;

3. stand age, although a useful indicator of old growth, is often considered less important than structure because (a) the rate of stand development depends more on environment and stand history than age alone, and (b) dominants are often multi-aged;
4. due to large differences in forest types, climate, site, quality, and natural disturbance history (e.g., fire, wind, and disease and insect epidemics), vary extensively in tree size, age classes, presence and abundance of structural elements, stability, and presence of understory;
5. minimum area needed to be a functional ecological unit depends on the nature and management of surrounding areas; small areas often do not contain all old-growth elements;
6. commonly perceived as an uncut, virgin forest with very little human-caused disturbance; some believe that the time taken for stands to develop old-growth structure can be shortened by silvicultural treatments aimed at producing the above characteristics.

**Properly (or proper) Functioning Condition (PFC)** – ecosystems at any temporal or spatial scale are in a properly functioning condition when they are dynamic and resilient to perturbations to structure, composition, and processes of their biological or physical components. To have sustainable conditions, a landscape should contain a balance of vegetative structural stages, vegetative seral stages, and species that are characteristic of the landscape during a defined historical period (see Historic Range of Variability). Refer to Appendix D of this EA.

| **Non-Functioning** | **Threshold**_1/ | **Properly Functioning Condition** |
|---|---|---|
| <---------- | ..... | ----------> *Ecosystem Potential* |
| Loss of important biological / physical components of ecosystems. | Functional but at- risk. | Biological and physical components of ecosystems are sustainable. The levels of sustainability in terms of time and spatial scales are dependent on management strategies implemented. |

_1/ Not a finite point.

**Post fledgling area** -- area of concentrated use by the goshawk family after the young leave the nest. May also be called the post fledgling family area.

**Reference condition** -- reference conditions ideally are based on undisturbed, functioning ecosystems where natural ecosystem structure, composition, and function are operating without human intervention. Historic range of variation (HRV) is used to determine our best estimate of "natural" conditions and functions. Current ecosystem conditions are compared to reference conditions to understand change over time.

**Replacement nest area** -- forest areas with physiographic characteristics and size similar to suitable goshawk nest areas. Replacement areas can have young to mature forests that can be developed into suitable nest areas.

**Seral species** -- a plant or animal species that will be replaced over time through forest succession.

**Seral stage** (may also be referred to as **successional stage**) -- any stage of development of an ecosystem from a disturbed, unvegetated state to a climax plant community. Forest seral stages are often referred to as early, mid, or late dependent upon the mix of species present and/or the conditions of the stand. Early seral stages are normally dominated by shade intolerant species, and late seral stands by shade tolerant species, with mid-seral stands in transition. In systems where a single tree species dominates, such as lodgepole pine or aspen, forest seral stages are more commonly equated to vegetative structural stages. Concurrent with a change in overstory composition as forests move from early to mid to late seral stages, is a change in understory species. With early seral stands typically containing shade intolerant ground plants and late seral stands typically containing more shade tolerant ground species.

**Shade tolerance** -- the capacity of a tree or plant species to develop and grow in the shade of, and in competition with, other trees or plants.

**Skid trail** -- narrow path on which logging equipment travels when moving logs from the forest to a designated landing location.

**Snag** -- a standing dead tree.

**Standard** -- Forest-wide management direction in Forest Plans. Designed to promote achievement of the desired habitat condition and related goals, and to assure compliance with laws, regulations, Executive Orders or policy direction established by the Forest Service. Standards either describe a condition of land, normally a maximum or minimum value that is clearly measurable or it expresses a constraint on management activities or practices. The key to a standard is that you would not expect variation to occur due to such things as changing site conditions or changed management circumstances. Standards are "black and white"; you must always do it in the format described in the standard to continue to promote achievement of the goal it was designed to address. Deviation from compliance with a standard requires a forest plan amendment.

**Structure** -- the horizontal and vertical arrangement of ecosystem components. Vegetation patches, edge, canopy layers, snags, down wood, steep canyons, rocks in streams, and roads may be arranged in some pattern or mosaic, or the structure may totally random.

**Succession** -- the gradual supplanting of one community of plants by another, the sequence of communities being termed a sere and each stage seral.

**Vegetative Structural Stage** -- A generalized description of forest growth and aging stages based on the size of the majority of trees in the subject stand. VSS-1 is referred to as the grass-forb or grass-forb-shrub stage; VSS-2 is referred to as the seedling/sapling stage; VSS-3 is the young forest stage; VSS-4 is the mid-aged forest stage; VSS-5 is the mature stage; and VSS-6 is the old stage of stand development.

**Viable population** -- a number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their regions. See persistent population.

**Woodland** - A vegetation community that includes widely spaced, mature trees. The tree crowns are typically more spreading in form than those of forest trees. Crowns do not touch and do not form a closed canopy. Woodland is often defined as having 40 percent canopy closure or less. Between the trees, grass, heath, or scrub communities typically develop, giving a park-like landscape.

# ACRONYMS

The following is a list of acronyms appearing in this document

| | |
|---|---|
| **AGFD** | Arizona Game and Fish Department |
| **Assessment** | *The Northern Goshawk in Utah: Habitat Assessment and Management Recommendations* |
| **ATV** | All-Terrain Vehicle |
| **AUMs** | Animal Unit Months |
| **BE** | Biological Evaluation |
| **BLM** | USDI Bureau of Land Management |
| **BMPs** | Best Management Practices |
| **CEQ** | The Council on Environmental Quality |
| **CFR** | Code of Federal Regulations |
| **DBH** | Diameter (at) Breast Height |
| **DFC** | Desired Future Condition |
| **DHC** | Desired Habitat Condition |
| **EA** | Environmental Assessment |
| **EIS** | Environmental Impact Statement |
| **ESA** | Endangered Species Act of 1973, as amended |
| **FEIS** | Final Environmental Impact Statement |
| **FONSI** | Finding of No Significant Impact |
| **Forest Plan** | Land and Resource Management Plan |
| **FR** | Federal Register |
| **FS** | Forest Service |
| **FSH** | Forest Service Handbook |
| **FSM** | Forest Service Manual |
| **FVS** | Forest Vegetation Simulator |
| **FWS** | US Fish and Wildlife Service |
| **GIS** | Geographic Information System |
| **GPRA** | Government Performance Results Act |
| **HCS** | "Conservation Strategy and Agreement for the Management of Northern Goshawk Habitat in Utah" |
| **HRV** | Historic Range of Variation |
| **HUC** | Hydrologic Unit Code |
| **ICBEMP** | Interior Columbia Basin Ecosystem Management Project |
| **ID Team** | Interdisciplinary Team |
| **LPP** | Lodgepole Pine |
| **LRMP** | Land and Resource Management Plan (Forest Plan) |
| **MIS** | Management Indicator Species |
| **MMA** | Minerals Management Area |
| **MSO** | Mexican spotted owl |
| **NEPA** | National Environmental Policy Act |
| **NF** | National Forest |
| **NFMA** | National Forest Management Act |
| **NFS** | National Forest System |
| **NPS** | USDI National Park Service |
| **NRA** | National Recreation Area |
| **NRV** | Natural Range of Variation |
| **PFA** | Post Fledgling Area |
| **PFC** | Properly Functioning Condition |
| **PVA** | Population Viability Analysis |
| **RNA** | Research Natural Area |
| **ROD** | Record of Decision |
| **SDI** | Stand Density Index |
| **SIR** | Supplemental Information Report |
| **SVS** | Stand Visualization Simulator |
| **TEP** | Threatened, Endangered and Proposed Species |
| **UDWR** | Utah Department of Wildlife Resources |
| **USC** | United States Code |
| **USDA** | United States Department of Agriculture |
| **USDI** | United States Department of Interior |